



# High-performance end mill tools 2011/12

**a passion for precision**



## Better milling with FRAISA

**Optimum products and services for maximum customer benefit.** That's how Fraisa defines its performance commitment. Here the milling tools play an important role.

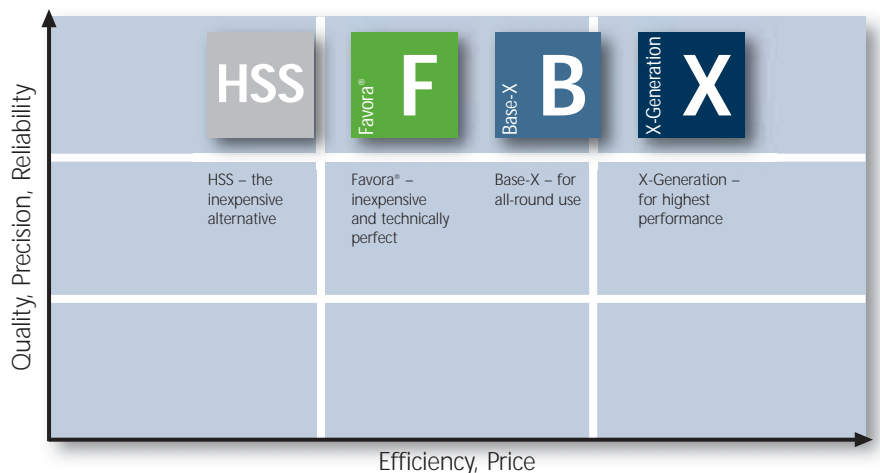
The innovative new products in our latest milling tool catalogue offer exceptional value for money. Our development engineers have again been able to come up with outstanding new products. Among these are the new milling cutters for machining aluminium at the highest cutting speeds with optimum smoothness in operation. The catalogue also features the most extensive programme of diamond-coated milling cutters for machining graphite.

Particular mention should also be made of one important introduction, namely the new profiled roughing end mill in the Base-X class. This tool stands out thanks to its unbeatable price-performance ratio. Many other new products are highlighted in the catalogue under the heading «New».

The NovoSys X® modular tool system and indexable insert milling tools complement the range of shaft milling tools to perfection.

Fraisa has the milling tool you are seeking at the right price, with the performance you need and the highest standard of quality. Order today and mill tomorrow! Take advantage of the widest range of milling tools in the industry.

**Whatever your needs are - our range has something to meet them!**



## ToolExpert for secure tooling

Our catalogues are known for their transparent and simply understood cutting data. Of course, this also applies to the specifications given for all other tools in this catalogue.

With the ToolExpert cutting data software, we continue to pursue this path. ToolExpert will continue to be expanded with new products and application data. In the meantime, the material database is so extensive, that virtually no material and the corresponding application parameters has been left out. The good thing about ToolExpert is the fact that the software can be very easily applied without training. The difficult job of presenting complex issues simply is managed perfectly using the ToolExpert. ToolExpert is available as a download on the Fraisa homepage [www.fraisa.com](http://www.fraisa.com).



### Fraisa advantages at a glance

- State-of-the-art technology
- Excellent understanding of customer needs thanks to high-quality advice
- Top-quality tools with a money-back guarantee
- Excellent availability from stock
- Unrivalled price/performance ratio







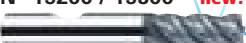

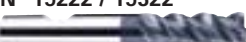

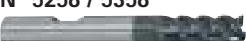



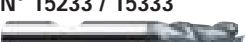

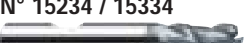

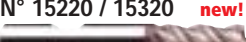

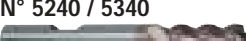

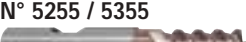

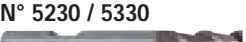



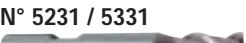

Replaces 2010/11 edition



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
















# End milling tools for steel, stainless steel and titanium

## Smooth-edged, cylindrical

Normal version									
N° 5227 / 5327	d1 3 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300	Inox Stainless	19	
N° 15227 / 15327	d1 3 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1100	Inox Stainless	21	
N° 15205 / 15305 <b>new!</b>	d1 3 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300	Inox Stainless	23	
N° 15200 / 15300 <b>new!</b>	d1 6 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300	Inox Stainless	25	
N° 15222 / 15322	d1 4 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm 850-1500	Ti Titanium	27	
N° 5258 / 5358	d1 5 - 16		X-Generation <b>X</b>	HM MG10	45° 	Rm 1300-1500	HRC 48-60	29	
N° 5214 / 5314	d1 3 - 16		X-Generation <b>X</b>	HM MG10	45° 	Inox Stainless		31	
N° 15233 / 15333	d1 3 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300		33	
N° 15234 / 15334	d1 3 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1100	Inox Stainless	35	
N° 15220 / 15320 <b>new!</b>	d1 3 - 20		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100	Inox Stainless	37	
N° 5240 / 5340	d1 2.0 - 20.0		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100		39	
N° 5255 / 5355	d1 6 - 20		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100	Inox Stainless	Ti Titanium	41
N° 5230 / 5330	d1 2.0 - 25.0		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100		43	
N° 15230	d1 2.0 - 12.0		Base-X <b>B</b>	HM MG10	90° 	Rm <850-1100		47	
N° 5231 / 5331	d1 3 - 20		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1300		49	

# End milling tools for steel, stainless steel and titanium

## Smooth-edged, cylindrical

Normal version									
N° 5200 / 5300	d1 2.0 – 20.0		Base-X <b>B</b>	HM MG10		<b>Rm</b> <850-1100			51
N° 45317	d1 3 – 20		Favora® <b>F</b>	HM		<b>Rm</b> <850-1100	Inox Stainless		53
N° 45340	d1 3 – 20		Favora® <b>F</b>	HM		<b>Rm</b> <850-1100			55
N° 45330	d1 3 – 20		Favora® <b>F</b>	HM		<b>Rm</b> <850-1100			57
N° 45320	d1 3 – 20		Favora® <b>F</b>	HM		<b>Rm</b> <850-1100			59
N° 0110	d1 1.0 – 40.0		HSS	HSS-E Co8		<b>Rm</b> <850-1100			61
N° 0115	d1 6 – 25		HSS	HSS PM/F		<b>Rm</b> <850	Inox Stainless	Ti Titanium	65
N° 0780	d1 1.0 – 25.0		HSS	HSS-E Co8		<b>Rm</b> <850-1100			67
N° 0770	d1 1.0 – 20.0		HSS	HSS-E Co8		<b>Rm</b> <850-1100			71

# End milling tools for steel, stainless steel and titanium

## Smooth-edged, cylindrical











Normal version with neck								
N° 5225 / 5325	d1 3 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300	Inox Stainless	73
N° 15202 / 15302	d1 6 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300	Inox Stainless	75
N° 15242 / 15342	d1 4 - 20		X-Generation <b>X</b>	HM MG10	45° 	Rm 850-1500	Ti Titanium	77
N° 5248 / 5348	d1 3 - 25		X-Generation <b>X</b>	HM MG10	45° 	Rm 1300-1500	HRC 48-60	79
N° 5244 / 5344	d1 3 - 20		X-Generation <b>X</b>	HM XT	45° 	HRC 48 - >60		81
N° 5218 / 5318	d1 3 - 20		X-Generation <b>X</b>	HM MG10	45° 	Inox Stainless		83
N° 5215 / 5315	d1 3 - 16		X-Generation <b>X</b>	HM MG10	45° 	Inox Stainless		85
N° 0580	d1 4 - 25		HSS	HSS PM/F	45° 	Rm <850-1100	Inox Stainless	87













# End milling tools for steel, stainless steel and titanium

## Smooth-edged, cylindrical

### Medium length version

N° 15223 / 15323	d1 4 – 20		X-Generation <b>X</b>	HM MG10	45° 	Rm 850-1500	Ti Titanium		89
N° 15243 / 15343	d1 2.0 – 25.0		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100			91
N° 5332	d1 2.0 – 20.0		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100			93
N° 45332	d1 2.0 – 20.0		Favora® <b>F</b>	HM	45° 	Rm <850-1100			95
N° 0190	d1 5 – 32		<b>HSS</b>	HSS-E Co8	90° 	Rm <850-1100			97

### Medium length version with neck

N° 15225 / 15325	d1 6 – 16		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300			99
N° 5251 / 5351	d1 6 – 20		X-Generation <b>X</b>	HM MG10	45° 	Rm 1300-1500	HRC 48-60		101
N° 5219 / 5319	d1 6 – 16		X-Generation <b>X</b>	HM MG10	45° 	Inox Stainless			103
N° 15299 / 15399	d1 3 – 12		X-Generation <b>X</b>	HM MG10	45° 	Rm <850-1300			105
N° 5333	d1 3 – 16		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100			107

# End milling tools for steel, stainless steel and titanium

## Smooth-edged, cylindrical

### Long version

N° 15245 / 15345 d1 6 – 20



Base-X	<b>B</b>	HM MG10	45°	Rm <850-1100			109

N° 0200 d1 2.0 – 40.0



HSS	HSS-E Co8	90°	Rm <850-1100			111

N° 0270 d1 2.0 – 20.0



HSS	HSS-E Co8	90°	Rm <850-1100			113

### Long version with neck

N° 5393 d1 3 – 16



Base-X	<b>B</b>	HM MG10	45°	Rm <850-1100			115

### Extra-long version

N° 15247 / 15347 d1 6 – 20



Base-X	<b>B</b>	HM MG10	45°	Rm <850-1100			117

### Short version

N° 5249 / 5349 d1 1.0 – 16.0



X-Generation	<b>X</b>	HM MG10	45°	Rm 1300-1500	HRC 48-60		119

N° 5213 / 5313 d1 3 – 16



X-Generation	<b>X</b>	HM MG10	45°	Inox Stainless			121

N° 5329 d1 6 – 16



X-Generation	<b>X</b>	HM MG10	45°	Rm <850-1100	Inox Stainless		123

N° 5036 d1 1.5 – 10.0



Base-X	<b>B</b>	HM MG10	90°	Rm <850-1100	Inox Stainless		125

N° 5400 d1 1.0 – 12.0



Base-X	<b>B</b>	HM MG10	45°	Rm <850-1100			127

N° 45315 d1 3 – 20



Favora	<b>F</b>	HM	45°	Rm <850-1100	Inox Stainless		129



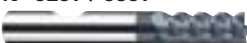

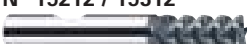


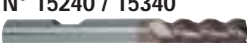
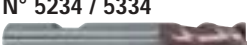


N° 0700 d1 1.0 – 25.0



HSS	HSS-E Co8	90°	Rm <850-1100			131































# End milling tools for steel, stainless steel and titanium

## Smooth-edged, with corner radius

Normal version							
N° 15226 / 15326 <b>new!</b>	d1 3 - 20 r 0.5, r 1.0, r 1.5, r 2.0		X-Generation <b>X</b>	HM MG10		<b>Rm</b> <850-1500	135
N° 15268 / 15368	d1 4 - 20 r 0.5, r 1.0, r 1.5, r 2.0		X-Generation <b>X</b>	HM MG10		<b>Rm</b> 850-1500 <b>Ti</b> Titanium	137
N° 5259 / 5359	d1 3 - 16 r 0.2, r 0.5		X-Generation <b>X</b>	HM MG10		<b>Rm</b> 1300-1500 <b>HRC</b> 48-60	139
N° 15257 / 15357	d1 6 - 20 r 1.0, r 2.0		X-Generation <b>X</b>	HM MG10		<b>Rm</b> 1300-1500 <b>HRC</b> 48-60	141
N° 15212 / 15312	d1 6 - 16 r 0.5, r 1.0, r 1.5		X-Generation <b>X</b>	HM MG10		<b>Inox</b> Stainless	143
N° 5470	d1 10 - 20 r 1.0, r 2.5, r 3.0, r 4.0		X-Generation <b>X</b>	HM MG10		<b>Ti</b> Titanium	145
N° 5480	d1 12 - 20 r 1.0		X-Generation <b>X</b>	HM MG10		<b>Ti</b> Titanium	147
N° 15240 / 15340	d1 3 - 20 r 0.5		Base-X <b>B</b>	HM MG10		<b>Rm</b> <850-1100	149
N° 5234 / 5334	d1 3 - 12 r 0.2, r 0.5		Base-X <b>B</b>	HM MG10		<b>Rm</b> <850-1100	151
N° 45319 <b>new!</b>	d1 3 - 20 r 0.5, r 1.0, r 1.5, r 2.0		Favra <b>F</b>	HM		<b>Rm</b> <850-1100 <b>Inox</b> Stainless	153
Normal version with neck							
N° 15221 / 15321	d1 6 - 16 r 0.5		X-Generation <b>X</b>	HM MG10		<b>Rm</b> 850-1500	155

# End milling tools for steel, stainless steel and titanium









## Profiled, cylindrical

Normal version										
N° 5379	d1 6 - 20		X-Generation <b>X</b>	HM XR	45° 	Rm <850-1300				157
N° 15379	d1 6 - 20		X-Generation <b>X</b>	HM XR	45° 	Rm <850-1300				159
N° 15331	d1 6 - 20		X-Generation <b>X</b>	HM XR	45° 	Rm <850-1300				161
N° 15349	d1 6 - 20		X-Generation <b>X</b>	HM XA	45° 	Rm 1300-1500	HRC 48-56			163
N° 15309	d1 6 - 20		X-Generation <b>X</b>	HM XR	45° 	Inox Stainless				165
N° 15336	d1 3 - 20		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100				167
N° 5373	d1 6 - 20		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100				169
N° 5370	d1 6 - 20		Favora® <b>F</b>	HM	45° 	Rm <850-1100				171
N° 0619	d1 5 - 25		HSS	HSS PM/F	45° 	Rm 850-1300				173
N° 0540	d1 6 - 25		HSS	HSS PM/F	45° 	Rm <850-1300	Inox Stainless			175
N° 0610	d1 5 - 40		HSS	HSS-E Co8	45° 	Rm <850-1100				177
N° 0611	d1 5 - 25		HSS	HSS-E Co8	45° 	Rm <850-1100				181
N° 0609	d1 6 - 32		HSS	HSS-E Co8	45° 	Rm <850-1100	Inox Stainless			183
N° 0695	d1 8 - 32		HSS	HSS-E Co8	45° 	Rm <850-1100	Inox Stainless			185
N° 0679	d1 6 - 20		HSS	HSS-E Co8	45° 	Rm <850-1100	Inox Stainless			187





# End milling tools for steel, stainless steel and titanium

## Profiled, cylindrical







### Medium length version

N° 5173	d1 6 – 20		X-Generation <b>X</b>	HM XR	45° 	Rm <850-1300			189
N° 5376	d1 6 – 20		Base-X <b>B</b>	HM MG10	45° 	Rm <850-1100			191
N° 0659	d1 6 – 25		<b>HSS</b>	HSS PM/F	45° 	Rm 850-1300			193
N° 0650	d1 5 – 32		<b>HSS</b>	HSS-E Co8	45° 	Rm <850-1100			195

### Medium length version with neck

N° 5174	d1 6 – 20		X-Generation <b>X</b>	HM XR	45° 	Rm <850-1300			197
N° 15304	d1 6 – 20		X-Generation <b>X</b>	HM XR	45° 	Inox Stainless			199

### Short version

N° 5176	d1 10 – 20		X-Generation <b>X</b>	HM XR	45° 	Rm <850-1300			201
N° 15306	d1 10 – 16		X-Generation <b>X</b>	HM XR	45° 	Inox Stainless			203
N° 0640	d1 5 – 32		<b>HSS</b>	HSS-E Co8	45° 	Rm <850-1100			205

### Long version

N° 0665	d1 5 – 40		<b>HSS</b>	HSS-E Co8	45° 	Rm <850-1100			207
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### Extra-long version with neck

N° 0621	d1 6 – 25		<b>HSS</b>	HSS PM/F	45° 	Rm 850-1300			209
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# End milling tools for steel, stainless steel and titanium

## Profiled, with corner radius

Normal version

N° 15389

d1 6 - 20

r 1.0, r 2.5



HM  
XR






Ti  
Titanium

211





# End milling tools for steel, stainless steel and titanium

## Finishing, cylindrical

### Normal version

N° 15250 <b>new!</b>	d1 3 – 20		X-Generation <b>X</b>	HM XA	45°	<b>Rm</b> 850-1300			213
N° 5264	d1 3 – 16 r 0.2, r 0.5		X-Generation <b>X</b>	HM MG10	r	<b>Rm</b> 1300-1500	<b>HRC</b> 48-60		215
N° 5266 / 5366	d1 3 – 20		X-Generation <b>X</b>	HM XA	45°	<b>HRC</b> 48- > 60			217
N° 5260 / 5360	d1 6 – 20		Base-X <b>B</b>	HM MG10	45°	<b>Rm</b> 850-1300			219
N° 45360	d1 6 – 20		Favora <b>F</b>	HM	45°	<b>Rm</b> 850-1300			221

### Medium length version







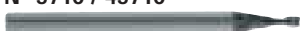





















N° 15251 <b>new!</b>	d1 6 – 20		X-Generation <b>X</b>	HM XA	45°	<b>Rm</b> 850-1300			223
N° 15266 / 15366	d1 6 – 20		X-Generation <b>X</b>	HM XA	45°	<b>HRC</b> 48- > 60			225
N° 5265	d1 6 – 20		Base-X <b>B</b>	HM MG10	45°	<b>Rm</b> 850-1300			227
N° 45362	d1 6 – 20		Favora <b>F</b>	HM	45°	<b>Rm</b> 850-1300			229

### Long version

N° 5268	d1 10 – 25		Base-X <b>B</b>	HM MG10	45°	<b>Rm</b> 850-1300			231
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# End milling tools for steel, stainless steel and titanium

## Micro, cylindrical

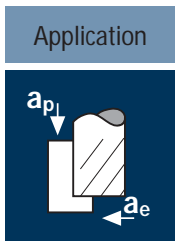
Shank $\varnothing$ 3mm									
N° 15711	d1 0.2 - 3.0		X-Generation <b>X</b>	1xd	45° 	Rm 850-1500	HRC 48-60	Ti Titanium	233
N° 5712	d1 0.2 - 3.0		Base-X <b>B</b>	3xd	45° 	Rm <850-1500	Inox Stainless	Ti Titanium	235
N° 5722	d1 0.5 - 3.0		X-Generation <b>X</b>	3xd	45° 	Rm 850-1500	HRC 48-60	Ti Titanium	237
N° 5710 / 45710	d1 0.3 - 3.0		Favora <b>F</b>	3xd	90° 	Rm <850-1100			239
N° 15752	d1 0.5 - 3.0		Base-X <b>B</b>	3xd	90° 	Rm <850-1500	Inox Stainless	Ti Titanium	243
N° 5714	d1 0.5 - 3.0		Base-X <b>B</b>	5xd	45° 	Rm <850-1500	Inox Stainless	Ti Titanium	245
N° 5724	d1 0.5 - 3.0		X-Generation <b>X</b>	5xd	45° 	Rm 850-1500	HRC 48-60	Ti Titanium	247
N° 15754	d1 0.5 - 3.0		Base-X <b>B</b>	5xd	90° 	Rm <850-1500	Inox Stainless	Ti Titanium	249
N° 5716	d1 0.5 - 3.0		Base-X <b>B</b>	8xd	45° 	Rm <850-1500	Inox Stainless	Ti Titanium	251
N° 5726	d1 0.5 - 3.0		X-Generation <b>X</b>	8xd	45° 	Rm 850-1500	HRC 48-60	Ti Titanium	253
N° 5717	d1 0.5 - 3.0		Base-X <b>B</b>	10xd	45° 	Rm <850-1500	Inox Stainless	Ti Titanium	255
N° 5721	d1 1.0 - 3.0		Base-X <b>B</b>	12xd	45° 	Rm <850-1300			257
N° 5723	d1 1.0 - 3.0		Base-X <b>B</b>	15xd	45° 	Rm <850-1300			259
N° 15725	d1 1.0 - 3.0		Base-X <b>B</b>	20xd	45° 	Rm <850-1100			261



# End milling tools for steel, stainless steel and titanium

## Smooth-edged, cylindrical

Short-shank version							
N° 5336	d1 1.5 – 10.0	Base-X <b>B</b>	HM MG10	90°	Rm <850-1100	Inox Stainless	263
N° 5339	d1 3 – 10	Base-X <b>B</b>	HM MG10	45°	Rm <850-1100	Inox Stainless	265
N° 5335	d1 2 – 10	Base-X <b>B</b>	HM MG10	45°	Rm <850-1100	Inox Stainless	267
N° 5336 / 45336	d1 1.5 – 10.0	Favora® <b>F</b>	HM	90°	Rm <850-1100	Inox Stainless	269
N° 45339	d1 3 – 10	Favora® <b>F</b>	HM	45°	Rm <850-1100	Inox Stainless	271
N° 45335	d1 2 – 10	Favora® <b>F</b>	HM	45°	Rm <850-1100	Inox Stainless	273
N° 0400	d1 1.0 – 2.0	HSS	HSS PM/F	90°	Rm <850		275
N° 0410	d1 2.0 – 20.0	HSS	HSS PM/F	90°	Rm <850		279
N° 5337	d1 3 – 10	Base-X <b>B</b>	HM MG10	90°	Rm <850-1300	Inox Stainless	281
N° 5338	d1 3 – 10	Base-X <b>B</b>	HM MG10	45°	Rm <850-1300	Inox Stainless	283



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	200	0.020	4.5	1.2	21220	1700	9.0
4	4	200	0.025	6.0	1.6	15915	1590	15.5
5	4	200	0.035	7.5	2.0	12735	1785	27.0
6	4	200	0.040	9.0	2.4	10610	1700	36.5
8	4	200	0.055	12.0	3.2	7960	1750	67.0
10	4	200	0.070	15.0	4.0	6365	1780	107.0
12	4	200	0.075	18.0	4.8	5305	1590	137.5
16	4	200	0.100	24.0	6.4	3980	1590	244.0
20	4	200	0.130	30.0	8.0	3185	1655	397.0

Steel  
850 - 1100 N/mm<sup>2</sup>

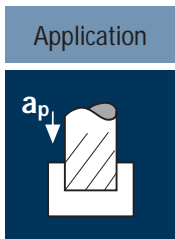
3	4	150	0.020	4.5	1.2	15915	1275	7.0
4	4	150	0.025	6.0	1.6	11935	1195	11.5
5	4	150	0.035	7.5	2.0	9550	1335	20.0
6	4	150	0.040	9.0	2.4	7960	1275	27.5
8	4	150	0.055	12.0	3.2	5970	1315	50.5
10	4	150	0.070	15.0	4.0	4775	1335	80.0
12	4	150	0.075	18.0	4.8	3980	1195	103.0
16	4	150	0.100	24.0	6.4	2985	1195	183.5
20	4	150	0.130	30.0	8.0	2385	1240	297.5

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

3	4	80	0.020	4.5	1.2	8490	680	3.5
4	4	80	0.025	6.0	1.6	6365	635	6.0
5	4	80	0.030	7.5	2.0	5095	610	9.0
6	4	80	0.040	9.0	2.4	4245	680	14.5
8	4	80	0.050	12.0	3.2	3185	635	24.5
10	4	80	0.065	15.0	4.0	2545	660	39.5
12	4	80	0.075	18.0	4.8	2120	635	55.0
16	4	80	0.095	24.0	6.4	1590	605	93.0
20	4	80	0.120	30.0	8.0	1275	610	146.5

Stainless steel  
[Cr-Ni/1.4301]

3	4	70	0.015	4.5	1.2	7425	445	2.5
4	4	70	0.020	6.0	1.6	5570	445	4.5
5	4	70	0.020	7.5	2.0	4455	355	5.5
6	4	70	0.030	9.0	2.4	3715	445	9.5
8	4	70	0.035	12.0	3.2	2785	390	15.0
10	4	70	0.045	15.0	4.0	2230	400	24.0
12	4	70	0.055	18.0	4.8	1855	410	35.5
16	4	70	0.065	24.0	6.4	1395	365	56.0
20	4	70	0.085	30.0	8.0	1115	380	91.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	180	0.015	3	3	19100	1145	10.5
4	4	180	0.020	4	4	14325	1145	18.5
5	4	180	0.030	5	5	11460	1375	34.5
6	4	180	0.035	6	6	9550	1335	48.0
8	4	180	0.045	8	8	7160	1290	82.5
10	4	180	0.055	10	10	5730	1260	126.0
12	4	180	0.060	12	12	4775	1145	165.0
16	4	180	0.075	8	16	3580	1075	137.5
20	4	180	0.095	10	20	2865	1090	218.0

Steel  
850 - 1100 N/mm<sup>2</sup>

3	4	120	0.015	3	3	12735	765	7.0
4	4	120	0.020	4	4	9550	765	12.0
5	4	120	0.030	5	5	7640	915	23.0
6	4	120	0.035	6	6	6365	890	32.0
8	4	120	0.045	8	8	4775	860	55.0
10	4	120	0.055	10	10	3820	840	84.0
12	4	120	0.060	12	12	3185	765	110.0
16	4	120	0.075	8	16	2385	715	91.5
20	4	120	0.095	10	20	1910	725	145.0

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

3	4	60	0.015	3	3	6365	380	3.5
4	4	60	0.020	4	4	4775	380	6.0
5	4	60	0.030	5	5	3820	460	11.5
6	4	60	0.035	6	6	3185	445	16.0
8	4	60	0.045	8	8	2385	430	27.5
10	4	60	0.055	10	10	1910	420	42.0
12	4	60	0.060	12	12	1590	380	54.5
16	4	60	0.075	8	16	1195	360	46.0
20	4	60	0.095	10	20	955	365	73.0

Stainless steel  
[Cr-Ni/1.4301]

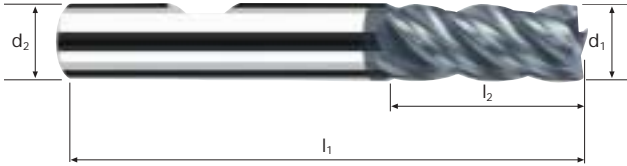
3	4	50	0.010	3	3	5305	210	2.0
4	4	50	0.015	4	4	3980	240	4.0
5	4	50	0.025	5	5	3185	320	8.0
6	4	50	0.030	6	6	2655	320	11.5
8	4	50	0.035	8	8	1990	280	18.0
10	4	50	0.045	10	10	1590	285	28.5
12	4	50	0.050	12	12	1325	265	38.0
16	4	50	0.060	8	16	995	240	30.5
20	4	50	0.075	10	20	795	240	48.0

# Cylindrical end mills NX-NV

Smooth-edged, normal version



**HM  
MG10**     $\lambda$  **40°**  
                   $\gamma$  **0°**



Roughing

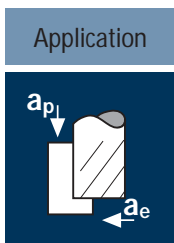


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel Nickel-Alloys
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Example: Order-N°.										POLYCHROM	
		Coating	Article-N°		α-Code					<b>P5327</b>	
		<b>P</b>	<b>5327</b>		<b>.180</b>					<b>P5227</b>	
∅ Code	d1 e8	d2 h6	l1	l2	45°	α	z				
.180	3	6	57	8	0.10	5.5°	4	●			
.220	4	6	57	11	0.10	4.0°	4	●			
.260	5	6	57	13	0.15	2.0°	4	●			
.300	6	6	57	13	0.15	0.0°	4	●			
.391	8	8	63	19	0.15	0.0°	4	●			
.450	10	10	72	22	0.20	0.0°	4	●			
.501	12	12	83	26	0.20	0.0°	4	●			
.610	16	16	92	32	0.20	0.0°	4	●			
.682	20	20	104	38	0.20	0.0°	4	●			



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	80	0.010	5.4	1.4	8490	340	2.5
4	4	80	0.015	7.2	1.8	6365	380	5.0
5	4	80	0.020	9.0	2.3	5095	410	8.5
6	4	80	0.020	10.8	2.7	4245	340	10.0
8	4	80	0.030	14.4	3.6	3185	380	19.5
10	4	80	0.035	18.0	4.5	2545	355	29.0
12	4	80	0.045	21.6	5.4	2120	380	44.5
16	4	80	0.055	28.8	6.4	1590	350	64.5
20	4	80	0.070	36.0	8.0	1275	355	102.0

Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	4	40	0.010	5.4	1.4	4245	170	1.0
4	4	40	0.015	7.2	1.8	3185	190	2.5
5	4	40	0.020	9.0	2.3	2545	205	4.0
6	4	40	0.020	10.8	2.7	2120	170	5.0
8	4	40	0.030	14.4	3.6	1590	190	10.0
10	4	40	0.035	18.0	4.5	1275	180	14.5
12	4	40	0.045	21.6	5.4	1060	190	22.0
16	4	40	0.055	28.8	6.4	795	175	32.5
20	4	40	0.070	36.0	8.0	635	180	52.0

Material

Heat resistant steel  
[17-4 PH]

3	4	25	0.010	5.4	1.4	2655	105	1.0
4	4	25	0.010	7.2	1.8	1990	80	1.0
5	4	25	0.015	9.0	2.3	1590	95	2.0
6	4	25	0.015	10.8	2.7	1325	80	2.5
8	4	25	0.020	14.4	3.6	995	80	4.0
10	4	25	0.025	18.0	4.5	795	80	6.5
12	4	25	0.030	21.6	5.4	665	80	9.5
16	4	25	0.040	28.8	6.4	495	80	14.5
20	4	25	0.055	36.0	8.0	400	90	26.0

Material

Nickel base alloys prec.-hard.  
[Inconel 718]

3	4	15	0.008	5.4	1.4	1590	50	0.4
4	4	15	0.010	7.2	1.8	1195	50	0.6
5	4	15	0.014	9.0	2.3	955	55	1.1
6	4	15	0.016	10.8	2.7	795	50	1.5
8	4	15	0.022	14.4	3.6	595	50	2.6
10	4	15	0.026	18.0	4.5	475	50	4.0
12	4	15	0.032	21.6	5.4	400	50	5.8
16	4	15	0.042	28.8	6.4	300	50	9.2
20	4	15	0.052	36.0	8.0	240	50	14.4



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	60	0.010	2.4	3	6365	255	2.0
4	4	60	0.015	3.2	4	4775	285	3.5
5	4	60	0.015	4.0	5	3820	230	4.5
6	4	60	0.020	4.8	6	3185	255	7.5
8	4	60	0.025	6.4	8	2385	240	12.5
10	4	60	0.030	8.0	10	1910	230	18.5
12	4	60	0.040	9.6	12	1590	255	29.5
16	4	60	0.050	12.8	16	1195	240	49.0
20	4	60	0.065	16.0	20	955	250	80.0

Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	4	30	0.010	2.4	3	3185	125	1.0
4	4	30	0.015	3.2	4	2385	145	2.0
5	4	30	0.015	4.0	5	1910	115	2.5
6	4	30	0.020	4.8	6	1590	125	3.5
8	4	30	0.025	6.4	8	1195	120	6.0
10	4	30	0.030	8.0	10	955	115	9.0
12	4	30	0.040	9.6	12	795	125	14.5
16	4	30	0.050	12.8	16	595	120	24.5
20	4	30	0.065	16.0	20	475	125	40.0

Material

Heat resistant steel  
[17-4 PH]

3	4	20	0.005	2.4	3	2120	40	0.5
4	4	20	0.010	3.2	4	1590	65	1.0
5	4	20	0.010	4.0	5	1275	50	1.0
6	4	20	0.015	4.8	6	1060	65	2.0
8	4	20	0.020	6.4	8	795	65	3.5
10	4	20	0.025	8.0	10	635	65	5.0
12	4	20	0.030	9.6	12	530	65	7.5
16	4	20	0.040	12.8	16	400	65	13.5
20	4	20	0.045	16.0	20	320	60	19.0

Material

Nickel base alloys prec.-hard.  
[Inconel 718]

3	4	10	0.005	2.4	3	1060	20	0.1
4	4	10	0.010	3.2	4	795	30	0.4
5	4	10	0.010	4.0	5	635	25	0.5
6	4	10	0.015	4.8	6	530	30	0.9
8	4	10	0.020	6.4	8	400	30	1.5
10	4	10	0.025	8.0	10	320	30	2.4
12	4	10	0.030	9.6	12	265	30	3.5
16	4	10	0.040	12.8	16	200	30	6.1
20	4	10	0.045	16.0	20	160	30	9.6

# Cylindrical end mills NV

Smooth-edged, normal version with short neck

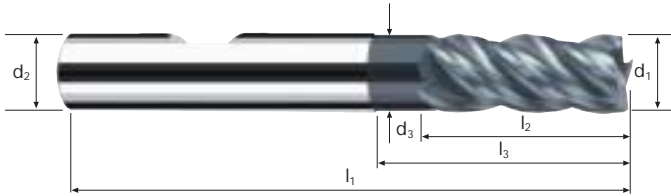


**HM**  
**MG10**

$\lambda$  40°  
 $\gamma$  10°

45°

Vario



Roughing



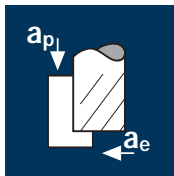
Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **Nickel-Alloys** Tool Steel

										POLYCHROM	
Example: Order-N°.										P15327	
										P15227	
$\emptyset$ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.180	3	6	2.8	57	8	14	0.10	5.5°	4	●	
.220	4	6	3.7	57	11	16	0.10	4.0°	4	●	
.260	5	6	4.6	57	13	18	0.15	2.0°	4	●	
.300	6	6	5.5	57	13	20	0.15	0.0°	4	●	
.391	8	8	7.4	63	19	26	0.15	0.0°	4	●	
.450	10	10	9.2	72	22	31	0.20	0.0°	4	●	
.501	12	12	11.0	83	26	37	0.20	0.0°	4	●	
.610	16	16	15.0	92	32	43	0.20	0.0°	4	●	
.682	20	20	19.0	104	38	53	0.20	0.0°	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	200	0.020	4.5	1.2	21220	1700	9.0
4	4	200	0.025	6.0	1.6	15915	1590	15.5
5	4	200	0.035	7.5	2.0	12735	1785	27.0
6	4	200	0.040	9.0	2.4	10610	1700	36.5
8	4	200	0.055	12.0	3.2	7960	1750	67.0
10	4	200	0.070	15.0	4.0	6365	1780	107.0
12	4	200	0.075	18.0	4.8	5305	1590	137.5
16	4	200	0.100	24.0	6.4	3980	1590	244.0
20	4	200	0.130	30.0	8.0	3185	1655	397.0

3	4	150	0.020	4.5	1.2	15915	1275	7.0
4	4	150	0.025	6.0	1.6	11935	1195	11.5
5	4	150	0.035	7.5	2.0	9550	1335	20.0
6	4	150	0.040	9.0	2.4	7960	1275	27.5
8	4	150	0.055	12.0	3.2	5970	1315	50.5
10	4	150	0.070	15.0	4.0	4775	1335	80.0
12	4	150	0.075	18.0	4.8	3980	1195	103.0
16	4	150	0.100	24.0	6.4	2985	1195	183.5
20	4	150	0.130	30.0	8.0	2385	1240	297.5

3	4	80	0.020	4.5	1.2	8490	680	3.5
4	4	80	0.025	6.0	1.6	6365	635	6.0
5	4	80	0.030	7.5	2.0	5095	610	9.0
6	4	80	0.040	9.0	2.4	4245	680	14.5
8	4	80	0.050	12.0	3.2	3185	635	24.5
10	4	80	0.065	15.0	4.0	2545	660	39.5
12	4	80	0.075	18.0	4.8	2120	635	55.0
16	4	80	0.095	24.0	6.4	1590	605	93.0
20	4	80	0.120	30.0	8.0	1275	610	146.5

3	4	70	0.015	4.5	1.2	7425	445	2.5
4	4	70	0.020	6.0	1.6	5570	445	4.5
5	4	70	0.020	7.5	2.0	4455	355	5.5
6	4	70	0.030	9.0	2.4	3715	445	9.5
8	4	70	0.035	12.0	3.2	2785	390	15.0
10	4	70	0.045	15.0	4.0	2230	400	24.0
12	4	70	0.055	18.0	4.8	1855	410	35.5
16	4	70	0.065	24.0	6.4	1395	365	56.0
20	4	70	0.085	30.0	8.0	1115	380	91.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	180	0.015	3	3	19100	1145	10.5
4	4	180	0.020	4	4	14325	1145	18.5
5	4	180	0.030	5	5	11460	1375	34.5
6	4	180	0.035	6	6	9550	1335	48.0
8	4	180	0.045	8	8	7160	1290	82.5
10	4	180	0.055	10	10	5730	1260	126.0
12	4	180	0.060	12	12	4775	1145	165.0
16	4	180	0.075	8	16	3580	1075	137.5
20	4	180	0.095	10	20	2865	1090	218.0

3	4	120	0.015	3	3	12735	765	7.0
4	4	120	0.020	4	4	9550	765	12.0
5	4	120	0.030	5	5	7640	915	23.0
6	4	120	0.035	6	6	6365	890	32.0
8	4	120	0.045	8	8	4775	860	55.0
10	4	120	0.055	10	10	3820	840	84.0
12	4	120	0.060	12	12	3185	765	110.0
16	4	120	0.075	8	16	2385	715	91.5
20	4	120	0.095	10	20	1910	725	145.0

3	4	60	0.015	3	3	6365	380	3.5
4	4	60	0.020	4	4	4775	380	6.0
5	4	60	0.030	5	5	3820	460	11.5
6	4	60	0.035	6	6	3185	445	16.0
8	4	60	0.045	8	8	2385	430	27.5
10	4	60	0.055	10	10	1910	420	42.0
12	4	60	0.060	12	12	1590	380	54.5
16	4	60	0.075	8	16	1195	360	46.0
20	4	60	0.095	10	20	955	365	73.0

3	4	50	0.010	3	3	5305	210	2.0
4	4	50	0.015	4	4	3980	240	4.0
5	4	50	0.025	5	5	3185	320	8.0
6	4	50	0.030	6	6	2655	320	11.5
8	4	50	0.035	8	8	1990	280	18.0
10	4	50	0.045	10	10	1590	285	28.5
12	4	50	0.050	12	12	1325	265	38.0
16	4	50	0.060	8	16	995	240	30.5
20	4	50	0.075	10	20	795	240	48.0

# Cylindrical end mills NX-NV

Smooth-edged, normal version

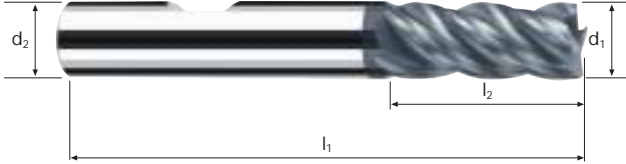


**HM**  
**MG10**

$\lambda$  40°  
 $\gamma$  0°

45°

Vario



**new!**

Roughing



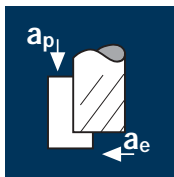
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel Nickel-Alloys
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Ø Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z	POLYCHROM	
								P15305	P15205
.180	3	6	57	8	0.10	5.5°	4	●	
.220	4	6	57	11	0.10	4.0°	4	●	
.260	5	6	57	13	0.15	2.0°	4	●	
.300	6	6	57	13	0.15	0.0°	4	●	
.391	8	8	63	19	0.15	0.0°	4	●	
.450	10	10	72	22	0.20	0.0°	4	●	
.501	12	12	83	26	0.20	0.0°	4	●	
.610	16	16	92	32	0.20	0.0°	4	●	
.682	20	20	104	38	0.20	0.0°	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	210	0.030	9.0	2.1	11140	1335	25.0
8	4	210	0.040	12.0	2.8	8355	1335	45.0
10	4	210	0.050	15.0	3.5	6685	1335	70.0
12	4	210	0.055	18.0	4.2	5570	1225	92.5
16	4	210	0.070	24.0	5.6	4180	1170	157.0
20	4	210	0.090	30.0	7.0	3340	1200	252.0

6	4	160	0.030	9.0	2.1	8490	1020	19.5
8	4	160	0.040	12.0	2.8	6365	1020	34.5
10	4	160	0.050	15.0	3.5	5095	1020	53.5
12	4	160	0.055	18.0	4.2	4245	935	70.5
16	4	160	0.070	24.0	5.6	3185	890	119.5
20	4	160	0.090	30.0	7.0	2545	915	192.0

6	4	90	0.030	9.0	2.1	4775	575	11.0
8	4	90	0.035	12.0	2.8	3580	500	17.0
10	4	90	0.045	15.0	3.5	2865	515	27.0
12	4	90	0.055	18.0	4.2	2385	525	39.5
16	4	90	0.065	24.0	5.6	1790	465	62.5
20	4	90	0.085	30.0	7.0	1430	485	102.0

6	4	80	0.020	9.0	2.1	4245	340	6.5
8	4	80	0.025	12.0	2.8	3185	320	11.0
10	4	80	0.030	15.0	3.5	2545	305	16.0
12	4	80	0.040	18.0	4.2	2120	340	25.5
16	4	80	0.045	24.0	5.6	1590	285	38.5
20	4	80	0.060	30.0	7.0	1275	305	64.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	190	0.025	5.4	6	10080	1010	32.5
8	4	190	0.030	7.2	8	7560	905	52.0
10	4	190	0.040	9.0	10	6050	970	87.5
12	4	190	0.040	10.8	12	5040	805	104.5
16	4	190	0.055	14.4	16	3780	830	191.0
20	4	190	0.065	10.0	20	3025	785	157.0

6	4	130	0.025	5.4	6	6895	690	22.5
8	4	130	0.030	7.2	8	5175	620	35.5
10	4	130	0.040	9.0	10	4140	660	59.5
12	4	130	0.040	10.8	12	3450	550	71.5
16	4	130	0.055	14.4	16	2585	570	131.5
20	4	130	0.065	10.0	20	2070	540	108.0

6	4	70	0.025	5.4	6	3715	370	12.0
8	4	70	0.030	7.2	8	2785	335	19.5
10	4	70	0.040	9.0	10	2230	355	32.0
12	4	70	0.040	10.8	12	1855	295	38.0
16	4	70	0.055	14.4	16	1395	305	70.5
20	4	70	0.065	10.0	20	1115	290	58.0

6	4	60	0.020	5.4	6	3185	255	8.5
8	4	60	0.025	7.2	8	2385	240	14.0
10	4	60	0.030	9.0	10	1910	230	20.5
12	4	60	0.035	10.8	12	1590	225	29.0
16	4	60	0.040	14.4	16	1195	190	44.0
20	4	60	0.055	10.0	20	955	210	42.0

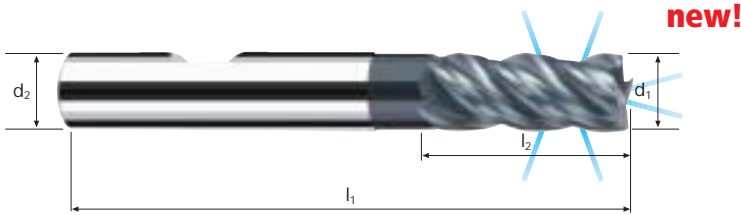


# Cylindrical end mills NX-NV

Smooth-edged, normal version, with integral air / cooling channel



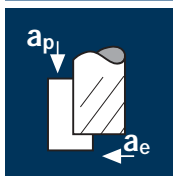
HM MG10	$\lambda$ 40° $\gamma$ 0°
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Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500					Inox Stainless	Ti Titanium	GG(G) Tool Steel Nickel-Alloys
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Example: Order-N°.							POLYCHROM	
			Coating	Article-N°	α-Code			
			P	15300	.300			P15300
								P15200
Ø Code	d1 e8	d2 h6	l1	l2	45°	Z		
.300	6	6	57	13	0.15	4	●	
.391	8	8	63	19	0.15	4	●	
.450	10	10	72	22	0.20	4	●	
.501	12	12	83	26	0.20	4	●	
.610	16	16	92	32	0.20	4	●	
.682	20	20	104	38	0.20	4	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	160	0.025	6.0	1.6	12735	1275	12.0
5	4	160	0.035	7.5	2.0	10185	1425	21.5
6	4	160	0.040	9.0	2.4	8490	1360	29.5
8	4	160	0.055	12.0	3.2	6365	1400	54.0
10	4	160	0.065	15.0	4.0	5095	1325	79.5
12	4	160	0.080	18.0	4.8	4245	1360	117.5
16	4	160	0.090	24.0	6.4	3185	1145	176.0
20	4	160	0.110	30.0	8.0	2545	1120	269.0

4	4	120	0.025	6.0	1.6	9550	955	9.0
5	4	120	0.035	7.5	2.0	7640	1070	16.0
6	4	120	0.040	9.0	2.4	6365	1020	22.0
8	4	120	0.055	12.0	3.2	4775	1050	40.5
10	4	120	0.065	15.0	4.0	3820	995	59.5
12	4	120	0.080	18.0	4.8	3185	1020	88.0
16	4	120	0.090	24.0	6.4	2385	860	132.0
20	4	120	0.110	30.0	8.0	1910	840	201.5

4	4	90	0.025	6.0	1.6	7160	715	7.0
5	4	90	0.030	7.5	2.0	5730	690	10.5
6	4	90	0.035	9.0	2.4	4775	670	14.5
8	4	90	0.045	12.0	3.2	3580	645	25.0
10	4	90	0.060	15.0	4.0	2865	690	41.5
12	4	90	0.070	18.0	4.8	2385	670	58.0
16	4	90	0.080	24.0	6.4	1790	575	88.5
20	4	90	0.100	30.0	8.0	1430	570	137.0

4	4	40	0.015	6.0	1.6	3185	190	2.0
5	4	40	0.020	7.5	2.0	2545	205	3.0
6	4	40	0.020	9.0	2.4	2120	170	3.5
8	4	40	0.025	12.0	3.2	1590	160	6.0
10	4	40	0.035	15.0	4.0	1275	180	11.0
12	4	40	0.040	18.0	4.8	1060	170	14.5
16	4	40	0.050	24.0	6.4	795	160	24.5
20	4	40	0.060	30.0	8.0	635	150	36.0

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	130	0.020	5.0	4	10345	830	16.5
5	4	130	0.025	6.3	5	8275	830	26.0
6	4	130	0.025	7.5	6	6895	690	31.0
8	4	130	0.035	10.0	8	5175	725	58.0
10	4	130	0.045	12.5	10	4140	745	93.0
12	4	130	0.055	15.0	12	3450	760	137.0
16	4	130	0.065	20.0	16	2585	670	214.5
20	4	130	0.080	25.0	20	2070	660	330.0

4	4	100	0.020	5.0	4	7960	635	12.5
5	4	100	0.025	6.3	5	6365	635	20.0
6	4	100	0.025	7.5	6	5305	530	24.0
8	4	100	0.035	10.0	8	3980	555	44.5
10	4	100	0.045	12.5	10	3185	575	72.0
12	4	100	0.055	15.0	12	2655	585	105.5
16	4	100	0.065	20.0	16	1990	515	165.0
20	4	100	0.080	25.0	20	1590	510	255.0

4	4	70	0.015	5.0	4	5570	335	6.5
5	4	70	0.020	6.3	5	4455	355	11.0
6	4	70	0.025	7.5	6	3715	370	16.5
8	4	70	0.030	10.0	8	2785	335	27.0
10	4	70	0.040	12.5	10	2230	355	44.5
12	4	70	0.050	15.0	12	1855	370	66.5
16	4	70	0.055	20.0	16	1395	305	97.5
20	4	70	0.070	25.0	20	1115	310	155.0

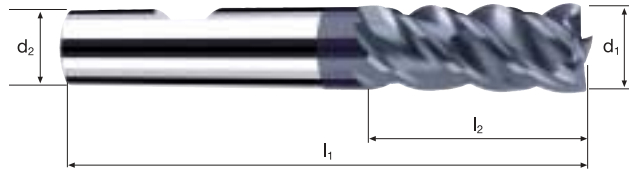
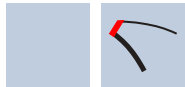
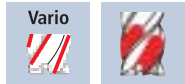
4	4	30	0.010	5.0	4	2385	95	2.0
5	4	30	0.015	6.3	5	1910	115	3.5
6	4	30	0.020	7.5	6	1590	125	5.5
8	4	30	0.025	10.0	8	1195	120	9.5
10	4	30	0.030	12.5	10	955	115	14.5
12	4	30	0.040	15.0	12	795	125	22.5
16	4	30	0.045	20.0	16	595	105	33.5
20	4	30	0.055	25.0	20	475	105	52.5

# Cylindrical end mills NX-NVD

Smooth-edged, normal version



**HM**  
**MG10**     $\lambda$  45°  
                 $\gamma$ -10°



Roughing

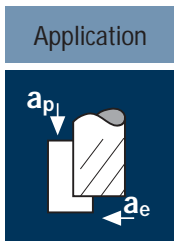


Finishing



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56				<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.								POLYCHROM	
Coating Article-N° α-Code								P 15322 .220	
Ø Code	d1 e8	d2 h6	l1	l2	45°	α	Z		
.220	4	6	57	8	0.10	4.0°	4	●	
.260	5	6	57	10	0.15	2.5°	4	●	
.300	6	6	57	12	0.15	0.0°	4	●	
.391	8	8	63	19	0.15	0.0°	4	●	
.450	10	10	72	23	0.20	0.0°	4	●	
.501	12	12	83	27	0.20	0.0°	4	●	
.610	16	16	92	32	0.20	0.0°	4	●	
.682	20	20	104	39	0.20	0.0°	4	●	



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	4	120	0.040	7.5	0.7	7640	1220	6.5
6	4	120	0.050	9.0	0.9	6365	1275	10.5
8	4	120	0.065	12.0	1.2	4775	1240	18.0
10	4	120	0.085	15.0	1.5	3820	1300	29.5
12	4	120	0.100	18.0	1.8	3185	1275	41.5
16	4	120	0.135	24.0	2.4	2385	1290	74.5

Hardened tool steel  
48 - 52 HRC

5	4	80	0.030	7.5	0.7	5095	610	3.0
6	4	80	0.035	9.0	0.9	4245	595	5.0
8	4	80	0.045	12.0	1.2	3185	575	8.5
10	4	80	0.055	15.0	1.5	2545	560	12.5
12	4	80	0.065	18.0	1.8	2120	550	18.0
16	4	80	0.090	24.0	2.4	1590	570	33.0

Hardened tool steel  
52 - 56 HRC

5	4	60	0.025	7.5	0.7	3820	380	2.0
6	4	60	0.025	9.0	0.9	3185	320	2.5
8	4	60	0.035	12.0	1.2	2385	335	5.0
10	4	60	0.045	15.0	1.5	1910	345	8.0
12	4	60	0.055	18.0	1.8	1590	350	11.5
16	4	60	0.075	24.0	2.4	1195	360	20.5

Hardened tool steel  
56 - 60 HRC

5	4	30	0.015	7.5	0.7	1910	115	0.5
6	4	30	0.020	9.0	0.9	1590	127	1.0
8	4	30	0.025	12.0	1.2	1195	120	1.5
10	4	30	0.035	15.0	1.5	955	134	3.0
12	4	30	0.040	18.0	1.8	795	127	4.0
16	4	30	0.055	24.0	2.4	595	131	7.5



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	4	100	0.035	2.5	5	6365	890	11.0
6	4	100	0.040	3.0	6	5305	850	15.5
8	4	100	0.055	4.0	8	3980	875	28.0
10	4	100	0.065	5.0	10	3185	830	41.5
12	4	100	0.080	6.0	12	2655	850	61.0
16	4	100	0.105	8.0	16	1990	835	53.5

Hardened tool steel  
48 - 52 HRC

5	4	60	0.025	2.5	5	3820	380	5.0
6	4	60	0.030	3.0	6	3185	380	7.0
8	4	60	0.040	4.0	8	2385	380	12.0
10	4	60	0.050	5.0	10	1910	380	19.0
12	4	60	0.060	6.0	12	1590	380	27.5
16	4	60	0.080	8.0	16	1195	380	24.5

Hardened tool steel  
52 - 56 HRC

5	4	40	0.020	2.5	5	2545	205	2.5
6	4	40	0.025	3.0	6	2120	210	4.0
8	4	40	0.030	4.0	8	1590	190	6.0
10	4	40	0.040	5.0	10	1275	205	10.5
12	4	40	0.050	6.0	12	1060	210	15.0
16	4	40	0.065	8.0	16	795	205	13.0

Hardened tool steel  
56 - 60 HRC

5	4	20	0.014	2.5	5	1275	71	1.0
6	4	20	0.017	3.0	6	1060	72	1.5
8	4	20	0.023	4.0	8	795	73	2.5
10	4	20	0.029	5.0	10	635	74	3.5
12	4	20	0.034	6.0	12	530	72	5.0
16	4	20	0.046	8.0	16	400	74	4.5

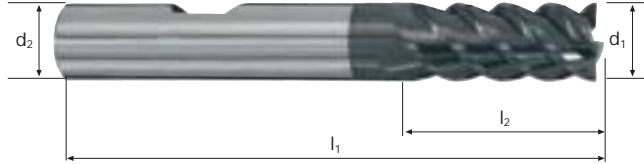
# Cylindrical end mills HX-N

Smooth-edged, normal version



**HM**  
**MG10**

$\lambda$  55°  
 $\gamma$ -10°



Roughing

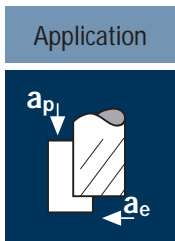


Finishing



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Ti</b> Titanium	<b>GG(G)</b>
--	--	------------------------	------------------------	---------------------	---------------------	--------------------	-----------------------	--------------

Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z	POLYCHROM	DURO-S
								P5358	D5358
.260	5	6	57	13	0.15	2.0°	4	●	●
.300	6	6	57	13	0.15	0.0°	4	●	●
.391	8	8	63	19	0.15	0.0°	4	●	●
.450	10	10	72	22	0.20	0.0°	4	●	●
.501	12	12	83	26	0.20	0.0°	4	●	●
.610	16	16	92	32	0.20	0.0°	4	●	●



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	80	0.015	4.5	1.2	8490	510	3.0
4	4	80	0.020	6.0	1.6	6365	510	5.0
5	4	80	0.025	7.5	2.0	5095	510	7.5
6	4	80	0.025	9.0	2.4	4245	425	9.0
8	4	80	0.035	12.0	3.2	3185	445	17.0
10	4	80	0.045	15.0	4.0	2545	460	27.5
12	4	80	0.050	18.0	4.8	2120	425	36.5
16	4	80	0.075	24.0	3.2	1590	475	36.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	4	40	0.015	4.5	1.2	4245	255	1.5
4	4	40	0.020	6.0	1.6	3185	255	2.5
5	4	40	0.025	7.5	2.0	2545	255	4.0
6	4	40	0.025	9.0	2.4	2120	210	4.5
8	4	40	0.035	12.0	3.2	1590	225	8.5
10	4	40	0.045	15.0	4.0	1275	230	14.0
12	4	40	0.050	18.0	4.8	1060	210	18.0
16	4	40	0.075	24.0	3.2	795	240	18.5

Heat resistant steel  
[17-4 PH]

3	4	25	0.010	4.5	1.2	2655	105	0.5
4	4	25	0.015	6.0	1.6	1990	120	1.0
5	4	25	0.020	7.5	2.0	1590	125	2.0
6	4	25	0.020	9.0	2.4	1325	105	2.5
8	4	25	0.030	12.0	3.2	995	120	4.5
10	4	25	0.035	15.0	4.0	795	110	6.5
12	4	25	0.040	18.0	4.8	665	105	9.0
16	4	25	0.060	24.0	3.2	495	120	9.0

Nickel base alloys prec.-hard.  
[Inconel 718]

3	4	15	0.010	4.5	1.2	1590	65	0.5
4	4	15	0.015	6.0	1.6	1195	70	0.5
5	4	15	0.020	7.5	2.0	955	75	1.0
6	4	15	0.020	9.0	2.4	795	65	1.5
8	4	15	0.030	12.0	3.2	595	70	2.5
10	4	15	0.035	15.0	4.0	475	65	4.0
12	4	15	0.040	18.0	4.8	400	65	5.5
16	4	15	0.060	24.0	3.2	300	70	5.5



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	60	0.015	1.5	3	6365	380	1.5
4	4	60	0.020	2.0	4	4775	380	3.0
5	4	60	0.025	2.5	5	3820	380	5.0
6	4	60	0.030	3.0	6	3185	380	7.0
8	4	60	0.040	4.0	8	2385	380	12.0
10	4	60	0.055	5.0	10	1910	420	21.0
12	4	60	0.055	6.0	12	1590	350	25.0
16	4	60	0.085	4.0	16	1195	405	26.0

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	4	30	0.015	1.5	3	3185	190	1.0
4	4	30	0.020	2.0	4	2385	190	1.5
5	4	30	0.025	2.5	5	1910	190	2.5
6	4	30	0.030	3.0	6	1590	190	3.5
8	4	30	0.040	4.0	8	1195	190	6.0
10	4	30	0.055	5.0	10	955	210	10.5
12	4	30	0.055	6.0	12	795	175	12.5
16	4	30	0.085	4.0	16	595	200	13.0

Heat resistant steel  
[17-4 PH]

3	4	20	0.015	1.5	3	2120	125	0.5
4	4	20	0.020	2.0	4	1590	125	1.0
5	4	20	0.025	2.5	5	1275	130	1.5
6	4	20	0.025	3.0	6	1060	105	2.0
8	4	20	0.035	4.0	8	795	110	3.5
10	4	20	0.045	5.0	10	635	115	6.0
12	4	20	0.050	6.0	12	530	105	7.5
16	4	20	0.075	4.0	16	400	120	7.5

Nickel base alloys prec.-hard.  
[Inconel 718]

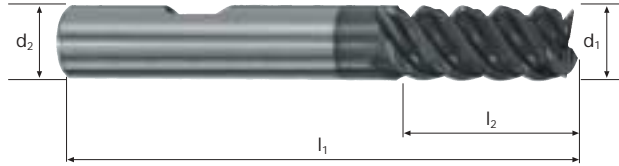
3	4	10	0.015	1.5	3	1060	65	0.5
4	4	10	0.020	2.0	4	795	65	0.5
5	4	10	0.025	2.5	5	635	65	1.0
6	4	10	0.025	3.0	6	530	55	1.0
8	4	10	0.035	4.0	8	400	55	2.0
10	4	10	0.045	5.0	10	320	60	3.0
12	4	10	0.050	6.0	12	265	55	4.0
16	4	10	0.075	4.0	16	200	60	4.0

# Cylindrical end mills SX-N

Smooth-edged, normal version



HM  
MG10    λ 55°  
                  γ 15°



Roughing

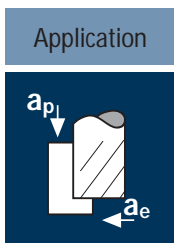


Finishing



Rm < 850    Rm 850-1100    **Inox** Stainless    **Ti** Titanium    **Nickel-Alloys** Tool Steel

								POLYCHROM	
Example: Order-N°.								P5314	
								P5214	
∅ Code	d1 e8	d2 h6	l1	l2	45°	α	z		
.180	3	6	57	8	0.10	5.5°	4	●	
.220	4	6	57	11	0.10	4.0°	4	●	
.260	5	6	57	13	0.15	2.0°	4	●	
.300	6	6	57	13	0.15	0.0°	4	●	
.391	8	8	63	19	0.15	0.0°	4	●	
.450	10	10	72	22	0.20	0.0°	4	●	
.501	12	12	83	26	0.20	0.0°	4	●	
.610	16	16	92	32	0.20	0.0°	4	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	200	0.015	4.5	1.4	21220	955	6.0
4	3	200	0.015	6.0	1.8	15915	715	7.5
5	3	200	0.020	7.5	2.3	12735	765	13.0
6	3	200	0.040	9.0	2.7	10610	1275	31.0
8	3	200	0.050	12.0	3.6	7960	1195	51.5
10	3	200	0.065	15.0	4.5	6365	1240	83.5
12	3	200	0.075	18.0	5.4	5305	1195	116.0
16	3	200	0.100	24.0	7.2	3980	1195	206.5
20	3	200	0.125	30.0	9.0	3185	1195	322.5

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	150	0.015	4.5	1.4	15915	715	4.5
4	3	150	0.015	6.0	1.8	11935	535	6.0
5	3	150	0.020	7.5	2.3	9550	575	9.5
6	3	150	0.040	9.0	2.7	7960	955	23.0
8	3	150	0.050	12.0	3.6	5970	895	38.5
10	3	150	0.065	15.0	4.5	4775	930	63.0
12	3	150	0.075	18.0	5.4	3980	895	87.0
16	3	150	0.100	24.0	7.2	2985	895	154.5
20	3	150	0.125	30.0	9.0	2385	895	241.5

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

3	3	80	0.010	4.5	1.4	8490	255	1.5
4	3	80	0.015	6.0	1.8	6365	285	3.0
5	3	80	0.015	7.5	2.3	5095	230	4.0
6	3	80	0.035	9.0	2.7	4245	445	11.0
8	3	80	0.045	12.0	3.6	3185	430	18.5
10	3	80	0.055	15.0	4.5	2545	420	28.5
12	3	80	0.065	18.0	5.4	2120	415	40.5
16	3	80	0.085	24.0	7.2	1590	405	70.0
20	3	80	0.110	30.0	9.0	1275	420	113.5

Stainless steel  
[Cr-Ni/1.4301]

3	3	70	0.010	4.5	1.4	7425	225	1.5
4	3	70	0.010	6.0	1.8	5570	165	2.0
5	3	70	0.010	7.5	2.3	4455	135	2.5
6	3	70	0.030	9.0	2.7	3715	335	8.0
8	3	70	0.035	12.0	3.6	2785	290	12.5
10	3	70	0.045	15.0	4.5	2230	300	20.5
12	3	70	0.050	18.0	5.4	1855	280	27.0
16	3	70	0.070	24.0	7.2	1395	295	51.0
20	3	70	0.090	30.0	9.0	1115	300	81.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	180	0.015	4.5	3	19100	860	11.5
4	3	180	0.015	6.0	4	14325	645	15.5
5	3	180	0.025	7.5	5	11460	860	32.5
6	3	180	0.030	9.0	6	9550	860	46.5
8	3	180	0.040	12.0	8	7160	860	82.5
10	3	180	0.050	15.0	10	5730	860	129.0
12	3	180	0.060	18.0	12	4775	860	186.0
16	3	180	0.080	16.0	16	3580	860	220.0
20	3	180	0.100	20.0	20	2865	860	344.0

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	120	0.015	4.5	3	12735	575	8.0
4	3	120	0.015	6.0	4	9550	430	10.5
5	3	120	0.025	7.5	5	7640	575	21.5
6	3	120	0.030	9.0	6	6365	575	31.0
8	3	120	0.040	12.0	8	4775	575	55.0
10	3	120	0.050	15.0	10	3820	575	86.5
12	3	120	0.060	18.0	12	3185	575	124.0
16	3	120	0.080	16.0	16	2385	570	146.0
20	3	120	0.100	20.0	20	1910	575	230.0

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

3	3	60	0.010	4.5	3	6365	190	2.5
4	3	60	0.015	6.0	4	4775	215	5.0
5	3	60	0.015	7.5	5	3820	170	6.5
6	3	60	0.030	9.0	6	3185	285	15.5
8	3	60	0.040	12.0	8	2385	285	27.5
10	3	60	0.050	15.0	10	1910	285	43.0
12	3	60	0.060	18.0	12	1590	285	61.5
16	3	60	0.080	16.0	16	1195	285	73.0
20	3	60	0.100	20.0	20	955	285	114.0

Stainless steel  
[Cr-Ni/1.4301]

3	3	50	0.010	4.5	3	5305	160	2.0
4	3	50	0.010	6.0	4	3980	120	3.0
5	3	50	0.010	7.5	5	3185	95	3.5
6	3	50	0.025	9.0	6	2655	200	11.0
8	3	50	0.030	12.0	8	1990	180	17.5
10	3	50	0.040	15.0	10	1590	190	28.5
12	3	50	0.050	18.0	12	1325	200	43.0
16	3	50	0.065	16.0	16	995	195	50.0
20	3	50	0.080	20.0	20	795	190	76.0



# Cylindrical end mills NV3

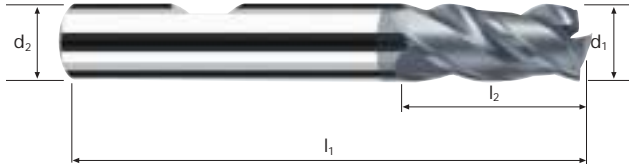
Smooth-edged, normal version



**HM**  
**MG10**      $\lambda$  40°  
                    $\gamma$  0°

45°

**Vario**



Roughing



Finishing



Rm  
< 850

Rm  
850-1100

Rm  
1100-1300

Rm  
1300-1500

Rm  
1500-1700

Rm  
1700-1900

Rm  
1900-2100

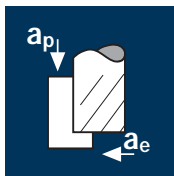
Inox  
Stainless

Ti  
Titanium

GG(G)  
Tool Steel

									POLYCHROM	
Example: Order-N°.									P15333	
									P15233	
Ø Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z			
.180	3	6	57	7	0.10	5.5°	3	●		
.220	4	6	57	8	0.10	4.0°	3	●		
.260	5	6	57	10	0.15	2.0°	3	●		
.300	6	6	57	10	0.15	0.0°	3	●		
.391	8	8	63	16	0.15	0.0°	3	●		
.450	10	10	72	19	0.20	0.0°	3	●		
.501	12	12	83	22	0.20	0.0°	3	●		
.610	16	16	92	26	0.20	0.0°	3	●		
.682	20	20	104	32	0.20	0.0°	3	●		

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	80	0.010	4.5	2.1	8490	255	2.5
4	3	80	0.015	6.0	2.8	6365	285	5.0
5	3	80	0.020	7.5	3.5	5095	305	8.0
6	3	80	0.020	9.0	4.2	4245	255	9.5
8	3	80	0.030	12.0	5.6	3185	285	19.0
10	3	80	0.035	15.0	7.0	2545	265	28.0
12	3	80	0.045	18.0	8.4	2120	285	43.0
16	3	80	0.055	24.0	9.6	1590	260	60.0
20	3	80	0.070	30.0	12.0	1275	270	97.0

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	3	40	0.010	4.5	2.1	4245	125	1.0
4	3	40	0.015	6.0	2.8	3185	145	2.5
5	3	40	0.020	7.5	3.5	2545	155	4.0
6	3	40	0.020	9.0	4.2	2120	125	4.5
8	3	40	0.030	12.0	5.6	1590	145	9.5
10	3	40	0.035	15.0	7.0	1275	135	14.0
12	3	40	0.045	18.0	8.4	1060	145	22.0
16	3	40	0.055	24.0	9.6	795	130	30.0
20	3	40	0.070	30.0	12.0	635	135	48.5

Heat resistant steel  
[17-4 PH]

3	3	25	0.010	4.5	2.1	2655	80	1.0
4	3	25	0.010	6.0	2.8	1990	60	1.0
5	3	25	0.015	7.5	3.5	1590	70	2.0
6	3	25	0.015	9.0	4.2	1325	60	2.5
8	3	25	0.020	12.0	5.6	995	60	4.0
10	3	25	0.025	15.0	7.0	795	60	6.5
12	3	25	0.030	18.0	8.4	665	60	9.0
16	3	25	0.040	24.0	9.6	495	60	14.0
20	3	25	0.055	30.0	12.0	400	65	23.5

Nickel base alloys prec.-hard.  
[Inconel 718]

3	3	15	0.010	4.5	2.1	1590	50	0.5
4	3	15	0.010	6.0	2.8	1195	35	0.5
5	3	15	0.015	7.5	3.5	955	45	1.0
6	3	15	0.015	9.0	4.2	795	35	1.5
8	3	15	0.020	12.0	5.6	595	35	2.5
10	3	15	0.025	15.0	7.0	475	35	3.5
12	3	15	0.030	18.0	8.4	400	35	5.5
16	3	15	0.040	24.0	9.6	300	35	8.0
20	3	15	0.055	30.0	12.0	240	40	14.5

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	60	0.010	4.8	3	6365	190	2.5
4	3	60	0.015	6.4	4	4775	215	5.5
5	3	60	0.015	8.0	5	3820	170	7.0
6	3	60	0.020	9.6	6	3185	190	11.0
8	3	60	0.025	12.8	8	2385	180	18.5
10	3	60	0.030	16.0	10	1910	170	27.0
12	3	60	0.040	19.2	12	1590	190	44.0
16	3	60	0.050	22.4	16	1195	180	64.5
20	3	60	0.065	28.0	20	955	185	103.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	3	30	0.010	4.8	3	3185	95	1.5
4	3	30	0.015	6.4	4	2385	105	2.5
5	3	30	0.015	8.0	5	1910	85	3.5
6	3	30	0.020	9.6	6	1590	95	5.5
8	3	30	0.025	12.8	8	1195	90	9.0
10	3	30	0.030	16.0	10	955	85	13.5
12	3	30	0.040	19.2	12	795	95	22.0
16	3	30	0.050	22.4	16	595	90	32.5
20	3	30	0.065	28.0	20	475	95	53.0

Heat resistant steel  
[17-4 PH]

3	3	20	0.005	4.8	3	2120	30	0.5
4	3	20	0.010	6.4	4	1590	50	1.5
5	3	20	0.010	8.0	5	1275	40	1.5
6	3	20	0.015	9.6	6	1060	50	3.0
8	3	20	0.020	12.8	8	795	50	5.0
10	3	20	0.025	16.0	10	635	50	8.0
12	3	20	0.030	19.2	12	530	50	11.5
16	3	20	0.040	22.4	16	400	50	18.0
20	3	20	0.045	28.0	20	320	45	25.0

Nickel base alloys prec.-hard.  
[Inconel 718]

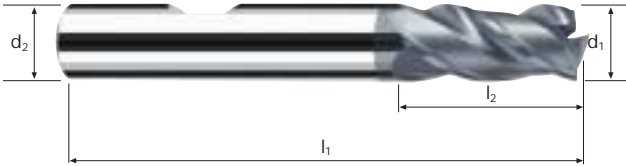
3	3	10	0.005	4.8	3	1060	15	0.2
4	3	10	0.010	6.4	4	795	25	0.5
5	3	10	0.010	8.0	5	635	20	1.0
6	3	10	0.015	9.6	6	530	25	1.5
8	3	10	0.020	12.8	8	400	25	2.5
10	3	10	0.025	16.0	10	320	25	4.0
12	3	10	0.030	19.2	12	265	25	6.0
16	3	10	0.040	22.4	16	200	25	9.0
20	3	10	0.045	28.0	20	160	20	11.0

# Cylindrical end mills NV3

Smooth-edged, normal version



HM  
MG10     $\lambda$  40°  
                   $\gamma$  10°



Roughing



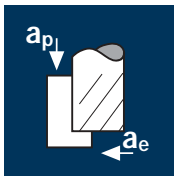
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	Nickel-Alloys Tool Steel
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									POLYCHROM	
Example: Order-N°.									P15334	
									P15234	
Ø Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z			
.180	3	6	57	7	0.10	5.5°	3	●		
.220	4	6	57	8	0.10	4.0°	3	●		
.260	5	6	57	10	0.15	2.0°	3	●		
.300	6	6	57	10	0.15	0.0°	3	●		
.391	8	8	63	16	0.15	0.0°	3	●		
.450	10	10	72	19	0.20	0.0°	3	●		
.501	12	12	83	22	0.20	0.0°	3	●		
.610	16	16	92	26	0.20	0.0°	3	●		
.682	20	20	104	32	0.20	0.0°	3	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	160	0.010	4.5	1.2	16975	680	3.5
4	4	160	0.015	6.0	1.6	12735	765	7.5
5	4	160	0.025	7.5	2.0	10185	1020	15.5
6	4	160	0.025	9.0	2.4	8490	850	18.5
8	4	160	0.035	12.0	3.2	6365	890	34.0
10	4	160	0.045	15.0	4.0	5095	915	55.0
12	4	160	0.050	18.0	4.8	4245	850	73.5
16	4	160	0.065	24.0	6.4	3185	830	127.5
20	4	160	0.085	30.0	8.0	2545	865	207.5

3	4	120	0.010	4.5	1.2	12735	510	3.0
4	4	120	0.015	6.0	1.6	9550	575	5.5
5	4	120	0.025	7.5	2.0	7640	765	11.5
6	4	120	0.025	9.0	2.4	6365	635	13.5
8	4	120	0.035	12.0	3.2	4775	670	25.5
10	4	120	0.045	15.0	4.0	3820	690	41.5
12	4	120	0.050	18.0	4.8	3185	635	55.0
16	4	120	0.065	24.0	6.4	2385	620	95.0
20	4	120	0.085	30.0	8.0	1910	650	156.0

3	4	60	0.010	4.5	1.2	6365	255	1.5
4	4	60	0.015	6.0	1.6	4775	285	2.5
5	4	60	0.020	7.5	2.0	3820	305	4.5
6	4	60	0.025	9.0	2.4	3185	320	7.0
8	4	60	0.030	12.0	3.2	2385	285	11.0
10	4	60	0.040	15.0	4.0	1910	305	18.5
12	4	60	0.050	18.0	4.8	1590	320	27.5
16	4	60	0.060	24.0	6.4	1195	285	44.0
20	4	60	0.075	30.0	8.0	955	285	68.5

3	4	145	0.015	4.5	1.2	15385	925	5.0
4	4	145	0.020	6.0	1.6	11540	925	9.0
5	4	145	0.025	7.5	2.0	9230	925	14.0
6	4	145	0.030	9.0	2.4	7695	925	20.0
8	4	145	0.040	12.0	3.2	5770	925	35.5
10	4	145	0.050	15.0	4.0	4615	925	55.5
12	4	145	0.060	18.0	4.8	3845	925	80.0
16	4	145	0.085	24.0	6.4	2885	980	150.5
20	4	145	0.105	30.0	8.0	2310	970	233.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	145	0.010	3	3	15385	615	5.5
4	4	145	0.010	4	4	11540	460	7.5
5	4	145	0.020	5	5	9230	740	18.5
6	4	145	0.025	6	6	7695	770	27.5
8	4	145	0.030	8	8	5770	690	44.0
10	4	145	0.035	10	10	4615	645	64.5
12	4	145	0.040	12	12	3845	615	88.5
16	4	145	0.050	8	16	2885	575	73.5
20	4	145	0.060	10	20	2310	555	111.0

3	4	95	0.010	3	3	10080	405	3.5
4	4	95	0.010	4	4	7560	300	5.0
5	4	95	0.020	5	5	6050	485	12.0
6	4	95	0.025	6	6	5040	505	18.0
8	4	95	0.030	8	8	3780	455	29.0
10	4	95	0.035	10	10	3025	425	42.5
12	4	95	0.040	12	12	2520	405	58.5
16	4	95	0.050	8	16	1890	380	48.5
20	4	95	0.060	10	20	1510	360	72.0

3	4	45	0.010	3	3	4775	190	1.5
4	4	45	0.010	4	4	3580	145	2.5
5	4	45	0.020	5	5	2865	230	6.0
6	4	45	0.025	6	6	2385	240	8.5
8	4	45	0.030	8	8	1790	215	14.0
10	4	45	0.035	10	10	1430	200	20.0
12	4	45	0.040	12	12	1195	190	27.5
16	4	45	0.050	8	16	895	180	23.0
20	4	45	0.060	10	20	715	170	34.0

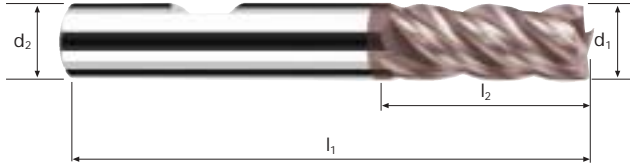
3	4	130	0.010	3	3	13795	550	5.0
4	4	130	0.015	4	4	10345	620	10.0
5	4	130	0.020	5	5	8275	660	16.5
6	4	130	0.025	6	6	6895	690	25.0
8	4	130	0.030	8	8	5175	620	39.5
10	4	130	0.040	10	10	4140	660	66.0
12	4	130	0.040	12	12	3450	550	79.0
16	4	130	0.055	8	16	2585	570	73.0
20	4	130	0.070	10	20	2070	580	116.0

# Cylindrical end mills

Smooth-edged, normal version



**HM  
MG10**     $\lambda$  **40°**  
                   $\gamma$  **6°**



**new!**

Roughing

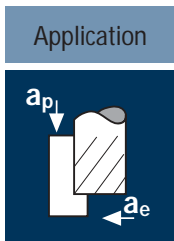


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300						Inox Stainless		GG(G) Nickel-Alloys
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Ø Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z	UNICUT-4X	
								U15320	U15220
								●	
.180	3	6	57	8	0.10	5.5°	4	●	
.220	4	6	57	11	0.10	4.0°	4	●	
.260	5	6	57	13	0.15	2.0°	4	●	
.300	6	6	57	13	0.15	0.0°	4	●	
.391	8	8	63	19	0.15	0.0°	4	●	
.450	10	10	72	22	0.20	0.0°	4	●	
.501	12	12	83	26	0.20	0.0°	4	●	
.610	16	16	92	32	0.20	0.0°	4	●	
.682	20	20	104	38	0.20	0.0°	4	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	170	0.010	4.5	0.3	18040	720
4	4	170	0.015	6.0	0.4	13530	810
5	4	170	0.015	7.5	0.5	10825	650
6	4	170	0.020	9.0	0.6	9020	720
8	4	170	0.025	12.0	0.8	6765	675
10	4	170	0.035	15.0	1.0	5410	755
12	4	170	0.040	18.0	1.2	4510	720
16	4	170	0.055	24.0	1.6	3380	745
20	4	170	0.065	30.0	2.0	2705	705

Steel  
850 - 1100 N/mm<sup>2</sup>

3	4	110	0.010	4.5	0.3	11670	465
4	4	110	0.015	6.0	0.4	8755	525
5	4	110	0.015	7.5	0.5	7005	420
6	4	110	0.020	9.0	0.6	5835	465
8	4	110	0.025	12.0	0.8	4375	440
10	4	110	0.035	15.0	1.0	3500	490
12	4	110	0.040	18.0	1.2	2920	465
16	4	110	0.055	24.0	1.6	2190	480
20	4	110	0.065	30.0	2.0	1750	455

Steel  
1100 - 1300 N/mm<sup>2</sup>

3	4	80	0.010	4.5	0.3	8490	340
4	4	80	0.015	6.0	0.4	6365	380
5	4	80	0.015	7.5	0.5	5095	305
6	4	80	0.020	9.0	0.6	4245	340
8	4	80	0.025	12.0	0.8	3185	320
10	4	80	0.035	15.0	1.0	2545	355
12	4	80	0.040	18.0	1.2	2120	340
16	4	80	0.055	24.0	1.6	1590	350
20	4	80	0.065	30.0	2.0	1275	330

Stainless steel  
[Cr-Ni/1.4301]

3	4	70	0.010	4.5	0.3	7425	295
4	4	70	0.015	6.0	0.4	5570	335
5	4	70	0.015	7.5	0.5	4455	265
6	4	70	0.020	9.0	0.6	3715	295
8	4	70	0.025	12.0	0.8	2785	280
10	4	70	0.035	15.0	1.0	2230	310
12	4	70	0.040	18.0	1.2	1855	295
16	4	70	0.055	24.0	1.6	1395	305
20	4	70	0.065	30.0	2.0	1115	290

Material

Cast iron  
(lamellar / spheroidal)

Unalloyed copper

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

Heat resistant steel  
[17-4 PH]

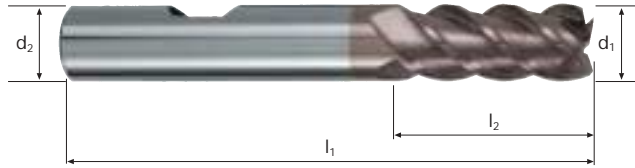
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	130	0.010	4.5	0.3	13795	550
4	4	130	0.015	6.0	0.4	10345	620
5	4	130	0.015	7.5	0.5	8275	495
6	4	130	0.020	9.0	0.6	6895	550
8	4	130	0.025	12.0	0.8	5175	520
10	4	130	0.035	15.0	1.0	4140	580
12	4	130	0.040	18.0	1.2	3450	550
16	4	130	0.055	24.0	1.6	2585	570
20	4	130	0.065	30.0	2.0	2070	540
3	4	230	0.010	4.5	0.3	24405	975
4	4	230	0.015	6.0	0.4	18305	1100
5	4	230	0.015	7.5	0.5	14645	880
6	4	230	0.020	9.0	0.6	12200	975
8	4	230	0.025	12.0	0.8	9150	915
10	4	230	0.035	15.0	1.0	7320	1025
12	4	230	0.040	18.0	1.2	6100	975
16	4	230	0.055	24.0	1.6	4575	1005
20	4	230	0.065	30.0	2.0	3660	950
3	4	80	0.010	4.5	0.3	8490	340
4	4	80	0.015	6.0	0.4	6365	380
5	4	80	0.015	7.5	0.5	5095	305
6	4	80	0.020	9.0	0.6	4245	340
8	4	80	0.025	12.0	0.8	3185	320
10	4	80	0.035	15.0	1.0	2545	355
12	4	80	0.040	18.0	1.2	2120	340
16	4	80	0.055	24.0	1.6	1590	350
20	4	80	0.065	30.0	2.0	1275	330
3	4	40	0.010	4.5	0.3	4245	170
4	4	40	0.015	6.0	0.4	3185	190
5	4	40	0.015	7.5	0.5	2545	155
6	4	40	0.020	9.0	0.6	2120	170
8	4	40	0.025	12.0	0.8	1590	160
10	4	40	0.035	15.0	1.0	1275	180
12	4	40	0.040	18.0	1.2	1060	170
16	4	40	0.055	24.0	1.6	795	175
20	4	40	0.065	30.0	2.0	635	165

# Cylindrical end mills

Smooth-edged, normal version



**HM**  
**MG10**     λ 45°  
                  γ 15°



Roughing



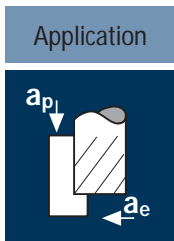
Finishing



**Rm** < 850     **Rm** 850-1100     **Rm** 1100-1300     **Inox** Stainless     **Ti** Titanium     **GG(G) Copper**

Example: Order-N°.									UNICUT-4X	
			Coating <b>U</b>	Article-N°. <b>5340</b>	α-Code <b>.140</b>				<b>U5340</b>	
									<b>U5240</b>	
∅ Code	d1 e8	d2 h6	l1	l2	45°	α	z			
.140	2.0	6	54	7	0.10	7.0°	4	●		
.160	2.5	6	54	8	0.10	6.0°	4	●		
.178*	3.0	3	45	8	0.10	0.0°	4	●		
.180	3.0	6	57	8	0.10	5.5°	4	●		
.218*	4.0	4	50	11	0.10	0.0°	4	●		
.220	4.0	6	57	11	0.10	3.5°	4	●		
.258*	5.0	5	50	13	0.15	0.0°	4	●		
.260	5.0	6	57	13	0.15	2.0°	4	●		
.300	6.0	6	57	13	0.15	0.0°	4	●		
.331	7.0	8	63	16	0.15	1.5°	4	●		
.391	8.0	8	63	19	0.15	0.0°	4	●		
.420	9.0	10	72	19	0.20	1.5°	4	●		
.450	10.0	10	72	22	0.20	0.0°	4	●		
.501	12.0	12	83	26	0.20	0.0°	4	●		
.570	14.0	14	83	26	0.20	0.0°	4	●		
.610	16.0	16	92	32	0.20	0.0°	4	●		
.640	18.0	18	92	32	0.20	0.0°	4	●		
.682	20.0	20	104	38	0.20	0.0°	4	●		

\* without clamping flat only



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	170	0.020	9.0	1.5	9020	720
7	4	170	0.025	10.5	1.8	7730	775
8	4	170	0.025	12.0	2.0	6765	675
10	4	170	0.035	15.0	2.5	5410	755
12	4	170	0.040	18.0	3.0	4510	720
14	4	170	0.045	21.0	3.5	3865	695
16	4	170	0.055	24.0	4.0	3380	745
18	4	170	0.060	27.0	4.5	3005	720
20	4	170	0.065	30.0	5.0	2705	705

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	110	0.020	9.0	1.5	5835	465
7	4	110	0.025	10.5	1.8	5000	500
8	4	110	0.025	12.0	2.0	4375	440
10	4	110	0.035	15.0	2.5	3500	490
12	4	110	0.040	18.0	3.0	2920	465
14	4	110	0.045	21.0	3.5	2500	450
16	4	110	0.055	24.0	4.0	2190	480
18	4	110	0.060	27.0	4.5	1945	465
20	4	110	0.065	30.0	5.0	1750	455

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	80	0.020	9.0	0.6	4245	340
7	4	80	0.025	10.5	0.7	3640	365
8	4	80	0.025	12.0	0.8	3185	320
10	4	80	0.035	15.0	1.0	2545	355
12	4	80	0.040	18.0	1.2	2120	340
14	4	80	0.045	21.0	1.4	1820	330
16	4	80	0.055	24.0	1.6	1590	350
18	4	80	0.060	27.0	1.8	1415	340
20	4	80	0.065	30.0	2.0	1275	330

Cold work t. st. (12% Cr),  
high alloyed [1.2379]  
Stainless steel  
[Cr-Ni/1.4301]

6	4	70	0.020	9.0	1.5	3715	295
7	4	70	0.025	10.5	1.8	3185	320
8	4	70	0.025	12.0	2.0	2785	280
10	4	70	0.035	15.0	2.5	2230	310
12	4	70	0.040	18.0	3.0	1855	295
14	4	70	0.045	21.0	3.5	1590	285
16	4	70	0.055	24.0	4.0	1395	305
18	4	70	0.060	27.0	4.5	1240	300
20	4	70	0.065	30.0	5.0	1115	290

Material

Cast iron  
(lamellar / spheroidal)

Unalloyed copper

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

Heat resistant steel  
[17-4 PH]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	130	0.020	9.0	1.5	6895	550
7	4	130	0.025	10.5	1.8	5910	590
8	4	130	0.025	12.0	2.0	5175	520
10	4	130	0.035	15.0	2.5	4140	580
12	4	130	0.040	18.0	3.0	3450	550
14	4	130	0.045	21.0	3.5	2955	530
16	4	130	0.055	24.0	4.0	2585	570
18	4	130	0.060	27.0	4.5	2300	550
20	4	130	0.065	30.0	5.0	2070	540
6	4	230	0.020	9.0	1.5	12200	975
7	4	230	0.025	10.5	1.8	10460	1045
8	4	230	0.025	12.0	2.0	9150	915
10	4	230	0.035	15.0	2.5	7320	1025
12	4	230	0.040	18.0	3.0	6100	975
14	4	230	0.045	21.0	3.5	5230	940
16	4	230	0.055	24.0	4.0	4575	1005
18	4	230	0.060	27.0	4.5	4065	975
20	4	230	0.065	30.0	5.0	3660	950
6	4	80	0.020	9.0	1.5	4245	340
7	4	80	0.025	10.5	1.8	3640	365
8	4	80	0.025	12.0	2.0	3185	320
10	4	80	0.035	15.0	2.5	2545	355
12	4	80	0.040	18.0	3.0	2120	340
14	4	80	0.045	21.0	3.5	1820	330
16	4	80	0.055	24.0	4.0	1590	350
18	4	80	0.060	27.0	4.5	1415	340
20	4	80	0.065	30.0	5.0	1275	330
6	4	40	0.020	9.0	1.5	2120	170
7	4	40	0.025	10.5	1.8	1820	180
8	4	40	0.025	12.0	2.0	1590	160
10	4	40	0.035	15.0	2.5	1275	180
12	4	40	0.040	18.0	3.0	1060	170
14	4	40	0.045	21.0	3.5	910	165
16	4	40	0.055	24.0	4.0	795	175
18	4	40	0.060	27.0	4.5	705	170
20	4	40	0.065	30.0	5.0	635	165

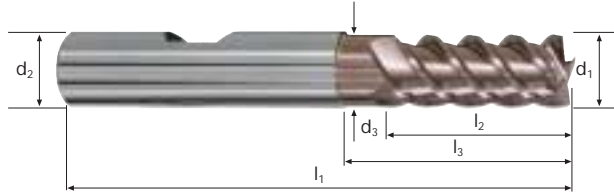


# Cylindrical end mills

Smooth-edged, normal version with short neck



**HM**  
**MG10**   λ **55°**  
                  γ **15°**



Roughing



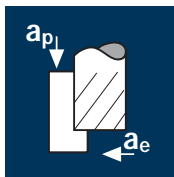
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Gold / Platinum
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∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	α	z	Coating	
										UNICUT-4X	TRIBO
Example: Order-N°.     Coating: <b>U</b> Article-N°: <b>5355</b> α-Code: <b>.300</b>											
<b>.300</b>	6	6	5.5	57	13	20	0.15	0.0°	4	●	●
<b>.331*</b>	7	8	-	63	16	-	0.15	1.5°	4	●	●
<b>.391</b>	8	8	7.4	63	19	26	0.15	0.0°	4	●	●
<b>.420*</b>	9	10	-	72	19	-	0.20	1.5°	4	●	●
<b>.450</b>	10	10	9.2	72	22	31	0.20	0.0°	4	●	●
<b>.470*</b>	11	12	-	83	26	-	0.20	1.0°	4	●	●
<b>.501</b>	12	12	11.0	83	26	37	0.20	0.0°	4	●	●
<b>.570</b>	14	14	13.0	83	26	37	0.20	0.0°	4	●	●
<b>.610</b>	16	16	15.0	92	32	43	0.20	0.0°	4	●	●
<b>.640</b>	18	18	17.9	92	32	43	0.20	0.0°	4	●	●
<b>.682</b>	20	20	19.0	104	38	53	0.20	0.0°	4	●	●
* without short neck only											

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2.0	3	120	0.005	3.0	0.2	19100	285	0.2
2.5	3	120	0.010	3.8	0.3	15280	460	0.4
3.0	3	120	0.010	4.5	0.3	12735	380	0.5
3.5	3	120	0.010	5.3	0.4	10915	325	0.6
4.0	3	120	0.015	6.0	0.4	9550	430	1.0
5.0	3	120	0.015	7.5	0.5	7640	345	1.3
6.0	3	120	0.020	9.0	0.6	6365	380	2.1
7.0	3	120	0.025	10.5	0.7	5455	410	3.0
8.0	3	120	0.025	12.0	0.8	4775	360	3.5

2.0	3	80	0.005	3.0	0.2	12735	190	0.1
2.5	3	80	0.010	3.8	0.3	10185	305	0.3
3.0	3	80	0.010	4.5	0.3	8490	255	0.3
3.5	3	80	0.010	5.3	0.4	7275	220	0.4
4.0	3	80	0.015	6.0	0.4	6365	285	0.7
5.0	3	80	0.015	7.5	0.5	5095	230	0.9
6.0	3	80	0.020	9.0	0.6	4245	255	1.4
7.0	3	80	0.025	10.5	0.7	3640	275	2.0
8.0	3	80	0.025	12.0	0.8	3185	240	2.3

2.0	3	60	0.005	3.0	0.2	9550	145	0.1
2.5	3	60	0.010	3.8	0.3	7640	230	0.2
3.0	3	60	0.010	4.5	0.3	6365	190	0.3
3.5	3	60	0.010	5.3	0.4	5455	165	0.3
4.0	3	60	0.015	6.0	0.4	4775	215	0.5
5.0	3	60	0.015	7.5	0.5	3820	170	0.6
6.0	3	60	0.020	9.0	0.6	3185	190	1.0
7.0	3	60	0.025	10.5	0.7	2730	205	1.5
8.0	3	60	0.025	12.0	0.8	2385	180	1.7

2.0	3	160	0.005	3.0	0.2	25465	380	0.2
2.5	3	160	0.010	3.8	0.3	20370	610	0.6
3.0	3	160	0.010	4.5	0.3	16975	510	0.7
3.5	3	160	0.010	5.3	0.4	14550	435	0.8
4.0	3	160	0.015	6.0	0.4	12735	575	1.4
5.0	3	160	0.015	7.5	0.5	10185	460	1.7
6.0	3	160	0.020	9.0	0.6	8490	510	2.8
7.0	3	160	0.025	10.5	0.7	7275	545	4.0
8.0	3	160	0.025	12.0	0.8	6365	475	4.6

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2.0	3	100	0.005	1.0	2	15915	240	0.5
2.5	3	100	0.005	1.3	3	12735	190	0.5
3.0	3	100	0.010	1.5	3	10610	320	1.5
3.5	3	100	0.010	1.8	4	9095	275	1.5
4.0	3	100	0.010	2.0	4	7960	240	2.0
5.0	3	100	0.015	2.5	5	6365	285	3.5
6.0	3	100	0.015	3.0	6	5305	240	4.5
7.0	3	100	0.020	3.5	7	4545	275	6.5
8.0	3	100	0.020	4.0	8	3980	240	7.5

2.0	3	70	0.005	1.0	2	11140	165	0.5
2.5	3	70	0.005	1.3	3	8915	135	0.5
3.0	3	70	0.010	1.5	3	7425	225	1.0
3.5	3	70	0.010	1.8	4	6365	190	1.0
4.0	3	70	0.010	2.0	4	5570	165	1.5
5.0	3	70	0.015	2.5	5	4455	200	2.5
6.0	3	70	0.015	3.0	6	3715	165	3.0
7.0	3	70	0.020	3.5	7	3185	190	4.5
8.0	3	70	0.020	4.0	8	2785	165	5.5

2.0	3	40	0.005	1.0	2	6365	95	0.2
2.5	3	40	0.005	1.3	3	5095	75	0.2
3.0	3	40	0.010	1.5	3	4245	125	0.5
3.5	3	40	0.010	1.8	4	3640	110	0.5
4.0	3	40	0.010	2.0	4	3185	95	1.0
5.0	3	40	0.015	2.5	5	2545	115	1.5
6.0	3	40	0.015	3.0	6	2120	95	1.5
7.0	3	40	0.020	3.5	7	1820	110	2.5
8.0	3	40	0.020	4.0	8	1590	95	3.0

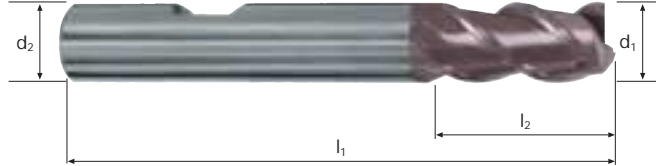
2.0	3	120	0.005	1.0	2	19100	285	0.5
2.5	3	120	0.010	1.3	3	15280	460	1.5
3.0	3	120	0.010	1.5	3	12735	380	1.5
3.5	3	120	0.010	1.8	4	10915	325	2.0
4.0	3	120	0.010	2.0	4	9550	285	2.5
5.0	3	120	0.015	2.5	5	7640	345	4.5
6.0	3	120	0.020	3.0	6	6365	380	7.0
7.0	3	120	0.020	3.5	7	5455	325	8.0
8.0	3	120	0.025	4.0	8	4775	360	11.5

# Cylindrical end mills

Smooth-edged, normal version



**HM**  
**MG10**     $\lambda$  45°  
                   $\gamma$  15°



Roughing



Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless		<b>GG(G)</b> Copper
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Example: Order-N°.		Coating <b>U</b>	Article-N°. <b>5330</b>	$\alpha$ -Code <b>.140</b>					<b>UNICUT-4X</b>
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z	<b>5330</b>	<b>U5330</b>
.138*	2.0	2.0	42	6	0.10	0.0°	3	●	●
.140	2.0	6.0	54	6	0.10	7.0°	3	●	●
.158*	2.5	2.5	42	7	0.10	0.0°	3	●	●
.160	2.5	6.0	54	6	0.10	6.5°	3	●	●
.178*	3.0	3.0	45	7	0.10	0.0°	3	●	●
.180	3.0	6.0	57	7	0.10	5.5°	3	●	●
.198*	3.5	3.5	50	7	0.10	0.0°	3	●	●
.200	3.5	6.0	57	7	0.10	5.0°	3	●	●
.218*	4.0	4.0	50	8	0.10	0.0°	3	●	●
.220	4.0	6.0	57	8	0.10	4.0°	3	●	●
.238*	4.5	4.5	50	8	0.15	0.0°	3	●	●
.240	4.5	6.0	57	8	0.10	3.5°	3	●	●
.258*	5.0	5.0	50	10	0.15	0.0°	3	●	●
.260	5.0	6.0	57	10	0.15	2.0°	3	●	●
.278*	5.5	5.5	57	10	0.15	0.0°	3	●	●
.280	5.5	6.0	57	10	0.15	1.5°	3	●	●
.300	6.0	6.0	57	10	0.15	0.0°	3	●	●
.322	6.5	8.0	63	13	0.15	2.5°	3	●	●
.331	7.0	8.0	63	13	0.15	2.0°	3	●	●
.362	7.5	8.0	63	16	0.15	1.0°	3	●	●
.391	8.0	8.0	63	16	0.15	0.0°	3	●	●
* without clamping flat only									

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	9	3	120	0.030	13.5	0.9	4245	380	4.5
		10	3	120	0.035	15.0	1.0	3820	400	6.0
		12	3	120	0.040	18.0	1.2	3185	380	8.0
		14	3	120	0.045	21.0	1.4	2730	370	11.0
		16	3	120	0.055	24.0	1.6	2385	395	15.0
		18	3	120	0.060	27.0	1.8	2120	380	18.5
		20	3	120	0.065	30.0	2.0	1910	370	22.0
		22	3	120	0.075	33.0	2.2	1735	390	28.5
		25	3	120	0.085	37.5	2.5	1530	390	36.5
		Steel 850 - 1100 N/mm <sup>2</sup> 	9	3	80	0.030	13.5	0.9	2830	255
10	3		80	0.035	15.0	1.0	2545	265	4.0	
12	3		80	0.040	18.0	1.2	2120	255	5.5	
14	3		80	0.045	21.0	1.4	1820	245	7.0	
16	3		80	0.055	24.0	1.6	1590	260	10.0	
18	3		80	0.060	27.0	1.8	1415	255	12.5	
20	3		80	0.065	30.0	2.0	1275	250	15.0	
22	3		80	0.075	33.0	2.2	1160	260	19.0	
25	3		80	0.085	37.5	2.5	1020	260	24.5	
Stainless steel [Cr-Ni/1.4301] 	9		3	60	0.030	13.5	0.9	2120	190	2.5
	10	3	60	0.035	15.0	1.0	1910	200	3.0	
	12	3	60	0.040	18.0	1.2	1590	190	4.0	
	14	3	60	0.045	21.0	1.4	1365	185	5.5	
	16	3	60	0.055	24.0	1.6	1195	195	7.5	
	18	3	60	0.060	27.0	1.8	1060	190	9.0	
	20	3	60	0.065	30.0	2.0	955	185	11.0	
	22	3	60	0.075	33.0	2.2	870	195	14.0	
	25	3	60	0.085	37.5	2.5	765	195	18.5	
	Cast iron (lamellar / spheroidal) 	9	3	160	0.030	13.5	0.9	5660	510	6.0
10		3	160	0.035	15.0	1.0	5095	535	8.0	
12		3	160	0.040	18.0	1.2	4245	510	11.0	
14		3	160	0.045	21.0	1.4	3640	490	14.5	
16		3	160	0.055	24.0	1.6	3185	525	20.0	
18		3	160	0.060	27.0	1.8	2830	510	25.0	
20		3	160	0.065	30.0	2.0	2545	495	29.5	
22		3	160	0.075	33.0	2.2	2315	520	38.0	
25		3	160	0.085	37.5	2.5	2035	520	49.0	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	9	3	100	0.025	4.5	9	3535	265	10.5
		10	3	100	0.030	5.0	10	3185	285	14.5
		12	3	100	0.035	6.0	12	2655	280	20.0
		14	3	100	0.040	7.0	14	2275	275	27.0
		16	3	100	0.045	8.0	16	1990	270	34.5
		18	3	100	0.050	9.0	18	1770	265	43.0
		20	3	100	0.055	10.0	20	1590	260	52.0
		22	3	100	0.060	11.0	22	1445	260	63.0
		25	3	100	0.070	12.5	25	1275	270	84.5
		Steel 850 - 1100 N/mm <sup>2</sup> 	9	3	70	0.025	4.5	9	2475	185
10	3		70	0.025	5.0	10	2230	165	8.5	
12	3		70	0.030	6.0	12	1855	165	12.0	
14	3		70	0.035	7.0	14	1590	165	16.0	
16	3		70	0.040	8.0	16	1395	165	21.0	
18	3		70	0.045	9.0	18	1240	165	26.5	
20	3		70	0.050	10.0	20	1115	165	33.0	
22	3		70	0.055	11.0	22	1015	165	40.0	
25	3		70	0.065	12.5	25	890	175	54.5	
Stainless steel [Cr-Ni/1.4301] 	9		3	40	0.025	4.5	9	1415	105	4.5
	10	3	40	0.025	5.0	10	1275	95	5.0	
	12	3	40	0.030	6.0	12	1060	95	7.0	
	14	3	40	0.035	7.0	14	910	95	9.5	
	16	3	40	0.040	8.0	16	795	95	12.0	
	18	3	40	0.045	9.0	18	705	95	15.5	
	20	3	40	0.050	10.0	20	635	95	19.0	
	22	3	40	0.055	11.0	22	580	95	23.0	
	25	3	40	0.065	12.5	25.0	510	100	31.5	
	Cast iron (lamellar / spheroidal) 	9	3	120	0.030	4.5	9	4245	380	15.5
10		3	120	0.030	5.0	10	3820	345	17.5	
12		3	120	0.035	6.0	12	3185	335	24.0	
14		3	120	0.045	7.0	14	2730	370	36.5	
16		3	120	0.050	8.0	16	2385	360	46.0	
18		3	120	0.055	9.0	18	2120	350	56.5	
20		3	120	0.060	10.0	20	1910	345	69.0	
22		3	120	0.065	11.0	22	1735	340	82.5	
25		3	120	0.075	12.5	25	1530	345	108.0	

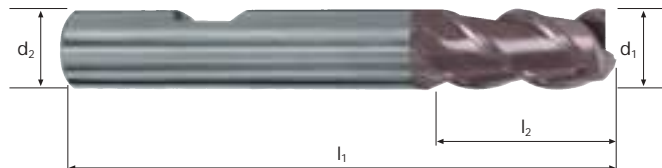
# Cylindrical end mills

Smooth-edged, normal version



**HM**  
**MG10**

$\lambda$  45°  
 $\gamma$  15°



Roughing

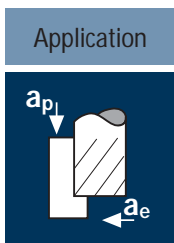


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless		GG(G) Copper
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Example: Order-N°.		Coating U		Article-N°. 5330		α-Code .410		UNICUT-4X	
∅ Code	d1 e8	d2 h6	l1	l2	45°	α	Z	5330	U5330
.410	8.5	10.0	72	16	0.20	2.0°	3	●	●
.420	9.0	10.0	72	16	0.20	1.5°	3	●	●
.430	9.5	10.0	72	19	0.20	1.0°	3	●	●
.450	10.0	10.0	72	19	0.20	0.0°	3	●	●
.470	11.0	12.0	83	22	0.20	1.5°	3	●	●
.501	12.0	12.0	83	22	0.20	0.0°	3	●	●
.540	13.0	14.0	83	22	0.20	1.5°	3	●	●
.570	14.0	14.0	83	22	0.20	0.0°	3	●	●
.581	15.0	16.0	92	26	0.20	1.0°	3	●	●
.610	16.0	16.0	92	26	0.20	0.0°	3	●	●
.640	18.0	18.0	92	26	0.20	0.0°	3	●	●
.682	20.0	20.0	104	32	0.20	0.0°	3	●	●
.710	22.0	20.0	104	38	0.25	0.0°	3	●	●
.772	25.0	25.0	121	45	0.25	0.0°	3	●	●



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2.0	3	120	0.005	3.0	0.2	19100	285	0.2
2.5	3	120	0.010	3.8	0.3	15280	460	0.4
3.0	3	120	0.010	4.5	0.3	12735	380	0.5
4.0	3	120	0.015	6.0	0.4	9550	430	1.0
5.0	3	120	0.015	7.5	0.5	7640	345	1.3
6.0	3	120	0.020	9.0	0.6	6365	380	2.1
8.0	3	120	0.025	12.0	0.8	4775	360	3.5
10.0	3	120	0.035	15.0	1.0	3820	400	6.0
12.0	3	120	0.040	18.0	1.2	3185	380	8.2

Steel  
850 - 1100 N/mm<sup>2</sup>

2.0	3	80	0.005	3.0	0.2	12735	190	0.1
2.5	3	80	0.010	3.8	0.3	10185	305	0.3
3.0	3	80	0.010	4.5	0.3	8490	255	0.3
4.0	3	80	0.015	6.0	0.4	6365	285	0.7
5.0	3	80	0.015	7.5	0.5	5095	230	0.9
6.0	3	80	0.020	9.0	0.6	4245	255	1.4
8.0	3	80	0.025	12.0	0.8	3185	240	2.3
10.0	3	80	0.035	15.0	1.0	2545	265	4.0
12.0	3	80	0.040	18.0	1.2	2120	255	5.5

Stainless steel  
[Cr-Ni/1.4301]

2.0	3	60	0.005	3.0	0.2	9550	145	0.1
2.5	3	60	0.010	3.8	0.3	7640	230	0.2
3.0	3	60	0.010	4.5	0.3	6365	190	0.3
4.0	3	60	0.015	6.0	0.4	4775	215	0.5
5.0	3	60	0.015	7.5	0.5	3820	170	0.6
6.0	3	60	0.020	9.0	0.6	3185	190	1.0
8.0	3	60	0.025	12.0	0.8	2385	180	1.7
10.0	3	60	0.035	15.0	1.0	1910	200	3.0
12.0	3	60	0.040	18.0	1.2	1590	190	4.1

Cast iron  
(lamellar / spheroidal)

2.0	3	160	0.005	3.0	0.2	25465	380	0.2
2.5	3	160	0.010	3.8	0.3	20370	610	0.6
3.0	3	160	0.010	4.5	0.3	16975	510	0.7
4.0	3	160	0.015	6.0	0.4	12735	575	1.4
5.0	3	160	0.015	7.5	0.5	10185	460	1.7
6.0	3	160	0.020	9.0	0.6	8490	510	2.8
8.0	3	160	0.025	12.0	0.8	6365	475	4.6
10.0	3	160	0.035	15.0	1.0	5095	535	8.0
12.0	3	160	0.040	18.0	1.2	4245	510	11.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2.0	3	100	0.005	1.0	2.0	15915	240	0.5
2.5	3	100	0.005	1.3	2.5	12735	190	0.5
3.0	3	100	0.010	1.5	3.0	10610	320	1.5
4.0	3	100	0.010	2.0	4.0	7960	240	2.0
5.0	3	100	0.015	2.5	5.0	6365	285	3.5
6.0	3	100	0.015	3.0	6.0	5305	240	4.5
8.0	3	100	0.020	4.0	8.0	3980	240	7.5
10.0	3	100	0.030	5.0	10.0	3185	285	14.5
12.0	3	100	0.035	6.0	12.0	2655	280	20.0

Steel  
850 - 1100 N/mm<sup>2</sup>

2.0	3	70	0.005	1.0	2.0	11140	165	0.5
2.5	3	70	0.005	1.3	2.5	8915	135	0.5
3.0	3	70	0.010	1.5	3.0	7425	225	1.0
4.0	3	70	0.010	2.0	4.0	5570	165	1.5
5.0	3	70	0.015	2.5	5.0	4455	200	2.5
6.0	3	70	0.015	3.0	6.0	3715	165	3.0
8.0	3	70	0.020	4.0	8.0	2785	165	5.5
10.0	3	70	0.025	5.0	10.0	2230	165	8.5
12.0	3	70	0.030	6.0	12.0	1855	165	12.0

Stainless steel  
[Cr-Ni/1.4301]

2.0	3	40	0.005	1.0	2.0	6365	95	0.2
2.5	3	40	0.005	1.3	2.5	5095	75	0.2
3.0	3	40	0.010	1.5	3.0	4245	125	0.5
4.0	3	40	0.010	2.0	4.0	3185	95	1.0
5.0	3	40	0.015	2.5	5.0	2545	115	1.5
6.0	3	40	0.015	3.0	6.0	2120	95	1.5
8.0	3	40	0.020	4.0	8.0	1590	95	3.0
10.0	3	40	0.025	5.0	10.0	1275	95	5.0
12.0	3	40	0.030	6.0	12.0	1060	95	7.0

Cast iron  
(lamellar / spheroidal)

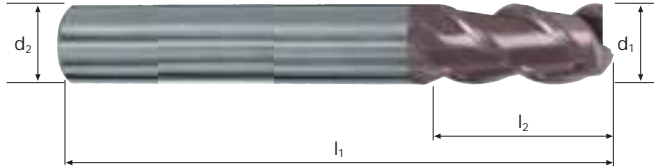
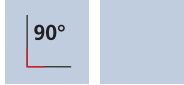
2.0	3	120	0.005	1.0	2.0	19100	285	0.5
2.5	3	120	0.010	1.3	2.5	15280	460	1.5
3.0	3	120	0.010	1.5	3.0	12735	380	1.5
4.0	3	120	0.010	2.0	4.0	9550	285	2.5
5.0	3	120	0.015	2.5	5.0	7640	345	4.5
6.0	3	120	0.020	3.0	6.0	6365	380	7.0
8.0	3	120	0.025	4.0	8.0	4775	360	11.5
10.0	3	120	0.030	5.0	10.0	3820	345	17.5
12.0	3	120	0.035	6.0	12.0	3185	335	24.0

# Cylindrical end mills

Smooth-edged, normal version



**HM**  
**MG10**     $\lambda$  45°  
                   $\gamma$  15°



Roughing

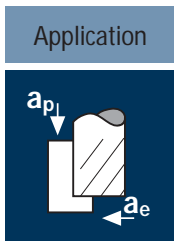


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless		<b>GG(G)</b> Copper
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Example: Order-N°.		Coating <b>U</b>	Article-N°. <b>15230</b>	$\alpha$ -Code <b>.140</b>						UNICUT-4X
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	$\alpha$	Z				
.140	2.0	6	54	6	7.0°	3	●		●	
.160	2.5	6	54	6	6.5°	3	●		●	
.180	3.0	6	57	7	5.5°	3	●		●	
.200	3.5	6	57	7	5.0°	3	●		●	
.220	4.0	6	57	8	4.0°	3	●		●	
.240	4.5	6	57	8	3.5°	3	●		●	
.260	5.0	6	57	10	2.0°	3	●		●	
.280	5.5	6	57	10	1.5°	3	●		●	
.300	6.0	6	57	10	0.0°	3	●		●	
.391	8.0	8	63	16	0.0°	3	●		●	
.450	10.0	10	72	19	0.0°	3	●		●	
.501	12.0	12	83	22	0.0°	3	●		●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	180	0.010	4.5	1.4	19100	575	3.5
4	3	180	0.015	6.0	1.8	14325	645	7.0
5	3	180	0.015	7.5	2.3	11460	515	8.5
6	3	180	0.035	9.0	2.7	9550	1005	24.5
8	3	180	0.045	12.0	3.6	7160	965	41.5
10	3	180	0.055	15.0	4.5	5730	945	64.0
12	3	180	0.065	18.0	5.4	4775	930	90.5
16	3	180	0.085	24.0	7.2	3580	915	158.0
20	3	180	0.110	30.0	9.0	2865	945	255.0

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	120	0.010	4.5	1.4	12735	380	2.5
4	3	120	0.015	6.0	1.8	9550	430	4.5
5	3	120	0.015	7.5	2.3	7640	345	6.0
6	3	120	0.035	9.0	2.7	6365	670	16.5
8	3	120	0.045	12.0	3.6	4775	645	28.0
10	3	120	0.055	15.0	4.5	3820	630	42.5
12	3	120	0.065	18.0	5.4	3185	620	60.5
16	3	120	0.085	24.0	7.2	2385	610	105.5
20	3	120	0.110	30.0	9.0	1910	630	170.0

Stainless steel  
[Cr-Ni/1.4301]

3	3	60	0.005	4.5	1.4	6365	95	0.5
4	3	60	0.010	6.0	1.8	4775	145	1.5
5	3	60	0.010	7.5	2.3	3820	115	2.0
6	3	60	0.025	9.0	2.7	3185	240	6.0
8	3	60	0.030	12.0	3.6	2385	215	9.5
10	3	60	0.040	15.0	4.5	1910	230	15.5
12	3	60	0.045	18.0	5.4	1590	215	21.0
16	3	60	0.060	24.0	7.2	1195	215	37.0
20	3	60	0.075	30.0	9.0	955	215	58.0

Cast iron  
(lamellar / spheroidal)

3	3	180	0.010	4.5	1.4	19100	575	3.5
4	3	180	0.015	6.0	1.8	14325	645	7.0
5	3	180	0.015	7.5	2.3	11460	515	8.5
6	3	180	0.035	9.0	2.7	9550	1005	24.5
8	3	180	0.045	12.0	3.6	7160	965	41.5
10	3	180	0.055	15.0	4.5	5730	945	64.0
12	3	180	0.065	18.0	5.4	4775	930	90.5
16	3	180	0.085	24.0	7.2	3580	915	158.0
20	3	180	0.110	30.0	9.0	2865	945	255.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	160	0.010	4.5	3	16975	510	7.0
4	3	160	0.015	6.0	4	12735	575	14.0
5	3	160	0.020	7.5	5	10185	610	23.0
6	3	160	0.025	9.0	6	8490	635	34.5
8	3	160	0.035	12.0	8	6365	670	64.5
10	3	160	0.040	15.0	10	5095	610	91.5
12	3	160	0.050	18.0	12	4245	635	137.0
16	3	160	0.065	16.0	16	3185	620	158.5
20	3	160	0.085	20.0	20	2545	650	260.0

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	100	0.010	4.5	3	10610	320	4.5
4	3	100	0.015	6.0	4	7960	360	8.5
5	3	100	0.020	7.5	5	6365	380	14.5
6	3	100	0.025	9.0	6	5305	400	21.5
8	3	100	0.035	12.0	8	3980	420	40.5
10	3	100	0.040	15.0	10	3185	380	57.0
12	3	100	0.050	18.0	12	2655	400	86.5
16	3	100	0.065	16.0	16	1990	390	100.0
20	3	100	0.085	20.0	20	1590	405	162.0

Stainless steel  
[Cr-Ni/1.4301]

3	3	40	0.005	4.5	3	4245	65	1.0
4	3	40	0.010	6.0	4	3185	95	2.5
5	3	40	0.015	7.5	5	2545	115	4.5
6	3	40	0.020	9.0	6	2120	125	7.0
8	3	40	0.025	12.0	8	1590	120	11.5
10	3	40	0.030	15.0	10	1275	115	17.5
12	3	40	0.035	18.0	12	1060	110	24.0
16	3	40	0.045	16.0	16	795	105	27.0
20	3	40	0.060	20.0	20	635	115	46.0

Cast iron  
(lamellar / spheroidal)

3	3	160	0.010	4.5	3	16975	510	7.0
4	3	160	0.010	6.0	4	12735	380	9.0
5	3	160	0.015	7.5	5	10185	460	17.5
6	3	160	0.025	9.0	6	8490	635	34.5
8	3	160	0.035	12.0	8	6365	670	64.5
10	3	160	0.045	15.0	10	5095	690	103.5
12	3	160	0.055	18.0	12	4245	700	151.0
16	3	160	0.075	16.0	16	3185	715	183.0
20	3	160	0.090	20.0	20	2545	685	274.0

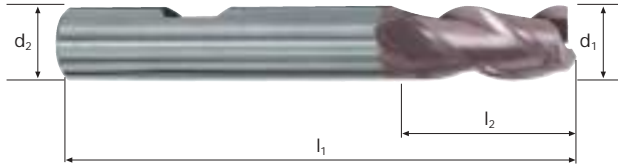


# Cylindrical end mills

Smooth-edged, normal version



HM  
MG10    λ 40°  
          γ 5°



Roughing



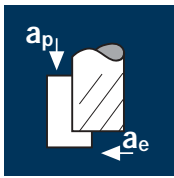
Finishing



Rm < 850    Rm 850-1100    Rm 1100-1300    Rm 1300-1500    Inox Stainless    Ti Titanium    GG(G)

		Coating		Article-N°		α-Code				UNICUT-4X	
Example: Order-N°.		U		5331		.180				U5331	
										U5231	
∅ Code	d1 e8	d2 h6	l1	l2	45°	α	z				
.180	3	6	57	7	0.10	5.5°	3	●			
.220	4	6	57	8	0.10	4.0°	3	●			
.260	5	6	57	10	0.15	2.0°	3	●			
.300	6	6	57	10	0.15	0.0°	3	●			
.391	8	8	63	16	0.15	0.0°	3	●			
.450	10	10	72	19	0.20	0.0°	3	●			
.501	12	12	83	22	0.20	0.0°	3	●			
.610	16	16	92	26	0.20	0.0°	3	●			
.682	20	20	104	32	0.20	0.0°	3	●			

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	120	0.010	3	1.4	12735	255	1.0
4	2	120	0.015	4	1.8	9550	285	2.0
5	2	120	0.020	5	2.3	7640	305	3.5
6	2	120	0.025	6	2.7	6365	320	5.0
8	2	120	0.030	8	3.6	4775	285	8.0
10	2	120	0.040	10	4.5	3820	305	13.5
12	2	120	0.050	12	5.4	3185	320	20.5
16	2	120	0.065	16	7.2	2385	310	35.5
20	2	120	0.080	20	9.0	1910	305	55.0

3	2	80	0.010	3	1.4	8490	170	0.5
4	2	80	0.015	4	1.8	6365	190	1.5
5	2	80	0.020	5	2.3	5095	205	2.5
6	2	80	0.020	6	2.7	4245	170	3.0
8	2	80	0.030	8	3.6	3185	190	5.5
10	2	80	0.035	10	4.5	2545	180	8.0
12	2	80	0.045	12	5.4	2120	190	12.5
16	2	80	0.060	16	7.2	1590	190	22.0
20	2	80	0.070	20	9.0	1275	180	32.5

3	2	60	0.010	3	1.4	6365	125	0.5
4	2	60	0.015	4	1.8	4775	145	1.0
5	2	60	0.020	5	2.3	3820	155	1.5
6	2	60	0.020	6	2.7	3185	125	2.0
8	2	60	0.030	8	3.6	2385	145	4.0
10	2	60	0.035	10	4.5	1910	135	6.0
12	2	60	0.045	12	5.4	1590	145	9.5
16	2	60	0.060	16	7.2	1195	145	16.5
20	2	60	0.070	20	9.0	955	135	24.5

3	2	160	0.015	3	1.4	16975	510	2.0
4	2	160	0.020	4	1.8	12735	510	3.5
5	2	160	0.020	5	2.3	10185	405	4.5
6	2	160	0.025	6	2.7	8490	425	7.0
8	2	160	0.035	8	3.6	6365	445	13.0
10	2	160	0.045	10	4.5	5095	460	20.5
12	2	160	0.055	12	5.4	4245	465	30.0
16	2	160	0.070	16	7.2	3185	445	51.5
20	2	160	0.090	20	9.0	2545	460	83.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	100	0.010	1.5	3	10610	210	1.0
4	2	100	0.010	2.0	4	7960	160	1.5
5	2	100	0.015	2.5	5	6365	190	2.5
6	2	100	0.015	3.0	6	5305	160	3.0
8	2	100	0.020	4.0	8	3980	160	5.0
10	2	100	0.030	5.0	10	3185	190	9.5
12	2	100	0.035	6.0	12	2655	185	13.5
16	2	100	0.045	8.0	16	1990	180	23.0
20	2	100	0.055	10.0	20	1590	175	35.0

3	2	70	0.010	1.5	3	7425	150	0.5
4	2	70	0.010	2.0	4	5570	110	1.0
5	2	70	0.015	2.5	5	4455	135	1.5
6	2	70	0.015	3.0	6	3715	110	2.0
8	2	70	0.020	4.0	8	2785	110	3.5
10	2	70	0.025	5.0	10	2230	110	5.5
12	2	70	0.030	6.0	12	1855	110	8.0
16	2	70	0.040	8.0	16	1395	110	14.0
20	2	70	0.050	10.0	20	1115	110	22.0

3	2	40	0.010	1.5	3	4245	85	0.5
4	2	40	0.010	2.0	4	3185	65	0.5
5	2	40	0.015	2.5	5	2545	75	1.0
6	2	40	0.015	3.0	6	2120	65	1.0
8	2	40	0.020	4.0	8	1590	65	2.0
10	2	40	0.025	5.0	10	1275	65	3.5
12	2	40	0.030	6.0	12	1060	65	4.5
16	2	40	0.040	8.0	16	795	65	8.5
20	2	40	0.050	10.0	20	635	65	13.0

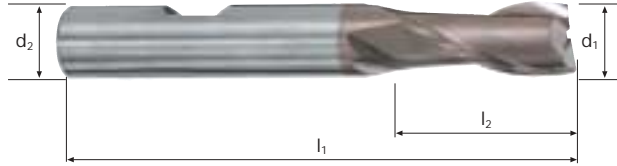
3	2	120	0.010	1.5	3	12735	255	1.0
4	2	120	0.010	2.0	4	9550	190	1.5
5	2	120	0.015	2.5	5	7640	230	3.0
6	2	120	0.020	3.0	6	6365	255	4.5
8	2	120	0.025	4.0	8	4775	240	7.5
10	2	120	0.030	5.0	10	3820	230	11.5
12	2	120	0.035	6.0	12	3185	225	16.0
16	2	120	0.050	8.0	16	2385	240	30.5
20	2	120	0.060	10.0	20	1910	230	46.0

# Cylindrical end mills

Smooth-edged, normal version



**HM**  
**MG10**     $\lambda$  30°  
                   $\gamma$  12°



Roughing



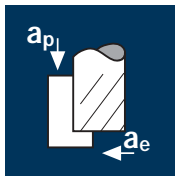
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless		<b>GG(G)</b> Copper
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Example: Order-N°.		Coating <b>U</b>	Article-N°. <b>5300</b>	$\alpha$ -Code <b>.140</b>						UNICUT-4X	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z				
.138*	2.0	2.0	42	6	0.10	0.0°	2	●			
.140	2.0	6.0	54	6	0.10	7.0°	2	●			
.158*	2.5	2.5	42	7	0.10	0.0°	2	●			
.160	2.5	6.0	54	6	0.10	6.5°	2	●			
.178*	3.0	3.0	45	7	0.10	0.0°	2	●			
.180	3.0	6.0	57	7	0.10	5.5°	2	●			
.200	3.5	6.0	57	7	0.10	5.0°	2	●			
.218*	4.0	4.0	50	8	0.10	0.0°	2	●			
.220	4.0	6.0	57	8	0.10	4.0°	2	●			
.240	4.5	6.0	57	8	0.15	3.5°	2	●			
.258*	5.0	5.0	50	10	0.15	0.0°	2	●			
.260	5.0	6.0	57	10	0.15	2.0°	2	●			
.280	5.5	6.0	57	10	0.15	1.5°	2	●			
.300	6.0	6.0	57	10	0.15	0.0°	2	●			
.331	7.0	8.0	63	13	0.15	2.0°	2	●			
.391	8.0	8.0	63	16	0.15	0.0°	2	●			
.420	9.0	10.0	72	16	0.20	1.5°	2	●			
.450	10.0	10.0	72	19	0.20	0.0°	2	●			
.501	12.0	12.0	83	22	0.20	0.0°	2	●			
.610	16.0	16.0	92	26	0.20	0.0°	2	●			
.682	20.0	20.0	104	32	0.20	0.0°	2	●			
* without clamping flat only											

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	160	0.010	4.5	1.2	16975	680	3.5
4	4	160	0.015	6.0	1.6	12735	765	7.5
5	4	160	0.025	7.5	2.0	10185	1020	15.5
6	4	160	0.025	9.0	2.4	8490	850	18.5
8	4	160	0.035	12.0	3.2	6365	890	34.0
10	4	160	0.045	15.0	4.0	5095	915	55.0
12	4	160	0.050	18.0	4.8	4245	850	73.5
16	4	160	0.065	24.0	6.4	3185	830	127.5
20	4	160	0.085	30.0	8.0	2545	865	207.5

Steel  
850 - 1100 N/mm<sup>2</sup>

3	4	120	0.010	4.5	1.2	12735	510	3.0
4	4	120	0.015	6.0	1.6	9550	575	5.5
5	4	120	0.025	7.5	2.0	7640	765	11.5
6	4	120	0.025	9.0	2.4	6365	635	13.5
8	4	120	0.035	12.0	3.2	4775	670	25.5
10	4	120	0.045	15.0	4.0	3820	690	41.5
12	4	120	0.050	18.0	4.8	3185	635	55.0
16	4	120	0.065	24.0	6.4	2385	620	95.0
20	4	120	0.085	30.0	8.0	1910	650	156.0

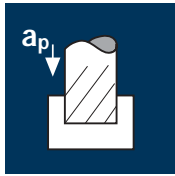
Stainless steel  
[Cr-Ni/1.4301]

3	4	60	0.010	4.5	1.2	6365	255	1.5
4	4	60	0.015	6.0	1.6	4775	285	2.5
5	4	60	0.020	7.5	2.0	3820	305	4.5
6	4	60	0.025	9.0	2.4	3185	320	7.0
8	4	60	0.030	12.0	3.2	2385	285	11.0
10	4	60	0.040	15.0	4.0	1910	305	18.5
12	4	60	0.050	18.0	4.8	1590	320	27.5
16	4	60	0.060	24.0	6.4	1195	285	44.0
20	4	60	0.075	30.0	8.0	955	285	68.5

Cast iron  
(lamellar / spheroidal)

3	4	145	0.015	4.5	1.2	15385	925	5.0
4	4	145	0.020	6.0	1.6	11540	925	9.0
5	4	145	0.025	7.5	2.0	9230	925	14.0
6	4	145	0.030	9.0	2.4	7695	925	20.0
8	4	145	0.040	12.0	3.2	5770	925	35.5
10	4	145	0.050	15.0	4.0	4615	925	55.5
12	4	145	0.060	18.0	4.8	3845	925	80.0
16	4	145	0.085	24.0	6.4	2885	980	150.5
20	4	145	0.105	30.0	8.0	2310	970	233.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	145	0.010	3	3	15385	615	5.5
4	4	145	0.010	4	4	11540	460	7.5
5	4	145	0.020	5	5	9230	740	18.5
6	4	145	0.025	6	6	7695	770	27.5
8	4	145	0.030	8	8	5770	690	44.0
10	4	145	0.035	10	10	4615	645	64.5
12	4	145	0.040	12	12	3845	615	88.5
16	4	145	0.050	8	16	2885	575	73.5
20	4	145	0.060	10	20	2310	555	111.0

Steel  
850 - 1100 N/mm<sup>2</sup>

3	4	95	0.010	3	3	10080	405	3.5
4	4	95	0.010	4	4	7560	300	5.0
5	4	95	0.020	5	5	6050	485	12.0
6	4	95	0.025	6	6	5040	505	18.0
8	4	95	0.030	8	8	3780	455	29.0
10	4	95	0.035	10	10	3025	425	42.5
12	4	95	0.040	12	12	2520	405	58.5
16	4	95	0.050	8	16	1890	380	48.5
20	4	95	0.060	10	20	1510	360	72.0

Stainless steel  
[Cr-Ni/1.4301]

3	4	45	0.010	3	3	4775	190	1.5
4	4	45	0.010	4	4	3580	145	2.5
5	4	45	0.020	5	5	2865	230	6.0
6	4	45	0.025	6	6	2385	240	8.5
8	4	45	0.030	8	8	1790	215	14.0
10	4	45	0.035	10	10	1430	200	20.0
12	4	45	0.040	12	12	1195	190	27.5
16	4	45	0.050	8	16	895	180	23.0
20	4	45	0.060	10	20	715	170	34.0

Cast iron  
(lamellar / spheroidal)

3	4	130	0.010	3	3	13795	550	5.0
4	4	130	0.015	4	4	10345	620	10.0
5	4	130	0.020	5	5	8275	660	16.5
6	4	130	0.025	6	6	6895	690	25.0
8	4	130	0.030	8	8	5175	620	39.5
10	4	130	0.040	10	10	4140	660	66.0
12	4	130	0.040	12	12	3450	550	79.0
16	4	130	0.055	8	16	2585	570	73.0
20	4	130	0.070	10	20	2070	580	116.0

# Cylindrical end mills

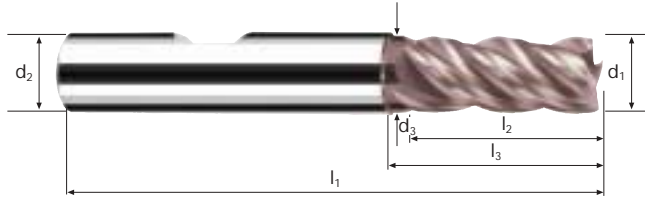
Smooth-edged, normal version with short neck



**HM**  $\lambda$  40°  
 $\gamma$  6°

45°

Vario



Roughing

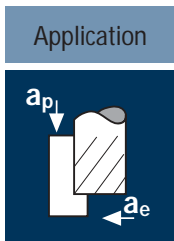


Finishing



**Rm** < 850   **Rm** 850-1100   **Rm** 1100-1300   **Inox** Stainless   **Nickel-Alloys** GG(G)

Example: Order-N°.										UNICUT-4X	
										U45317	
$\emptyset$ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.178*	3	3	-	45	8	-	0.10	0.0°	4	●	
.180	3	6	2.8	57	8	14	0.10	5.5°	4	●	
.218*	4	4	-	50	11	-	0.10	0.0°	4	●	
.220	4	6	3.7	57	11	16	0.10	4.0°	4	●	
.258*	5	5	-	50	13	-	0.15	0.0°	4	●	
.260	5	6	4.6	57	13	18	0.15	2.0°	4	●	
.300	6	6	5.5	57	13	20	0.15	0.0°	4	●	
.391	8	8	7.4	63	19	26	0.15	0.0°	4	●	
.450	10	10	9.2	72	22	31	0.20	0.0°	4	●	
.501	12	12	11.0	83	26	37	0.20	0.0°	4	●	
.610	16	16	15.0	92	32	43	0.20	0.0°	4	●	
.682	20	20	19.0	104	38	53	0.20	0.0°	4	●	
* without clamping flat only, without short neck											



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	160	0.010	4.5	0.25	16975	680
4	4	160	0.015	6.0	0.30	12735	765
5	4	160	0.015	7.5	0.40	10185	610
6	4	160	0.020	9.0	0.50	8490	680
8	4	160	0.025	12.0	0.65	6365	635
10	4	160	0.035	15.0	0.80	5095	715
12	4	160	0.040	18.0	0.95	4245	680
16	4	160	0.055	24.0	1.30	3185	700
20	4	160	0.065	30.0	1.60	2545	660

Steel  
850 - 1100 N/mm<sup>2</sup>

3	4	100	0.010	4.5	0.25	10610	425
4	4	100	0.015	6.0	0.30	7960	480
5	4	100	0.015	7.5	0.40	6365	380
6	4	100	0.020	9.0	0.50	5305	425
8	4	100	0.025	12.0	0.65	3980	400
10	4	100	0.035	15.0	0.80	3185	445
12	4	100	0.040	18.0	0.95	2655	425
16	4	100	0.055	24.0	1.30	1990	440
20	4	100	0.065	30.0	1.60	1590	415

Steel  
1100 - 1300 N/mm<sup>2</sup>

3	4	70	0.010	4.5	0.25	7425	295
4	4	70	0.015	6.0	0.30	5570	335
5	4	70	0.015	7.5	0.40	4455	265
6	4	70	0.020	9.0	0.50	3715	295
8	4	70	0.025	12.0	0.65	2785	280
10	4	70	0.035	15.0	0.80	2230	310
12	4	70	0.040	18.0	0.95	1855	295
16	4	70	0.055	24.0	1.30	1395	305
20	4	70	0.065	30.0	1.60	1115	290

Stainless steel  
[Cr-Ni/1.4301]

3	4	70	0.010	4.5	0.25	7425	295
4	4	70	0.015	6.0	0.30	5570	335
5	4	70	0.015	7.5	0.40	4455	265
6	4	70	0.020	9.0	0.50	3715	295
8	4	70	0.025	12.0	0.65	2785	280
10	4	70	0.035	15.0	0.80	2230	310
12	4	70	0.040	18.0	0.95	1855	295
16	4	70	0.055	24.0	1.30	1395	305
20	4	70	0.065	30.0	1.60	1115	290

Material

Cast iron  
(lamellar / spheroidal)

Unalloyed copper

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

Heat resistant steel  
[17-4 PH]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	120	0.010	5	0.25	12735	510
4	4	120	0.015	6	0.30	9550	575
5	4	120	0.015	8	0.40	7640	460
6	4	120	0.020	9	0.50	6365	510
8	4	120	0.025	12	0.65	4775	480
10	4	120	0.035	15	0.80	3820	535
12	4	120	0.040	18	0.95	3185	510
16	4	120	0.055	24	1.30	2385	525
20	4	120	0.065	30	1.60	1910	495
3	4	180	0.010	5	0.25	19100	765
4	4	180	0.015	6	0.30	14325	860
5	4	180	0.015	8	0.40	11460	690
6	4	180	0.020	9	0.50	9550	765
8	4	180	0.025	12	0.65	7160	715
10	4	180	0.035	15	0.80	5730	800
12	4	180	0.040	18	0.95	4775	765
16	4	180	0.055	24	1.30	3580	790
20	4	180	0.065	30	1.60	2865	745
3	4	70	0.010	5	0.25	7425	295
4	4	70	0.015	6	0.30	5570	335
5	4	70	0.015	8	0.40	4455	265
6	4	70	0.020	9	0.50	3715	295
8	4	70	0.025	12	0.65	2785	280
10	4	70	0.035	15	0.80	2230	310
12	4	70	0.040	18	0.95	1855	295
16	4	70	0.055	24	1.30	1395	305
20	4	70	0.065	30	1.60	1115	290
3	4	35	0.010	5	0.25	3715	150
4	4	35	0.015	6	0.30	2785	165
5	4	35	0.015	8	0.40	2230	135
6	4	35	0.020	9	0.50	1855	150
8	4	35	0.025	12	0.65	1395	140
10	4	35	0.035	15	0.80	1115	155
12	4	35	0.040	18	0.95	930	150
16	4	35	0.055	24	1.30	695	155
20	4	35	0.065	30	1.60	555	145

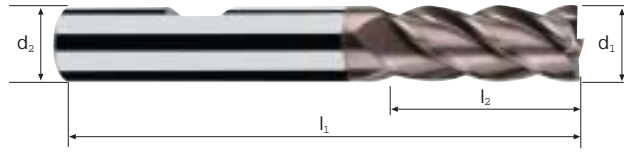
# Cylindrical end mills

Smooth-edged, normal version



**HM**  $\lambda$  40°  
 $\gamma$  12°

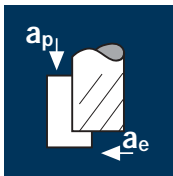
45°



**Rm** < 850   **Rm** 850-1100   **Rm** 1100-1300   **Inox** Stainless   **Ti** Titanium   **GG(G)** Copper

Example: Order-N°.							UNICUT-4X	
							U45340	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	Z		
.178*	3	3	45	8	0.10	4	●	
.218*	4	4	50	11	0.10	4	●	
.258*	5	5	50	13	0.15	4	●	
.300	6	6	57	13	0.15	4	●	
.391	8	8	63	19	0.15	4	●	
.450	10	10	72	22	0.20	4	●	
.501	12	12	83	26	0.20	4	●	
.610	16	16	92	32	0.20	4	●	
.682	20	20	104	38	0.20	4	●	
* without clamping flat only								

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d <sub>1</sub> [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	110	0.010	3.0	0.3	11670	350	0.5
4	3	110	0.015	4.0	0.4	8755	395	0.5
5	3	110	0.015	5.0	0.5	7005	315	1.0
6	3	110	0.020	6.0	0.6	5835	350	1.5
8	3	110	0.025	8.0	0.8	4375	330	2.0
10	3	110	0.035	10.0	1.0	3500	370	3.5
12	3	110	0.040	12.0	1.2	2920	350	5.0
16	3	110	0.055	16.0	1.6	2190	360	9.0
20	3	110	0.065	20.0	2.0	1750	340	13.5

3	3	70	0.010	3.0	0.3	7425	225	0.0
4	3	70	0.015	4.0	0.4	5570	250	0.5
5	3	70	0.015	5.0	0.5	4455	200	0.5
6	3	70	0.020	6.0	0.6	3715	225	1.0
8	3	70	0.025	8.0	0.8	2785	210	1.5
10	3	70	0.035	10.0	1.0	2230	235	2.5
12	3	70	0.040	12.0	1.2	1855	225	3.0
16	3	70	0.055	16.0	1.6	1395	230	6.0
20	3	70	0.065	20.0	2.0	1115	215	8.5

3	3	50	0.010	3.0	0.3	5305	160	0.0
4	3	50	0.015	4.0	0.4	3980	180	0.5
5	3	50	0.015	5.0	0.5	3185	145	0.5
6	3	50	0.020	6.0	0.6	2655	160	0.5
8	3	50	0.025	8.0	0.8	1990	150	1.0
10	3	50	0.035	10.0	1.0	1590	165	1.5
12	3	50	0.040	12.0	1.2	1325	160	2.5
16	3	50	0.055	16.0	1.6	995	165	4.0
20	3	50	0.065	20.0	2.0	795	155	6.0

3	3	150	0.010	3.0	0.3	15915	475	0.5
4	3	150	0.015	4.0	0.4	11935	535	1.0
5	3	150	0.015	5.0	0.5	9550	430	1.0
6	3	150	0.020	6.0	0.6	7960	480	1.5
8	3	150	0.025	8.0	0.8	5970	450	3.0
10	3	150	0.035	10.0	1.0	4775	500	5.0
12	3	150	0.040	12.0	1.2	3980	480	7.0
16	3	150	0.055	16.0	1.6	2985	495	12.5
20	3	150	0.065	20.0	2.0	2385	465	18.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d <sub>1</sub> [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	90	0.010	0.6	3	9550	285	0.5
4	3	90	0.010	0.8	4	7160	215	0.5
5	3	90	0.015	1.0	5	5730	260	1.5
6	3	90	0.015	1.2	6	4775	215	1.5
8	3	90	0.020	1.6	8	3580	215	3.0
10	3	90	0.030	2.0	10	2865	260	5.0
12	3	90	0.035	2.4	12	2385	250	7.0
16	3	90	0.045	3.2	16	1790	240	12.5
20	3	90	0.055	4.0	20	1430	235	19.0

3	3	60	0.010	0.6	3	6365	190	0.5
4	3	60	0.010	0.8	4	4775	145	0.5
5	3	60	0.015	1.0	5	3820	170	1.0
6	3	60	0.015	1.2	6	3185	145	1.0
8	3	60	0.020	1.6	8	2385	145	2.0
10	3	60	0.025	2.0	10	1910	145	3.0
12	3	60	0.030	2.4	12	1590	145	4.0
16	3	60	0.040	3.2	16	1195	145	7.5
20	3	60	0.050	4.0	20	955	145	11.5

3	3	35	0.010	0.6	3	3715	110	0.0
4	3	35	0.010	0.8	4	2785	85	0.5
5	3	35	0.015	1.0	5	2230	100	0.5
6	3	35	0.020	1.2	6	1855	110	1.0
8	3	35	0.025	1.6	8	1395	105	1.5
10	3	35	0.030	2.0	10	1115	100	2.0
12	3	35	0.035	2.4	12	930	100	3.0
16	3	35	0.050	3.2	16	695	105	5.5
20	3	35	0.060	4.0	20	555	100	8.0

3	3	110	0.010	0.6	3	11670	350	0.5
4	3	110	0.010	0.8	4	8755	265	1.0
5	3	110	0.015	1.0	5	7005	315	1.5
6	3	110	0.015	1.2	6	5835	265	2.0
8	3	110	0.020	1.6	8	4375	265	3.5
10	3	110	0.025	2.0	10	3500	265	5.5
12	3	110	0.030	2.4	12	2920	265	7.5
16	3	110	0.040	3.2	16	2190	265	13.5
20	3	110	0.050	4.0	20	1750	265	21.0

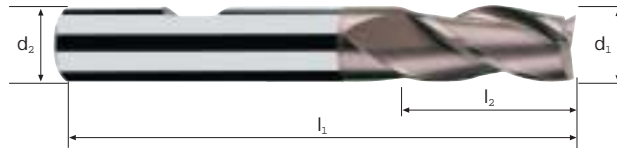


# Cylindrical end mills

Smooth-edged, normal version



<b>HM</b>	$\lambda$ 35° $\gamma$ 12°
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Roughing

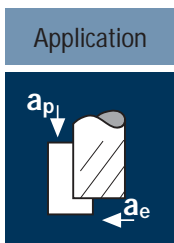


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless		<b>GG(G)</b> Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
Coating <b>U</b>		Article-N° <b>45330</b>		α-Code <b>.178</b>			<b>U45330</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	z		
<b>.178*</b>	3	3	45	7	0.10	3	●	
<b>.218*</b>	4	4	50	8	0.10	3	●	
<b>.258*</b>	5	5	50	10	0.15	3	●	
<b>.300</b>	6	6	57	10	0.15	3	●	
<b>.391</b>	8	8	63	16	0.15	3	●	
<b>.450</b>	10	10	72	19	0.20	3	●	
<b>.501</b>	12	12	83	22	0.20	3	●	
<b>.610</b>	16	16	92	26	0.20	3	●	
<b>.682</b>	20	20	104	32	0.20	3	●	
* without clamping flat only								



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	110	0.010	4.5	0.6	11670	235	0.5
4	2	110	0.015	6.0	0.8	8755	265	1.5
5	2	110	0.020	7.5	1.0	7005	280	2.0
6	2	110	0.025	9.0	1.2	5835	290	3.0
8	2	110	0.030	12.0	1.6	4375	265	5.0
10	2	110	0.040	15.0	2.0	3500	280	8.5
12	2	110	0.050	18.0	2.4	2920	290	12.5
16	2	110	0.065	24.0	3.2	2190	285	22.0
20	2	110	0.080	30.0	4.0	1750	280	33.5

Steel  
850 - 1100 N/mm<sup>2</sup>

3	2	70	0.010	4.5	0.6	7425	150	0.5
4	2	70	0.015	6.0	0.8	5570	165	1.0
5	2	70	0.020	7.5	1.0	4455	180	1.5
6	2	70	0.020	9.0	1.2	3715	150	1.5
8	2	70	0.030	12.0	1.6	2785	165	3.0
10	2	70	0.035	15.0	2.0	2230	155	4.5
12	2	70	0.045	18.0	2.4	1855	165	7.0
16	2	70	0.060	24.0	3.2	1395	165	12.5
20	2	70	0.070	30.0	4.0	1115	155	18.5

Stainless steel  
[Cr-Ni/1.4301]

3	2	50	0.010	4.5	0.6	5305	105	0.5
4	2	50	0.015	6.0	0.8	3980	120	0.5
5	2	50	0.020	7.5	1.0	3185	125	1.0
6	2	50	0.020	9.0	1.2	2655	105	1.0
8	2	50	0.030	12.0	1.6	1990	120	2.5
10	2	50	0.035	15.0	2.0	1590	110	3.5
12	2	50	0.045	18.0	2.4	1325	120	5.0
16	2	50	0.060	24.0	3.2	995	120	9.0
20	2	50	0.070	30.0	4.0	795	110	13.0

Cast iron  
(lamellar / spheroidal)

3	2	150	0.015	4.5	0.6	15915	475	1.5
4	2	150	0.020	6.0	0.8	11935	475	2.5
5	2	150	0.020	7.5	1.0	9550	380	3.0
6	2	150	0.025	9.0	1.2	7960	400	4.5
8	2	150	0.035	12.0	1.6	5970	420	8.0
10	2	150	0.045	15.0	2.0	4775	430	13.0
12	2	150	0.055	18.0	2.4	3980	440	19.0
16	2	150	0.070	24.0	3.2	2985	420	32.5
20	2	150	0.090	30.0	4.0	2385	430	51.5



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	90	0.010	0.6	3	9550	190	0.5
4	2	90	0.010	0.8	4	7160	145	0.5
5	2	90	0.015	1.0	5	5730	170	1.0
6	2	90	0.015	1.2	6	4775	145	1.0
8	2	90	0.020	1.6	8	3580	145	2.0
10	2	90	0.030	2.0	10	2865	170	3.5
12	2	90	0.035	2.4	12	2385	165	5.0
16	2	90	0.045	3.2	16	1790	160	8.0
20	2	90	0.055	4.0	20	1430	155	12.5

Steel  
850 - 1100 N/mm<sup>2</sup>

3	2	60	0.010	0.6	3	6365	125	0.0
4	2	60	0.010	0.8	4	4775	95	0.5
5	2	60	0.015	1.0	5	3820	115	0.5
6	2	60	0.015	1.2	6	3185	95	0.5
8	2	60	0.020	1.6	8	2385	95	1.0
10	2	60	0.025	2.0	10	1910	95	2.0
12	2	60	0.030	2.4	12	1590	95	2.5
16	2	60	0.040	3.2	16	1195	95	5.0
20	2	60	0.050	4.0	20	955	95	7.5

Stainless steel  
[Cr-Ni/1.4301]

3	2	35	0.010	0.6	3	3715	75	0.0
4	2	35	0.010	0.8	4	2785	55	0.0
5	2	35	0.015	1.0	5	2230	65	0.5
6	2	35	0.015	1.2	6	1855	55	0.5
8	2	35	0.020	1.6	8	1395	55	0.5
10	2	35	0.025	2.0	10	1115	55	1.0
12	2	35	0.030	2.4	12	930	55	1.5
16	2	35	0.040	3.2	16	695	55	3.0
20	2	35	0.050	4.0	20	555	55	4.5

Cast iron  
(lamellar / spheroidal)

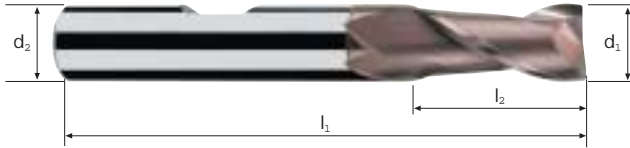
3	2	110	0.010	0.6	3	11670	235	0.5
4	2	110	0.010	0.8	4	8755	175	0.5
5	2	110	0.015	1.0	5	7005	210	1.0
6	2	110	0.020	1.2	6	5835	235	1.5
8	2	110	0.025	1.6	8	4375	220	3.0
10	2	110	0.030	2.0	10	3500	210	4.0
12	2	110	0.035	2.4	12	2920	205	6.0
16	2	110	0.050	3.2	16	2190	220	11.5
20	2	110	0.060	4.0	20	1750	210	17.0

# Cylindrical end mills

Smooth-edged, normal version



HM  $\lambda$  35°  
 $\gamma$  12°



Roughing

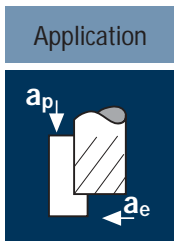


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless		GG(G) Aluminium Copper
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Example: Order-N°.								UNICUT-4X	
		Coating <b>U</b>	Article-N°. <b>45320</b>		α-Code <b>.178</b>			<b>U45320</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	z			
.178*	3	3	45	7	0.10	2	●		
.218*	4	4	50	8	0.10	2	●		
.258*	5	5	50	10	0.15	2	●		
.300	6	6	57	10	0.15	2	●		
.391	8	8	63	16	0.15	2	●		
.450	10	10	72	19	0.20	2	●		
.501	12	12	83	22	0.20	2	●		
.610	16	16	92	26	0.20	2	●		
.682	20	20	104	32	0.20	2	●		
* without clamping flat only									



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	4	65	0.005	3	0.05	10345	205
4	4	65	0.010	6	0.10	5175	205
5	4	65	0.015	8	0.15	4140	250
6	4	65	0.015	9	0.15	3450	205
8	4	65	0.025	12	0.20	2585	260
10	4	65	0.030	15	0.25	2070	250
12	4	65	0.035	18	0.30	1725	240
16	4	65	0.045	24	0.40	1295	235
20	4	65	0.055	30	0.50	1035	230

Steel  
850 - 1100 N/mm<sup>2</sup>

2	4	54	0.005	3	0.05	8595	170
4	4	54	0.010	6	0.10	4295	170
5	4	54	0.015	8	0.15	3440	205
6	4	54	0.015	9	0.15	2865	170
8	4	54	0.025	12	0.20	2150	215
10	4	54	0.030	15	0.25	1720	205
12	4	54	0.035	18	0.30	1430	200
16	4	54	0.045	24	0.40	1075	195
20	4	54	0.055	30	0.50	860	190

Steel  
1100 - 1300 N/mm<sup>2</sup>

2	4	42	0.005	3	0.05	6685	135
4	4	42	0.010	6	0.10	3340	135
5	4	42	0.015	8	0.15	2675	160
6	4	42	0.015	9	0.15	2230	135
8	4	42	0.025	12	0.20	1670	165
10	4	42	0.030	15	0.25	1335	160
12	4	42	0.035	18	0.30	1115	155
16	4	42	0.045	24	0.40	835	150
20	4	42	0.055	30	0.50	670	145

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

2	4	30	0.005	3	0.05	4775	95
4	4	30	0.010	6	0.10	2385	95
5	4	30	0.015	8	0.15	1910	115
6	4	30	0.015	9	0.15	1590	95
8	4	30	0.025	12	0.20	1195	120
10	4	30	0.030	15	0.25	955	115
12	4	30	0.035	18	0.30	795	110
16	4	30	0.045	24	0.40	595	105
20	4	30	0.055	30	0.50	475	105

Material

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	4	50	0.005	3	0.05	7960	160
4	4	50	0.010	6	0.10	3980	160
5	4	50	0.015	8	0.15	3185	190
6	4	50	0.015	9	0.15	2655	160
8	4	50	0.025	12	0.20	1990	200
10	4	50	0.030	15	0.25	1590	190
12	4	50	0.035	18	0.30	1325	185
16	4	50	0.045	24	0.40	995	180
20	4	50	0.055	30	0.50	795	175

Stainless steel  
[Cr-Ni/1.4301]

2	4	26	0.005	3	0.05	4140	85
4	4	26	0.010	6	0.10	2070	85
5	4	26	0.015	8	0.15	1655	100
6	4	26	0.015	9	0.15	1380	85
8	4	26	0.025	12	0.20	1035	105
10	4	26	0.030	15	0.25	830	100
12	4	26	0.035	18	0.30	690	95
16	4	26	0.045	24	0.40	515	95
20	4	26	0.055	30	0.50	415	90

Unalloyed copper

2	4	80	0.005	3	0.05	12735	255
4	4	80	0.010	6	0.10	6365	255
5	4	80	0.015	8	0.15	5095	305
6	4	80	0.015	9	0.15	4245	255
8	4	80	0.025	12	0.20	3185	320
10	4	80	0.030	15	0.25	2545	305
12	4	80	0.035	18	0.30	2120	295
16	4	80	0.045	24	0.40	1590	285
20	4	80	0.055	30	0.50	1275	280

Wrought aluminium  
alloys Si < 6%

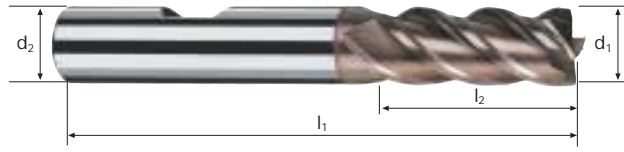
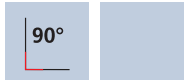
2	4	100	0.005	3	0.05	15915	320
4	4	100	0.010	6	0.10	7960	320
5	4	100	0.015	8	0.15	6365	380
6	4	100	0.015	9	0.15	5305	320
8	4	100	0.025	12	0.20	3980	400
10	4	100	0.030	15	0.25	3185	380
12	4	100	0.035	18	0.30	2655	370
16	4	100	0.045	24	0.40	1990	360
20	4	100	0.055	30	0.50	1590	350

# Cylindrical end mills

Smooth-edged, normal version



**HSS-E**  $\lambda$  40°  
**Co8**  $\gamma$  15°



Roughing

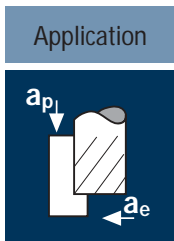


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Aluminium Copper
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Example: Order-N°.								UNICUT-4X	
		Coating <b>U</b>	Article-N°. <b>0110</b>	α-Code <b>.100</b>				<b>U0110</b>	
Ø Code	d1 k8	d2 h6	l1	l2	α	Z			
.100	1.0	6	49	5	3.0°	4	●		
.120	1.5	6	50	6	3.0°	4	●		
.140	2.0	6	51	7	2.5°	4	●		
.160	2.5	6	52	8	2.0°	4	●		
.180	3.0	6	52	8	2.0°	4	●		
.200	3.5	6	54	10	1.5°	4	●		
.220	4.0	6	55	11	1.5°	4	●		
.240	4.5	6	55	11	1.0°	4	●		
.260	5.0	6	57	13	1.0°	4	●		
.280	5.5	6	57	13	1.0°	4	●		
.300	6.0	6	57	13	0.0°	4	●		
.342	7.0	10	66	16	1.5°	4	●		
.391	8.0	8	63	19	0.0°	4	●		
.420	9.0	10	69	19	0.5°	4	●		
.450	10.0	10	72	22	0.0°	4	●		
.470	11.0	12	79	22	0.5°	4	●		
.501	12.0	12	83	26	0.0°	4	●		
.570	14.0	12	83	26	0.0°	4	●		
.581	15.0	12	83	26	0.0°	4	●		
.610	16.0	16	92	32	0.0°	4	●		
.640	18.0	16	92	32	0.0°	4	●		
.682	20.0	20	104	38	0.0°	4	●		
.690	21.0	20	104	38	0.0°	4	●		



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
22	4	65	0.065	33	0.55	940	245
24	4	65	0.070	36	0.60	860	240
25	4	65	0.070	38	0.65	830	230
28	6	65	0.080	42	0.70	740	355
30	6	65	0.085	45	0.75	690	350
32	6	65	0.090	48	0.80	645	350
36	6	65	0.105	54	0.90	575	360
40	6	65	0.115	60	1.00	515	355

Steel  
850 - 1100 N/mm<sup>2</sup>

22	4	54	0.065	33	0.55	780	205
24	4	54	0.070	36	0.60	715	200
25	4	54	0.070	38	0.65	690	195
28	6	54	0.080	42	0.70	615	295
30	6	54	0.085	45	0.75	575	295
32	6	54	0.090	48	0.80	535	290
36	6	54	0.105	54	0.90	475	300
40	6	54	0.115	60	1.00	430	295

Steel  
1100 - 1300 N/mm<sup>2</sup>

22	4	42	0.065	33	0.55	610	160
24	4	42	0.070	36	0.60	555	155
25	4	42	0.070	38	0.65	535	150
28	6	42	0.080	42	0.70	475	230
30	6	42	0.085	45	0.75	445	225
32	6	42	0.090	48	0.80	420	225
36	6	42	0.105	54	0.90	370	235
40	6	42	0.115	60	1.00	335	230

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

22	4	30	0.065	33	0.55	435	115
24	4	30	0.070	36	0.60	400	110
25	4	30	0.070	38	0.65	380	105
28	6	30	0.080	42	0.70	340	165
30	6	30	0.085	45	0.75	320	165
32	6	30	0.090	48	0.80	300	160
36	6	30	0.105	54	0.90	265	165
40	6	30	0.115	60	1.00	240	165

Material

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
22	4	50	0.065	33	0.55	725	190
24	4	50	0.070	36	0.60	665	185
25	4	50	0.070	38	0.65	635	180
28	6	50	0.080	42	0.70	570	275
30	6	50	0.085	45	0.75	530	270
32	6	50	0.090	48	0.80	495	265
36	6	50	0.105	54	0.90	440	275
40	6	50	0.115	60	1.00	400	275

Stainless steel  
[Cr-Ni/1.4301]

22	4	26	0.065	33	0.55	375	100
24	4	26	0.070	36	0.60	345	95
25	4	26	0.070	38	0.65	330	90
28	6	26	0.080	42	0.70	295	140
30	6	26	0.085	45	0.75	275	140
32	6	26	0.090	48	0.80	260	140
36	6	26	0.105	54	0.90	230	145
40	6	26	0.115	60	1.00	205	140

Unalloyed copper

22	4	80	0.065	33	0.55	1160	300
24	4	80	0.070	36	0.60	1060	295
25	4	80	0.070	38	0.65	1020	285
28	6	80	0.080	42	0.70	910	435
30	6	80	0.085	45	0.75	850	435
32	6	80	0.090	48	0.80	795	430
36	6	80	0.105	54	0.90	705	445
40	6	80	0.115	60	1.00	635	440

Wrought aluminium  
alloys Si < 6%

22	4	100	0.065	33	0.55	1445	375
24	4	100	0.070	36	0.60	1325	370
25	4	100	0.070	38	0.65	1275	355
28	6	100	0.080	42	0.70	1135	545
30	6	100	0.085	45	0.75	1060	540
32	6	100	0.090	48	0.80	995	535
36	6	100	0.105	54	0.90	885	560
40	6	100	0.115	60	1.00	795	550

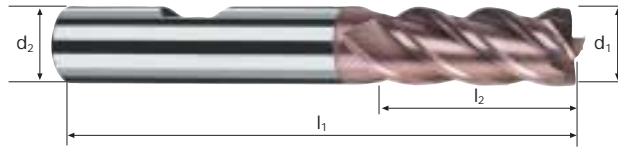
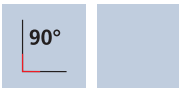
# Cylindrical end mills

Smooth-edged, normal version



HSS-E  
Co8

$\lambda$  40°  
 $\gamma$  15°



Roughing

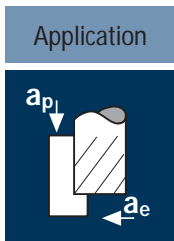


Finishing





Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
							U0110	
∅ Code	d1 k8	d2 h6	l1	l2	α	Z		
.710	22.0	20	104	38	0.0°	4	●	
.741	24.0	20	111	45	0.0°	4	●	
.772	25.0	25	121	45	0.0°	4	●	
.800	28.0	25	121	45	0.0°	6	●	
.810	30.0	25	121	45	0.0°	6	●	
.832	32.0	32	133	53	0.0°	6	●	
.860	36.0	32	133	53	0.0°	6	●	
.881	40.0	32	143	63	0.0°	6	●	





Material

Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	29	0.015	9	0.15	1540	90
8	4	29	0.025	12	0.20	1155	115
10	4	29	0.030	15	0.25	925	110
12	4	29	0.035	18	0.30	770	110
14	4	29	0.040	21	0.35	660	105
16	4	29	0.045	24	0.40	575	105
18	4	29	0.050	27	0.45	515	105
20	4	29	0.055	30	0.50	460	100
25	6	29	0.070	38	0.65	370	155

Stainless steel  
[Cr-Ni-Mo-.../1.4571]



6	4	23	0.015	9	0.15	1220	75
8	4	23	0.025	12	0.20	915	90
10	4	23	0.030	15	0.25	730	90
12	4	23	0.035	18	0.30	610	85
14	4	23	0.040	21	0.35	525	85
16	4	23	0.045	24	0.40	460	85
18	4	23	0.050	27	0.45	405	80
20	4	23	0.055	30	0.50	365	80
25	6	23	0.070	38	0.65	295	125

Titanium alloys  
>300 HB  
[Ti6Al4V]

6	4	26	0.015	9	0.15	1380	85
8	4	26	0.025	12	0.20	1035	105
10	4	26	0.030	15	0.25	830	100
12	4	26	0.035	18	0.30	690	95
14	4	26	0.040	21	0.35	590	95
16	4	26	0.045	24	0.40	515	95
18	4	26	0.050	27	0.45	460	90
20	4	26	0.055	30	0.50	415	90
25	6	26	0.070	38	0.65	330	140



Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

6	4	37	0.015	9	0.15	1965	120
8	4	37	0.025	12	0.20	1470	145
10	4	37	0.030	15	0.25	1180	140
12	4	37	0.035	18	0.30	980	135
14	4	37	0.040	21	0.35	840	135
16	4	37	0.045	24	0.40	735	130
18	4	37	0.050	27	0.45	655	130
20	4	37	0.055	30	0.50	590	130
25	6	37	0.070	38	0.65	470	195



Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	50	0.015	9	0.15	2655	160
8	4	50	0.025	12	0.20	1990	200
10	4	50	0.030	15	0.25	1590	190
12	4	50	0.035	18	0.30	1325	185
14	4	50	0.040	21	0.35	1135	180
16	4	50	0.045	24	0.40	995	180
18	4	50	0.050	27	0.45	885	175
20	4	50	0.055	30	0.50	795	175
25	6	50	0.070	38	0.65	635	265

Steel  
850 - 1100 N/mm<sup>2</sup>



6	4	40	0.015	9	0.15	2120	125
8	4	40	0.025	12	0.20	1590	160
10	4	40	0.030	15	0.25	1275	155
12	4	40	0.035	18	0.30	1060	150
14	4	40	0.040	21	0.35	910	145
16	4	40	0.045	24	0.40	795	145
18	4	40	0.050	27	0.45	705	140
20	4	40	0.055	30	0.50	635	140
25	6	40	0.070	38	0.65	510	215

Unalloyed copper

6	4	80	0.015	9	0.15	4245	255
8	4	80	0.025	12	0.20	3185	320
10	4	80	0.030	15	0.25	2545	305
12	4	80	0.035	18	0.30	2120	295
14	4	80	0.040	21	0.35	1820	290
16	4	80	0.045	24	0.40	1590	285
18	4	80	0.050	27	0.45	1415	285
20	4	80	0.055	30	0.50	1275	280
25	6	80	0.070	38	0.65	1020	430

Wrought aluminium  
alloys Si < 6%

6	4	100	0.015	9	0.15	5305	320
8	4	100	0.025	12	0.20	3980	400
10	4	100	0.030	15	0.25	3185	380
12	4	100	0.035	18	0.30	2655	370
14	4	100	0.040	21	0.35	2275	365
16	4	100	0.045	24	0.40	1990	360
18	4	100	0.050	27	0.45	1770	355
20	4	100	0.055	30	0.50	1590	350
25	6	100	0.070	38	0.65	1275	535

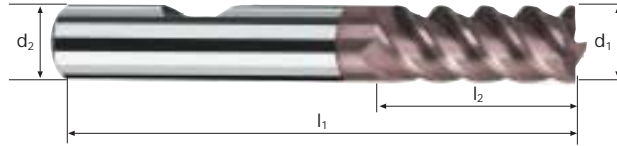
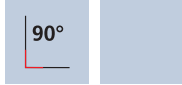


# Cylindrical end mills

Smooth-edged, normal version



HSS  
PM/F  $\lambda$  55°  
 $\gamma$  15°



Roughing

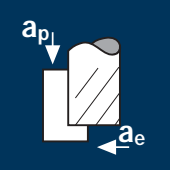







Finishing



Rm < 850    Rm 850-1100    Rm 1100-1300    **Inox** Stainless    **Ti** Titanium    GG(G) Aluminium Copper

Example: Order-N°.							UNICUT-4X	
		Coating <b>U</b>	Article-N° <b>0115</b>	α-Code <b>.300</b>			<b>U0115</b>	
Ø Code	d1 k8	d2 h6	l1	l2	α	Z		
.300	6	6	57	13	0.0°	4	●	
.402	8	10	69	19	2.5°	4	●	
.450	10	10	72	22	0.0°	4	●	
.501	12	12	83	26	0.0°	4	●	
.570	14	12	83	26	0.0°	4	●	
.610	16	16	92	32	0.0°	4	●	
.640	18	16	92	32	0.0°	4	●	
.682	20	20	104	38	0.0°	4	●	
.772	25	25	121	45	0.0°	6	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	2	3	64	0.005	3.0	0.2	10185	155	0.1
		3	3	64	0.010	4.5	0.2	6790	205	0.2
		4	3	64	0.010	6.0	0.3	5095	155	0.3
		5	3	64	0.015	7.5	0.4	4075	185	0.5
		6	3	64	0.020	9.0	0.4	3395	205	0.7
		8	3	64	0.025	12.0	0.6	2545	190	1.3
		10	3	64	0.030	15.0	0.7	2035	185	1.9
		12	3	64	0.045	18.0	0.9	1700	230	3.5
		16	3	64	0.060	24.0	1.1	1275	230	6.1
		2	3	52	0.005	3.0	0.2	8275	125	0.1
		3	3	52	0.010	4.5	0.2	5520	165	0.1
		4	3	52	0.010	6.0	0.3	4140	125	0.2
		5	3	52	0.015	7.5	0.4	3310	150	0.4
		6	3	52	0.020	9.0	0.4	2760	165	0.6
		8	3	52	0.025	12.0	0.6	2070	155	1.0
		10	3	52	0.030	15.0	0.7	1655	150	1.6
12	3	52	0.045	18.0	0.9	1380	185	2.8		
16	3	52	0.060	24.0	1.1	1035	185	4.9		
	Stainless steel [Cr-Ni/1.4301] 	2	3	26	0.005	3.0	0.2	4140	60	0.1
		3	3	26	0.010	4.5	0.2	2760	85	0.1
		4	3	26	0.010	6.0	0.3	2070	60	0.1
		5	3	26	0.015	7.5	0.4	1655	75	0.2
		6	3	26	0.020	9.0	0.4	1380	85	0.3
		8	3	26	0.025	12.0	0.6	1035	80	0.5
		10	3	26	0.030	15.0	0.7	830	75	0.8
		12	3	26	0.045	18.0	0.9	690	95	1.5
		16	3	26	0.060	24.0	1.1	515	95	2.5
		2	3	45	0.005	3.0	0.2	7160	105	0.1
		3	3	45	0.010	4.5	0.2	4775	145	0.1
		4	3	45	0.010	6.0	0.3	3580	105	0.2
		5	3	45	0.015	7.5	0.4	2865	130	0.3
		6	3	45	0.020	9.0	0.4	2385	145	0.5
		8	3	45	0.025	12.0	0.6	1790	135	0.9
		10	3	45	0.030	15.0	0.7	1430	130	1.4
12	3	45	0.045	18.0	0.9	1195	160	2.4		
16	3	45	0.060	24.0	1.1	895	160	4.2		

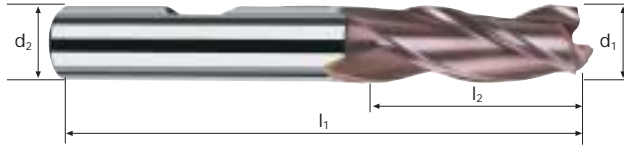
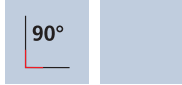
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	2	3	60	0.005	1.0	2	9550	145	0.3
		3	3	60	0.010	1.5	3	6365	190	0.9
		4	3	60	0.010	2.0	4	4775	145	1.2
		5	3	60	0.015	2.5	5	3820	170	2.1
		6	3	60	0.020	3.0	6	3185	190	3.4
		8	3	60	0.025	4.0	8	2385	180	5.8
		10	3	60	0.030	5.0	10	1910	170	8.5
		12	3	60	0.045	6.0	12	1590	215	15.5
		16	3	60	0.065	8.0	16	1195	235	30.1
		2	3	50	0.005	1.0	2	7960	120	0.2
		3	3	50	0.010	1.5	3	5305	160	0.7
		4	3	50	0.010	2.0	4	3980	120	1.0
		5	3	50	0.015	2.5	5	3185	145	1.8
		6	3	50	0.020	3.0	6	2655	160	2.9
		8	3	50	0.025	4.0	8	1990	150	4.8
		10	3	50	0.030	5.0	10	1590	145	7.3
12	3	50	0.045	6.0	12	1325	180	13.0		
16	3	50	0.065	8.0	16	995	195	25.0		
	Stainless steel [Cr-Ni/1.4301] 	2	3	23	0.005	1.0	2	3660	55	0.1
		3	3	23	0.010	1.5	3	2440	75	0.3
		4	3	23	0.010	2.0	4	1830	55	0.4
		5	3	23	0.015	2.5	5	1465	65	0.8
		6	3	23	0.020	3.0	6	1220	75	1.4
		8	3	23	0.025	4.0	8	915	70	2.2
		10	3	23	0.030	5.0	10	730	65	3.3
		12	3	23	0.045	6.0	12	610	80	5.8
		16	3	23	0.065	8.0	16	460	90	11.5
		2	3	40	0.005	1.0	2	6365	95	0.2
		3	3	40	0.010	1.5	3	4245	125	0.6
		4	3	40	0.010	2.0	4	3185	95	0.8
		5	3	40	0.015	2.5	5	2545	115	1.4
		6	3	40	0.020	3.0	6	2120	125	2.3
		8	3	40	0.025	4.0	8	1590	120	3.8
		10	3	40	0.030	5.0	10	1275	115	5.8
12	3	40	0.045	6.0	12	1060	145	10.4		
16	3	40	0.065	8.0	16	795	155	19.8		

# Cylindrical end mills

Smooth-edged, normal version



**HSS-E**  
**Co8**     $\lambda$  30°  
                   $\gamma$  15°



Roughing



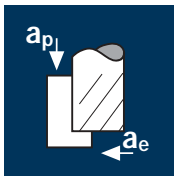
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless		<b>GG(G)</b> Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
		Coating	Article-N°.	α-Code			U0780	
		U	0780	.100				
Ø Code	d1 f8	d2 h6	l1	l2	α	Z		
.100	1.0	6	49	5	10.5°	3	●	
.120	1.5	6	50	6	10.0°	3	●	
.140	2.0	6	51	7	8.5°	3	●	
.160	2.5	6	52	8	6.5°	3	●	
.180	3.0	6	52	8	6.0°	3	●	
.200	3.5	6	54	10	4.5°	3	●	
.220	4.0	6	55	11	3.5°	3	●	
.240	4.5	6	55	11	2.5°	3	●	
.260	5.0	6	57	13	1.5°	3	●	
.280	5.5	6	57	13	1.0°	3	●	
.300	6.0	6	57	13	0.0°	3	●	
.322	6.5	10	66	16	4.0°	3	●	
.342	7.0	10	66	16	3.5°	3	●	
.391	8.0	8	63	19	0.0°	3	●	
.402	8.0	10	69	19	2.5°	3	●	
.420	9.0	10	69	19	1.5°	3	●	
.450	10.0	10	72	22	0.0°	3	●	
.470	11.0	12	79	22	1.0°	3	●	
.501	12.0	12	83	26	0.0°	3	●	
.540	13.0	12	83	26	0.0°	3	●	
.570	14.0	12	83	26	0.0°	3	●	
.581	15.0	12	83	26	0.0°	3	●	
.610	16.0	16	92	32	0.0°	3	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
18	3	64	0.070	27.0	1.3	1130	235	8.0
20	3	64	0.080	30.0	1.4	1020	245	10.5
22	3	64	0.085	33.0	1.6	925	235	12.0
25	3	64	0.100	37.5	1.8	815	245	16.0

18	3	52	0.070	27.0	1.3	920	195	6.5
20	3	52	0.080	30.0	1.4	830	200	8.5
22	3	52	0.085	33.0	1.6	750	190	9.5
25	3	52	0.100	37.5	1.8	660	200	13.0

18	3	26	0.070	27.0	1.3	460	95	3.0
20	3	26	0.080	30.0	1.4	415	100	4.0
22	3	26	0.085	33.0	1.6	375	95	5.0
25	3	26	0.100	37.5	1.8	330	100	6.5

18	3	45	0.070	27.0	1.3	795	165	5.5
20	3	45	0.080	30.0	1.4	715	170	7.0
22	3	45	0.085	33.0	1.6	650	165	8.5
25	3	45	0.100	37.5	1.8	575	175	11.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
18	3	60	0.070	9.0	18	1060	225	36.5
20	3	60	0.080	10.0	20	955	230	46.0
22	3	60	0.085	11.0	22	870	220	53.0
25	3	60	0.100	12.5	25	765	230	72.0

18	3	50	0.070	9.0	18	885	185	30.0
20	3	50	0.080	10.0	20	795	190	38.0
22	3	50	0.085	11.0	22	725	185	45.0
25	3	50	0.100	12.5	25	635	190	59.5

18	3	23	0.070	9.0	18	405	85	14.0
20	3	23	0.080	10.0	20	365	90	18.0
22	3	23	0.085	11.0	22	335	85	20.5
25	3	23	0.100	12.5	25	295	90	28.0

18	3	40	0.070	9.0	18	705	150	24.5
20	3	40	0.080	10.0	20	635	150	30.0
22	3	40	0.085	11.0	22	580	150	36.5
25	3	40	0.100	12.5	25	510	155	48.5

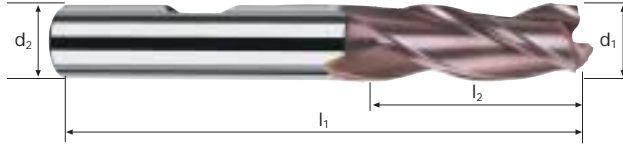
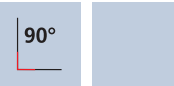
# Cylindrical end mills

Smooth-edged, normal version



HSS-E  
Co8

$\lambda$  30°  
 $\gamma$  15°



Roughing



Finishing



Rm  
< 850

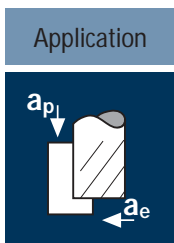
Rm  
850-1100

Rm  
1100-1300

Inox  
Stainless

GG(G)  
Aluminium  
Copper

		Coating U	Article-N° 0780	α-Code .640				UNICUT-4X U0780	
Ø Code	d1 f8	d2 h6	l1	l2	α	Z			
.640	18.0	16	92	32	0.0°	3	•		
.671	20.0	16	98	38	0.0°	3	•		
.682	20.0	20	104	38	0.0°	3	•		
.710	22.0	20	104	38	0.0°	3	•		
.772	25.0	25	121	45	0.0°	3	•		



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2	2	60	0.010	2.0	0.5	9550	190	0.2
3	2	60	0.015	3.0	0.8	6365	190	0.4
5	2	60	0.020	5.0	1.3	3820	155	1.0
6	2	60	0.025	6.0	1.5	3185	160	1.4
8	2	60	0.035	8.0	2.0	2385	165	2.6
10	2	60	0.045	10.0	2.5	1910	170	4.3
12	2	60	0.065	12.0	3.0	1590	205	7.4
16	2	60	0.090	16.0	4.0	1195	215	13.8
20	2	60	0.110	20.0	5.0	955	210	21.0

Steel  
850 - 1100 N/mm<sup>2</sup>

2	2	48	0.010	2.0	0.5	7640	155	0.2
3	2	48	0.015	3.0	0.8	5095	155	0.3
5	2	48	0.020	5.0	1.3	3055	120	0.8
6	2	48	0.025	6.0	1.5	2545	125	1.1
8	2	48	0.035	8.0	2.0	1910	135	2.2
10	2	48	0.045	10.0	2.5	1530	140	3.5
12	2	48	0.065	12.0	3.0	1275	165	5.9
16	2	48	0.090	16.0	4.0	955	170	10.9
20	2	48	0.110	20.0	5.0	765	170	17.0

Stainless steel  
[Cr-Ni/1.4301]

2	2	25	0.010	2.0	0.5	3980	80	0.1
3	2	25	0.015	3.0	0.8	2655	80	0.2
5	2	25	0.020	5.0	1.3	1590	65	0.4
6	2	25	0.025	6.0	1.5	1325	65	0.6
8	2	25	0.035	8.0	2.0	995	70	1.1
10	2	25	0.045	10.0	2.5	795	70	1.8
12	2	25	0.065	12.0	3.0	665	85	3.1
16	2	25	0.090	16.0	4.0	495	90	5.8
20	2	25	0.110	20.0	5.0	400	90	9.0

Cast iron  
(lamellar / spheroidal)

2	2	42	0.010	2.0	0.5	6685	135	0.1
3	2	42	0.015	3.0	0.8	4455	135	0.3
5	2	42	0.020	5.0	1.3	2675	105	0.7
6	2	42	0.025	6.0	1.5	2230	110	1.0
8	2	42	0.035	8.0	2.0	1670	115	1.8
10	2	42	0.045	10.0	2.5	1335	120	3.0
12	2	42	0.065	12.0	3.0	1115	145	5.2
16	2	42	0.090	16.0	4.0	835	150	9.6
20	2	42	0.110	20.0	5.0	670	145	14.5



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2	2	55	0.005	0.8	2	8755	90	0.1
3	2	55	0.010	1.2	3	5835	115	0.4
5	2	55	0.015	2.0	5	3500	105	1.1
6	2	55	0.020	2.4	6	2920	115	1.7
8	2	55	0.025	3.2	8	2190	110	2.8
10	2	55	0.035	4.0	10	1750	125	5.0
12	2	55	0.055	4.8	12	1460	160	9.2
16	2	55	0.070	6.4	16	1095	155	15.9
20	2	55	0.090	8.0	20	875	160	25.6

Steel  
850 - 1100 N/mm<sup>2</sup>

2	2	45	0.005	0.8	2	7160	70	0.1
3	2	45	0.010	1.2	3	4775	95	0.3
5	2	45	0.015	2.0	5	2865	85	0.9
6	2	45	0.020	2.4	6	2385	95	1.4
8	2	45	0.025	3.2	8	1790	90	2.3
10	2	45	0.035	4.0	10	1430	100	4.0
12	2	45	0.055	4.8	12	1195	130	7.5
16	2	45	0.070	6.4	16	895	125	12.8
20	2	45	0.090	8.0	20	715	130	20.8

Stainless steel  
[Cr-Ni/1.4301]

2	2	22	0.005	0.8	2	3500	35	0.1
3	2	22	0.010	1.2	3	2335	45	0.2
5	2	22	0.015	2.0	5	1400	40	0.4
6	2	22	0.020	2.4	6	1165	45	0.6
8	2	22	0.025	3.2	8	875	45	1.2
10	2	22	0.035	4.0	10	700	50	2.0
12	2	22	0.055	4.8	12	585	65	3.7
16	2	22	0.070	6.4	16	440	60	6.1
20	2	22	0.090	8.0	20	350	65	10.4

Cast iron  
(lamellar / spheroidal)

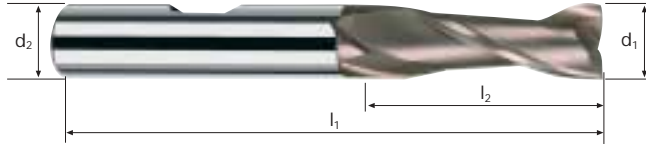
2	2	36	0.005	0.8	2	5730	55	0.1
3	2	36	0.010	1.2	3	3820	75	0.3
5	2	36	0.015	2.0	5	2290	70	0.7
6	2	36	0.020	2.4	6	1910	75	1.1
8	2	36	0.025	3.2	8	1430	70	1.8
10	2	36	0.035	4.0	10	1145	80	3.2
12	2	36	0.055	4.8	12	955	105	6.0
16	2	36	0.070	6.4	16	715	100	10.2
20	2	36	0.090	8.0	20	575	105	16.8

# Cylindrical end mills

Smooth-edged, normal version



HSS-E  
Co8     λ 30°  
                 γ 15°



Roughing



Finishing



Rm  
< 850

Rm  
850-1100

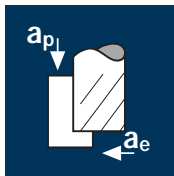
Rm  
1100-1300

Inox  
Stainless

GG(G)  
Aluminium  
Copper

Example: Order-N°.							UNICUT-4X	
		Coating	Article-N°	α-Code			U0770	
		<b>U</b>	<b>0770</b>	<b>.100</b>				
Ø Code	d1 f8	d2 h6	l1	l2	α	z		
.100	1.0	6	49	5	11.5°	2	●	
.120	1.5	6	50	6	10.0°	2	●	
.140	2.0	6	51	7	8.5°	2	●	
.160	2.5	6	52	8	6.5°	2	●	
.180	3.0	6	52	8	6.0°	2	●	
.220	4.0	6	55	11	3.5°	2	●	
.260	5.0	6	57	13	1.5°	2	●	
.300	6.0	6	57	13	0.0°	2	●	
.391	8.0	8	63	19	0.0°	2	●	
.450	10.0	10	72	22	0.0°	2	●	
.501	12.0	12	83	26	0.0°	2	●	
.570	14.0	12	83	26	0.0°	2	●	
.610	16.0	16	92	32	0.0°	2	●	
.682	20.0	20	104	38	0.0°	2	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	200	0.020	3	1.4	21220	1700	7.0
4	4	200	0.030	4	1.8	15915	1910	14.0
5	4	200	0.040	5	2.3	12735	2040	23.0
6	4	200	0.050	6	2.7	10610	2120	34.5
8	4	200	0.065	8	3.6	7960	2070	59.5
10	4	200	0.080	10	4.5	6365	2035	91.5
12	4	200	0.095	12	5.4	5305	2015	130.5
16	4	200	0.125	16	7.2	3980	1990	229.0
20	4	200	0.155	20	9.0	3185	1975	355.5
3	4	150	0.020	3	1.4	15915	1275	5.0
4	4	150	0.030	4	1.8	11935	1430	10.5
5	4	150	0.040	5	2.3	9550	1530	17.0
6	4	150	0.050	6	2.7	7960	1590	26.0
8	4	150	0.065	8	3.6	5970	1550	44.5
10	4	150	0.080	10	4.5	4775	1530	69.0
12	4	150	0.095	12	5.4	3980	1510	98.0
16	4	150	0.125	16	7.2	2985	1495	172.0
20	4	150	0.155	20	9.0	2385	1480	266.5
3	4	80	0.020	3	1.4	8490	680	3.0
4	4	80	0.030	4	1.8	6365	765	5.5
5	4	80	0.035	5	2.3	5095	715	8.0
6	4	80	0.045	6	2.7	4245	765	12.5
8	4	80	0.060	8	3.6	3185	765	22.0
10	4	80	0.070	10	4.5	2545	715	32.0
12	4	80	0.085	12	5.4	2120	720	46.5
16	4	80	0.110	16	7.2	1590	700	80.5
20	4	80	0.140	20	9.0	1275	715	128.5
3	4	70	0.015	3	1.4	7425	445	2.0
4	4	70	0.020	4	1.8	5570	445	3.0
5	4	70	0.025	5	2.3	4455	445	5.0
6	4	70	0.030	6	2.7	3715	445	7.0
8	4	70	0.040	8	3.6	2785	445	13.0
10	4	70	0.050	10	4.5	2230	445	20.0
12	4	70	0.060	12	5.4	1855	445	29.0
16	4	70	0.075	16	7.2	1395	420	48.5
20	4	70	0.100	20	9.0	1115	445	80.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	180	0.015	2.4	3	19100	1145	8.0
4	4	180	0.020	3.2	4	14325	1145	14.5
5	4	180	0.030	4.0	5	11460	1375	27.5
6	4	180	0.040	4.8	6	9550	1530	44.0
8	4	180	0.050	6.4	8	7160	1430	73.0
10	4	180	0.065	8.0	10	5730	1490	119.0
12	4	180	0.075	9.6	12	4775	1435	165.5
16	4	180	0.075	8.0	16	3580	1075	137.5
20	4	180	0.095	10.0	20	2865	1090	218.0
3	4	120	0.015	2.4	3	12735	765	5.5
4	4	120	0.020	3.2	4	9550	765	10.0
5	4	120	0.030	4.0	5	7640	915	18.5
6	4	120	0.040	4.8	6	6365	1020	29.5
8	4	120	0.050	6.4	8	4775	955	49.0
10	4	120	0.065	8.0	10	3820	995	79.5
12	4	120	0.075	9.6	12	3185	955	110.0
16	4	120	0.075	8.0	16	2385	715	91.5
20	4	120	0.095	10.0	20	1910	725	145.0
3	4	60	0.015	2.4	3	6365	380	2.5
4	4	60	0.020	3.2	4	4775	380	5.0
5	4	60	0.030	4.0	5	3820	460	9.0
6	4	60	0.035	4.8	6	3185	445	13.0
8	4	60	0.045	6.4	8	2385	430	22.0
10	4	60	0.055	8.0	10	1910	420	33.5
12	4	60	0.060	9.6	12	1590	380	44.0
16	4	60	0.075	8.0	16	1195	360	46.0
20	4	60	0.095	10.0	20	955	365	73.0
3	4	50	0.015	2.4	3	5305	320	2.5
4	4	50	0.020	3.2	4	3980	320	4.0
5	4	50	0.025	4.0	5	3185	320	6.5
6	4	50	0.030	4.8	6	2655	320	9.0
8	4	50	0.040	6.4	8	1990	320	16.5
10	4	50	0.050	8.0	10	1590	320	25.5
12	4	50	0.055	9.6	12	1325	290	33.5
16	4	50	0.070	8.0	16	995	280	36.0
20	4	50	0.085	10.0	20	795	270	54.0



# Cylindrical end mills NX-V

Smooth-edged, normal version with neck

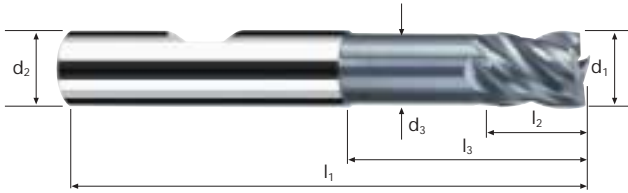


**HM**  
**MG10**

$\lambda$  40°  
 $\gamma$  0°

45°

Vario



Roughing

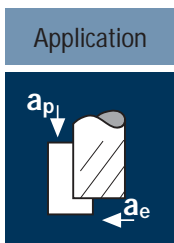


Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **GG(G)** Tool Steel    **Nickel-Alloys**

Example: Order-N°.										POLYCHROM	
										P5325	
										P5225	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.180	3	6	2.8	57	4	14	0.10	4.0°	4	●	
.220	4	6	3.7	57	5	16	0.10	3.0°	4	●	
.260	5	6	4.6	57	6	18	0.15	2.0°	4	●	
.300	6	6	5.5	57	7	20	0.15	0.0°	4	●	
.391	8	8	7.4	63	9	26	0.15	0.0°	4	●	
.450	10	10	9.2	72	11	31	0.20	0.0°	4	●	
.501	12	12	11.0	83	13	37	0.20	0.0°	4	●	
.610	16	16	15.0	92	17	43	0.20	0.0°	4	●	
.682	20	20	19.0	104	21	53	0.20	0.0°	4	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	210	0.035	6	2.4	11140	1560	22.5
8	4	210	0.045	8	3.2	8355	1505	38.5
10	4	210	0.055	10	4.0	6685	1470	59.0
12	4	210	0.065	12	4.8	5570	1450	83.5
16	4	210	0.090	16	6.4	4180	1505	154.0
20	4	210	0.110	20	8.0	3340	1470	235.0

Material

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	160	0.035	6	2.4	8490	1190	17.0
8	4	160	0.045	8	3.2	6365	1145	29.5
10	4	160	0.055	10	4.0	5095	1120	45.0
12	4	160	0.065	12	4.8	4245	1105	63.5
16	4	160	0.090	16	6.4	3185	1145	117.0
20	4	160	0.110	20	8.0	2545	1120	179.0

Material

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

6	4	90	0.030	6	2.4	4775	575	8.5
8	4	90	0.040	8	3.2	3580	575	14.5
10	4	90	0.050	10	4.0	2865	575	23.0
12	4	90	0.060	12	4.8	2385	570	33.0
16	4	90	0.075	16	6.4	1790	535	55.0
20	4	90	0.100	20	8.0	1430	570	91.0

Material

Stainless steel  
[Cr-Ni/1.4301]

6	4	80	0.020	6	2.4	4245	340	5.0
8	4	80	0.030	8	3.2	3185	380	9.5
10	4	80	0.035	10	4.0	2545	355	14.0
12	4	80	0.040	12	4.8	2120	340	19.5
16	4	80	0.055	16	6.4	1590	350	36.0
20	4	80	0.070	20	8.0	1275	355	57.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	190	0.030	4.2	6	10080	1210	30.5
8	4	190	0.035	5.6	8	7560	1060	47.5
10	4	190	0.045	7.0	10	6050	1090	76.5
12	4	190	0.055	8.4	12	5040	1110	112.0
16	4	190	0.055	11.2	16	3780	830	148.5
20	4	190	0.065	9.0	20	3025	785	141.5

Material

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	130	0.030	4.2	6	6895	825	21.0
8	4	130	0.035	5.6	8	5175	725	32.5
10	4	130	0.045	7.0	10	4140	745	52.0
12	4	130	0.055	8.4	12	3450	760	76.5
16	4	130	0.055	11.2	16	2585	570	102.0
20	4	130	0.065	9.0	20	2070	540	97.0

Material

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

6	4	70	0.025	4.2	6	3715	370	9.5
8	4	70	0.030	5.6	8	2785	335	15.0
10	4	70	0.040	7.0	10	2230	355	25.0
12	4	70	0.040	8.4	12	1855	295	29.5
16	4	70	0.055	11.2	16	1395	305	54.5
20	4	70	0.065	9.0	20	1115	290	52.0

Material

Stainless steel  
[Cr-Ni/1.4301]

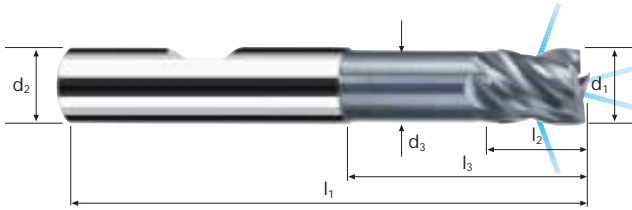
6	4	60	0.020	4.2	6	3185	255	6.5
8	4	60	0.030	5.6	8	2385	285	13.0
10	4	60	0.035	7.0	10	1910	265	18.5
12	4	60	0.040	8.4	12	1590	255	25.5
16	4	60	0.050	11.2	16	1195	240	43.0
20	4	60	0.060	9.0	20	955	230	41.5

# Cylindrical end mills NX-V

Smooth-edged, normal version with neck, with integral air / cooling channel



<b>HM MG10</b>	$\lambda$ 40° $\gamma$ 0°
45°	
Vario	



**new!**

Roughing



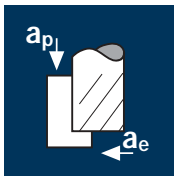
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel Nickel-Alloys
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Example: Order-N°.									POLYCHROM	
			Coating <b>P</b>	Article-N°. <b>15302</b>	α-Code <b>.300</b>				<b>P15302</b>	
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	z		
.300	6	6	5.5	57	7	20	0.15	4	●	
.391	8	8	7.4	63	9	26	0.15	4	●	
.450	10	10	9.2	72	11	31	0.20	4	●	
.501	12	12	11.0	83	13	37	0.20	4	●	
.610	16	16	15.0	92	17	43	0.20	4	●	
.682	20	20	19.0	104	21	53	0.20	4	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	160	0.025	4	2.6	12735	1275	13.5
5	4	160	0.035	5	3.3	10185	1425	23.0
6	4	160	0.040	6	3.9	8490	1360	32.0
8	4	160	0.055	8	5.2	6365	1400	58.0
10	4	160	0.065	10	6.5	5095	1325	86.0
12	4	160	0.080	12	7.8	4245	1360	127.5
16	4	160	0.090	16	10.4	3185	1145	190.5
20	4	160	0.110	20	13.0	2545	1120	291.0

4	4	120	0.025	4	2.6	9550	955	10.0
5	4	120	0.035	5	3.3	7640	1070	17.5
6	4	120	0.040	6	3.9	6365	1020	24.0
8	4	120	0.055	8	5.2	4775	1050	43.5
10	4	120	0.065	10	6.5	3820	995	64.5
12	4	120	0.080	12	7.8	3185	1020	95.5
16	4	120	0.090	16	10.4	2385	860	143.0
20	4	120	0.110	20	13.0	1910	840	218.5

4	4	90	0.025	4	2.6	7160	715	7.5
5	4	90	0.030	5	3.3	5730	690	11.0
6	4	90	0.035	6	3.9	4775	670	15.5
8	4	90	0.045	8	5.2	3580	645	27.0
10	4	90	0.060	10	6.5	2865	690	45.0
12	4	90	0.070	12	7.8	2385	670	62.5
16	4	90	0.080	16	10.4	1790	575	95.5
20	4	90	0.100	20	13.0	1430	570	148.0

4	4	40	0.015	4	2.6	3185	190	2.0
5	4	40	0.020	5	3.3	2545	205	3.5
6	4	40	0.020	6	3.9	2120	170	4.0
8	4	40	0.025	8	5.2	1590	160	6.5
10	4	40	0.035	10	6.5	1275	180	11.5
12	4	40	0.040	12	7.8	1060	170	16.0
16	4	40	0.050	16	10.4	795	160	26.5
20	4	40	0.060	20	13.0	635	150	39.0

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	130	0.020	3.6	4	10345	830	12.0
5	4	130	0.025	4.5	5	8275	830	18.5
6	4	130	0.035	5.4	6	6895	965	31.5
8	4	130	0.045	7.2	8	5175	930	53.5
10	4	130	0.055	9.0	10	4140	910	82.0
12	4	130	0.065	10.8	12	3450	895	116.0
16	4	130	0.075	14.4	16	2585	775	178.5
20	4	130	0.095	18.0	20	2070	785	282.5

4	4	100	0.020	3.6	4	7960	635	9.0
5	4	100	0.025	4.5	5	6365	635	14.5
6	4	100	0.035	5.4	6	5305	745	24.0
8	4	100	0.045	7.2	8	3980	715	41.0
10	4	100	0.055	9.0	10	3185	700	63.0
12	4	100	0.065	10.8	12	2655	690	89.5
16	4	100	0.075	14.4	16	1990	595	137.0
20	4	100	0.095	18.0	20	1590	605	218.0

4	4	70	0.020	3.6	4	5570	445	6.5
5	4	70	0.025	4.5	5	4455	445	10.0
6	4	70	0.030	5.4	6	3715	445	14.5
8	4	70	0.040	7.2	8	2785	445	25.5
10	4	70	0.050	9.0	10	2230	445	40.0
12	4	70	0.060	10.8	12	1855	445	57.5
16	4	70	0.070	14.4	16	1395	390	90.0
20	4	70	0.085	18.0	20	1115	380	137.0

4	4	30	0.015	3.6	4	2385	145	2.0
5	4	30	0.020	4.5	5	1910	155	3.5
6	4	30	0.020	5.4	6	1590	125	4.0
8	4	30	0.030	7.2	8	1195	145	8.5
10	4	30	0.035	9.0	10	955	135	12.0
12	4	30	0.040	10.8	12	795	125	16.0
16	4	30	0.050	14.4	16	595	120	27.5
20	4	30	0.060	18.0	20	475	115	41.5

# Cylindrical end mills NX-VD

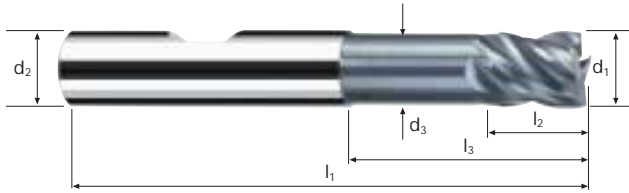
Smooth-edged, normal version with neck



**HM MG10**  $\lambda$  45°  $\gamma$ -10°

45°

Vario



Roughing

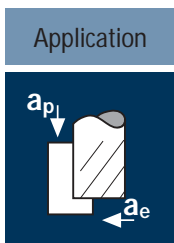


Finishing



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56				<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.										POLYCHROM	
										P15342	
										P15242	
$\emptyset$ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.220	4	6	3.7	57	6	16	0.10	3.0°	4	●	
.260	5	6	4.6	57	8	18	0.15	1.5°	4	●	
.300	6	6	5.5	57	9	20	0.15	0.0°	4	●	
.391	8	8	7.4	63	12	26	0.15	0.0°	4	●	
.450	10	10	9.2	72	15	31	0.20	0.0°	4	●	
.501	12	12	11.0	83	18	37	0.20	0.0°	4	●	
.610	16	16	15.0	92	24	43	0.20	0.0°	4	●	
.682	20	20	19.0	104	30	53	0.20	0.0°	4	●	



Material

Hardened tool steel  
42 - 48 HRC

**P**  
 **P** **D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	120	0.025	3	1.8	12735	1275	7.0
4	4	120	0.035	4	2.4	9550	1335	13.0
5	4	120	0.040	5	3.0	7640	1220	18.5
6	4	120	0.050	6	3.6	6365	1275	27.5
8	4	120	0.065	8	4.8	4775	1240	47.5
10	4	120	0.085	10	6.0	3820	1300	78.0
12	4	120	0.100	12	7.2	3185	1275	110.0
16	4	120	0.135	16	4.0	2385	1290	82.5
20	4	120	0.165	20	5.0	1910	1260	126.0

Hardened tool steel  
48 - 52 HRC

**P**  
 **P** **D**

3	4	80	0.015	3	1.8	8490	510	3.0
4	4	80	0.020	4	2.4	6365	510	5.0
5	4	80	0.030	5	3.0	5095	610	9.0
6	4	80	0.035	6	3.6	4245	595	13.0
8	4	80	0.045	8	4.8	3185	575	22.0
10	4	80	0.055	10	6.0	2545	560	33.5
12	4	80	0.065	12	7.2	2120	550	47.5
16	4	80	0.090	16	4.0	1590	570	36.5
20	4	80	0.110	20	5.0	1275	560	56.0

Hardened tool steel  
52 - 56 HRC

**D** **P**

3	4	60	0.015	3	1.8	6365	380	2.0
4	4	60	0.020	4	2.4	4775	380	3.5
5	4	60	0.025	5	3.0	3820	380	5.5
6	4	60	0.025	6	3.6	3185	320	7.0
8	4	60	0.035	8	4.8	2385	335	13.0
10	4	60	0.045	10	6.0	1910	345	20.5
12	4	60	0.055	12	3.0	1590	350	12.5
16	4	60	0.075	16	4.0	1195	360	23.0
20	4	60	0.090	20	5.0	955	345	34.5

Hardened tool steel  
56 - 60 HRC

**D**

3	4	30	0.010	3	1.8	3185	127	0.5
4	4	30	0.015	4	2.4	2385	143	1.5
5	4	30	0.015	5	3.0	1910	115	1.5
6	4	30	0.020	6	3.6	1590	127	2.5
8	4	30	0.025	8	4.8	1195	120	4.5
10	4	30	0.035	10	6.0	955	134	8.0
12	4	30	0.040	12	3.0	795	127	4.5
16	4	30	0.055	16	4.0	595	131	8.5
20	4	30	0.065	20	5.0	475	124	12.5



Material

Hardened tool steel  
42 - 48 HRC

**P**  
 **P** **D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	100	0.020	1.5	3	10610	850	4.0
4	4	100	0.025	2.0	4	7960	795	6.5
5	4	100	0.035	2.5	5	6365	890	11.0
6	4	100	0.040	3.0	6	5305	850	15.5
8	4	100	0.055	4.0	8	3980	875	28.0
10	4	100	0.065	5.0	10	3185	830	41.5
12	4	100	0.080	6.0	12	2655	850	61.0
16	4	100	0.105	4.0	16	1990	835	53.5
20	4	100	0.135	5.0	20	1590	860	86.0

Hardened tool steel  
48 - 52 HRC

**P**  
 **P** **D**

3	4	60	0.015	1.5	3	6365	380	1.5
4	4	60	0.020	2.0	4	4775	380	3.0
5	4	60	0.025	2.5	5	3820	380	5.0
6	4	60	0.030	3.0	6	3185	380	7.0
8	4	60	0.040	4.0	8	2385	380	12.0
10	4	60	0.050	5.0	10	1910	380	19.0
12	4	60	0.060	6.0	12	1590	380	27.5
16	4	60	0.080	4.0	16	1195	380	24.5
20	4	60	0.100	5.0	20	955	380	38.0

Hardened tool steel  
52 - 56 HRC

**D** **P**

3	4	40	0.010	1.5	3	4245	170	1.0
4	4	40	0.015	2.0	4	3185	190	1.5
5	4	40	0.020	2.5	5	2545	205	2.5
6	4	40	0.025	3.0	6	2120	210	4.0
8	4	40	0.030	4.0	8	1590	190	6.0
10	4	40	0.040	5.0	10	1275	205	10.5
12	4	40	0.050	6.0	12	1060	210	15.0
16	4	40	0.065	4.0	16	795	205	13.0
20	4	40	0.080	5.0	20	635	205	20.5

Hardened tool steel  
56 - 60 HRC

**D**

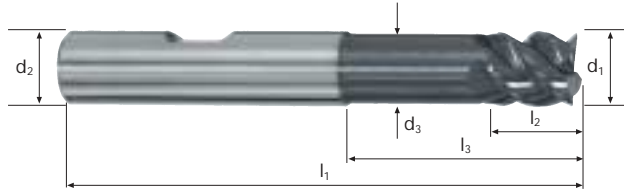
3	4	20	0.009	1.5	3	2120	76	0.3
4	4	20	0.011	2.0	4	1590	70	0.5
5	4	20	0.014	2.5	5	1275	71	1.0
6	4	20	0.017	3.0	6	1060	72	1.5
8	4	20	0.023	4.0	8	795	73	2.5
10	4	20	0.029	5.0	10	635	74	3.5
12	4	20	0.034	6.0	12	530	72	5.0
16	4	20	0.046	4.0	16	400	74	4.5
20	4	20	0.057	5.0	20	320	73	7.5

# Cylindrical end mills HX

Smooth-edged, normal version with neck



HM  
MG10    λ 55°  
             γ-10°



Roughing



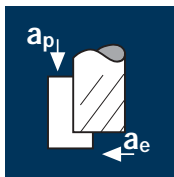
Finishing



		Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	GG(G)
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Example: Order-N°.										POLYCHROM	DURO-S
										P5348	D5348
										P5248	D5248
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	α	z		
.180	3	6	2.8	57	4	14	0.10	4.0°	4	●	●
.220	4	6	3.7	57	5	16	0.10	3.0°	4	●	●
.260	5	6	4.6	57	6	18	0.15	2.0°	4	●	●
.300	6	6	5.5	57	7	20	0.15	0.0°	4	●	●
.391	8	8	7.4	63	9	26	0.15	0.0°	4	●	●
.450	10	10	9.2	72	11	31	0.20	0.0°	4	●	●
.501	12	12	11.0	83	13	37	0.20	0.0°	4	●	●
.610	16	16	15.0	92	17	43	0.20	0.0°	4	●	●
.682	20	20	19.0	104	21	53	0.20	0.0°	4	●	●
.772	25	25	24.0	121	26	64	0.25	0.0°	4	●	●

## Application



## Material

Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



Hardened tool steel  
> 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	90	0.020	3	1.2	9550	765	3.0
4	4	90	0.025	4	1.6	7160	715	4.5
5	4	90	0.030	5	2.0	5730	690	7.0
6	4	90	0.040	6	2.4	4775	765	11.0
8	4	90	0.050	8	3.2	3580	715	18.5
10	4	90	0.065	10	4.0	2865	745	30.0
12	4	90	0.075	12	4.8	2385	715	41.0
16	4	90	0.100	16	4.0	1790	715	46.0
20	4	90	0.125	20	5.0	1430	715	71.5
3	4	70	0.015	3	1.2	7425	445	1.5
4	4	70	0.020	4	1.6	5570	445	3.0
5	4	70	0.030	5	2.0	4455	535	5.5
6	4	70	0.035	6	2.4	3715	520	7.5
8	4	70	0.045	8	3.2	2785	500	13.0
10	4	70	0.055	10	4.0	2230	490	19.5
12	4	70	0.065	12	3.0	1855	480	17.5
16	4	70	0.090	16	4.0	1395	500	32.0
20	4	70	0.110	20	5.0	1115	490	49.0
3	4	35	0.015	3	1.2	3715	225	1.0
4	4	35	0.020	4	1.6	2785	225	1.5
5	4	35	0.025	5	2.0	2230	225	2.5
6	4	35	0.025	6	2.4	1855	185	2.5
8	4	35	0.035	8	3.2	1395	195	5.0
10	4	35	0.045	10	4.0	1115	200	8.0
12	4	35	0.055	12	3.0	930	205	7.5
16	4	35	0.075	16	4.0	695	210	13.5
20	4	35	0.090	20	5.0	555	200	20.0
3	4	25	0.010	3	1.2	2655	106	0.5
4	4	25	0.010	4	1.6	1990	80	0.5
5	4	25	0.015	5	2.0	1590	95	1.0
6	4	25	0.015	6	2.4	1325	80	1.0
8	4	25	0.025	8	3.2	995	100	2.5
10	4	25	0.030	10	4.0	795	95	4.0
12	4	25	0.035	12	3.0	665	93	3.5
16	4	25	0.045	16	4.0	495	89	5.5
20	4	25	0.055	20	5.0	400	88	9.0

## Application



## Material

Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



Hardened tool steel  
> 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	70	0.015	1.5	3	7425	445	2.0
4	4	70	0.020	2.0	4	5570	445	3.5
5	4	70	0.030	2.5	5	4455	535	6.5
6	4	70	0.035	3.0	6	3715	520	9.5
8	4	70	0.045	4.0	8	2785	500	16.0
10	4	70	0.055	5.0	10	2230	490	24.5
12	4	70	0.065	6.0	12	1855	480	34.5
16	4	70	0.090	4.0	16	1395	500	32.0
20	4	70	0.110	5.0	20	1115	490	49.0
3	4	50	0.015	1.5	3	5305	320	1.5
4	4	50	0.020	2.0	4	3980	320	2.5
5	4	50	0.025	2.5	5	3185	320	4.0
6	4	50	0.025	3.0	6	2655	265	5.0
8	4	50	0.035	4.0	8	1990	280	9.0
12	4	50	0.055	6.0	12	1325	290	21.0
16	4	50	0.075	4.0	16	995	300	19.0
20	4	50	0.090	5.0	20	795	285	28.5
3	4	30	0.010	1.5	3	3185	125	0.5
4	4	30	0.013	2.0	4	2385	125	1.0
5	4	30	0.017	2.5	5	1910	130	1.5
6	4	30	0.020	3.0	6	1590	125	2.5
8	4	30	0.027	4.0	8	1195	130	4.0
10	4	30	0.033	5.0	10	955	125	6.5
12	4	30	0.040	6.0	12	795	125	9.0
16	4	30	0.053	4.0	16	595	125	8.0
20	4	30	0.067	5.0	20	475	125	12.5
3	4	20	0.008	1.5	3	2120	68	0.5
4	4	20	0.011	2.0	4	1590	70	0.5
5	4	20	0.013	2.5	5	1275	66	1.0
6	4	20	0.016	3.0	6	1060	68	1.0
8	4	20	0.021	4.0	8	795	67	2.0
10	4	20	0.026	5.0	10	635	66	3.5
12	4	20	0.032	6.0	12	530	68	5.0
16	4	20	0.042	4.0	16	400	67	4.5
20	4	20	0.053	5.0	20	320	68	7.0

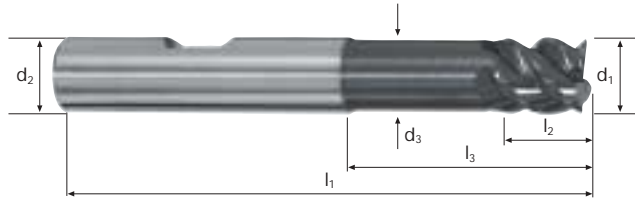


# Cylindrical end mills HX-H

Smooth-edged, normal version with neck



**HM  
XT**     $\lambda$  **55°**  
 $\gamma$  **-10°**



Roughing



Finishing



**Rm**  
1300-1500

**HRC**  
48-56

**HRC**  
56-60

**HRC**  
> 60

HSS

Example:  
Order-N°.

Coating    Article-N°     $\alpha$ -Code  
**D**    **5344**    **.180**

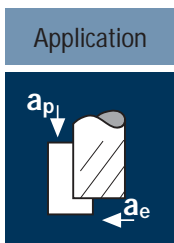


**DURO-S**

**D5344**

**D5244**

$\emptyset$ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.180	3	6	2.8	57	4	14	0.10	4.0°	4	●	
.220	4	6	3.7	57	5	16	0.10	3.0°	4	●	
.260	5	6	4.6	57	6	18	0.15	2.0°	4	●	
.300	6	6	5.5	57	7	20	0.15	0.0°	4	●	
.391	8	8	7.4	63	9	26	0.15	0.0°	4	●	
.450	10	10	9.2	72	11	31	0.20	0.0°	4	●	
.501	12	12	11.0	83	13	37	0.20	0.0°	4	●	
.610	16	16	15.0	92	17	43	0.20	0.0°	4	●	
.682	20	20	19.0	104	21	53	0.20	0.0°	4	●	



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	80	0.015	3	1.2	8490	510	2.0
4	4	80	0.020	4	1.6	6365	510	3.5
5	4	80	0.025	5	2.0	5095	510	5.0
6	4	80	0.030	6	2.4	4245	510	7.5
8	4	80	0.040	8	3.2	3185	510	13.0
10	4	80	0.055	10	4.0	2545	560	22.5
12	4	80	0.065	12	4.8	2120	550	31.5
16	4	80	0.085	16	4.0	1590	540	34.5
20	4	80	0.090	20	5.0	1275	460	46.0

Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	4	40	0.015	3	1.2	4245	255	1.0
4	4	40	0.020	4	1.6	3185	255	1.5
5	4	40	0.025	5	2.0	2545	255	2.5
6	4	40	0.030	6	2.4	2120	255	3.5
8	4	40	0.040	8	3.2	1590	255	6.5
10	4	40	0.055	10	4.0	1275	280	11.0
12	4	40	0.065	12	4.8	1060	275	16.0
16	4	40	0.085	16	4.0	795	270	17.5
20	4	40	0.090	20	5.0	635	230	23.0

Material

Heat resistant steel  
[17-4 PH]

3	4	25	0.015	3	1.2	2655	160	0.5
4	4	25	0.020	4	1.6	1990	160	1.0
5	4	25	0.025	5	2.0	1590	160	1.5
6	4	25	0.030	6	2.4	1325	160	2.5
8	4	25	0.035	8	3.2	995	140	3.5
10	4	25	0.045	10	4.0	795	145	6.0
12	4	25	0.050	12	4.8	665	135	8.0
16	4	25	0.065	16	4.0	495	130	8.5
20	4	25	0.085	20	5.0	400	135	13.5

Material

Nickel base alloys prec.-hard.  
[Inconel 718]

3	4	15	0.015	3	1.2	1590	95	0.5
4	4	15	0.020	4	1.6	1195	95	0.5
5	4	15	0.025	5	2.0	955	95	1.0
6	4	15	0.030	6	2.4	795	95	1.5
8	4	15	0.035	8	3.2	595	85	2.0
10	4	15	0.045	10	4.0	475	85	3.5
12	4	15	0.050	12	4.8	400	80	4.5
16	4	15	0.065	16	4.0	300	80	5.0
20	4	15	0.085	20	5.0	240	80	8.0



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	60	0.015	2.3	3	6365	380	2.5
4	4	60	0.020	3.0	4	4775	380	4.5
5	4	60	0.025	3.8	5	3820	380	7.0
6	4	60	0.030	4.5	6	3185	380	10.5
8	4	60	0.040	6.0	8	2385	380	18.0
10	4	60	0.055	7.5	10	1910	420	31.5
12	4	60	0.055	9.0	12	1590	350	38.0
16	4	60	0.085	8.0	16	1195	405	52.0
20	4	60	0.105	10.0	20	955	400	80.0

Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	4	30	0.015	2.3	3	3185	190	1.5
4	4	30	0.020	3.0	4	2385	190	2.5
5	4	30	0.025	3.8	5	1910	190	3.5
6	4	30	0.030	4.5	6	1590	190	5.0
8	4	30	0.040	6.0	8	1195	190	9.0
10	4	30	0.055	7.5	10	955	210	16.0
12	4	30	0.065	9.0	12	795	205	22.0
16	4	30	0.085	8.0	16	595	200	25.5
20	4	30	0.105	10.0	20	475	200	40.0

Material

Heat resistant steel  
[17-4 PH]

3	4	20	0.015	2.3	3	2120	125	1.0
4	4	20	0.020	3.0	4	1590	125	1.5
5	4	20	0.025	3.8	5	1275	130	2.5
6	4	20	0.030	4.5	6	1060	125	3.5
8	4	20	0.035	6.0	8	795	110	5.5
10	4	20	0.045	7.5	10	635	115	8.5
12	4	20	0.050	9.0	12	530	105	11.5
16	4	20	0.070	8.0	16	400	110	14.0
20	4	20	0.090	10.0	20	320	115	23.0

Material

Nickel base alloys prec.-hard.  
[Inconel 718]

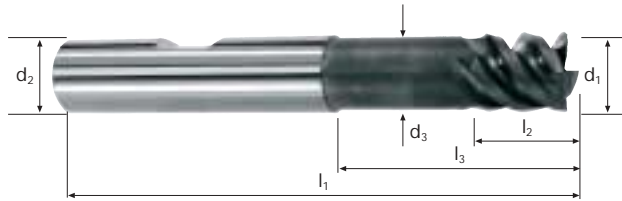
3	4	10	0.015	2.3	3	1060	65	0.5
4	4	10	0.020	3.0	4	795	65	1.0
5	4	10	0.025	3.8	5	635	65	1.0
6	4	10	0.030	4.5	6	530	65	2.0
8	4	10	0.035	6.0	8	400	55	2.5
10	4	10	0.045	7.5	10	320	60	4.5
12	4	10	0.050	9.0	12	265	55	6.0
16	4	10	0.070	8.0	16	200	55	7.0
20	4	10	0.090	10.0	20	160	60	12.0

# Cylindrical end mills SX

Smooth-edged, normal version with neck



**HM**  
**MG10**    λ **55°**  
                  γ **15°**



Roughing



Finishing



**Rm**  
< 850

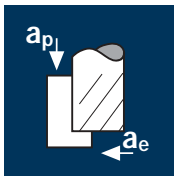








**Rm**  
850-1100

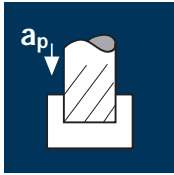








**Inox**  
Stainless

**Ti**  
Titanium

**Nickel-Alloys**  
**Tool Steel**

Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	α	z	POLYCHROM	
										P5318	P5218
.180	3	6	2.8	57	4	14	0.10	4.0°	4	●	
.220	4	6	3.7	57	5	16	0.10	3.0°	4	●	
.260	5	6	4.6	57	6	18	0.15	2.0°	4	●	
.300	6	6	5.5	57	7	20	0.15	0.0°	4	●	
.391	8	8	7.4	63	9	26	0.15	0.0°	4	●	
.450	10	10	9.2	72	11	31	0.20	0.0°	4	●	
.501	12	12	11.0	83	13	37	0.20	0.0°	4	●	
.610	16	16	15.0	92	17	43	0.20	0.0°	4	●	
.682	20	20	19.0	104	21	53	0.20	0.0°	4	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Stainless steel [Cr-Ni/1.4301]   	3	3	80	0.015	3	1.2	8490	380	1.5
		4	3	80	0.020	4	1.6	6365	380	2.5
		5	3	80	0.025	5	2.0	5095	380	4.0
		6	3	80	0.030	6	2.4	4245	380	5.5
		8	3	80	0.040	8	3.2	3185	380	9.5
		10	3	80	0.055	10	4.0	2545	420	17.0
		12	3	80	0.065	12	4.8	2120	415	24.0
16	3	80	0.085	16	4.0	1590	405	26.0		
	Stainless steel [Cr-Ni-Mo-.../1.4571]   	3	3	40	0.015	3	1.2	4245	190	0.5
		4	3	40	0.020	4	1.6	3185	190	1.0
		5	3	40	0.025	5	2.0	2545	190	2.0
		6	3	40	0.030	6	2.4	2120	190	2.5
		8	3	40	0.040	8	3.2	1590	190	5.0
		10	3	40	0.055	10	4.0	1275	210	8.5
		12	3	40	0.065	12	4.8	1060	205	12.0
16	3	40	0.085	16	4.0	795	205	13.0		
	Heat resistant steel [17-4 PH]   	3	3	25	0.015	3	1.2	2655	120	0.5
		4	3	25	0.020	4	1.6	1990	120	1.0
		5	3	25	0.025	5	2.0	1590	120	1.0
		6	3	25	0.030	6	2.4	1325	120	1.5
		8	3	25	0.035	8	3.2	995	105	2.5
		10	3	25	0.045	10	4.0	795	105	4.0
		12	3	25	0.050	12	4.8	665	100	6.0
16	3	25	0.060	16	4.0	495	90	6.0		
	Nickel base alloys prec.-hard. [Inconel 718]   	3	3	15	0.015	3	1.2	1590	70	0.5
		4	3	15	0.020	4	1.6	1195	70	0.5
		5	3	15	0.025	5	2.0	955	70	0.5
		6	3	15	0.030	6	2.4	795	70	1.0
		8	3	15	0.035	8	3.2	595	60	1.5
		10	3	15	0.045	10	4.0	475	65	2.5
		12	3	15	0.050	12	4.8	400	60	3.5
16	3	15	0.060	16	4.0	300	55	3.5		

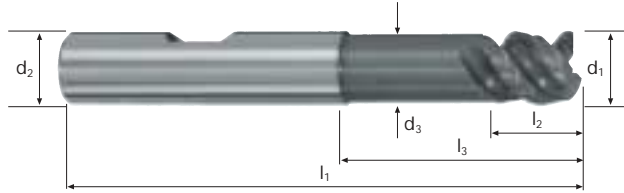
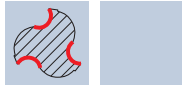
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Stainless steel [Cr-Ni/1.4301]   	3	3	60	0.015	1.5	3	6365	285	1.5
		4	3	60	0.020	2.0	4	4775	285	2.5
		5	3	60	0.025	2.5	5	3820	285	3.5
		6	3	60	0.030	3.0	6	3185	285	5.0
		8	3	60	0.040	4.0	8	2385	285	9.0
		10	3	60	0.055	5.0	10	1910	315	16.0
		12	3	60	0.065	6.0	12	1590	310	22.5
16	3	60	0.085	4.0	16	1195	305	19.5		
	Stainless steel [Cr-Ni-Mo-.../1.4571]   	3	3	30	0.015	1.5	3	3185	145	0.5
		4	3	30	0.020	2.0	4	2385	145	1.0
		5	3	30	0.025	2.5	5	1910	145	2.0
		6	3	30	0.030	3.0	6	1590	145	2.5
		8	3	30	0.040	4.0	8	1195	145	4.5
		10	3	30	0.055	5.0	10	955	160	8.0
		12	3	30	0.065	6.0	12	795	155	11.0
16	3	30	0.085	4.0	16	595	150	9.5		
	Heat resistant steel [17-4 PH]   	3	3	20	0.015	1.5	3	2120	95	0.5
		4	3	20	0.020	2.0	4	1590	95	1.0
		5	3	20	0.025	2.5	5	1275	95	1.0
		6	3	20	0.030	3.0	6	1060	95	1.5
		8	3	20	0.035	4.0	8	795	85	2.5
		10	3	20	0.045	5.0	10	635	85	4.5
		12	3	20	0.050	6.0	12	530	80	6.0
16	3	20	0.060	4.0	16	400	70	4.5		
	Nickel base alloys prec.-hard. [Inconel 718]   	3	3	10	0.015	1.5	3	1060	50	0.2
		4	3	10	0.020	2.0	4	795	50	0.5
		5	3	10	0.025	2.5	5	635	50	0.5
		6	3	10	0.030	3.0	6	530	50	1.0
		8	3	10	0.035	4.0	8	400	40	1.5
		10	3	10	0.045	5.0	10	320	45	2.5
		12	3	10	0.050	6.0	12	265	40	3.0
16	3	10	0.060	4.0	16	200	35	2.0		

# Cylindrical end mills SX-3

Smooth-edged, normal version with neck



**HM**  
**MG10**     $\lambda$  55°  
                   $\gamma$  15°



Roughing

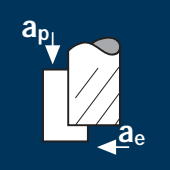











Finishing



**Rm** < 850    **Rm** 850-1100    **Inox** Stainless    **Ti** Titanium    **Nickel-Alloys** Tool Steel

Example: Order-N°.										POLYCHROM	
										P5315	
										P5215	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	α	z		
.180	3	6	2.8	57	4	14	0.10	4.0°	3	●	
.220	4	6	3.7	57	5	16	0.10	3.0°	3	●	
.260	5	6	4.6	57	6	18	0.15	1.5°	3	●	
.300	6	6	5.5	57	7	20	0.15	0.0°	3	●	
.391	8	8	7.4	63	9	26	0.15	0.0°	3	●	
.450	10	10	9.2	72	11	31	0.20	0.0°	3	●	
.501	12	12	11.0	83	13	37	0.20	0.0°	3	●	
.610	16	16	15.0	92	17	43	0.20	0.0°	3	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Stainless steel [Cr-Ni/1.4301]   <b>U</b>	4	4	28	0.035	4	2.2	2230	310	2.5
		5	4	28	0.045	5	2.8	1785	320	4.5
		6	4	28	0.050	6	3.3	1485	295	6.0
		8	4	28	0.070	8	4.4	1115	310	11.0
		10	4	28	0.085	10	5.5	890	305	17.0
		12	4	28	0.135	12	6.6	745	400	31.5
		16	4	28	0.175	16	8.8	555	390	55.0
		20	4	28	0.220	20	11.0	445	390	86.0
		25	4	28	0.275	25	13.8	355	390	134.0
		Stainless steel [Cr-Ni-Mo-.../1.4571]   <b>U</b>	4	4	22	0.035	4	2.2	1750	245
5	4		22	0.045	5	2.8	1400	250	3.5	
6	4		22	0.050	6	3.3	1165	235	4.5	
8	4		22	0.070	8	4.4	875	245	8.5	
10	4		22	0.085	10	5.5	700	240	13.0	
12	4		22	0.135	12	6.6	585	315	25.0	
16	4		22	0.175	16	8.8	440	310	43.5	
20	4		22	0.220	20	11.0	350	310	68.0	
25	4		22	0.275	25	13.8	280	310	106.5	
Heat resistant steel [17-4 PH]   <b>U</b>	4		4	12	0.035	4	2.2	955	135	1.0
	5	4	12	0.045	5	2.8	765	140	2.0	
	6	4	12	0.050	6	3.3	635	125	2.5	
	8	4	12	0.070	8	4.4	475	135	5.0	
	10	4	12	0.085	10	5.5	380	130	7.0	
	12	4	12	0.135	12	6.6	320	175	14.0	
	16	4	12	0.175	16	8.8	240	170	24.0	
	20	4	12	0.220	20	11.0	190	165	36.5	
	25	4	12	0.275	25	13.8	155	170	58.5	
	Nickel base alloys prec.-hard. [Inconel 718]   <b>U</b>	4	4	7	0.035	4	2.2	555	80	0.5
5		4	7	0.045	5	2.8	445	80	1.0	
6		4	7	0.050	6	3.3	370	75	1.5	
8		4	7	0.070	8	4.4	280	80	3.0	
10		4	7	0.085	10	5.5	225	75	4.0	
12		4	7	0.135	12	6.6	185	100	8.0	
16		4	7	0.175	16	8.8	140	100	14.0	
20		4	7	0.220	20	11.0	110	95	21.0	
25		4	7	0.275	25	13.8	90	100	34.5	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Stainless steel [Cr-Ni/1.4301]   <b>U</b>	4	4	25	0.025	2	4	1990	200	1.5
		5	4	25	0.030	3	5	1590	190	2.5
		6	4	25	0.040	3	6	1325	210	4.0
		8	4	25	0.050	4	8	995	200	6.5
		10	4	25	0.065	5	10	795	205	10.5
		12	4	25	0.100	6	12	665	265	19.0
		16	4	25	0.135	8	16	495	265	34.0
		20	4	25	0.165	10	20	400	265	53.0
		25	4	25	0.210	13	25	320	270	84.5
		Stainless steel [Cr-Ni-Mo-.../1.4571]   <b>U</b>	4	4	20	0.025	2	4	1590	160
5	4		20	0.030	3	5	1275	155	2.0	
6	4		20	0.040	3	6	1060	170	3.0	
8	4		20	0.050	4	8	795	160	5.0	
10	4		20	0.065	5	10	635	165	8.5	
12	4		20	0.100	6	12	530	210	15.0	
16	4		20	0.135	8	16	400	215	27.5	
20	4		20	0.165	10	20	320	210	42.0	
25	4		20	0.210	13	25	255	215	67.0	
Heat resistant steel [17-4 PH]   <b>U</b>	4		4	10	0.025	2	4	795	80	0.5
	5	4	10	0.030	3	5	635	75	1.0	
	6	4	10	0.040	3	6	530	85	1.5	
	8	4	10	0.050	4	8	400	80	2.5	
	10	4	10	0.065	5	10	320	85	4.5	
	12	4	10	0.100	6	12	265	105	7.5	
	16	4	10	0.135	8	16	200	110	14.0	
	20	4	10	0.165	10	20	160	105	21.0	
	25	4	10	0.210	13	25	125	105	33.0	
	Nickel base alloys prec.-hard. [Inconel 718]   <b>U</b>	4	4	7	0.025	2	4	555	55	0.5
5		4	7	0.030	3	5	445	55	0.5	
6		4	7	0.040	3	6	370	60	1.0	
8		4	7	0.050	4	8	280	55	2.0	
10		4	7	0.065	5	10	225	60	3.0	
12		4	7	0.100	6	12	185	75	5.5	
16		4	7	0.135	8	16	140	75	9.5	
20		4	7	0.165	10	20	110	75	15.0	
25		4	7	0.210	13	25	90	75	23.5	

# Cylindrical end mills Supracut SNC

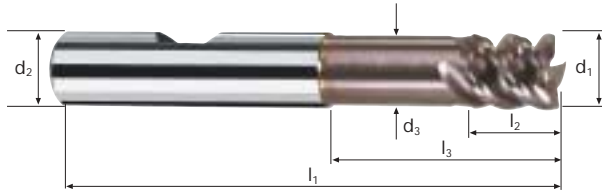
Smooth-edged, normal version with neck



**HSS**  
**PM/F**

$\lambda$  55°  
 $\gamma$  15°

45°



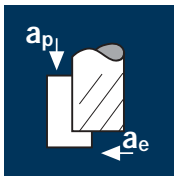
Roughing

Finishing

**Rm** < 850     **Rm** 850-1100     **Rm** 1100-1300     **Inox** Stainless     **Ti** Titanium     **Nickel-Alloys**

Example: Order-N°.										UNICUT-4X	
										U0580	
Ø Code	d1 k8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.220	4	6	3.7	57	5	16	0.10	1.5°	4	●	
.260	5	6	4.6	57	6	18	0.15	1.0°	4	●	
.300	6	6	5.5	57	7	20	0.15	0.0°	4	●	
.391	8	8	7.4	63	9	26	0.15	0.0°	4	●	
.450	10	10	9.2	72	11	31	0.20	0.0°	4	●	
.501	12	12	11.0	83	13	37	0.20	0.0°	4	●	
.610	16	16	15.0	92	17	43	0.20	0.0°	4	●	
.682	20	20	19.0	104	21	53	0.20	0.0°	4	●	
.772	25	25	24.0	121	26	64	0.25	0.0°	4	●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Steel  
1500 - 1800 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	120	0.025	7.2	0.8	9550	955	5.5
5	4	120	0.035	9.0	1.0	7640	1070	9.5
6	4	120	0.040	10.8	1.2	6365	1020	13.0
8	4	120	0.055	14.4	1.6	4775	1050	24.0
10	4	120	0.065	18.0	2.0	3820	995	36.0
12	4	120	0.080	21.6	2.4	3185	1020	53.0
16	4	120	0.090	28.8	3.2	2385	860	79.5
20	4	120	0.110	36.0	4.0	1910	840	121.0

4	4	90	0.025	7.2	0.8	7160	715	4.0
5	4	90	0.030	9.0	1.0	5730	690	6.0
6	4	90	0.035	10.8	1.2	4775	670	8.5
8	4	90	0.045	14.4	1.6	3580	645	15.0
10	4	90	0.060	18.0	2.0	2865	690	25.0
12	4	90	0.070	21.6	2.4	2385	670	34.5
16	4	90	0.080	28.8	3.2	1790	575	53.0
20	4	90	0.100	36.0	4.0	1430	570	82.0

4	4	70	0.020	7.2	0.8	5570	445	2.5
5	4	70	0.025	9.0	1.0	4455	445	4.0
6	4	70	0.025	10.8	1.2	3715	370	5.0
8	4	70	0.035	14.4	1.6	2785	390	9.0
10	4	70	0.045	18.0	2.0	2230	400	14.5
12	4	70	0.055	21.6	2.4	1855	410	21.5
16	4	70	0.065	28.8	3.2	1395	365	33.5
20	4	70	0.080	36.0	4.0	1115	355	51.0

4	4	40	0.015	7.2	0.8	3185	190	1.0
5	4	40	0.020	9.0	1.0	2545	205	2.0
6	4	40	0.020	10.8	1.2	2120	170	2.0
8	4	40	0.030	14.4	1.6	1590	190	4.5
10	4	40	0.035	18.0	2.0	1275	180	6.5
12	4	40	0.045	21.6	2.4	1060	190	10.0
16	4	40	0.050	28.8	3.2	795	160	14.5
20	4	40	0.065	36.0	4.0	635	165	24.0

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Steel  
1500 - 1800 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	100	0.015	6.0	4	7960	480	11.5
5	4	100	0.015	7.5	5	6365	380	14.5
6	4	100	0.020	9.0	6	5305	425	23.0
8	4	100	0.025	12.0	8	3980	400	38.5
10	4	100	0.035	15.0	10	3185	445	67.0
12	4	100	0.040	18.0	12	2655	425	92.0
16	4	100	0.050	24.0	16	1990	400	153.5
20	4	100	0.060	30.0	20	1590	380	228.0

4	4	70	0.010	6.0	4	5570	225	5.5
5	4	70	0.015	7.5	5	4455	265	10.0
6	4	70	0.020	9.0	6	3715	295	16.0
8	4	70	0.025	12.0	8	2785	280	27.0
10	4	70	0.030	15.0	10	2230	270	40.5
12	4	70	0.035	18.0	12	1855	260	56.0
16	4	70	0.045	24.0	16	1395	250	96.0
20	4	70	0.055	30.0	20	1115	245	147.0

4	4	50	0.010	6.0	4	3980	160	4.0
5	4	50	0.015	7.5	5	3185	190	7.0
6	4	50	0.020	9.0	6	2655	210	11.5
8	4	50	0.025	12.0	8	1990	200	19.0
10	4	50	0.030	15.0	10	1590	190	28.5
12	4	50	0.035	18.0	12	1325	185	40.0
16	4	50	0.045	24.0	16	995	180	69.0
20	4	50	0.055	30.0	20	795	175	105.0

4	4	30	0.005	6.0	4	2385	50	1.0
5	4	30	0.010	7.5	5	1910	75	3.0
6	4	30	0.015	9.0	6	1590	95	5.0
8	4	30	0.020	12.0	8	1195	95	9.0
10	4	30	0.020	15.0	10	955	75	11.5
12	4	30	0.025	18.0	12	795	80	17.5
16	4	30	0.030	24.0	16	595	70	27.0
20	4	30	0.040	30.0	20	475	75	45.0



# Cylindrical end mills NX-NVD

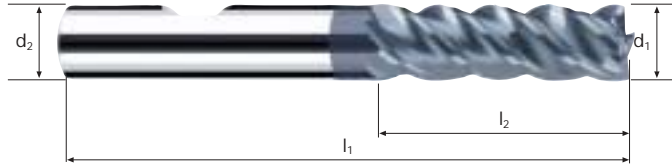
Smooth-edged, medium length version



**HM MG10**     $\lambda$  45°  
 $\gamma$ -10°

45°

Vario



Roughing

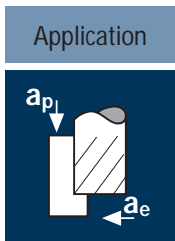


Finishing



**Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **HRC** 48-56    **Ti** Titanium    **GG(G)**

Example: Order-N°.								POLYCHROM	
		Coating	Article-N°.	α-Code				P15323	
		P	15323	.220				P15223	
Ø Code	d1 e8	d2 h6	l1	l2	45°	α	Z		
.220	4	6	63	13	0.10	3.0°	4	●	
.260	5	6	63	16	0.15	1.5°	4	●	
.300	6	6	63	21	0.15	0.0°	4	●	
.391	8	8	72	31	0.15	0.0°	4	●	
.450	10	10	84	37	0.20	0.0°	4	●	
.501	12	12	97	44	0.20	0.0°	4	●	
.610	16	16	108	53	0.20	0.0°	4	●	
.682	20	20	122	62	0.20	0.0°	4	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	4	140	0.005	4	0.2	22280	445
3	4	140	0.010	6	0.2	14855	595
4	4	140	0.010	8	0.3	11140	445
6	4	140	0.015	12	0.5	7425	445
8	4	140	0.025	16	0.6	5570	555
10	4	140	0.030	20	0.8	4455	535
12	4	140	0.035	24	1.0	3715	520
16	4	140	0.045	32	1.3	2785	500
20	4	140	0.055	40	1.6	2230	490

Steel  
850 - 1100 N/mm<sup>2</sup>

2	4	90	0.005	4	0.2	14325	285
3	4	90	0.010	6	0.2	9550	380
4	4	90	0.010	8	0.3	7160	285
6	4	90	0.015	12	0.5	4775	285
8	4	90	0.025	16	0.6	3580	360
10	4	90	0.030	20	0.8	2865	345
12	4	90	0.035	24	1.0	2385	335
16	4	90	0.045	32	1.3	1790	320
20	4	90	0.055	40	1.6	1430	315

Steel  
1100 - 1300 N/mm<sup>2</sup>

2	4	65	0.005	4	0.2	10345	205
3	4	65	0.010	6	0.2	6895	275
4	4	65	0.010	8	0.3	5175	205
6	4	65	0.015	12	0.5	3450	205
8	4	65	0.025	16	0.6	2585	260
10	4	65	0.030	20	0.8	2070	250
12	4	65	0.035	24	1.0	1725	240
16	4	65	0.045	32	1.3	1295	235
20	4	65	0.055	40	1.6	1035	230

Stainless steel  
[Cr-Ni/1.4301]

2	4	55	0.005	4	0.2	8755	175
3	4	55	0.010	6	0.2	5835	235
4	4	55	0.010	8	0.3	4375	175
6	4	55	0.015	12	0.5	2920	175
8	4	55	0.025	16	0.6	2190	220
10	4	55	0.030	20	0.8	1750	210
12	4	55	0.035	24	1.0	1460	205
16	4	55	0.045	32	1.3	1095	195
20	4	55	0.055	40	1.6	875	195

Material

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	4	100	0.005	4	0.2	15915	320
3	4	100	0.010	6	0.2	10610	425
4	4	100	0.010	8	0.3	7960	320
6	4	100	0.015	12	0.5	5305	320
8	4	100	0.025	16	0.6	3980	400
10	4	100	0.030	20	0.8	3185	380
12	4	100	0.035	24	1.0	2655	370
16	4	100	0.045	32	1.3	1990	360
20	4	100	0.055	40	1.6	1590	350

Unalloyed copper

2	4	180	0.005	4	0.2	28650	575
3	4	180	0.010	6	0.2	19100	765
4	4	180	0.010	8	0.3	14325	575
6	4	180	0.015	12	0.5	9550	575
8	4	180	0.025	16	0.6	7160	715
10	4	180	0.030	20	0.8	5730	690
12	4	180	0.035	24	1.0	4775	670
16	4	180	0.045	32	1.3	3580	645
20	4	180	0.055	40	1.6	2865	630

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

2	4	65	0.005	4	0.2	10345	205
3	4	65	0.010	6	0.2	6895	275
4	4	65	0.010	8	0.3	5175	205
6	4	65	0.015	12	0.5	3450	205
8	4	65	0.025	16	0.6	2585	260
10	4	65	0.030	20	0.8	2070	250
12	4	65	0.035	24	1.0	1725	240
16	4	65	0.045	32	1.3	1295	235
20	4	65	0.055	40	1.6	1035	230

Heat resistant steel  
[17-4 PH]

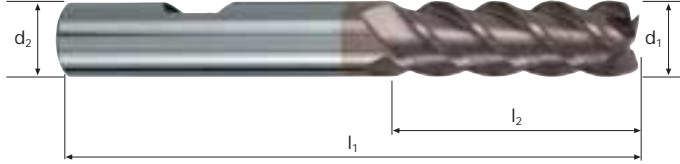
2	4	30	0.005	4	0.2	4775	95
3	4	30	0.010	6	0.2	3185	125
4	4	30	0.010	8	0.3	2385	95
6	4	30	0.015	12	0.5	1590	95
8	4	30	0.025	16	0.6	1195	120
10	4	30	0.030	20	0.8	955	115
12	4	30	0.035	24	1.0	795	110
16	4	30	0.045	32	1.3	595	105
20	4	30	0.055	40	1.6	475	105

# Cylindrical end mills

Smooth-edged, medium length version



**HM**  
**MG10**     $\lambda$  45°  
                   $\gamma$  15°



Roughing

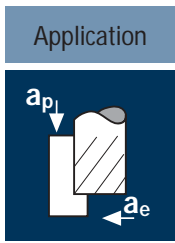


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300						Inox Stainless	Ti Titanium	GG(G) Copper
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Example: Order-N°.								UNICUT-4X	
		Coating <b>U</b>	Article-N°. <b>15343</b>	$\alpha$ -Code <b>.140</b>				<b>U15343</b>	
								<b>U15243</b>	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	Z		
.140	2.0	6	63	12	0.10	9.5°	4	●	
.160	2.5	6	63	13	0.10	7.8°	4	●	
.180	3.0	6	63	14	0.10	6.1°	4	●	
.220	4.0	6	63	17	0.10	3.4°	4	●	
.260	5.0	6	63	19	0.15	1.5°	4	●	
.300	6.0	6	63	19	0.15	0.0°	4	●	
.391	8.0	8	72	28	0.15	0.0°	4	●	
.450	10.0	10	84	34	0.20	0.0°	4	●	
.501	12.0	12	97	40	0.20	0.0°	4	●	
.610	16.0	16	108	48	0.20	0.0°	4	●	
.682	20.0	20	122	56	0.20	0.0°	4	●	
.772	25.0	25	144	70	0.25	0.0°	4	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	3	120	0.005	5.0	0.1	19100	285
3	3	120	0.010	7.5	0.2	12735	380
4	3	120	0.010	10.0	0.2	9550	285
6	3	120	0.015	15.0	0.3	6365	285
8	3	120	0.020	20.0	0.4	4775	285
10	3	120	0.025	25.0	0.5	3820	285
12	3	120	0.030	30.0	0.6	3185	285
16	3	120	0.040	40.0	0.8	2385	285
20	3	120	0.050	50.0	1.0	1910	285

Steel  
850 - 1100 N/mm<sup>2</sup>

2	3	80	0.005	5.0	0.1	12735	190
3	3	80	0.010	7.5	0.2	8490	255
4	3	80	0.010	10.0	0.2	6365	190
6	3	80	0.015	15.0	0.3	4245	190
8	3	80	0.020	20.0	0.4	3185	190
10	3	80	0.025	25.0	0.5	2545	190
12	3	80	0.030	30.0	0.6	2120	190
16	3	80	0.040	40.0	0.8	1590	190
20	3	80	0.050	50.0	1.0	1275	190

Cast iron  
(lamellar / spheroidal)

2	3	160	0.005	5.0	0.1	25465	380
3	3	160	0.010	7.5	0.2	16975	510
4	3	160	0.010	10.0	0.2	12735	380
6	3	160	0.015	15.0	0.3	8490	380
8	3	160	0.020	20.0	0.4	6365	380
10	3	160	0.025	25.0	0.5	5095	380
12	3	160	0.030	30.0	0.6	4245	380
16	3	160	0.040	40.0	0.8	3185	380
20	3	160	0.050	50.0	1.0	2545	380

Stainless steel  
[Cr-Ni/1.4301]

2	3	50	0.005	5.0	0.1	7960	120
3	3	50	0.010	7.5	0.2	5305	160
4	3	50	0.010	10.0	0.2	3980	120
6	3	50	0.015	15.0	0.3	2655	120
8	3	50	0.020	20.0	0.4	1990	120
10	3	50	0.025	25.0	0.5	1590	120
12	3	50	0.030	30.0	0.6	1325	120
16	3	50	0.040	40.0	0.8	995	120
20	3	50	0.050	50.0	1.0	795	120



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2	3	100	0.005	0.4	2	15915	240	0.2
3	3	100	0.005	0.6	3	10610	160	0.3
4	3	100	0.010	0.8	4	7960	240	0.8
6	3	100	0.010	1.2	6	5305	160	1.2
8	3	100	0.015	1.6	8	3980	180	2.3
10	3	100	0.020	2.0	10	3185	190	3.8
12	3	100	0.025	2.4	12	2655	200	5.8
16	3	100	0.030	3.2	16	1990	180	9.2
20	3	100	0.040	4.0	20	1590	190	15.2

Steel  
850 - 1100 N/mm<sup>2</sup>

2	3	70	0.005	0.4	2	11140	165	0.1
3	3	70	0.005	0.6	3	7425	110	0.2
4	3	70	0.005	0.8	4	5570	85	0.3
6	3	70	0.010	1.2	6	3715	110	0.8
8	3	70	0.015	1.6	8	2785	125	1.6
10	3	70	0.020	2.0	10	2230	135	2.7
12	3	70	0.020	2.4	12	1855	110	3.2
16	3	70	0.030	3.2	16	1395	125	6.4
20	3	70	0.040	4.0	20	1115	135	10.8

Cast iron  
(lamellar / spheroidal)

2	3	120	0.005	0.4	2	19100	285	0.2
3	3	120	0.005	0.6	3	12735	190	0.3
4	3	120	0.010	0.8	4	9550	285	0.9
6	3	120	0.015	1.2	6	6365	285	2.1
8	3	120	0.020	1.6	8	4775	285	3.6
10	3	120	0.020	2.0	10	3820	230	4.6
12	3	120	0.025	2.4	12	3185	240	6.9
16	3	120	0.035	3.2	16	2385	250	12.8
20	3	120	0.040	4.0	20	1910	230	18.4

Stainless steel  
[Cr-Ni/1.4301]

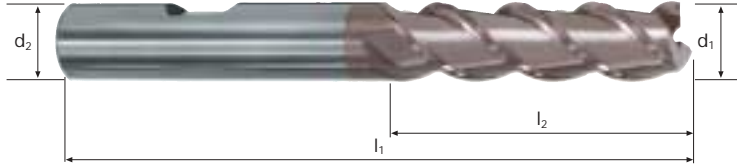
2	3	35	0.005	0.4	2	5570	85	0.1
3	3	35	0.005	0.6	3	3715	55	0.1
4	3	35	0.005	0.8	4	2785	40	0.1
6	3	35	0.010	1.2	6	1855	55	0.4
8	3	35	0.015	1.6	8	1395	65	0.8
10	3	35	0.020	2.0	10	1115	65	1.3
12	3	35	0.020	2.4	12	930	55	1.6
16	3	35	0.030	3.2	16	695	65	3.3
20	3	35	0.040	4.0	20	555	65	5.2

# Cylindrical end mills

Smooth-edged, medium length version



**HM**  
**MG10**     $\lambda$  **45°**  
                   $\gamma$  **15°**



Roughing



Finishing



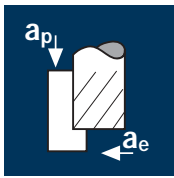
<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Copper
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Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z	UNICUT-4X	
								5332	U5332
.140	2.0	6	63	12	0.10	9.5°	3	●	●
.160	2.5	6	63	13	0.10	7.8°	3	●	●
.180	3.0	6	63	14	0.10	6.1°	3	●	●
.220	4.0	6	63	17	0.10	3.4°	3	●	●
.260	5.0	6	63	19	0.15	1.5°	3	●	●
.300	6.0	6	63	19	0.15	0.0°	3	●	●
.331	7.0	8	72	24	0.15	1.5°	3	●	●
.391	8.0	8	72	28	0.15	0.0°	3	●	●
.420	9.0	10	84	28	0.20	1.0°	3	●	●
.450	10.0	10	84	34	0.20	0.0°	3	●	●
.501	12.0	12	97	40	0.20	0.0°	3	●	●
.610	16.0	16	108	48	0.20	0.0°	3	●	●
.682	20.0	20	122	56	0.20	0.0°	3	●	●

Example:  
Order-N°.    Coating    Article-N°.    α-Code  
                  **U**            **5332**            **.140**



## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	3	120	0.005	5.0	0.1	19100	285
3	3	120	0.010	7.5	0.1	12735	380
4	3	120	0.010	10.0	0.1	9550	285
6	3	120	0.015	15.0	0.2	6365	285
8	3	120	0.020	20.0	0.2	4775	285
10	3	120	0.025	25.0	0.3	3820	285
12	3	120	0.030	30.0	0.3	3185	285
16	3	120	0.040	40.0	0.4	2385	285
20	3	120	0.050	50.0	0.5	1910	285

2	3	80	0.005	5.0	0.1	12735	190
3	3	80	0.010	7.5	0.1	8490	255
4	3	80	0.010	10.0	0.1	6365	190
6	3	80	0.015	15.0	0.2	4245	190
8	3	80	0.020	20.0	0.2	3185	190
10	3	80	0.025	25.0	0.3	2545	190
12	3	80	0.030	30.0	0.3	2120	190
16	3	80	0.040	40.0	0.4	1590	190
20	3	80	0.050	50.0	0.5	1275	190

2	3	160	0.005	5.0	0.1	25465	380
3	3	160	0.010	7.5	0.1	16975	510
4	3	160	0.010	10.0	0.1	12735	380
6	3	160	0.015	15.0	0.2	8490	380
8	3	160	0.020	20.0	0.2	6365	380
10	3	160	0.025	25.0	0.3	5095	380
12	3	160	0.030	30.0	0.3	4245	380
16	3	160	0.040	40.0	0.4	3185	380
20	3	160	0.050	50.0	0.5	2545	380

2	3	50	0.005	5.0	0.1	7960	120
3	3	50	0.010	7.5	0.1	5305	160
4	3	50	0.010	10.0	0.1	3980	120
6	3	50	0.015	15.0	0.2	2655	120
8	3	50	0.020	20.0	0.2	1990	120
10	3	50	0.025	25.0	0.3	1590	120
12	3	50	0.030	30.0	0.3	1325	120
16	3	50	0.040	40.0	0.4	995	120
20	3	50	0.050	50.0	0.5	795	120

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	3	90	0.005	0.2	2	14325	215
3	3	90	0.005	0.3	3	9550	145
4	3	90	0.010	0.4	4	7160	215
6	3	90	0.010	0.6	6	4775	145
8	3	90	0.015	0.8	8	3580	160
10	3	90	0.020	1.0	10	2865	170
12	3	90	0.025	1.2	12	2385	180
16	3	90	0.030	1.6	16	1790	160
20	3	90	0.040	2.0	20	1430	170

2	3	60	0.005	0.2	2	9550	145
3	3	60	0.005	0.3	3	6365	95
4	3	60	0.005	0.4	4	4775	70
6	3	60	0.010	0.6	6	3185	95
8	3	60	0.015	0.8	8	2385	105
10	3	60	0.020	1.0	10	1910	115
12	3	60	0.020	1.2	12	1590	95
16	3	60	0.030	1.6	16	1195	110
20	3	60	0.040	2.0	20	955	115

2	3	110	0.005	0.2	2	17510	265
3	3	110	0.005	0.3	3	11670	175
4	3	110	0.010	0.4	4	8755	265
6	3	110	0.015	0.6	6	5835	265
8	3	110	0.020	0.8	8	4375	265
10	3	110	0.020	1.0	10	3500	210
12	3	110	0.025	1.2	12	2920	220
16	3	110	0.035	1.6	16	2190	230
20	3	110	0.040	2.0	20	1750	210

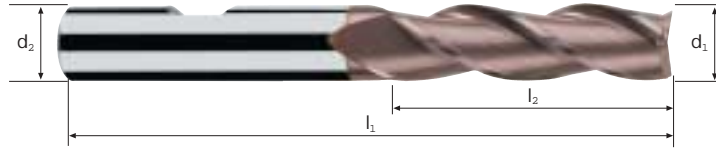
2	3	35	0.005	0.2	2	5570	85
3	3	35	0.005	0.3	3	3715	55
4	3	35	0.005	0.4	4	2785	40
6	3	35	0.010	0.6	6	1855	55
8	3	35	0.015	0.8	8	1395	65
10	3	35	0.020	1.0	10	1115	65
12	3	35	0.020	1.2	12	930	55
16	3	35	0.030	1.6	16	695	65
20	3	35	0.040	2.0	20	555	65

# Cylindrical end mills

Smooth-edged, medium length version



**HM**  $\lambda$  35°  
 $\gamma$  12°



Roughing



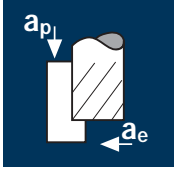
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300						Inox Stainless		GG(G) Aluminium Copper
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Example: Order-N°.									UNICUT-4X	
									U45332	
		Coating	Article-N°.		α-Code					
		U	45332		.140					
Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z			
.140	2.0	6	63	12	0.10	9.5°	3	●		
.160	2.5	6	63	13	0.10	7.8°	3	●		
.180	3.0	6	63	14	0.10	6.1°	3	●		
.220	4.0	6	63	17	0.10	3.4°	3	●		
.260	5.0	6	63	19	0.15	1.5°	3	●		
.300	6.0	6	63	19	0.15	0.0°	3	●		
.391	8.0	8	72	28	0.15	0.0°	3	●		
.450	10.0	10	84	34	0.20	0.0°	3	●		
.501	12.0	12	97	40	0.20	0.0°	3	●		
.610	16.0	16	108	48	0.20	0.0°	3	●		
.682	20.0	20	122	56	0.20	0.0°	3	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



## Material

Cast iron  
(lamellar / spheroidal)



Stainless steel  
[Cr-Ni/1.4301]



Unalloyed copper



Wrought aluminium  
alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	44	0.015	15	0.10	2335	140
8	4	44	0.020	20	0.15	1750	140
10	4	44	0.020	25	0.20	1400	110
12	4	44	0.025	30	0.25	1165	115
16	4	44	0.035	40	0.30	875	125
20	4	44	0.045	50	0.40	700	125
25	4	44	0.055	63	0.50	560	125
30	6	44	0.065	75	0.60	465	180
32	6	44	0.070	80	0.65	440	185

6	4	36	0.015	15	0.10	1910	115
8	4	36	0.020	20	0.15	1430	115
10	4	36	0.020	25	0.20	1145	90
12	4	36	0.025	30	0.25	955	95
16	4	36	0.035	40	0.30	715	100
20	4	36	0.045	50	0.40	575	105
25	4	36	0.055	63	0.50	460	100
30	6	36	0.065	75	0.60	380	150
32	6	36	0.070	80	0.65	360	150

6	4	30	0.015	15	0.10	1590	95
8	4	30	0.020	20	0.15	1195	95
10	4	30	0.020	25	0.20	955	75
12	4	30	0.025	30	0.25	795	80
16	4	30	0.035	40	0.30	595	85
20	4	30	0.045	50	0.40	475	85
25	4	30	0.055	63	0.50	380	85
30	6	30	0.065	75	0.60	320	125
32	6	30	0.070	80	0.65	300	125

6	4	25	0.015	15	0.10	1325	80
8	4	25	0.020	20	0.15	995	80
10	4	25	0.020	25	0.20	795	65
12	4	25	0.025	30	0.25	665	65
16	4	25	0.035	40	0.30	495	70
20	4	25	0.045	50	0.40	400	70
25	4	25	0.055	63	0.50	320	70
30	6	25	0.065	75	0.60	265	105
32	6	25	0.070	80	0.65	250	105

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	34	0.015	15	0.10	1805	110
8	4	34	0.020	20	0.15	1355	110
10	4	34	0.020	25	0.20	1080	85
12	4	34	0.025	30	0.25	900	90
16	4	34	0.035	40	0.30	675	95
20	4	34	0.045	50	0.40	540	95
25	4	34	0.055	63	0.50	435	95
30	6	34	0.065	75	0.60	360	140
32	6	34	0.070	80	0.65	340	145

6	4	18	0.015	15	0.10	955	55
8	4	18	0.020	20	0.15	715	55
10	4	18	0.020	25	0.20	575	45
12	4	18	0.025	30	0.25	475	50
16	4	18	0.035	40	0.30	360	50
20	4	18	0.045	50	0.40	285	50
25	4	18	0.055	63	0.50	230	50
30	6	18	0.065	75	0.60	190	75
32	6	18	0.070	80	0.65	180	75

6	4	60	0.015	15	0.10	3185	190
8	4	60	0.020	20	0.15	2385	190
10	4	60	0.020	25	0.20	1910	155
12	4	60	0.025	30	0.25	1590	160
16	4	60	0.035	40	0.30	1195	165
20	4	60	0.045	50	0.40	955	170
25	4	60	0.055	63	0.50	765	170
30	6	60	0.065	75	0.60	635	250
32	6	60	0.070	80	0.65	595	250

6	4	70	0.015	15	0.10	3715	225
8	4	70	0.020	20	0.15	2785	225
10	4	70	0.020	25	0.20	2230	180
12	4	70	0.025	30	0.25	1855	185
16	4	70	0.035	40	0.30	1395	195
20	4	70	0.045	50	0.40	1115	200
25	4	70	0.055	63	0.50	890	195
30	6	70	0.065	75	0.60	745	290
32	6	70	0.070	80	0.65	695	290

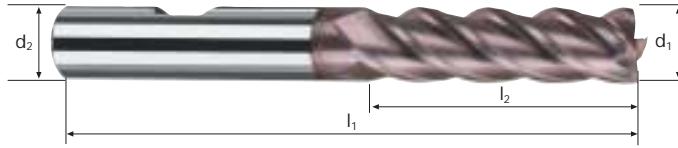
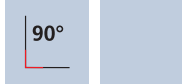


# Cylindrical end mills

Smooth-edged, medium length version



HSS-E  
Co8  
 $\lambda$  40°  
 $\gamma$  15°



Roughing



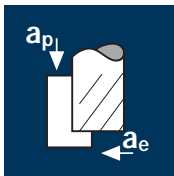
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	GG(G) Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
Coating <b>U</b>		Article-N°. <b>0190</b>		α-Code <b>.260</b>		<b>U0190</b>		
Ø Code	d1 e8	d2 h6	l1	l2	α	Z		
.260	5	6	63	19	1.5°	4	●	
.300	6	6	63	19	0.0°	4	●	
.402	8	10	78	28	2.0°	4	●	
.450	10	10	84	34	0.0°	4	●	
.501	12	12	97	40	0.0°	4	●	
.570	14	12	97	40	0.0°	4	●	
.610	16	16	108	48	0.0°	4	●	
.640	18	16	108	48	0.0°	4	●	
.682	20	20	122	56	0.0°	4	●	
.710	22	20	122	56	0.0°	4	●	
.772	25	25	144	68	0.0°	4	●	
.810	30	25	144	68	0.0°	6	●	
.832	32	32	160	80	0.0°	6	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	200	0.050	6	1.8	10610	2120	23.0
8	4	200	0.065	8	2.4	7960	2070	39.5
10	4	200	0.080	10	3.0	6365	2035	61.0
12	4	200	0.095	12	3.6	5305	2015	87.0
16	4	200	0.125	16	3.2	3980	1990	102.0

6	4	150	0.050	6	1.8	7960	1590	17.0
8	4	150	0.065	8	2.4	5970	1550	30.0
10	4	150	0.080	10	3.0	4775	1530	46.0
12	4	150	0.095	12	3.6	3980	1510	65.0
16	4	150	0.125	16	3.2	2985	1495	76.5

6	4	80	0.045	6	1.8	4245	765	8.5
8	4	80	0.060	8	2.4	3185	765	14.5
10	4	80	0.070	10	3.0	2545	715	21.5
12	4	80	0.085	12	3.6	2120	720	31.0
16	4	80	0.110	16	3.2	1590	700	36.0

6	4	70	0.035	6	1.8	3715	520	5.5
8	4	70	0.050	8	2.4	2785	555	10.5
10	4	70	0.055	10	3.0	2230	490	14.5
12	4	70	0.070	12	3.6	1855	520	22.5
16	4	70	0.090	16	3.2	1395	500	25.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	180	0.040	4.2	6	9550	1530	38.5
8	4	180	0.050	5.6	8	7160	1430	64.0
10	4	180	0.065	7.0	10	5730	1490	104.5
12	4	180	0.075	8.4	12	4775	1435	144.5
16	4	180	0.075	6.4	16	3580	1075	110.0

6	4	120	0.040	4.2	6	6365	1020	25.5
8	4	120	0.050	5.6	8	4775	955	43.0
10	4	120	0.065	7.0	10	3820	995	69.5
12	4	120	0.075	8.4	12	3185	955	96.5
16	4	120	0.075	6.4	16	2385	715	73.0

6	4	60	0.035	4.2	6	3185	445	11.0
8	4	60	0.045	5.6	8	2385	430	19.5
10	4	60	0.055	7.0	10	1910	420	29.5
12	4	60	0.060	8.4	12	1590	380	38.5
16	4	60	0.075	6.4	16	1195	360	37.0

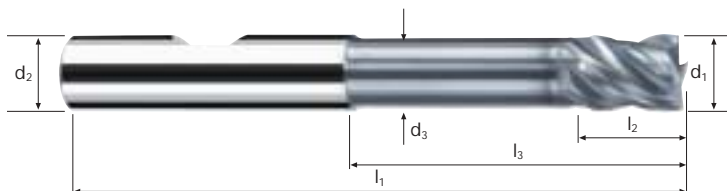
6	4	50	0.030	4.2	6	2655	320	8.0
8	4	50	0.035	5.6	8	1990	280	12.5
10	4	50	0.045	7.0	10	1590	285	20.0
12	4	50	0.050	8.4	12	1325	265	26.5
16	4	50	0.060	6.4	16	995	240	24.5

# Cylindrical end mills NX-V

Smooth-edged, medium length version with neck



**HM**  
**MG10**     $\lambda$  40°  
                   $\gamma$  0°



Roughing



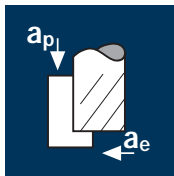
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel
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										POLYCHROM	
Example: Order-N°.										P15325	
										P15225	
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	z			
.300	6	6	5.5	70	7	33	0.15	4	●		
.391	8	8	7.4	80	9	43	0.15	4	●		
.450	10	10	9.2	84	11	43	0.20	4	●		
.501	12	12	11.0	97	13	51	0.20	4	●		
.610	16	16	15.0	115	17	66	0.20	4	●		

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	120	0.045	6	2.4	6365	1145	16.5
8	4	120	0.060	8	3.2	4775	1145	29.5
10	4	120	0.075	10	4.0	3820	1145	46.0
12	4	120	0.090	12	4.8	3185	1145	66.0
16	4	120	0.120	16	3.2	2385	1145	58.5
20	4	120	0.150	20	4.0	1910	1145	91.5

Hardened tool steel  
48 - 52 HRC



6	4	80	0.030	6	2.4	4245	510	7.5
8	4	80	0.040	8	3.2	3185	510	13.0
10	4	80	0.050	10	4.0	2545	510	20.5
12	4	80	0.060	12	4.8	2120	510	29.5
16	4	80	0.080	16	3.2	1590	510	26.0
20	4	80	0.100	20	4.0	1275	510	41.0

Hardened tool steel  
52 - 56 HRC



6	4	60	0.025	6	2.4	3185	320	4.5
8	4	60	0.035	8	3.2	2385	335	8.5
10	4	60	0.040	10	4.0	1910	305	12.0
12	4	60	0.050	12	4.8	1590	320	18.5
16	4	60	0.065	16	3.2	1195	310	16.0
20	4	60	0.080	20	4.0	955	305	24.5

Hardened tool steel  
56 - 60 HRC



6	4	30	0.020	6	2.4	1590	127	2.0
8	4	30	0.025	8	3.2	1195	120	3.0
10	4	30	0.030	10	4.0	955	115	4.5
12	4	30	0.035	12	4.8	795	111	6.5
16	4	30	0.050	16	3.2	595	119	6.0
20	4	30	0.060	20	4.0	475	114	9.0

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	100	0.035	2.4	6	5305	745	10.5
8	4	100	0.050	3.2	8	3980	795	20.5
10	4	100	0.060	4.0	10	3185	765	30.5
12	4	100	0.070	4.8	12	2655	745	43.0
16	4	100	0.095	3.2	16	1990	755	38.5
20	4	100	0.120	4.0	20	1590	765	61.0

Hardened tool steel  
48 - 52 HRC



6	4	60	0.025	2.4	6	3185	320	4.5
8	4	60	0.035	3.2	8	2385	335	8.5
10	4	60	0.045	4.0	10	1910	345	14.0
12	4	60	0.055	4.8	12	1590	350	20.0
16	4	60	0.070	3.2	16	1195	335	17.0
20	4	60	0.090	4.0	20	955	345	27.5

Hardened tool steel  
52 - 56 HRC



6	4	40	0.020	2.4	6	2120	170	2.5
8	4	40	0.030	3.2	8	1590	190	5.0
10	4	40	0.035	4.0	10	1275	180	7.0
12	4	40	0.045	4.8	12	1060	190	11.0
16	4	40	0.060	3.2	16	795	190	9.5
20	4	40	0.070	4.0	20	635	180	14.5

Hardened tool steel  
56 - 60 HRC



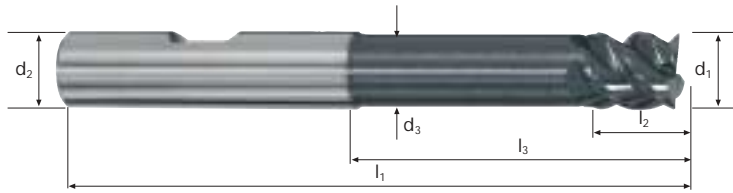
6	4	20	0.015	2.4	6	1060	64	1.0
8	4	20	0.021	3.2	8	795	67	1.5
10	4	20	0.026	4.0	10	635	66	2.5
12	4	20	0.031	4.8	12	530	66	4.0
16	4	20	0.041	3.2	16	400	66	3.5
20	4	20	0.051	4.0	20	320	65	5.0

# Cylindrical end mills HX

Smooth-edged, medium length version with neck



<b>HM</b> <b>MG10</b>	$\lambda$ 55° $\gamma$ -10°



Roughing



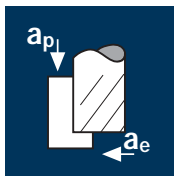
Finishing



<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Ti</b> Titanium	<b>GG(G)</b>
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Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	z	Coating	
									POLYCHROM	DURO-S
Example: Order-N°.									<b>P</b>	<b>5351</b>
										<b>.300</b>
<b>.300</b>	6	6	5.5	70	7	33	0.15	4	<b>P5351</b>	<b>D5351</b>
<b>.391</b>	8	8	7.4	80	9	43	0.15	4	<b>P5251</b>	<b>D5251</b>
<b>.450</b>	10	10	9.2	84	11	43	0.20	4		
<b>.501</b>	12	12	11.0	97	13	51	0.20	4		
<b>.610</b>	16	16	15.0	115	17	66	0.20	4		
<b>.682</b>	20	20	19.0	130	21	79	0.20	4		

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	80	0.030	6	1.8	4245	510	5.5
8	4	80	0.040	8	2.4	3185	510	10.0
10	4	80	0.055	10	3.0	2545	560	17.0
12	4	80	0.060	12	3.6	2120	510	22.0
16	4	80	0.085	16	2.4	1590	540	20.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]



6	4	40	0.030	6	1.8	2120	255	3.0
8	4	40	0.040	8	2.4	1590	255	5.0
10	4	40	0.055	10	3.0	1275	280	8.5
12	4	40	0.060	12	3.6	1060	255	11.0
16	4	40	0.085	16	2.4	795	270	10.5

Heat resistant steel  
[17-4 PH]



6	4	25	0.030	6	1.8	1325	160	1.5
8	4	25	0.035	8	2.4	995	140	2.5
10	4	25	0.045	10	3.0	795	145	4.5
12	4	25	0.050	12	3.6	665	135	6.0
16	4	25	0.060	16	2.4	495	120	4.5

Nickel base  
alloys prec.-hard.  
[Inconel 718]



6	4	15	0.030	6	1.8	795	95	1.0
8	4	15	0.035	8	2.4	595	85	1.5
10	4	15	0.045	10	3.0	475	85	2.5
12	4	15	0.050	12	3.6	400	80	3.5
16	4	15	0.060	16	2.4	300	70	2.5

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	60	0.030	1.5	6	3185	380	3.5
8	4	60	0.040	2.0	8	2385	380	6.0
10	4	60	0.055	2.5	10	1910	420	10.5
12	4	60	0.065	3.0	12	1590	415	15.0
16	4	60	0.085	2.4	16	1195	405	15.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]



6	4	30	0.030	1.5	6	1590	190	1.5
8	4	30	0.040	2.0	8	1195	190	3.0
10	4	30	0.055	2.5	10	955	210	5.5
12	4	30	0.065	3.0	12	795	205	7.5
16	4	30	0.085	2.4	16	595	200	7.5

Heat resistant steel  
[17-4 PH]



6	4	20	0.030	1.5	6	1060	125	1.0
8	4	20	0.035	2.0	8	795	110	2.0
10	4	20	0.045	2.5	10	635	115	3.0
12	4	20	0.050	3.0	12	530	105	4.0
16	4	20	0.060	2.4	16	400	95	3.5

Nickel base  
alloys prec.-hard.  
[Inconel 718]



6	4	10	0.030	1.5	6	530	65	0.5
8	4	10	0.035	2.0	8	400	55	1.0
10	4	10	0.045	2.5	10	320	60	1.5
12	4	10	0.050	3.0	12	265	55	2.0
16	4	10	0.060	2.4	16	200	50	2.0

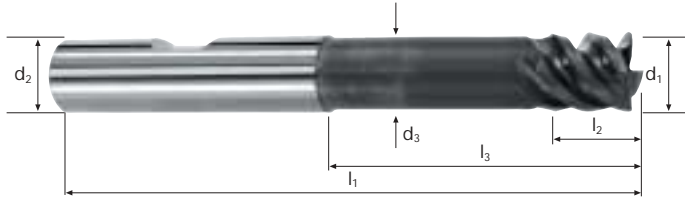
# Cylindrical end mills SX

Smooth-edged, medium length version with neck



**HM MG10**  $\lambda$  55°  $\gamma$  15°

45°

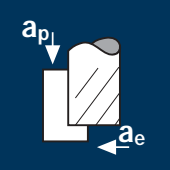




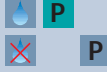
Roughing

Finishing

Rm < 850   Rm 850-1100   **Inox** Stainless   Ti Titanium   Nickel-Alloys Tool Steel

Example: Order-N°.									POLYCHROM	
		Coating	Article-N°.	α-Code					P5319	
		P	5319	.300					P5219	
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	Z		
.300	6	6	5.5	70	7	33	0.15	4	●	
.391	8	8	7.4	80	9	43	0.15	4	●	
.450	10	10	9.2	84	11	43	0.20	4	●	
.501	12	12	11.0	97	13	51	0.20	4	●	
.610	16	16	15.0	115	17	66	0.20	4	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	3	3	200	0.015	4.5	1.2	21220	955	5.0
		4	3	200	0.015	6.0	1.6	15915	715	7.0
		5	3	200	0.020	7.5	2.0	12735	765	11.5
		6	3	200	0.040	9.0	2.4	10610	1275	27.5
		8	3	200	0.050	12.0	3.2	7960	1195	46.0
		10	3	200	0.065	15.0	4.0	6365	1240	74.5
		12	3	200	0.075	18.0	4.8	5305	1195	103.0
		3	3	150	0.015	4.5	1.2	15915	715	4.0
		4	3	150	0.015	6.0	1.6	11935	535	5.0
		5	3	150	0.020	7.5	2.0	9550	575	8.5
		6	3	150	0.040	9.0	2.4	7960	955	20.5
		8	3	150	0.050	12.0	3.2	5970	895	34.5
10	3	150	0.065	15.0	4.0	4775	930	56.0		
12	3	150	0.075	18.0	4.8	3980	895	77.5		
3	3	80	0.010	4.5	1.2	8490	255	1.5		
4	3	80	0.015	6.0	1.6	6365	285	2.5		
5	3	80	0.015	7.5	2.0	5095	230	3.5		
6	3	80	0.035	9.0	2.4	4245	445	9.5		
8	3	80	0.045	12.0	3.2	3185	430	16.5		
10	3	80	0.055	15.0	4.0	2545	420	25.0		
12	3	80	0.065	18.0	4.8	2120	415	36.0		
3	3	70	0.010	4.5	1.2	7425	225	1.0		
4	3	70	0.010	6.0	1.6	5570	165	1.5		
5	3	70	0.010	7.5	2.0	4455	135	2.0		
6	3	70	0.030	9.0	2.4	3715	335	7.0		
8	3	70	0.035	12.0	3.2	2785	290	11.0		
10	3	70	0.045	15.0	4.0	2230	300	18.0		
12	3	70	0.050	18.0	4.8	1855	280	24.0		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	3	3	180	0.015	4.2	3	19100	860	11.0
		4	3	180	0.015	5.6	4	14325	645	14.5
		5	3	180	0.025	7.0	5	11460	860	30.0
		6	3	180	0.030	8.4	6	9550	860	43.5
		8	3	180	0.040	11.2	8	7160	860	77.0
		10	3	180	0.050	14.0	10	5730	860	120.5
		12	3	180	0.060	16.8	12	4775	860	173.5
		3	3	120	0.015	4.2	3	12735	575	7.0
		4	3	120	0.015	5.6	4	9550	430	9.5
		5	3	120	0.025	7.0	5	7640	575	20.0
		6	3	120	0.030	8.4	6	6365	575	29.0
		8	3	120	0.040	11.2	8	4775	575	51.5
10	3	120	0.050	14.0	10	3820	575	80.5		
12	3	120	0.060	16.8	12	3185	575	116.0		
3	3	60	0.010	4.2	3	6365	190	2.5		
4	3	60	0.015	5.6	4	4775	215	5.0		
5	3	60	0.015	7.0	5	3820	170	6.0		
6	3	60	0.030	8.4	6	3185	285	14.5		
8	3	60	0.040	11.2	8	2385	285	25.5		
10	3	60	0.050	14.0	10	1910	285	40.0		
12	3	60	0.060	16.8	12	1590	285	57.5		
3	3	50	0.010	4.2	3	5305	160	2.0		
4	3	50	0.010	5.6	4	3980	120	2.5		
5	3	50	0.010	7.0	5	3185	95	3.5		
6	3	50	0.025	8.4	6	2655	200	10.0		
8	3	50	0.030	11.2	8	1990	180	16.0		
10	3	50	0.040	14.0	10	1590	190	26.5		
12	3	50	0.050	16.8	12	1325	200	40.5		



# Cylindrical end mills NV3

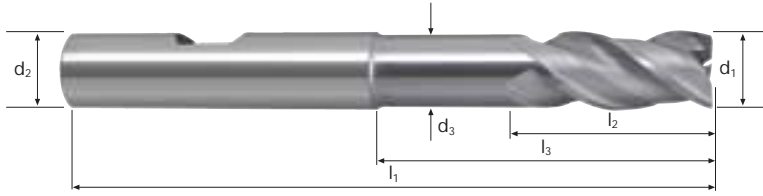
Smooth-edged, medium length version with neck



**HM MG10**     $\lambda$  40°  
 $\gamma$  0°

45°

Vario

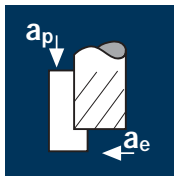


Roughing      Finishing

Rm < 850    Rm 850-1100    Rm 1100-1300    Rm 1300-1500    Inox Stainless    Ti Titanium    GG(G) Tool Steel

Example: Order-N°.										POLYCHROM	
										P15399	
										P15299	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.180	3	6	2.8	63	7	20	0.10	5.0°	3	●	
.220	4	6	3.7	63	8	22	0.10	4.0°	3	●	
.260	5	6	4.6	63	10	24	0.15	1.5°	3	●	
.300	6	6	5.5	63	10	26	0.15	0.0°	3	●	
.391	8	8	7.4	72	16	35	0.15	0.0°	3	●	
.450	10	10	9.2	84	19	43	0.20	0.0°	3	●	
.501	12	12	11.0	97	22	51	0.20	0.0°	3	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	3	120	0.010	4.5	0.2	12735	380
4	3	120	0.010	6.0	0.2	9550	285
5	3	120	0.015	7.5	0.3	7640	345
6	3	120	0.015	9.0	0.3	6365	285
8	3	120	0.020	12.0	0.4	4775	285
10	3	120	0.025	15.0	0.5	3820	285
12	3	120	0.030	18.0	0.6	3185	285
16	3	120	0.040	24.0	0.8	2385	285

3	3	80	0.010	4.5	0.2	8490	255
4	3	80	0.010	6.0	0.2	6365	190
5	3	80	0.015	7.5	0.3	5095	230
6	3	80	0.015	9.0	0.3	4245	190
8	3	80	0.020	12.0	0.4	3185	190
10	3	80	0.025	15.0	0.5	2545	190
12	3	80	0.030	18.0	0.6	2120	190
16	3	80	0.040	24.0	0.8	1590	190

3	3	160	0.010	4.5	0.2	16975	510
4	3	160	0.010	6.0	0.2	12735	380
5	3	160	0.015	7.5	0.3	10185	460
6	3	160	0.015	9.0	0.3	8490	380
8	3	160	0.020	12.0	0.4	6365	380
10	3	160	0.025	15.0	0.5	5095	380
12	3	160	0.030	18.0	0.6	4245	380
16	3	160	0.040	24.0	0.8	3185	380

3	3	50	0.010	4.5	0.2	5305	160
4	3	50	0.010	6.0	0.2	3980	120
5	3	50	0.015	7.5	0.3	3185	145
6	3	50	0.015	9.0	0.3	2655	120
8	3	50	0.020	12.0	0.4	1990	120
10	3	50	0.025	15.0	0.5	1590	120
12	3	50	0.030	18.0	0.6	1325	120
16	3	50	0.040	24.0	0.8	995	120

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	100	0.005	0.6	3	10610	160	0.3
4	3	100	0.010	0.8	4	7960	240	0.8
5	3	100	0.010	1.0	5	6365	190	1.0
6	3	100	0.010	1.2	6	5305	160	1.2
8	3	100	0.015	1.6	8	3980	180	2.3
10	3	100	0.020	2.0	10	3185	190	3.8
12	3	100	0.025	2.4	12	2655	200	5.8
16	3	100	0.030	3.2	16	1990	180	9.2

3	3	70	0.005	0.6	3	7425	110	0.2
4	3	70	0.005	0.8	4	5570	85	0.3
5	3	70	0.010	1.0	5	4455	135	0.7
6	3	70	0.010	1.2	6	3715	110	0.8
8	3	70	0.015	1.6	8	2785	125	1.6
10	3	70	0.020	2.0	10	2230	135	2.7
12	3	70	0.020	2.4	12	1855	110	3.2
16	3	70	0.030	3.2	16	1395	125	6.4

3	3	120	0.005	0.6	3	12735	190	0.3
4	3	120	0.010	0.8	4	9550	285	0.9
5	3	120	0.010	1.0	5	7640	230	1.2
6	3	120	0.015	1.2	6	6365	285	2.1
8	3	120	0.020	1.6	8	4775	285	3.6
10	3	120	0.020	2.0	10	3820	230	4.6
12	3	120	0.025	2.4	12	3185	240	6.9
16	3	120	0.035	3.2	16	2385	250	12.8

3	3	35	0.005	0.6	3	3715	55	0.1
4	3	35	0.005	0.8	4	2785	40	0.1
5	3	35	0.010	1.0	5	2230	65	0.3
6	3	35	0.010	1.2	6	1855	55	0.4
8	3	35	0.015	1.6	8	1395	65	0.8
10	3	35	0.020	2.0	10	1115	65	1.3
12	3	35	0.020	2.4	12	930	55	1.6
16	3	35	0.030	3.2	16	695	65	3.3

# Cylindrical end mills

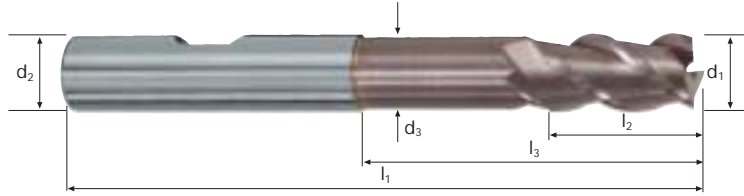
Smooth-edged, medium length version with neck



**HM**  
**MG10**

$\lambda$  45°  
 $\gamma$  15°

45°



Roughing

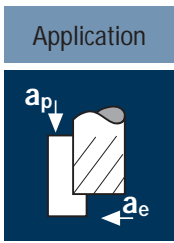


Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **GG(G)** Copper

Example: Order-N°.										5333	UNICUT-4X U5333
										<div style="display: flex; justify-content: space-around;"> <span>Coating <b>U</b></span> <span>Article-N°. <b>5333</b></span> <span>α-Code <b>.180</b></span> </div>	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	α	z		
.180	3	6	2.8	63	7	11	0.10	5.0°	3	●	●
.220	4	6	3.7	63	8	13	0.10	3.5°	3	●	●
.260	5	6	4.6	63	10	16	0.15	1.5°	3	●	●
.300	6	6	5.5	63	13	26	0.15	0.0°	3	●	●
.391	8	8	7.4	72	16	35	0.15	0.0°	3	●	●
.450	10	10	9.2	84	19	43	0.20	0.0°	3	●	●
.501	12	12	11.0	97	22	51	0.20	0.0°	3	●	●
.610	16	16	15.0	108	26	59	0.20	0.0°	3	●	●



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	80	0.015	15	0.4	4245	255
8	4	80	0.020	20	0.5	3185	255
10	4	80	0.025	25	0.6	2545	255
12	4	80	0.030	30	0.7	2120	255
16	4	80	0.040	40	1.0	1590	255
20	4	80	0.050	50	1.2	1275	255

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	55	0.015	15	0.4	2920	175
8	4	55	0.020	20	0.5	2190	175
10	4	55	0.025	25	0.6	1750	175
12	4	55	0.030	30	0.7	1460	175
16	4	55	0.040	40	1.0	1095	175
20	4	55	0.050	50	1.2	875	175

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	40	0.015	15	0.4	2120	125
8	4	40	0.020	20	0.5	1590	125
10	4	40	0.025	25	0.6	1275	130
12	4	40	0.030	30	0.7	1060	125
16	4	40	0.040	40	1.0	795	125
20	4	40	0.050	50	1.2	635	125

Stainless steel  
[Cr-Ni/1.4301]

6	4	35	0.015	15	0.4	1855	110
8	4	35	0.020	20	0.5	1395	110
10	4	35	0.025	25	0.6	1115	110
12	4	35	0.030	30	0.7	930	110
16	4	35	0.040	40	1.0	695	110
20	4	35	0.050	50	1.2	555	110

Material

Cast iron  
(lamellar / spheroidal)

Unalloyed copper

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

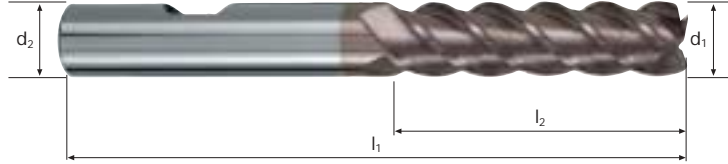
Heat resistant steel  
[17-4 PH]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	65	0.015	15	0.4	3450	205
8	4	65	0.020	20	0.5	2585	205
10	4	65	0.025	25	0.6	2070	205
12	4	65	0.030	30	0.7	1725	205
16	4	65	0.040	40	1.0	1295	205
20	4	65	0.050	50	1.2	1035	205
6	4	110	0.015	15	0.4	5835	350
8	4	110	0.020	20	0.5	4375	350
10	4	110	0.025	25	0.6	3500	350
12	4	110	0.030	30	0.7	2920	350
16	4	110	0.040	40	1.0	2190	350
20	4	110	0.050	50	1.2	1750	350
6	4	40	0.015	15	0.4	2120	125
8	4	40	0.020	20	0.5	1590	125
10	4	40	0.025	25	0.6	1275	130
12	4	40	0.030	30	0.7	1060	125
16	4	40	0.040	40	1.0	795	125
20	4	40	0.050	50	1.2	635	125
6	4	20	0.015	15	0.4	1060	65
8	4	20	0.020	20	0.5	795	65
10	4	20	0.025	25	0.6	635	65
12	4	20	0.030	30	0.7	530	65
16	4	20	0.040	40	1.0	400	65
20	4	20	0.050	50	1.2	320	65

# Cylindrical end mills

Smooth-edged, long version

**HM**  
**MG10**     $\lambda$  45°  
                    $\gamma$  15°



Roughing



Finishing



**Rm**  
< 850

**Rm**  
850-1100

**Rm**  
1100-1300



**Inox**  
Stainless

**Ti**  
Titanium

**GG(G)**  
Copper

**UNICUT-4X**

Example:  
Order-N°.

Coating    Article-N°     $\alpha$ -Code  
**U**    **15345**    **.300**

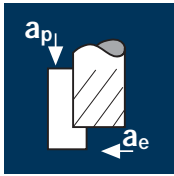


**U15345**

**U15245**

$\varnothing$ Code	d1 e8	d2 h6	l1	l2	45°	Z		
.300	6	6	70	26	0.15	4	●	
.391	8	8	80	36	0.15	4	●	
.450	10	10	95	45	0.20	4	●	
.501	12	12	110	53	0.20	4	●	
.610	16	16	123	63	0.20	4	●	
.682	20	20	141	75	0.20	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



## Material

Cast iron  
(lamellar / spheroidal)



Stainless steel  
[Cr-Ni/1.4301]



Unalloyed copper



Wrought aluminium  
alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
4	4	32	0.005	11	0.05	2545	50
6	4	32	0.010	17	0.10	1700	70
8	4	32	0.015	22	0.10	1275	75
10	4	32	0.020	28	0.15	1020	80
12	4	32	0.020	34	0.20	850	70
16	4	32	0.030	45	0.25	635	75
20	4	32	0.035	56	0.30	510	70
30	6	32	0.055	84	0.45	340	110
40	6	32	0.075	112	0.60	255	115

4	4	25	0.005	11	0.05	1990	40
6	4	25	0.010	17	0.10	1325	55
8	4	25	0.015	22	0.10	995	60
10	4	25	0.020	28	0.15	795	65
12	4	25	0.020	34	0.20	665	55
16	4	25	0.030	45	0.25	495	60
20	4	25	0.035	56	0.30	400	55
30	6	25	0.055	84	0.45	265	85
40	6	25	0.075	112	0.60	200	90

4	4	20	0.005	11	0.05	1590	30
6	4	20	0.010	17	0.10	1060	40
8	4	20	0.015	22	0.10	795	50
10	4	20	0.020	28	0.15	635	50
12	4	20	0.020	34	0.20	530	40
16	4	20	0.030	45	0.25	400	50
20	4	20	0.035	56	0.30	320	45
30	6	20	0.055	84	0.45	210	70
40	6	20	0.075	112	0.60	160	70

4	4	18	0.005	11	0.05	1430	30
6	4	18	0.010	17	0.10	955	40
8	4	18	0.015	22	0.10	715	45
10	4	18	0.020	28	0.15	575	45
12	4	18	0.020	34	0.20	475	40
16	4	18	0.030	45	0.25	360	45
20	4	18	0.035	56	0.30	285	40
30	6	18	0.055	84	0.45	190	65
40	6	18	0.075	112	0.60	145	65

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
4	4	24	0.005	11	0.05	1910	40
6	4	24	0.010	17	0.10	1275	50
8	4	24	0.015	22	0.10	955	55
10	4	24	0.020	28	0.15	765	60
12	4	24	0.020	34	0.20	635	50
16	4	24	0.030	45	0.25	475	55
20	4	24	0.035	56	0.30	380	55
30	6	24	0.055	84	0.45	255	85
40	6	24	0.075	112	0.60	190	85

4	4	15	0.005	11	0.05	1195	25
6	4	15	0.010	17	0.10	795	30
8	4	15	0.015	22	0.10	595	35
10	4	15	0.020	28	0.15	475	40
12	4	15	0.020	34	0.20	400	30
16	4	15	0.030	45	0.25	300	35
20	4	15	0.035	56	0.30	240	35
30	6	15	0.055	84	0.45	160	55
40	6	15	0.075	112	0.60	120	55

4	4	40	0.005	11	0.05	3185	65
6	4	40	0.010	17	0.10	2120	85
8	4	40	0.015	22	0.10	1590	95
10	4	40	0.020	28	0.15	1275	100
12	4	40	0.020	34	0.20	1060	85
16	4	40	0.030	45	0.25	795	95
20	4	40	0.035	56	0.30	635	90
30	6	40	0.055	84	0.45	425	140
40	6	40	0.075	112	0.60	320	145

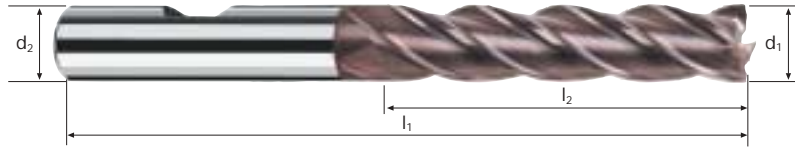
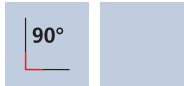
4	4	50	0.005	11	0.05	3980	80
6	4	50	0.010	17	0.10	2655	105
8	4	50	0.015	22	0.10	1990	120
10	4	50	0.020	28	0.15	1590	125
12	4	50	0.020	34	0.20	1325	105
16	4	50	0.030	45	0.25	995	120
20	4	50	0.035	56	0.30	795	110
30	6	50	0.055	84	0.45	530	175
40	6	50	0.075	112	0.60	400	180

# Cylindrical end mills

Smooth-edged, long version



HSS-E  
Co8  
 $\lambda$  35°  
 $\gamma$  15°



Roughing



Finishing



Rm  
< 850

Rm  
850-1100

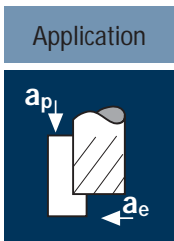
Rm  
1100-1300

Inox  
Stainless

Ti  
Titanium

GG(G)  
Copper

Example: Order-N°.		Coating <b>U</b>	Article-N°. <b>0200</b>	$\alpha$ -Code <b>.140</b>			UNICUT-4X	
$\emptyset$ Code	d1 k8	d2 h6	l1	l2	$\alpha$	Z		
.140	2.0	6	54	10	7.0°	4	●	
.160	2.5	6	56	12	5.5°	4	●	
.180	3.0	6	56	12	4.5°	4	●	
.220	4.0	6	63	19	2.5°	4	●	
.260	5.0	6	68	24	1.0°	4	●	
.300	6.0	6	68	24	0.0°	4	●	
.391	8.0	8	82	38	0.0°	4	●	
.450	10.0	10	95	45	0.0°	4	●	
.501	12.0	12	110	53	0.0°	4	●	
.570	14.0	12	110	53	0.0°	4	●	
.610	16.0	16	123	63	0.0°	4	●	
.640	18.0	16	123	63	0.0°	4	●	
.682	20.0	20	141	75	0.0°	4	●	
.772	25.0	25	166	90	0.0°	4	●	
.810	30.0	25	166	90	0.0°	6	●	
.832	32.0	32	186	106	0.0°	6	●	
.860	36.0	32	186	106	0.0°	6	●	
.881	40.0	32	205	125	0.0°	6	●	
.892	40.0	40	217	125	0.0°	6	●	





Material

Steel  
< 850 N/mm<sup>2</sup>






d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	3	34	0.005	7.0	0.05	5410	80
4	3	34	0.005	14.0	0.10	2705	40
5	3	34	0.005	17.5	0.10	2165	30
6	3	34	0.010	21.0	0.10	1805	55
8	3	34	0.010	28.0	0.15	1355	40
10	3	34	0.015	35.0	0.20	1080	50
12	3	34	0.015	42.0	0.25	900	40
16	3	34	0.020	56.0	0.30	675	40
20	3	34	0.025	70.0	0.40	540	40

Steel  
850 - 1100 N/mm<sup>2</sup>



2	3	22	0.005	7.0	0.05	3500	55
4	3	22	0.005	14.0	0.10	1750	25
5	3	22	0.005	17.5	0.10	1400	20
6	3	22	0.010	21.0	0.10	1165	35
8	3	22	0.010	28.0	0.15	875	25
10	3	22	0.015	35.0	0.20	700	30
12	3	22	0.015	42.0	0.25	585	25
16	3	22	0.020	56.0	0.30	440	25
20	3	22	0.025	70.0	0.40	350	25

Cast iron  
(lamellar / spheroidal)

2	3	20	0.005	7.0	0.05	3185	50
4	3	20	0.005	14.0	0.10	1590	25
5	3	20	0.005	17.5	0.10	1275	20
6	3	20	0.010	21.0	0.10	1060	30
8	3	20	0.010	28.0	0.15	795	25
10	3	20	0.015	35.0	0.20	635	30
12	3	20	0.015	42.0	0.25	530	25
16	3	20	0.020	56.0	0.30	400	25
20	3	20	0.025	70.0	0.40	320	25



Stainless steel  
[Cr-Ni/1.4301]

2	3	15	0.005	7.0	0.05	2385	35
4	3	15	0.005	14.0	0.10	1195	20
5	3	15	0.005	17.5	0.10	955	15
6	3	15	0.010	21.0	0.10	795	25
8	3	15	0.010	28.0	0.15	595	20
10	3	15	0.015	35.0	0.20	475	20
12	3	15	0.015	42.0	0.25	400	20
16	3	15	0.020	56.0	0.30	300	20
20	3	15	0.025	70.0	0.40	240	20



Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	3	12	0.005	7.0	0.05	1910	30
4	3	12	0.005	14.0	0.10	955	15
5	3	12	0.005	17.5	0.10	765	10
6	3	12	0.010	21.0	0.10	635	20
8	3	12	0.010	28.0	0.15	475	15
10	3	12	0.015	35.0	0.20	380	15
12	3	12	0.015	42.0	0.25	320	15
16	3	12	0.020	56.0	0.30	240	15
20	3	12	0.025	70.0	0.40	190	15

Unalloyed copper

2	3	40	0.005	7.0	0.05	6365	95
4	3	40	0.005	14.0	0.10	3185	50
5	3	40	0.005	17.5	0.10	2545	40
6	3	40	0.010	21.0	0.10	2120	65
8	3	40	0.010	28.0	0.15	1590	50
10	3	40	0.015	35.0	0.20	1275	55
12	3	40	0.015	42.0	0.25	1060	50
16	3	40	0.020	56.0	0.30	795	50
20	3	40	0.025	70.0	0.40	635	50

Wrought aluminium  
alloys Si < 6%

2	3	50	0.005	7.0	0.05	7960	120
4	3	50	0.005	14.0	0.10	3980	60
5	3	50	0.005	17.5	0.10	3185	50
6	3	50	0.010	21.0	0.10	2655	80
8	3	50	0.010	28.0	0.15	1990	60
10	3	50	0.015	35.0	0.20	1590	70
12	3	50	0.015	42.0	0.25	1325	60
16	3	50	0.020	56.0	0.30	995	60
20	3	50	0.025	70.0	0.40	795	60

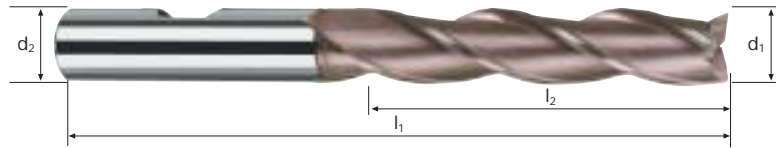
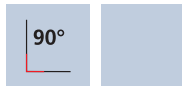



# Cylindrical end mills

Smooth-edged, long version



**HSS-E**  $\lambda$  30°  
**Co8**  $\gamma$  15°



Roughing

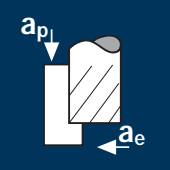



























Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Copper
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Example: Order-N°.							UNICUT-4X	
							U0270	
$\emptyset$ Code	d1 k8	d2 h6	l1	l2	$\alpha$	Z		
.140	2.0	6	54	10	7.0°	3	●	
.160	2.5	6	56	12	5.5°	3	●	
.180	3.0	6	56	12	4.5°	3	●	
.200	3.5	6	59	15	3.5°	3	●	
.220	4.0	6	63	19	2.5°	3	●	
.260	5.0	6	68	24	1.0°	3	●	
.300	6.0	6	68	24	0.0°	3	●	
.391	8.0	8	82	38	0.0°	3	●	
.450	10.0	10	95	45	0.0°	3	●	
.501	12.0	12	110	53	0.0°	3	●	
.570	14.0	12	110	53	0.0°	3	●	
.610	16.0	16	123	63	0.0°	3	●	
.640	18.0	16	123	63	0.0°	3	●	
.682	20.0	20	141	75	0.0°	3	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	3	3	120	0.010	4.5	0.1	12735	380	0.1
		4	3	120	0.010	6.0	0.1	9550	285	0.2
		5	3	120	0.015	7.5	0.1	7640	345	0.3
		6	3	120	0.015	9.0	0.2	6365	285	0.4
		8	3	120	0.020	12.0	0.2	4775	285	0.7
		10	3	120	0.025	15.0	0.3	3820	285	1.1
		12	3	120	0.030	18.0	0.3	3185	285	1.5
16	3	120	0.040	24.0	0.4	2385	285	2.7		
Steel 850 - 1100 N/mm <sup>2</sup>    	3	3	80	0.010	4.5	0.1	8490	255	0.1	
	4	3	80	0.010	6.0	0.1	6365	190	0.1	
	5	3	80	0.015	7.5	0.1	5095	230	0.0	
	6	3	80	0.015	9.0	0.2	4245	190	0.5	
	8	3	80	0.020	12.0	0.2	3185	190	0.5	
	10	3	80	0.025	15.0	0.3	2545	190	0.5	
	12	3	80	0.030	18.0	0.3	2120	190	1.0	
16	3	80	0.040	24.0	0.4	1590	190	2.0		
Cast iron (lamellar / spheroidal)    	3	3	160	0.010	4.5	0.1	16975	510	0.2	
	4	3	160	0.010	6.0	0.1	12735	380	0.2	
	5	3	160	0.015	7.5	0.1	10185	460	0.4	
	6	3	160	0.015	9.0	0.2	8490	380	0.5	
	8	3	160	0.020	12.0	0.2	6365	380	0.9	
	10	3	160	0.025	15.0	0.3	5095	380	1.4	
	12	3	160	0.030	18.0	0.3	4245	380	2.1	
16	3	160	0.040	24.0	0.4	3185	380	3.6		
Stainless steel [Cr-Ni/1.4301]  	3	3	50	0.010	4.5	0.1	5305	160	0.1	
	4	3	50	0.010	6.0	0.1	3980	120	0.1	
	5	3	50	0.015	7.5	0.1	3185	145	0.1	
	6	3	50	0.015	9.0	0.2	2655	120	0.2	
	8	3	50	0.020	12.0	0.2	1990	120	0.3	
	10	3	50	0.025	15.0	0.3	1590	120	0.5	
	12	3	50	0.030	18.0	0.3	1325	120	0.6	
16	3	50	0.040	24.0	0.4	995	120	1.2		

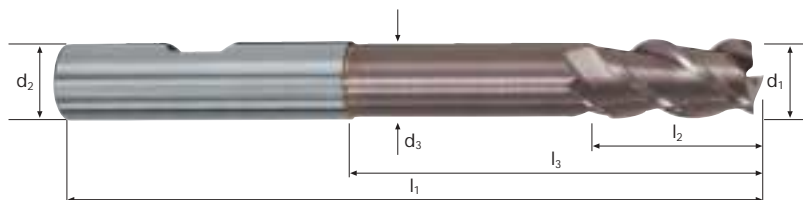
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	3	3	100	0.005	0.3	3	10610	160	0.1
		4	3	100	0.010	0.4	4	7960	240	0.4
		5	3	100	0.010	0.5	5	6365	190	0.5
		6	3	100	0.010	0.6	6	5305	160	0.6
		8	3	100	0.015	0.8	8	3980	180	1.2
		10	3	100	0.020	1.0	10	3185	190	1.9
		12	3	100	0.025	1.2	12	2655	200	2.9
16	3	100	0.030	1.6	16	1990	180	4.6		
Steel 850 - 1100 N/mm <sup>2</sup>    	3	3	70	0.005	0.3	3	7425	110	0.1	
	4	3	70	0.005	0.4	4	5570	85	0.1	
	5	3	70	0.010	0.5	5	4455	135	0.3	
	6	3	70	0.010	0.6	6	3715	110	0.4	
	8	3	70	0.015	0.8	8	2785	125	0.8	
	10	3	70	0.020	1.0	10	2230	135	1.4	
	12	3	70	0.020	1.2	12	1855	110	1.6	
16	3	70	0.030	1.6	16	1395	125	3.2		
Cast iron (lamellar / spheroidal)    	3	3	120	0.005	0.3	3	12735	190	0.2	
	4	3	120	0.010	0.4	4	9550	285	0.5	
	5	3	120	0.010	0.5	5	7640	230	0.6	
	6	3	120	0.015	0.6	6	6365	285	1.0	
	8	3	120	0.020	0.8	8	4775	285	1.8	
	10	3	120	0.020	1.0	10	3820	230	2.3	
	12	3	120	0.025	1.2	12	3185	240	3.5	
16	3	120	0.035	1.6	16	2385	250	6.4		
Stainless steel [Cr-Ni/1.4301]  	3	3	35	0.005	0.3	3	3715	55	0.1	
	4	3	35	0.005	0.4	4	2785	40	0.1	
	5	3	35	0.010	0.5	5	2230	65	0.2	
	6	3	35	0.010	0.6	6	1855	55	0.2	
	8	3	35	0.015	0.8	8	1395	65	0.4	
	10	3	35	0.020	1.0	10	1115	65	0.7	
	12	3	35	0.020	1.2	12	930	55	0.8	
16	3	35	0.030	1.6	16	695	65	1.7		

# Cylindrical end mills

Smooth-edged, long version with neck



**HM**  
**MG10**     $\lambda$  45°  
                   $\gamma$  15°



Roughing

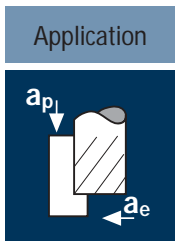


Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **GG(G)** Copper

Example: Order-N°.    Coating    Article-N°. $\alpha$ -Code										UNICUT-4X		
											<b>U5393</b>	
$\emptyset$ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	Z			
.180	3	6	2.8	68	7	16	0.10	4.0°	3	●		
.220	4	6	3.7	68	8	18	0.10	2.5°	3	●		
.260	5	6	4.6	68	10	21	0.15	1.5°	3	●		
.300	6	6	5.5	68	13	31	0.15	0.0°	3	●		
.391	8	8	7.4	88	16	51	0.15	0.0°	3	●		
.450	10	10	9.2	95	19	54	0.20	0.0°	3	●		
.501	12	12	11.0	110	22	64	0.20	0.0°	3	●		
.610	16	16	15.0	123	26	74	0.20	0.0°	3	●		



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	30	0.010	18	0.1	1590	65
8	4	30	0.015	24	0.2	1195	70
10	4	30	0.020	30	0.2	955	75
12	4	30	0.025	36	0.2	795	80
16	4	30	0.030	48	0.3	595	70
20	4	30	0.040	60	0.4	475	75

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	30	0.010	18	0.1	1590	65
8	4	30	0.015	24	0.2	1195	70
10	4	30	0.020	30	0.2	955	75
12	4	30	0.025	36	0.2	795	80
16	4	30	0.030	48	0.3	595	70
20	4	30	0.040	60	0.4	475	75

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	20	0.010	18	0.1	1060	40
8	4	20	0.015	24	0.2	795	50
10	4	20	0.020	30	0.2	635	50
12	4	20	0.025	36	0.2	530	55
16	4	20	0.030	48	0.3	400	50
20	4	20	0.040	60	0.4	320	50

Stainless steel  
[Cr-Ni/1.4301]

6	4	18	0.010	18	0.1	955	40
8	4	18	0.015	24	0.2	715	45
10	4	18	0.020	30	0.2	575	45
12	4	18	0.025	36	0.2	475	50
16	4	18	0.030	48	0.3	360	45
20	4	18	0.040	60	0.4	285	45

Material

Cast iron  
(lamellar / spheroidal)

Unalloyed copper

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

Heat resistant steel  
[17-4 PH]

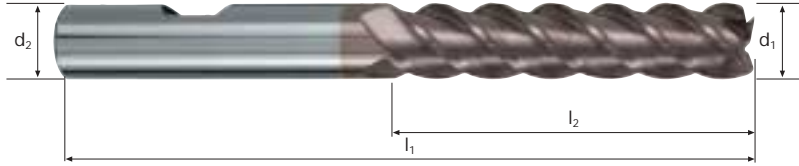
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	30	0.010	18	0.1	1590	65
8	4	30	0.015	24	0.2	1195	70
10	4	30	0.020	30	0.2	955	75
12	4	30	0.025	36	0.2	795	80
16	4	30	0.030	48	0.3	595	70
20	4	30	0.040	60	0.4	475	75
6	4	30	0.010	18	0.1	1590	65
8	4	30	0.015	24	0.2	1195	70
10	4	30	0.020	30	0.2	955	75
12	4	30	0.025	36	0.2	795	80
16	4	30	0.030	48	0.3	595	70
20	4	30	0.040	60	0.4	475	75
6	4	20	0.010	18	0.1	1060	40
8	4	20	0.015	24	0.2	795	50
10	4	20	0.020	30	0.2	635	50
12	4	20	0.025	36	0.2	530	55
16	4	20	0.030	48	0.3	400	50
20	4	20	0.040	60	0.4	320	50
6	4	15	0.010	18	0.1	795	30
8	4	15	0.015	24	0.2	595	35
10	4	15	0.020	30	0.2	475	40
12	4	15	0.025	36	0.2	400	40
16	4	15	0.030	48	0.3	300	35
20	4	15	0.040	60	0.4	240	40

# Cylindrical end mills

Smooth-edged, extra-long version



**HM  
MG10**     $\lambda$  45°  
                 $\gamma$  15°



Roughing

Finishing

**Rm**  
< 850

**Rm**  
850-1100

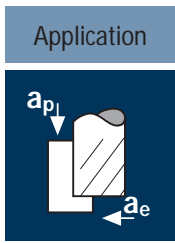
**Rm**  
1100-1300

**Inox**  
Stainless

**Ti**  
Titanium

**GG(G)**  
Copper

Example: Order-N°.		Coating <b>U</b>	Article-N° <b>15347</b>	$\alpha$ -Code <b>.300</b>				<b>UNICUT-4X</b>	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	z		<b>U15347</b>	
<b>.300</b>	6	6	75	31	0.15	4	•		
<b>.391</b>	8	8	90	45	0.15	4	•		
<b>.450</b>	10	10	104	54	0.20	4	•		
<b>.501</b>	12	12	120	69	0.20	4	•		
<b>.610</b>	16	16	135	75	0.20	4	•		
<b>.682</b>	20	20	166	100	0.20	4	•		



Material

Hardened tool steel  
42 - 48 HRC

**P**  
 **P** **D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2	3	120	0.020	2	1.2	19100	1145	2.5
3	4	120	0.030	3	1.8	12735	1530	8.5
4	4	120	0.035	4	2.4	9550	1335	13.0
5	4	120	0.045	5	3.0	7640	1375	20.5
6	4	120	0.055	6	1.5	6365	1400	12.5
8	4	120	0.075	8	4.8	4775	1435	55.0
10	4	120	0.090	10	6.0	3820	1375	82.5
12	4	120	0.110	12	7.2	3185	1400	121.0
16	4	120	0.145	16	4.0	2385	1385	88.5

Material

Hardened tool steel  
48 - 52 HRC

**P**  
 **P** **D**

2	3	80	0.010	2	1.2	12735	380	1.0
3	4	80	0.020	3	1.8	8490	680	3.5
4	4	80	0.025	4	2.4	6365	635	6.0
5	4	80	0.030	5	3.0	5095	610	9.0
6	4	80	0.035	6	1.5	4245	595	5.5
8	4	80	0.050	8	4.8	3185	635	24.5
10	4	80	0.060	10	6.0	2545	610	36.5
12	4	80	0.075	12	7.2	2120	635	55.0
16	4	80	0.100	16	4.0	1590	635	40.5

Material

Hardened tool steel  
52 - 56 HRC

**D** **P**

2	3	60	0.010	2	1.2	9550	285	.5
3	4	60	0.015	3	1.8	6365	380	2.0
4	4	60	0.020	4	2.4	4775	380	3.5
5	4	60	0.025	5	3.0	3820	380	5.5
6	4	60	0.030	6	1.5	3185	380	3.5
8	4	60	0.040	8	4.8	2385	380	14.5
10	4	60	0.050	10	6.0	1910	380	23.0
12	4	60	0.060	12	7.2	1590	380	33.0
16	4	60	0.080	16	4.0	1195	380	24.5

Material

Hardened tool steel  
56 - 60 HRC

**D**

2	3	30	0.005	2	1.2	4775	70	0.2
3	4	30	0.010	3	1.8	3185	125	0.5
4	4	30	0.015	4	2.4	2385	145	1.5
5	4	30	0.020	5	3.0	1910	155	2.5
6	4	30	0.020	6	1.5	1590	125	1.0
8	4	30	0.030	8	4.8	1195	145	5.5
10	4	30	0.035	10	6.0	955	135	8.0
12	4	30	0.045	12	7.2	795	145	12.5
16	4	30	0.060	16	4.0	595	145	9.5



Material

Hardened tool steel  
42 - 48 HRC

**P**  
 **P** **D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2	3	100	0.015	1.0	2	15915	715	1.5
3	4	100	0.020	1.5	3	10610	850	4.0
4	4	100	0.030	2.0	4	7960	955	7.5
5	4	100	0.035	2.5	5	6365	890	11.0
6	4	100	0.045	3.0	6	5305	955	17.0
8	4	100	0.060	4.0	8	3980	955	30.5
10	4	100	0.075	5.0	10	3185	955	48.0
12	4	100	0.090	6.0	12	2655	955	69.0
16	4	100	0.115	4.0	16	1990	915	58.5

Material

Hardened tool steel  
48 - 52 HRC

**P**  
 **P** **D**

2	3	60	0.010	1.0	2	9550	285	.5
3	4	60	0.015	1.5	3	6365	380	1.5
4	4	60	0.020	2.0	4	4775	380	3.0
5	4	60	0.030	2.5	5	3820	460	6.0
6	4	60	0.035	3.0	6	3185	445	8.0
8	4	60	0.045	4.0	8	2385	430	14.0
10	4	60	0.055	5.0	10	1910	420	21.0
12	4	60	0.065	6.0	12	1590	415	30.0
16	4	60	0.090	4.0	16	1195	430	27.5

Material

Hardened tool steel  
52 - 56 HRC

**D** **P**

2	3	40	0.010	1.0	2	6365	190	0.5
3	4	40	0.015	1.5	3	4245	255	1.0
4	4	40	0.020	2.0	4	3185	255	2.0
5	4	40	0.020	2.5	5	2545	205	2.5
6	4	40	0.025	3.0	6	2120	210	4.0
8	4	40	0.035	4.0	8	1590	225	7.0
10	4	40	0.045	5.0	10	1275	230	11.5
12	4	40	0.055	6.0	12	1060	235	17.0
16	4	40	0.070	4.0	16	795	225	14.5

Material

Hardened tool steel  
56 - 60 HRC

**D**

2	3	20	0.006	1.0	2	3185	55	0.1
3	4	20	0.009	1.5	3	2120	75	0.5
4	4	20	0.013	2.0	4	1590	85	0.5
5	4	20	0.016	2.5	5	1275	80	1.0
6	4	20	0.019	3.0	6	1060	80	1.5
8	4	20	0.025	4.0	8	795	80	2.5
10	4	20	0.031	5.0	10	635	80	4.0
12	4	20	0.038	6.0	12	530	80	6.0
16	4	20	0.050	4.0	16	400	80	5.0

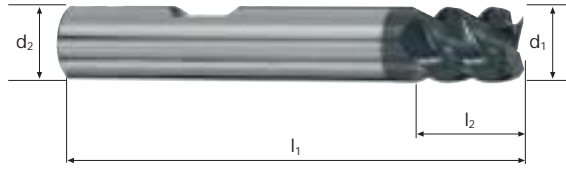
# Cylindrical end mills HX

Smooth-edged, short version



**HM**  
**MG10**

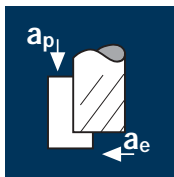
$\lambda$  55°  
 $\gamma$ -10°



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Ti</b> Titanium	<b>GG(G)</b>
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Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z	POLYCHROM	DURO-S
								P5349	D5349
.100	1.0	6	50	1.0	0.07	11.0°	3	●	●
.108	1.2	6	50	1.2	0.07	11.0°	3	●	●
.120	1.5	6	50	1.5	0.07	10.0°	3	●	●
.140	2.0	6	50	2.0	0.10	10.0°	3	●	●
.148	2.2	6	50	2.2	0.10	9.0°	3	●	●
.160	2.5	6	50	2.5	0.10	9.0°	3	●	●
.180	3.0	6	50	3.0	0.10	8.0°	4	●	●
.220	4.0	6	54	4.0	0.10	6.0°	4	●	●
.260	5.0	6	54	5.0	0.15	4.0°	4	●	●
.300	6.0	6	54	7.0	0.15	0.0°	4	●	●
.391	8.0	8	58	9.0	0.15	0.0°	4	●	●
.450	10.0	10	66	11.0	0.20	0.0°	4	●	●
.501	12.0	12	73	13.0	0.20	0.0°	4	●	●
.610	16.0	16	82	17.0	0.20	0.0°	4	●	●

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	80	0.015	3	1.8	8490	510	3.0
4	4	80	0.020	4	2.4	6365	510	5.0
5	4	80	0.025	5	3.0	5095	510	7.5
6	4	80	0.030	6	3.6	4245	510	11.0
8	4	80	0.040	8	4.8	3185	510	19.5
10	4	80	0.050	10	6.0	2545	510	30.5
12	4	80	0.060	12	7.2	2120	510	44.0
16	4	80	0.075	16	6.4	1590	475	48.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]



3	4	40	0.015	3	1.8	4245	255	1.5
4	4	40	0.020	4	2.4	3185	255	2.5
5	4	40	0.025	5	3.0	2545	255	4.0
6	4	40	0.030	6	3.6	2120	255	5.5
8	4	40	0.040	8	4.8	1590	255	10.0
10	4	40	0.050	10	6.0	1275	255	15.5
12	4	40	0.060	12	7.2	1060	255	22.0
16	4	40	0.075	16	6.4	795	240	24.5

Heat resistant steel  
[17-4 PH]



3	4	25	0.015	3	1.8	2655	160	1.0
4	4	25	0.020	4	2.4	1990	160	1.5
5	4	25	0.025	5	3.0	1590	160	2.5
6	4	25	0.030	6	3.6	1325	160	3.5
8	4	25	0.035	8	4.8	995	140	5.5
10	4	25	0.045	10	6.0	795	145	8.5
12	4	25	0.050	12	7.2	665	135	11.5
16	4	25	0.060	16	6.4	495	120	12.5

Nickel base  
alloys prec.-hard.  
[Inconel 718]



3	4	15	0.015	3	1.8	1590	95	0.5
4	4	15	0.020	4	2.4	1195	95	1.0
5	4	15	0.025	5	3.0	955	95	1.5
6	4	15	0.030	6	3.6	795	95	2.0
8	4	15	0.035	8	4.8	595	85	3.5
10	4	15	0.045	10	6.0	475	85	5.0
12	4	15	0.050	12	7.2	400	80	7.0
16	4	15	0.060	16	6.4	300	70	7.0

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	60	0.015	2.1	3	6365	380	2.5
4	4	60	0.020	2.8	4	4775	380	4.5
5	4	60	0.025	3.5	5	3820	380	6.5
6	4	60	0.030	4.2	6	3185	380	9.5
8	4	60	0.040	5.6	8	2385	380	17.0
10	4	60	0.045	7.0	10	1910	345	24.0
12	4	60	0.045	8.4	12	1590	285	28.5
16	4	60	0.065	6.4	16	1195	310	31.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]



3	4	30	0.015	2.1	3	3185	190	1.0
4	4	30	0.020	2.8	4	2385	190	2.0
5	4	30	0.025	3.5	5	1910	190	3.5
6	4	30	0.030	4.2	6	1590	190	5.0
8	4	30	0.040	5.6	8	1195	190	8.5
10	4	30	0.045	7.0	10	955	170	12.0
12	4	30	0.045	8.4	12	795	145	14.5
16	4	30	0.065	6.4	16	595	155	16.0

Heat resistant steel  
[17-4 PH]



3	4	20	0.015	2.1	3	2120	125	1.0
4	4	20	0.020	2.8	4	1590	125	1.5
5	4	20	0.025	3.5	5	1275	130	2.5
6	4	20	0.030	4.2	6	1060	125	3.0
8	4	20	0.035	5.6	8	795	110	5.0
10	4	20	0.045	7.0	10	635	115	8.0
12	4	20	0.045	8.4	12	530	95	9.5
16	4	20	0.060	6.4	16	400	95	9.5

Nickel base  
alloys prec.-hard.  
[Inconel 718]



3	4	10	0.015	2.1	3	1060	65	0.5
4	4	10	0.020	2.8	4	795	65	0.5
5	4	10	0.025	3.5	5	635	65	1.0
6	4	10	0.030	4.2	6	530	65	1.5
8	4	10	0.035	5.6	8	400	55	2.5
10	4	10	0.045	7.0	10	320	60	4.0
12	4	10	0.045	8.4	12	265	50	5.0
16	4	10	0.060	6.4	16	200	50	5.0

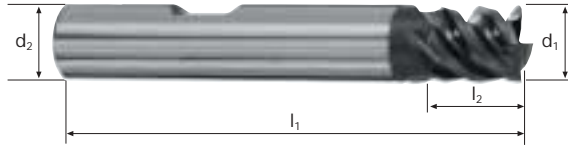
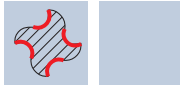


# Cylindrical end mills SX

Smooth-edged, short version



**HM**  
**MG10**     $\lambda$  **55°**  
                   $\gamma$  **15°**



Roughing



Finishing



**Rm**  
< 850

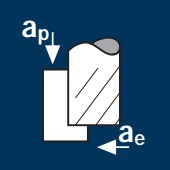
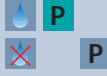
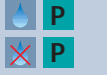


**Rm**  
850-1100


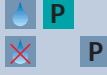
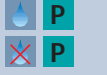


**Inox**  
Stainless

**Ti**  
Titanium

**Nickel-Alloys**  
**Tool Steel**

		Coating		Article-N°.		α-Code				<b>POLYCHROM</b>	
Example: Order-N°.		<b>P</b>	<b>5313</b>	<b>.180</b>					<b>P5313</b>		
									<b>P5213</b>		
Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z				
<b>.180</b>	3	6	50	3	0.10	7.5°	4	●			
<b>.220</b>	4	6	54	4	0.10	6.0°	4	●			
<b>.260</b>	5	6	54	5	0.15	3.5°	4	●			
<b>.300</b>	6	6	54	7	0.15	0.0°	4	●			
<b>.391</b>	8	8	58	9	0.15	0.0°	4	●			
<b>.450</b>	10	10	66	11	0.20	0.0°	4	●			
<b>.501</b>	12	12	73	13	0.20	0.0°	4	●			
<b>.610</b>	16	16	82	17	0.20	0.0°	4	●			

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	6	4	200	0.040	6	2.7	10610	1700	27.5
		8	4	200	0.055	8	3.6	7960	1750	50.5
		10	4	200	0.070	10	4.5	6365	1780	80.0
		12	4	200	0.075	12	5.4	5305	1590	103.0
		16	4	200	0.100	16	4.0	3980	1590	102.0
Steel 850 - 1100 N/mm <sup>2</sup>  	6	4	150	0.040	6	2.7	7960	1275	20.5	
	8	4	150	0.055	8	3.6	5970	1315	38.0	
	10	4	150	0.070	10	4.5	4775	1335	60.0	
	12	4	150	0.075	12	5.4	3980	1195	77.5	
	16	4	150	0.100	16	4.0	2985	1195	76.5	
Cold work tool steel (12% Cr), high alloyed [1.2379]  	6	4	80	0.040	6	2.7	4245	680	11.0	
	8	4	80	0.050	8	3.6	3185	635	18.5	
	10	4	80	0.065	10	4.5	2545	660	29.5	
	12	4	80	0.075	12	5.4	2120	635	41.0	
	16	4	80	0.095	16	4.0	1590	605	38.5	
Stainless steel [Cr-Ni/1.4301]  	6	4	70	0.030	6	2.7	3715	445	7.0	
	8	4	70	0.035	8	3.6	2785	390	11.0	
	10	4	70	0.045	10	4.5	2230	400	18.0	
	12	4	70	0.055	12	5.4	1855	410	26.5	
	16	4	70	0.065	16	4.0	1395	365	23.5	

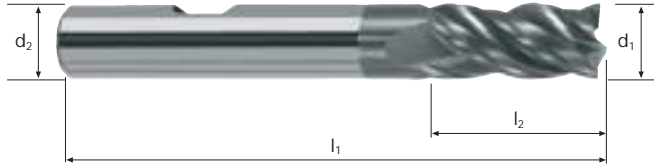
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	6	4	180	0.035	4.8	6	9550	1335	38.5
		8	4	180	0.045	6.4	8	7160	1290	66.0
		10	4	180	0.055	8.0	10	5730	1260	101.0
		12	4	180	0.060	9.6	12	4775	1145	132.0
		16	4	180	0.075	6.4	16	3580	1075	110.0
Steel 850 - 1100 N/mm <sup>2</sup>  	6	4	120	0.035	4.8	6	6365	890	25.5	
	8	4	120	0.045	6.4	8	4775	860	44.0	
	10	4	120	0.055	8.0	10	3820	840	67.0	
	12	4	120	0.060	9.6	12	3185	765	88.0	
	16	4	120	0.075	6.4	16	2385	715	73.0	
Cold work tool steel (12% Cr), high alloyed [1.2379]  	6	4	60	0.035	4.8	6	3185	445	13.0	
	8	4	60	0.045	6.4	8	2385	430	22.0	
	10	4	60	0.055	8.0	10	1910	420	33.5	
	12	4	60	0.060	9.6	12	1590	380	44.0	
	16	4	60	0.075	6.4	16	1195	360	37.0	
Stainless steel [Cr-Ni/1.4301]  	6	4	50	0.030	4.8	6	2655	320	9.0	
	8	4	50	0.035	6.4	8	1990	280	14.5	
	10	4	50	0.045	8.0	10	1590	285	23.0	
	12	4	50	0.050	9.6	12	1325	265	30.5	
	16	4	50	0.060	6.4	16	995	240	24.5	

# Cylindrical end mills Cut-V

Smooth-edged, short version



**HM**  
**MG10**     $\lambda$  40°  
                   $\gamma$  0°



Roughing



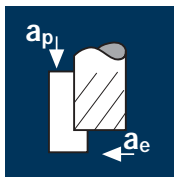
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel Nickel-Alloys
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Example: Order-N°.							POLYCHROM	
							P5329	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	z		
.300	6	6	50	10	0.15	4	●	
.391	8	8	54	13	0.15	4	●	
.450	10	10	63	16	0.20	4	●	
.501	12	12	72	19	0.20	4	●	
.610	16	16	82	25	0.20	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.5	3	180	0.010	1.8	0.2	38200	1145
2.0	3	180	0.015	2.4	0.2	28650	1290
2.5	3	180	0.015	3.0	0.3	22920	1030
3.0	3	180	0.020	3.6	0.3	19100	1145
4.0	3	180	0.025	4.8	0.4	14325	1075
5.0	3	180	0.035	6.0	0.5	11460	1205
6.0	3	180	0.040	7.2	0.6	9550	1145
8.0	3	180	0.055	9.6	0.8	7160	1180
10.0	3	180	0.065	12.0	1.0	5730	1115

1.5	3	140	0.010	1.8	0.2	29710	890
2.0	3	140	0.015	2.4	0.2	22280	1005
2.5	3	140	0.015	3.0	0.3	17825	800
3.0	3	140	0.020	3.6	0.3	14855	890
4.0	3	140	0.025	4.8	0.4	11140	835
5.0	3	140	0.035	6.0	0.5	8915	935
6.0	3	140	0.040	7.2	0.6	7425	890
8.0	3	140	0.050	9.6	0.8	5570	835
10.0	3	140	0.060	12.0	1.0	4455	800

1.5	3	40	0.005	1.8	0.2	8490	125
2.0	3	40	0.010	2.4	0.2	6365	190
2.5	3	40	0.010	3.0	0.3	5095	155
3.0	3	40	0.010	3.6	0.3	4245	125
4.0	3	40	0.015	4.8	0.4	3185	145
5.0	3	40	0.020	6.0	0.5	2545	155
6.0	3	40	0.020	7.2	0.6	2120	125
8.0	3	40	0.030	9.6	0.8	1590	145
10.0	3	40	0.035	12.0	1.0	1275	135

1.5	3	60	0.005	1.8	0.2	12735	190
2.0	3	60	0.010	2.4	0.2	9550	285
2.5	3	60	0.010	3.0	0.3	7640	230
3.0	3	60	0.015	3.6	0.3	6365	285
4.0	3	60	0.020	4.8	0.4	4775	285
5.0	3	60	0.025	6.0	0.5	3820	285
6.0	3	60	0.030	7.2	0.6	3185	285
8.0	3	60	0.040	9.6	0.8	2385	285
10.0	3	60	0.045	12.0	1.0	1910	260

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Titanium alloys  
>300 HB  
[Ti6Al4V]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1.5	3	150	0.010	0.6	1.5	31830	955	1.0
2.0	3	150	0.010	0.8	2.0	23875	715	1.0
2.5	3	150	0.015	1.0	2.5	19100	860	2.0
3.0	3	150	0.015	1.2	3.0	15915	715	2.5
4.0	3	150	0.020	1.6	4.0	11935	715	4.5
5.0	3	150	0.030	2.0	5.0	9550	860	8.5
6.0	3	150	0.035	2.4	6.0	7960	835	12.0
8.0	3	150	0.045	3.2	8.0	5970	805	20.5
10.0	3	150	0.055	4.0	10.0	4775	790	31.5

1.5	3	100	0.010	0.6	1.5	21220	635	0.5
2.0	3	100	0.010	0.8	2.0	15915	475	1.0
2.5	3	100	0.015	1.0	2.5	12735	575	1.5
3.0	3	100	0.015	1.2	3.0	10610	475	1.5
4.0	3	100	0.020	1.6	4.0	7960	480	3.0
5.0	3	100	0.030	2.0	5.0	6365	575	6.0
6.0	3	100	0.035	2.4	6.0	5305	555	8.0
8.0	3	100	0.045	3.2	8.0	3980	535	13.5
10.0	3	100	0.050	4.0	10.0	3185	480	19.0

1.5	3	30	0.005	0.6	1.5	6365	95	0.0
2.0	3	30	0.005	0.8	2.0	4775	70	0.0
2.5	3	30	0.010	1.0	2.5	3820	115	0.5
3.0	3	30	0.010	1.2	3.0	3185	95	0.5
4.0	3	30	0.010	1.6	4.0	2385	70	0.5
5.0	3	30	0.015	2.0	5.0	1910	85	1.0
6.0	3	30	0.020	2.4	6.0	1590	95	1.5
8.0	3	30	0.025	3.2	8.0	1195	90	2.5
10.0	3	30	0.030	4.0	10.0	955	85	3.5

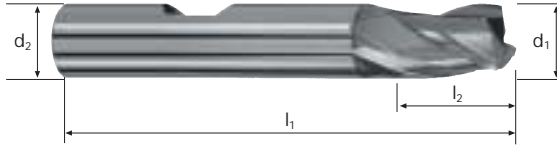
1.5	3	40	0.005	0.6	1.5	8490	125	0.0
2.0	3	40	0.005	0.8	2.0	6365	95	0.0
2.5	3	40	0.010	1.0	2.5	5095	155	0.5
3.0	3	40	0.010	1.2	3.0	4245	125	0.5
4.0	3	40	0.015	1.6	4.0	3185	145	1.0
5.0	3	40	0.020	2.0	5.0	2545	155	1.5
6.0	3	40	0.025	2.4	6.0	2120	160	2.5
8.0	3	40	0.030	3.2	8.0	1590	145	3.5
10.0	3	40	0.040	4.0	10.0	1275	155	6.0

# Cylindrical end mills

Smooth-edged, short version



**HM  
MG10**     $\lambda$  **30°**  
                   $\gamma$  **12°**



Roughing

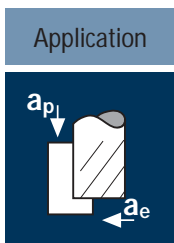


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Nickel-Alloys
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Example: Order-N°. <span style="margin-left: 40px;">Coating</span> <span style="margin-left: 20px;">Article-N°</span> <span style="margin-left: 20px;">α-Code</span>							UNICUT-4X	POLYCHROM
		<b>U</b>	<b>5036</b>	<b>.120</b>			U5036	P5036
Ø Code	d1 e8	d2 h6	l1	l2	α	Z		
.120	1.5	6	50	5	10.0°	3	•	•
.140	2.0	6	50	5	9.5°	3	•	•
.160	2.5	6	50	5	8.5°	3	•	•
.180	3.0	6	50	6	6.5°	3	•	•
.200	3.5	6	50	8	5.5°	3	•	•
.220	4.0	6	50	8	4.5°	3	•	•
.240	4.5	6	50	8	3.5°	3	•	•
.260	5.0	6	50	9	2.5°	3	•	•
.300	6.0	6	50	10	0.0°	3	•	•
.331	7.0	8	54	10	2.0°	3	•	•
.391	8.0	8	54	12	0.0°	3	•	•
.420	9.0	10	63	12	2.0°	3	•	•
.450	10.0	10	63	13	0.0°	3	•	•
							•	•
							•	•
							•	•
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							•	•
							•	•
							•	•
							•	•
							•	•
							•	•



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1	2	120	0.005	1	0.45	38200	380	0.0
2	2	120	0.010	2	0.90	19100	380	0.5
3	2	120	0.010	3	1.35	12735	255	1.0
4	2	120	0.015	4	1.80	9550	285	2.0
5	2	120	0.020	5	2.25	7640	305	3.5
6	2	120	0.025	6	2.70	6365	320	5.0
8	2	120	0.030	8	3.60	4775	285	8.0
10	2	120	0.040	10	4.50	3820	305	13.5
12	2	120	0.050	12	5.40	3185	320	20.5

Steel  
850 - 1100 N/mm<sup>2</sup>

1	2	80	0.005	1	0.45	25465	255	0.0
2	2	80	0.005	2	0.90	12735	125	0.0
3	2	80	0.010	3	1.35	8490	170	0.5
4	2	80	0.015	4	1.80	6365	190	1.5
5	2	80	0.020	5	2.25	5095	205	2.5
6	2	80	0.020	6	2.70	4245	170	3.0
8	2	80	0.030	8	3.60	3185	190	5.5
10	2	80	0.035	10	4.50	2545	180	8.0
12	2	80	0.045	12	5.40	2120	190	12.5

Cast iron  
(lamellar / spheroidal)

1	2	160	0.005	1	0.45	50930	510	0.0
2	2	160	0.010	2	0.90	25465	510	1.0
3	2	160	0.015	3	1.35	16975	510	2.0
4	2	160	0.020	4	1.80	12735	510	3.5
5	2	160	0.020	5	2.25	10185	405	4.5
6	2	160	0.025	6	2.70	8490	425	7.0
8	2	160	0.035	8	3.60	6365	445	13.0
10	2	160	0.045	10	4.50	5095	460	20.5
12	2	160	0.055	12	5.40	4245	465	30.0

Stainless steel  
[Cr-Ni/1.4301]

1	2	40	0.005	1	0.45	12735	125	0.0
2	2	40	0.005	2	0.90	6365	65	0.0
3	2	40	0.010	3	1.35	4245	85	0.5
4	2	40	0.015	4	1.80	3185	95	0.5
5	2	40	0.020	5	2.25	2545	100	1.0
6	2	40	0.020	6	2.70	2120	85	1.5
8	2	40	0.030	8	3.60	1590	95	2.5
10	2	40	0.035	10	4.50	1275	90	4.0
12	2	40	0.045	12	5.40	1060	95	6.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1	2	100	0.005	0.5	1	31830	320	0.0
2	2	100	0.005	1.0	2	15915	160	0.5
3	2	100	0.010	1.5	3	10610	210	1.0
4	2	100	0.010	2.0	4	7960	160	1.5
5	2	100	0.015	2.5	5	6365	190	2.5
6	2	100	0.015	3.0	6	5305	160	3.0
8	2	100	0.020	4.0	8	3980	160	5.0
10	2	100	0.030	5.0	10	3185	190	9.5
12	2	100	0.035	6.0	12	2655	185	13.5

Steel  
850 - 1100 N/mm<sup>2</sup>

1	2	70	0.005	0.5	1	22280	225	0.0
2	2	70	0.005	1.0	2	11140	110	0.0
3	2	70	0.010	1.5	3	7425	150	0.5
4	2	70	0.010	2.0	4	5570	110	1.0
5	2	70	0.015	2.5	5	4455	135	1.5
6	2	70	0.015	3.0	6	3715	110	2.0
8	2	70	0.020	4.0	8	2785	110	3.5
10	2	70	0.025	5.0	10	2230	110	5.5
12	2	70	0.030	6.0	12	1855	110	8.0

Cast iron  
(lamellar / spheroidal)

1	2	120	0.005	0.5	1	38200	380	0.0
2	2	120	0.005	1.0	2	19100	190	0.5
3	2	120	0.010	1.5	3	12735	255	1.0
4	2	120	0.010	2.0	4	9550	190	1.5
5	2	120	0.015	2.5	5	7640	230	3.0
6	2	120	0.020	3.0	6	6365	255	4.5
8	2	120	0.025	4.0	8	4775	240	7.5
10	2	120	0.030	5.0	10	3820	230	11.5
12	2	120	0.035	6.0	12	3185	225	16.0

Stainless steel  
[Cr-Ni/1.4301]

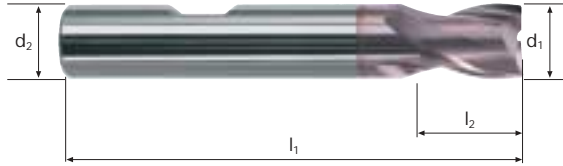
1	2	30	0.005	0.5	1	9550	95	0.0
2	2	30	0.005	1.0	2	4775	50	0.0
3	2	30	0.010	1.5	3	3185	65	0.5
4	2	30	0.010	2.0	4	2385	50	0.5
5	2	30	0.015	2.5	5	1910	55	0.5
6	2	30	0.015	3.0	6	1590	50	1.0
8	2	30	0.020	4.0	8	1195	50	1.5
10	2	30	0.025	5.0	10	955	50	2.5
12	2	30	0.030	6.0	12	795	50	3.5

# Cylindrical end mills

Smooth-edged, short version



**HM**  
**MG10**    λ **30°**  
                  γ **12°**



Roughing



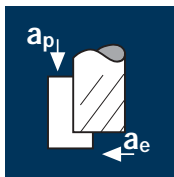
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless		<b>GG(G)</b> Copper
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Example: Order-N°.		Coating <b>U</b>	Article-N°. <b>5400</b>	α-Code <b>.100</b>				<b>UNICUT-4X</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	α	Z		
.100	1.0	6	50	3	0.07	10.5°	2	●	
.120	1.5	6	50	3	0.07	10.0°	2	●	
.140	2.0	6	50	3	0.10	9.5°	2	●	
.160	2.5	6	50	3	0.10	9.0°	2	●	
.180	3.0	6	50	4	0.10	7.5°	2	●	
.220	4.0	6	54	5	0.10	5.5°	2	●	
.260	5.0	6	54	6	0.15	3.0°	2	●	
.300	6.0	6	54	7	0.15	0.0°	2	●	
.391	8.0	8	58	9	0.15	0.0°	2	●	
.450	10.0	10	66	11	0.20	0.0°	2	●	
.501	12.0	12	73	12	0.20	0.0°	2	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	160	0.010	4.5	1.4	16975	680	4.0
4	4	160	0.015	6.0	1.8	12735	765	8.5
5	4	160	0.025	7.5	2.3	10185	1020	17.0
6	4	160	0.025	9.0	2.7	8490	850	20.5
8	4	160	0.035	12.0	3.6	6365	890	38.5
10	4	160	0.045	15.0	4.5	5095	915	62.0
12	4	160	0.050	18.0	5.4	4245	850	82.5
16	4	160	0.065	24.0	7.2	3185	830	143.5
20	4	160	0.085	30.0	9.0	2545	865	233.5

3	4	120	0.010	4.5	1.4	12735	510	3.0
4	4	120	0.015	6.0	1.8	9550	575	6.0
5	4	120	0.025	7.5	2.3	7640	765	13.0
6	4	120	0.025	9.0	2.7	6365	635	15.5
8	4	120	0.035	12.0	3.6	4775	670	29.0
10	4	120	0.045	15.0	4.5	3820	690	46.5
12	4	120	0.050	18.0	5.4	3185	635	61.5
16	4	120	0.065	24.0	7.2	2385	620	107.0
20	4	120	0.085	30.0	9.0	1910	650	175.5

3	4	60	0.010	4.5	1.4	6365	255	1.5
4	4	60	0.015	6.0	1.8	4775	285	3.0
5	4	60	0.020	7.5	2.3	3820	305	5.0
6	4	60	0.025	9.0	2.7	3185	320	8.0
8	4	60	0.030	12.0	3.6	2385	285	12.5
10	4	60	0.040	15.0	4.5	1910	305	20.5
12	4	60	0.050	18.0	5.4	1590	320	31.0
16	4	60	0.060	24.0	7.2	1195	285	49.0
20	4	60	0.075	30.0	9.0	955	285	77.0

3	4	145	0.015	4.5	1.4	15385	925	5.5
4	4	145	0.020	6.0	1.8	11540	925	10.0
5	4	145	0.025	7.5	2.3	9230	925	15.5
6	4	145	0.030	9.0	2.7	7695	925	22.5
8	4	145	0.040	12.0	3.6	5770	925	40.0
10	4	145	0.050	15.0	4.5	4615	925	62.5
12	4	145	0.060	18.0	5.4	3845	925	90.0
16	4	145	0.085	24.0	7.2	2885	980	169.5
20	4	145	0.105	30.0	9.0	2310	970	262.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	145	0.010	4	3	15385	615	6.5
4	4	145	0.010	5	4	11540	460	9.0
5	4	145	0.020	6	5	9230	740	22.0
6	4	145	0.025	7	6	7695	770	33.5
8	4	145	0.030	10	8	5770	690	53.0
10	4	145	0.035	12	10	4615	645	77.5
12	4	145	0.040	14	12	3845	615	106.5
16	4	145	0.050	10	16	2885	575	88.5
20	4	145	0.060	12	20	2310	555	133.0

3	4	95	0.010	4	3	10080	405	4.5
4	4	95	0.010	5	4	7560	300	6.0
5	4	95	0.020	6	5	6050	485	14.5
6	4	95	0.025	7	6	5040	505	22.0
8	4	95	0.030	10	8	3780	455	35.0
10	4	95	0.035	12	10	3025	425	51.0
12	4	95	0.040	14	12	2520	405	70.0
16	4	95	0.050	10	16	1890	380	58.5
20	4	95	0.060	12	20	1510	360	86.5

3	4	45	0.010	4	3	4775	190	2.0
4	4	45	0.010	5	4	3580	145	3.0
5	4	45	0.020	6	5	2865	230	7.0
6	4	45	0.025	7	6	2385	240	10.5
8	4	45	0.030	10	8	1790	215	16.5
10	4	45	0.035	12	10	1430	200	24.0
12	4	45	0.040	14	12	1195	190	33.0
16	4	45	0.050	10	16	895	180	27.5
20	4	45	0.060	12	20	715	170	41.0

3	4	130	0.010	4	3	13795	550	6.0
4	4	130	0.015	5	4	10345	620	12.0
5	4	130	0.020	6	5	8275	660	20.0
6	4	130	0.025	7	6	6895	690	30.0
8	4	130	0.030	10	8	5175	620	47.5
10	4	130	0.040	12	10	4140	660	79.0
12	4	130	0.040	14	12	3450	550	95.0
16	4	130	0.055	10	16	2585	570	87.5
20	4	130	0.070	12	20	2070	580	139.0

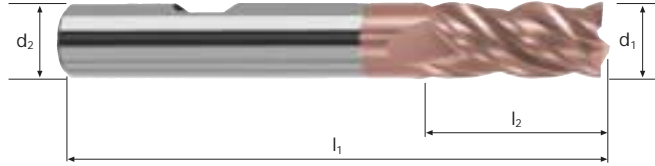


# Cylindrical end mills

Smooth-edged, short version



**HM**  $\lambda$  40°  
 $\gamma$  0°



Roughing



Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **GG(G)** Nickel-Alloys

Example: Order-N°.								UNICUT-4X	
								U45315	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	Z		
.178*	3	3	40	6	0.10	0.0°	4	●	
.180	3	6	50	6	0.10	6.0°	4	●	
.218*	4	4	42	8	0.10	0.0°	4	●	
.220	4	6	50	8	0.10	4.0°	4	●	
.258*	5	5	45	9	0.15	0.0°	4	●	
.260	5	6	50	9	0.15	2.5°	4	●	
.300	6	6	50	10	0.15	0.0°	4	●	
.391	8	8	54	13	0.15	0.0°	4	●	
.450	10	10	63	16	0.20	0.0°	4	●	
.501	12	12	72	19	0.20	0.0°	4	●	
.610	16	16	82	25	0.20	0.0°	4	●	
.682	20	20	92	29	0.20	0.0°	4	●	
* without clamping flat only									

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	44	0.002	0.5	1.0	14005	55
2.0	2	44	0.004	1.0	2.0	7005	55
3.0	2	44	0.006	1.5	3.0	4670	55
4.0	2	44	0.008	2.0	4.0	3500	55
5.0	2	44	0.012	2.5	5.0	2800	65
6.0	2	44	0.014	3.0	6.0	2335	65
8.0	2	44	0.018	4.0	8.0	1750	65
10.0	2	44	0.022	5.0	10.0	1400	60
12.0	2	44	0.026	6.0	12.0	1165	60

Steel  
850 - 1100 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	36	0.002	0.5	1.0	11460	45
2.0	2	36	0.004	1.0	2.0	5730	45
3.0	2	36	0.006	1.5	3.0	3820	45
4.0	2	36	0.008	2.0	4.0	2865	45
5.0	2	36	0.012	2.5	5.0	2290	55
6.0	2	36	0.014	3.0	6.0	1910	55
8.0	2	36	0.018	4.0	8.0	1430	50
10.0	2	36	0.022	5.0	10.0	1145	50
12.0	2	36	0.026	6.0	12.0	955	50

Steel  
1100 - 1300 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	28	0.002	0.5	1.0	8915	35
2.0	2	28	0.004	1.0	2.0	4455	35
3.0	2	28	0.006	1.5	3.0	2970	35
4.0	2	28	0.008	2.0	4.0	2230	35
5.0	2	28	0.012	2.5	5.0	1785	45
6.0	2	28	0.014	3.0	6.0	1485	40
8.0	2	28	0.018	4.0	8.0	1115	40
10.0	2	28	0.022	5.0	10.0	890	40
12.0	2	28	0.026	6.0	12.0	745	40

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	25	0.002	0.5	1.0	7960	30
2.0	2	25	0.004	1.0	2.0	3980	30
3.0	2	25	0.006	1.5	3.0	2655	30
4.0	2	25	0.008	2.0	4.0	1990	30
5.0	2	25	0.012	2.5	5.0	1590	40
6.0	2	25	0.014	3.0	6.0	1325	35
8.0	2	25	0.018	4.0	8.0	995	35
10.0	2	25	0.022	5.0	10.0	795	35
12.0	2	25	0.026	6.0	12.0	665	35

## Material

Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	34	0.002	0.5	1.0	10825	45
2.0	2	34	0.004	1.0	2.0	5410	45
3.0	2	34	0.006	1.5	3.0	3610	45
4.0	2	34	0.008	2.0	4.0	2705	45
5.0	2	34	0.012	2.5	5.0	2165	50
6.0	2	34	0.014	3.0	6.0	1805	50
8.0	2	34	0.018	4.0	8.0	1355	50
10.0	2	34	0.022	5.0	10.0	1080	50
12.0	2	34	0.026	6.0	12.0	900	45

Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	18	0.002	0.5	1.0	5730	25
2.0	2	18	0.004	1.0	2.0	2865	25
3.0	2	18	0.006	1.5	3.0	1910	25
4.0	2	18	0.008	2.0	4.0	1430	25
5.0	2	18	0.012	2.5	5.0	1145	25
6.0	2	18	0.014	3.0	6.0	955	25
8.0	2	18	0.018	4.0	8.0	715	25
10.0	2	18	0.022	5.0	10.0	575	25
12.0	2	18	0.026	6.0	12.0	475	25

Unalloyed copper



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	80	0.002	0.5	1.0	25465	100
2.0	2	80	0.004	1.0	2.0	12735	100
3.0	2	80	0.006	1.5	3.0	8490	100
4.0	2	80	0.008	2.0	4.0	6365	100
5.0	2	80	0.012	2.5	5.0	5095	120
6.0	2	80	0.014	3.0	6.0	4245	120
8.0	2	80	0.018	4.0	8.0	3185	115
10.0	2	80	0.022	5.0	10.0	2545	110
12.0	2	80	0.026	6.0	12.0	2120	110

Wrought aluminium  
alloys Si < 6%



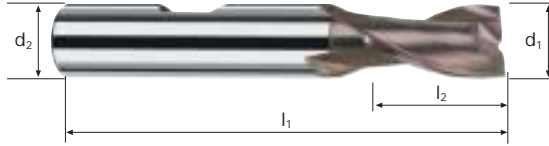
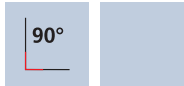
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	2	100	0.002	0.5	1.0	31830	125
2.0	2	100	0.004	1.0	2.0	15915	125
3.0	2	100	0.006	1.5	3.0	10610	125
4.0	2	100	0.008	2.0	4.0	7960	125
5.0	2	100	0.012	2.5	5.0	6365	155
6.0	2	100	0.014	3.0	6.0	5305	150
8.0	2	100	0.018	4.0	8.0	3980	145
10.0	2	100	0.022	5.0	10.0	3185	140
12.0	2	100	0.026	6.0	12.0	2655	140

# Cylindrical end mills

Smooth-edged, short version



**HSS-E**  $\lambda$  30°  
**Co8**  $\gamma$  15°



Roughing

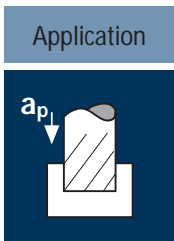


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
		Coating <b>U</b>	Article-N°. <b>0700</b>	α-Code <b>.100</b>			<b>U0700</b>	
Ø Code	d1 p9	d2 h6	l1	l2	α	Z		
.100	1.0	6	47	3	14.0°	2	●	
.120	1.5	6	47	3	13.0°	2	●	
.140	2.0	6	48	4	11.0°	2	●	
.160	2.5	6	49	5	8.0°	2	●	
.180	3.0	6	49	5	7.0°	2	●	
.200	3.5	6	50	6	5.5°	2	●	
.220	4.0	6	51	7	4.0°	2	●	
.240	4.5	6	51	7	3.0°	2	●	
.260	5.0	6	52	8	2.0°	2	●	
.280	5.5	6	52	8	1.0°	2	●	
.300	6.0	6	52	8	0.0°	2	●	
.322	6.5	10	60	10	5.5°	2	●	
.331	7.0	8	54	10	2.0°	2	●	
.362	7.5	10	60	10	4.0°	2	●	
.391	8.0	8	55	11	0.0°	2	●	
.410	8.5	10	61	11	2.5°	2	●	
.420	9.0	10	61	11	1.5°	2	●	
.440	9.7	10	63	13	0.0°	2	●	
.450	10.0	10	63	13	0.0°	2	●	
.460	10.5	12	70	13	2.0°	2	●	
.470	11.0	12	70	13	1.5°	2	●	
.501	12.0	12	73	16	0.0°	2	●	
.540	13.0	12	73	16	0.0°	2	●	



Material
Steel < 850 N/mm <sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	44	0.032	7.0	14.0	1000	65
15.0	2	44	0.034	7.5	15.0	935	65
16.0	2	44	0.036	8.0	16.0	875	65
17.0	2	44	0.038	8.5	17.0	825	65
18.0	2	44	0.040	9.0	18.0	780	60
19.0	2	44	0.042	9.5	19.0	735	60
20.0	2	44	0.044	10.0	20.0	700	60
22.0	2	44	0.048	11.0	22.0	635	60
25.0	2	44	0.056	12.5	25.0	560	65

Material
Steel 850 - 1100 N/mm <sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	36	0.032	7.0	14.0	820	50
15.0	2	36	0.034	7.5	15.0	765	50
16.0	2	36	0.036	8.0	16.0	715	50
17.0	2	36	0.038	8.5	17.0	675	50
18.0	2	36	0.040	9.0	18.0	635	50
19.0	2	36	0.042	9.5	19.0	605	50
20.0	2	36	0.044	10.0	20.0	575	50
22.0	2	36	0.048	11.0	22.0	520	50
25.0	2	36	0.056	12.5	25.0	460	50

Material
Steel 1100 - 1300 N/mm <sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	28	0.032	7.0	14.0	635	40
15.0	2	28	0.034	7.5	15.0	595	40
16.0	2	28	0.036	8.0	16.0	555	40
17.0	2	28	0.038	8.5	17.0	525	40
18.0	2	28	0.040	9.0	18.0	495	40
19.0	2	28	0.042	9.5	19.0	470	40
20.0	2	28	0.044	10.0	20.0	445	40
22.0	2	28	0.048	11.0	22.0	405	40
25.0	2	28	0.056	12.5	25.0	355	40

Material
Cold work tool steel (12% Cr), high alloyed [1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	25	0.032	7.0	14.0	570	35
15.0	2	25	0.034	7.5	15.0	530	35
16.0	2	25	0.036	8.0	16.0	495	35
17.0	2	25	0.038	8.5	17.0	470	35
18.0	2	25	0.040	9.0	18.0	440	35
19.0	2	25	0.042	9.5	19.0	420	35
20.0	2	25	0.044	10.0	20.0	400	35
22.0	2	25	0.048	11.0	22.0	360	35
25.0	2	25	0.056	12.5	25.0	320	35

Material
Cast iron (lamellar / spheroidal)
Stainless steel [Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	34	0.032	7.0	14.0	775	50
15.0	2	34	0.034	7.5	15.0	720	50
16.0	2	34	0.036	8.0	16.0	675	50
17.0	2	34	0.038	8.5	17.0	635	50
18.0	2	34	0.040	9.0	18.0	600	50
19.0	2	34	0.042	9.5	19.0	570	50
20.0	2	34	0.044	10.0	20.0	540	50
22.0	2	34	0.048	11.0	22.0	490	45
25.0	2	34	0.056	12.5	25.0	435	50

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	18	0.032	7.0	14.0	410	25
15.0	2	18	0.034	7.5	15.0	380	25
16.0	2	18	0.036	8.0	16.0	360	25
17.0	2	18	0.038	8.5	17.0	335	25
18.0	2	18	0.040	9.0	18.0	320	25
19.0	2	18	0.042	9.5	19.0	300	25
20.0	2	18	0.044	10.0	20.0	285	25
22.0	2	18	0.048	11.0	22.0	260	25
25.0	2	18	0.056	12.5	25.0	230	25

Material
Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	80	0.032	7.0	14.0	1820	115
15.0	2	80	0.034	7.5	15.0	1700	115
16.0	2	80	0.036	8.0	16.0	1590	115
17.0	2	80	0.038	8.5	17.0	1500	115
18.0	2	80	0.040	9.0	18.0	1415	115
19.0	2	80	0.042	9.5	19.0	1340	115
20.0	2	80	0.044	10.0	20.0	1275	110
22.0	2	80	0.048	11.0	22.0	1160	110
25.0	2	80	0.056	12.5	25.0	1020	115

Material
Wrought aluminium alloys Si < 6%

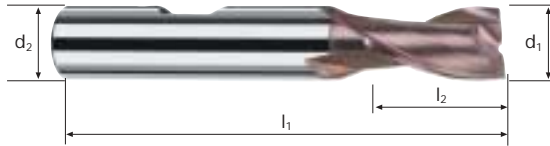
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
14.0	2	100	0.032	7.0	14.0	2275	145
15.0	2	100	0.034	7.5	15.0	2120	145
16.0	2	100	0.036	8.0	16.0	1990	145
17.0	2	100	0.038	8.5	17.0	1870	140
18.0	2	100	0.040	9.0	18.0	1770	140
19.0	2	100	0.042	9.5	19.0	1675	140
20.0	2	100	0.044	10.0	20.0	1590	140
22.0	2	100	0.048	11.0	22.0	1445	140
25.0	2	100	0.056	12.5	25.0	1275	145

# Cylindrical end mills

Smooth-edged, short version



<b>HSS-E</b> <b>Co8</b>	$\lambda$ 30° $\gamma$ 15°
90°	



Roughing



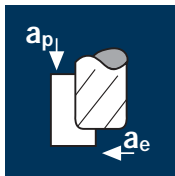
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
		Coating	Article-N°.	α-Code				
		U	0700	.570				
Ø Code	d1 p9	d2 h6	l1	l2	α	Z		
.570	14.0	12	73	16	0.0°	2	●	
.581	15.0	12	73	16	0.0°	2	●	
.610	16.0	16	79	19	0.0°	2	●	
.620	17.0	16	79	19	0.0°	2	●	
.640	18.0	16	79	19	0.0°	2	●	
.650	19.0	16	79	19	0.0°	2	●	
.682	20.0	20	88	22	0.0°	2	●	
.710	22.0	20	88	22	0.0°	2	●	
.772	25.0	25	102	26	0.0°	2	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	200	0.020	4.5	1.2	21220	1700	9.0
4	4	200	0.025	6.0	1.6	15915	1590	15.5
5	4	200	0.035	7.5	2.0	12735	1785	27.0
6	4	200	0.040	9.0	2.4	10610	1700	36.5
8	4	200	0.055	12.0	3.2	7960	1750	67.0
10	4	200	0.070	15.0	4.0	6365	1780	107.0
12	4	200	0.075	18.0	4.8	5305	1590	137.5
16	4	200	0.100	24.0	6.4	3980	1590	244.0
20	4	200	0.130	30.0	8.0	3185	1655	397.0

3	4	150	0.020	4.5	1.2	15915	1275	7.0
4	4	150	0.025	6.0	1.6	11935	1195	11.5
5	4	150	0.035	7.5	2.0	9550	1335	20.0
6	4	150	0.040	9.0	2.4	7960	1275	27.5
8	4	150	0.055	12.0	3.2	5970	1315	50.5
10	4	150	0.070	15.0	4.0	4775	1335	80.0
12	4	150	0.075	18.0	4.8	3980	1195	103.0
16	4	150	0.100	24.0	6.4	2985	1195	183.5
20	4	150	0.130	30.0	8.0	2385	1240	297.5

3	4	80	0.020	4.5	1.2	8490	680	3.5
4	4	80	0.025	6.0	1.6	6365	635	6.0
5	4	80	0.030	7.5	2.0	5095	610	9.0
6	4	80	0.040	9.0	2.4	4245	680	14.5
8	4	80	0.050	12.0	3.2	3185	635	24.5
10	4	80	0.065	15.0	4.0	2545	660	39.5
12	4	80	0.075	18.0	4.8	2120	635	55.0
16	4	80	0.095	24.0	6.4	1590	605	93.0
20	4	80	0.120	30.0	8.0	1275	610	146.5

3	4	70	0.015	4.5	1.2	7425	445	2.5
4	4	70	0.020	6.0	1.6	5570	445	4.5
5	4	70	0.020	7.5	2.0	4455	355	5.5
6	4	70	0.030	9.0	2.4	3715	445	9.5
8	4	70	0.035	12.0	3.2	2785	390	15.0
10	4	70	0.045	15.0	4.0	2230	400	24.0
12	4	70	0.055	18.0	4.8	1855	410	35.5
16	4	70	0.065	24.0	6.4	1395	365	56.0
20	4	70	0.085	30.0	8.0	1115	380	91.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	180	0.015	3	3	19100	1145	10.5
4	4	180	0.020	4	4	14325	1145	18.5
5	4	180	0.030	5	5	11460	1375	34.5
6	4	180	0.035	6	6	9550	1335	48.0
8	4	180	0.045	8	8	7160	1290	82.5
10	4	180	0.055	10	10	5730	1260	126.0
12	4	180	0.060	12	12	4775	1145	165.0
16	4	180	0.075	8	16	3580	1075	137.5
20	4	180	0.095	10	20	2865	1090	218.0

3	4	120	0.015	3	3	12735	765	7.0
4	4	120	0.020	4	4	9550	765	12.0
5	4	120	0.030	5	5	7640	915	23.0
6	4	120	0.035	6	6	6365	890	32.0
8	4	120	0.045	8	8	4775	860	55.0
10	4	120	0.055	10	10	3820	840	84.0
12	4	120	0.060	12	12	3185	765	110.0
16	4	120	0.075	8	16	2385	715	91.5
20	4	120	0.095	10	20	1910	725	145.0

3	4	60	0.015	3	3	6365	380	3.5
4	4	60	0.020	4	4	4775	380	6.0
5	4	60	0.030	5	5	3820	460	11.5
6	4	60	0.035	6	6	3185	445	16.0
8	4	60	0.045	8	8	2385	430	27.5
10	4	60	0.055	10	10	1910	420	42.0
12	4	60	0.060	12	12	1590	380	54.5
16	4	60	0.075	8	16	1195	360	46.0
20	4	60	0.095	10	20	955	365	73.0

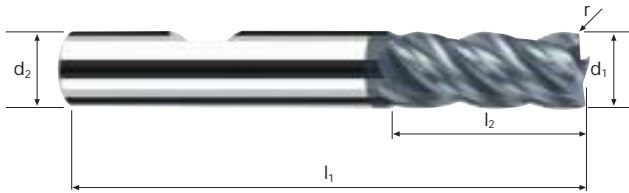
3	4	50	0.010	3	3	5305	210	2.0
4	4	50	0.015	4	4	3980	240	4.0
5	4	50	0.025	5	5	3185	320	8.0
6	4	50	0.030	6	6	2655	320	11.5
8	4	50	0.035	8	8	1990	280	18.0
10	4	50	0.045	10	10	1590	285	28.5
12	4	50	0.050	12	12	1325	265	38.0
16	4	50	0.060	8	16	995	240	30.5
20	4	50	0.075	10	20	795	240	48.0

# Corner radius end mills NX-RNV

Smooth-edged, short version



HM  
MG10  $\lambda$  40°  
 $\gamma$  0°



new!

Roughing

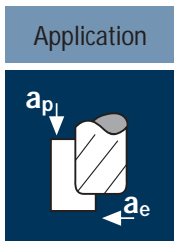


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500					Inox Stainless	Ti Titanium	GG(G) Tool Steel
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Example: Order-N°.									POLYCHROM	
									P15326	
									P15226	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	$\alpha$	Z			
.180	3	6	57	8	0.5	5.5°	4	●		
.220	4	6	57	11	0.5	3.5°	4	●		
.260	5	6	57	13	0.5	2.0°	4	●		
.300	6	6	57	13	0.5	0.0°	4	●		
.388	8	8	63	19	0.5	0.0°	4	●		
.448	10	10	72	22	0.5	0.0°	4	●		
.498	12	12	83	26	0.5	0.0°	4	●		
.302	6	6	57	13	1.0	0.0°	4	●		
.391	8	8	63	19	1.0	0.0°	4	●		
.450	10	10	72	22	1.0	0.0°	4	●		
.501	12	12	83	26	1.0	0.0°	4	●		
.608	16	16	92	32	1.0	0.0°	4	●		
.680	20	20	104	38	1.0	0.0°	4	●		
.453	10	10	72	22	1.5	0.0°	4	●		
.503	12	12	83	26	1.5	0.0°	4	●		
.610	16	16	92	32	1.5	0.0°	4	●		
.505	12	12	83	26	2.0	0.0°	4	●		
.611	16	16	92	32	2.0	0.0°	4	●		
.683	20	20	104	38	2.0	0.0°	4	●		



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	160	0.025	6.0	1.6	12735	1275	12.0
5	4	160	0.035	7.5	2.0	10185	1425	21.5
6	4	160	0.040	9.0	2.4	8490	1360	29.5
8	4	160	0.055	12.0	3.2	6365	1400	54.0
10	4	160	0.065	15.0	4.0	5095	1325	79.5
12	4	160	0.080	18.0	4.8	4245	1360	117.5
16	4	160	0.090	24.0	6.4	3185	1145	176.0
20	4	160	0.110	30.0	8.0	2545	1120	269.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

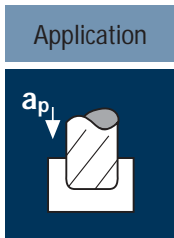
4	4	120	0.025	6.0	1.6	9550	955	9.0
5	4	120	0.035	7.5	2.0	7640	1070	16.0
6	4	120	0.040	9.0	2.4	6365	1020	22.0
8	4	120	0.055	12.0	3.2	4775	1050	40.5
10	4	120	0.065	15.0	4.0	3820	995	59.5
12	4	120	0.080	18.0	4.8	3185	1020	88.0
16	4	120	0.090	24.0	6.4	2385	860	132.0
20	4	120	0.110	30.0	8.0	1910	840	201.5

Steel  
1300 - 1500 N/mm<sup>2</sup>

4	4	90	0.025	6.0	1.6	7160	715	7.0
5	4	90	0.030	7.5	2.0	5730	690	10.5
6	4	90	0.035	9.0	2.4	4775	670	14.5
8	4	90	0.045	12.0	3.2	3580	645	25.0
10	4	90	0.060	15.0	4.0	2865	690	41.5
12	4	90	0.070	18.0	4.8	2385	670	58.0
16	4	90	0.080	24.0	6.4	1790	575	88.5
20	4	90	0.100	30.0	8.0	1430	570	137.0

Titanium alloys  
>300 HB  
[Ti6Al4V]

4	4	40	0.015	6.0	1.6	3185	190	2.0
5	4	40	0.020	7.5	2.0	2545	205	3.0
6	4	40	0.020	9.0	2.4	2120	170	3.5
8	4	40	0.025	12.0	3.2	1590	160	6.0
10	4	40	0.035	15.0	4.0	1275	180	11.0
12	4	40	0.040	18.0	4.8	1060	170	14.5
16	4	40	0.050	24.0	6.4	795	160	24.5
20	4	40	0.060	30.0	8.0	635	150	36.0



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
4	4	130	0.020	5.0	4	10345	830	16.5
5	4	130	0.025	6.3	5	8275	830	26.0
6	4	130	0.025	7.5	6	6895	690	31.0
8	4	130	0.035	10.0	8	5175	725	58.0
10	4	130	0.045	12.5	10	4140	745	93.0
12	4	130	0.055	15.0	12	3450	760	137.0
16	4	130	0.065	20.0	16	2585	670	214.5
20	4	130	0.080	25.0	20	2070	660	330.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

4	4	100	0.020	5.0	4	7960	635	12.5
5	4	100	0.025	6.3	5	6365	635	20.0
6	4	100	0.025	7.5	6	5305	530	24.0
8	4	100	0.035	10.0	8	3980	555	44.5
10	4	100	0.045	12.5	10	3185	575	72.0
12	4	100	0.055	15.0	12	2655	585	105.5
16	4	100	0.065	20.0	16	1990	515	165.0
20	4	100	0.080	25.0	20	1590	510	255.0

Steel  
1300 - 1500 N/mm<sup>2</sup>

4	4	70	0.015	5.0	4	5570	335	6.5
5	4	70	0.020	6.3	5	4455	355	11.0
6	4	70	0.025	7.5	6	3715	370	16.5
8	4	70	0.030	10.0	8	2785	335	27.0
10	4	70	0.040	12.5	10	2230	355	44.5
12	4	70	0.050	15.0	12	1855	370	66.5
16	4	70	0.055	20.0	16	1395	305	97.5
20	4	70	0.070	25.0	20	1115	310	155.0

Titanium alloys  
>300 HB  
[Ti6Al4V]

4	4	30	0.010	5.0	4	2385	95	2.0
5	4	30	0.015	6.3	5	1910	115	3.5
6	4	30	0.020	7.5	6	1590	125	5.5
8	4	30	0.025	10.0	8	1195	120	9.5
10	4	30	0.030	12.5	10	955	115	14.5
12	4	30	0.040	15.0	12	795	125	22.5
16	4	30	0.045	20.0	16	595	105	33.5
20	4	30	0.055	25.0	20	475	105	52.5



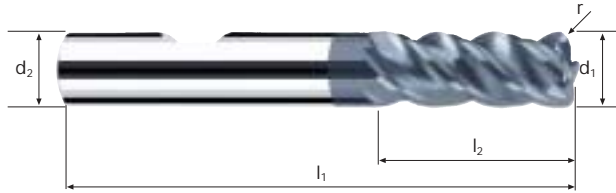
# Corner radius end mills NX-RNVD

Smooth-edged, normal version



**HM MG10**  $\lambda$  45°  $\gamma$ -10°

**Vario**



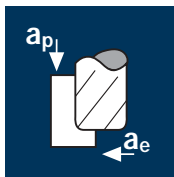
Roughing

Finishing

<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56				<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.								POLYCHROM	
		Coating	Article-N°.	α-Code				P15368	
		P	15368	.220				P15268	
Ø Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	α	Z		
.220	4	6	57	8	0.5	4.0°	4	●	
.260	5	6	57	10	0.5	2.5°	4	●	
.300	6	6	57	12	0.5	0.0°	4	●	
.388	8	8	63	19	0.5	0.0°	4	●	
.448	10	10	72	23	0.5	0.0°	4	●	
.498	12	12	83	27	0.5	0.0°	4	●	
.302	6	6	57	12	1.0	0.0°	4	●	
.391	8	8	63	19	1.0	0.0°	4	●	
.450	10	10	72	23	1.0	0.0°	4	●	
.501	12	12	83	27	1.0	0.0°	4	●	
.608	16	16	92	32	1.0	0.0°	4	●	
.680	20	20	104	39	1.0	0.0°	4	●	
.453	10	10	72	23	1.5	0.0°	4	●	
.503	12	12	83	27	1.5	0.0°	4	●	
.610	16	16	92	32	1.5	0.0°	4	●	
.505	12	12	83	27	2.0	0.0°	4	●	
.611	16	16	92	32	2.0	0.0°	4	●	
.683	20	20	104	39	2.0	0.0°	4	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	120	0.025	4.5	0.45	12735	1275	2.5
4	4	120	0.035	6.0	0.60	9550	1335	5.0
5	4	120	0.040	7.5	0.75	7640	1220	7.0
6	4	120	0.050	9.0	0.90	6365	1275	10.5
8	4	120	0.065	12.0	1.20	4775	1240	18.0
10	4	120	0.085	15.0	1.50	3820	1300	29.5
12	4	120	0.100	18.0	1.80	3185	1275	41.5
16	4	120	0.135	24.0	2.40	2385	1290	74.5

Hardened tool steel  
48 - 52 HRC



3	4	80	0.015	4.5	0.45	8490	510	1.0
4	4	80	0.020	6.0	0.60	6365	510	2.0
5	4	80	0.030	7.5	0.75	5095	610	3.5
6	4	80	0.035	9.0	0.90	4245	595	5.0
8	4	80	0.045	12.0	1.20	3185	575	8.5
10	4	80	0.055	15.0	1.50	2545	560	12.5
12	4	80	0.065	18.0	1.80	2120	550	18.0
16	4	80	0.090	24.0	2.40	1590	570	33.0

Hardened tool steel  
52 - 56 HRC



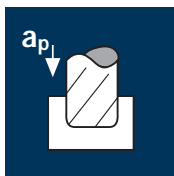
3	4	60	0.015	4.5	0.45	6365	380	1.0
4	4	60	0.020	6.0	0.60	4775	380	1.5
5	4	60	0.025	7.5	0.75	3820	380	2.0
6	4	60	0.025	9.0	0.90	3185	320	2.5
8	4	60	0.035	12.0	1.20	2385	335	5.0
10	4	60	0.045	15.0	1.50	1910	345	8.0
12	4	60	0.055	18.0	1.80	1590	350	11.5
16	4	60	0.075	24.0	2.40	1195	360	20.5

Hardened tool steel  
56 - 60 HRC



3	4	30	0.010	4.5	0.45	3185	127	0.3
4	4	30	0.015	6.0	0.60	2385	143	0.5
5	4	30	0.015	7.5	0.75	1910	115	0.5
6	4	30	0.020	9.0	0.90	1590	127	1.0
8	4	30	0.025	12.0	1.20	1195	120	1.5
10	4	30	0.035	15.0	1.50	955	134	3.0
12	4	30	0.040	18.0	1.80	795	127	4.0
16	4	30	0.055	24.0	2.40	595	131	7.5

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	100	0.020	1.5	3	10610	850	4.0
4	4	100	0.025	2.0	4	7960	795	6.5
5	4	100	0.035	2.5	5	6365	890	11.0
6	4	100	0.040	3.0	6	5305	850	15.5
8	4	100	0.055	4.0	8	3980	875	28.0
10	4	100	0.065	5.0	10	3185	830	41.5
12	4	100	0.080	6.0	12	2655	850	61.0
16	4	100	0.105	8.0	16	1990	835	53.5

Hardened tool steel  
48 - 52 HRC



3	4	60	0.015	1.5	3	6365	380	1.5
4	4	60	0.020	2.0	4	4775	380	3.0
5	4	60	0.025	2.5	5	3820	380	5.0
6	4	60	0.030	3.0	6	3185	380	7.0
8	4	60	0.040	4.0	8	2385	380	12.0
10	4	60	0.050	5.0	10	1910	380	19.0
12	4	60	0.060	6.0	12	1590	380	27.5
16	4	60	0.080	8.0	16	1195	380	24.5

Hardened tool steel  
52 - 56 HRC



3	4	40	0.010	1.5	3	4245	170	1.0
4	4	40	0.015	2.0	4	3185	190	1.5
5	4	40	0.020	2.5	5	2545	205	2.5
6	4	40	0.025	3.0	6	2120	210	4.0
8	4	40	0.030	4.0	8	1590	190	6.0
10	4	40	0.040	5.0	10	1275	205	10.5
12	4	40	0.050	6.0	12	1060	210	15.0
16	4	40	0.065	8.0	16	795	205	13.0

Hardened tool steel  
56 - 60 HRC



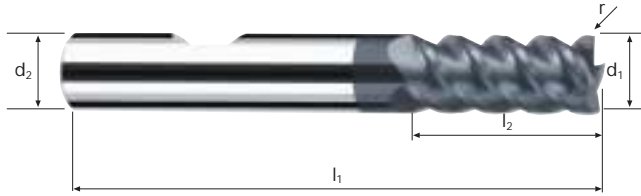
3	4	20	0.009	1.5	3	2120	76	0.3
4	4	20	0.011	2.0	4	1590	70	0.5
5	4	20	0.014	2.5	5	1275	71	1.0
6	4	20	0.017	3.0	6	1060	72	1.5
8	4	20	0.023	4.0	8	795	73	2.5
10	4	20	0.029	5.0	10	635	74	3.5
12	4	20	0.034	6.0	12	530	72	5.0
16	4	20	0.046	8.0	16	400	74	4.5

# Corner radius end mills HX-RN

Smooth-edged, normal version



**HM**  
**MG10**     $\lambda$  55°  
                   $\gamma$ -10°



Roughing



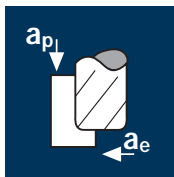
Finishing



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60		<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.									<b>POLYCHROM</b>	<b>DURO-S</b>		
		Coating <b>P</b>	Article-N°. <b>5359</b>	α-Code <b>.178</b>					<b>P5359</b>	<b>D5359</b>		
											<b>P5259</b>	<b>D5259</b>
Ø Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	α	Z					
.178	3	6	57	8	0.2	6.0°	4	●	●			
.218	4	6	57	11	0.2	4.0°	4	●	●			
.258	5	6	57	13	0.2	2.0°	4	●	●			
.297	6	6	57	13	0.2	0.0°	4	●	●			
.388	8	8	63	19	0.2	0.0°	4	●	●			
.445	10	10	72	22	0.2	0.0°	4	●	●			
.496	12	12	83	26	0.2	0.0°	4	●	●			
.605	16	16	92	32	0.2	0.0°	4	●	●			
.180	3	6	57	8	0.5	6.0°	4	●	●			
.220	4	6	57	11	0.5	4.0°	4	●	●			
.260	5	6	57	13	0.5	2.0°	4	●	●			
.300	6	6	57	13	0.5	0.0°	4	●	●			
.391	8	8	63	19	0.5	0.0°	4	●	●			
.450	10	10	72	22	0.5	0.0°	4	●	●			
.501	12	12	83	26	0.5	0.0°	4	●	●			
.610	16	16	92	32	0.5	0.0°	4	●	●			

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	120	0.050	9	0.9	6365	1275	10.5
8	4	120	0.065	12	1.2	4775	1240	18.0
10	4	120	0.085	15	1.5	3820	1300	29.5
12	4	120	0.100	18	1.8	3185	1275	41.5
16	4	120	0.135	24	2.4	2385	1290	74.5
20	4	120	0.165	30	3.0	1910	1260	113.5

Hardened tool steel  
48 - 52 HRC



6	4	80	0.035	9	0.9	4245	595	5.0
8	4	80	0.045	12	1.2	3185	575	8.5
10	4	80	0.055	15	1.5	2545	560	12.5
12	4	80	0.065	18	1.8	2120	550	18.0
16	4	80	0.090	24	2.4	1590	570	33.0
20	4	80	0.110	30	3.0	1275	560	50.5

Hardened tool steel  
52 - 56 HRC



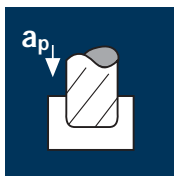
6	4	60	0.025	9	0.9	3185	320	2.5
8	4	60	0.035	12	1.2	2385	335	5.0
10	4	60	0.045	15	1.5	1910	345	8.0
12	4	60	0.055	18	1.8	1590	350	11.5
16	4	60	0.075	24	2.4	1195	360	20.5
20	4	60	0.090	30	3.0	955	345	31.0

Hardened tool steel  
56 - 60 HRC



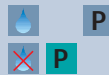
6	4	30	0.020	9	0.9	1590	127	1.0
8	4	30	0.025	12	1.2	1195	120	1.7
10	4	30	0.035	15	1.5	955	134	3.0
12	4	30	0.040	18	1.8	795	127	4.0
16	4	30	0.055	24	2.4	595	131	7.5
20	4	30	0.065	30	3.0	475	124	11.0

## Application



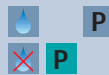
## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	100	0.040	3	6	5305	850	15.5
8	4	100	0.055	4	8	3980	875	28.0
10	4	100	0.065	5	10	3185	830	41.5
12	4	100	0.080	6	12	2655	850	61.0
16	4	100	0.105	4	16	1990	835	53.5
20	4	100	0.135	5	20	1590	860	86.0

Hardened tool steel  
48 - 52 HRC



6	4	80	0.030	3	6	4245	510	9.0
8	4	80	0.040	4	8	3185	510	16.5
10	4	80	0.050	5	10	2545	510	25.5
12	4	80	0.060	6	12	2120	510	36.5
16	4	80	0.080	4	16	1590	510	32.5
20	4	80	0.100	5	20	1275	510	51.0

Hardened tool steel  
52 - 56 HRC



6	4	40	0.025	3	6	2120	210	4.0
8	4	40	0.030	4	8	1590	190	6.0
10	4	40	0.040	5	10	1275	205	10.5
12	4	40	0.050	6	12	1060	210	15.0
16	4	40	0.065	4	16	795	205	13.0
20	4	40	0.080	5	20	635	205	20.5

Hardened tool steel  
56 - 60 HRC



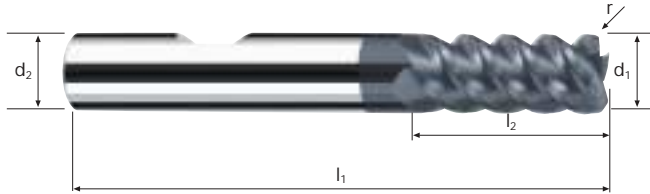
6	4	20	0.017	3	6	1060	72	1.3
8	4	20	0.023	4	8	795	73	2.5
10	4	20	0.029	5	10	635	74	3.5
12	4	20	0.034	6	12	530	72	5.0
16	4	20	0.046	4	16	400	74	4.5
20	4	20	0.057	5	20	320	73	7.5

# Corner radius end mills HX-RN

Smooth-edged, normal version



**HM**  
**MG10**     $\lambda$  55°  
                   $\gamma$ -10°



Roughing



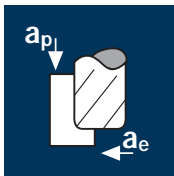
Finishing



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60		<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.							POLYCHROM		
		Coating <b>P</b>	Article-N°. <b>15357</b>	α-Code <b>.302</b>				<b>P15357</b>	
∅ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	Z			
.302	6	6	57	13	1.0	4	●		
.391	8	8	63	19	1.0	4	●		
.450	10	10	72	22	1.0	4	●		
.501	12	12	83	26	1.0	4	●		
.608	16	16	92	32	1.0	4	●		
.680	20	20	104	38	1.0	4	●		
.306	6	6	57	13	2.0	4	●		
.395	8	8	63	19	2.0	4	●		
.455	10	10	72	22	2.0	4	●		
.505	12	12	83	26	2.0	4	●		
.611	16	16	92	32	2.0	4	●		
.683	20	20	104	38	2.0	4	●		

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	80	0.025	9	2.4	4245	425	9.0
8	4	80	0.035	12	3.2	3185	445	17.0
10	4	80	0.045	15	4.0	2545	460	27.5
12	4	80	0.050	18	4.8	2120	425	36.5
16	4	80	0.075	24	3.2	1590	475	36.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

6	4	40	0.025	9	2.4	2120	210	4.5
8	4	40	0.035	12	3.2	1590	225	8.5
10	4	40	0.045	15	4.0	1275	230	14.0
12	4	40	0.050	18	4.8	1060	210	18.0
16	4	40	0.075	24	3.2	795	240	18.5

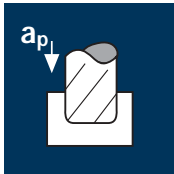
Heat resistant steel  
[17-4 PH]

6	4	25	0.020	9	2.4	1325	105	2.5
8	4	25	0.030	12	3.2	995	120	4.5
10	4	25	0.035	15	4.0	795	110	6.5
12	4	25	0.040	18	4.8	665	105	9.0
16	4	25	0.060	24	3.2	495	120	9.0

Nickel base alloys prec.-hard.  
[Inconel 718]

6	4	15	0.020	9	2.4	795	65	1.5
8	4	15	0.030	12	3.2	595	70	2.5
10	4	15	0.035	15	4.0	475	65	4.0
12	4	15	0.040	18	4.8	400	65	5.5
16	4	15	0.060	24	3.2	300	70	5.5

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	60	0.030	3	6	3185	380	7.0
8	4	60	0.040	4	8	2385	380	12.0
10	4	60	0.055	5	10	1910	420	21.0
12	4	60	0.055	6	12	1590	350	25.0
16	4	60	0.085	4	16	1195	405	26.0

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

6	4	30	0.030	3	6	1590	190	3.5
8	4	30	0.040	4	8	1195	190	6.0
10	4	30	0.055	5	10	955	210	10.5
12	4	30	0.055	6	12	795	175	12.5
16	4	30	0.085	4	16	595	200	13.0

Heat resistant steel  
[17-4 PH]

6	4	20	0.025	3	6	1060	105	2.0
8	4	20	0.035	4	8	795	110	3.5
10	4	20	0.045	5	10	635	115	6.0
12	4	20	0.050	6	12	530	105	7.5
16	4	20	0.075	4	16	400	120	7.5

Nickel base alloys prec.-hard.  
[Inconel 718]

6	4	10	0.025	3	6	530	55	1.0
8	4	10	0.035	4	8	400	55	2.0
10	4	10	0.045	5	10	320	60	3.0
12	4	10	0.050	6	12	265	55	4.0
16	4	10	0.075	4	16	200	60	4.0

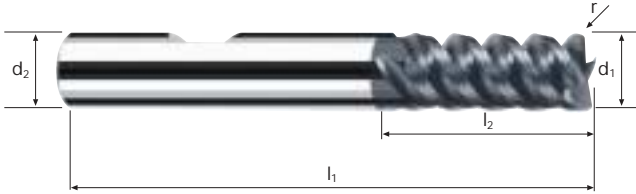
# Corner radius end mills SX-RN

Smooth-edged, normal version



**HM**  
**MG10**

$\lambda$  55°  
 $\gamma$  15°



Roughing



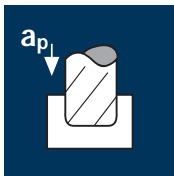
Finishing



**Rm** < 850    **Rm** 850-1100    **Inox** Stainless    **Ti** Titanium    **Nickel-Alloys** Tool Steel

Example: Order-N°.							POLYCHROM	
							P15312	
							P15212	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	Z		
.300	6	6	57	13	0.5	4	●	
.388	8	8	63	19	0.5	4	●	
.448	10	10	72	22	0.5	4	●	
.498	12	12	83	26	0.5	4	●	
.606	16	16	92	32	0.5	4	●	
.302	6	6	57	13	1.0	4	●	
.391	8	8	63	19	1.0	4	●	
.450	10	10	72	22	1.0	4	●	
.501	12	12	83	26	1.0	4	●	
.608	16	16	92	32	1.0	4	●	
.304	6	6	57	13	1.5	4	●	
.393	8	8	63	19	1.5	4	●	
.453	10	10	72	22	1.5	4	●	
.503	12	12	83	26	1.5	4	●	
.610	16	16	92	32	1.5	4	●	

### Application



### Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

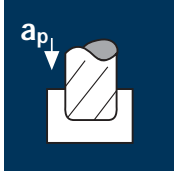
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	4	40	0.025	10	10	1275	130	13.0
12	4	40	0.030	12	12	1060	125	18.0
16	4	40	0.040	16	16	795	125	32.0
20	4	40	0.055	20	20	635	140	56.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

10	4	60	0.025	10	10	1910	190	19.0
12	4	60	0.030	12	12	1590	190	27.5
16	4	60	0.040	16	16	1195	190	48.5
20	4	60	0.055	20	20	955	210	84.0



### Application



### Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	4	40	0.020	15	10	1275	100	15.0
12	4	40	0.025	18	12	1060	105	22.5
16	4	40	0.035	24	16	795	110	42.0
20	4	40	0.045	30	20	635	115	69.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

10	4	60	0.020	15	10	1910	155	23.5
12	4	60	0.025	18	12	1590	160	34.5
16	4	60	0.035	24	16	1195	165	63.5
20	4	60	0.045	30	20	955	170	102.0





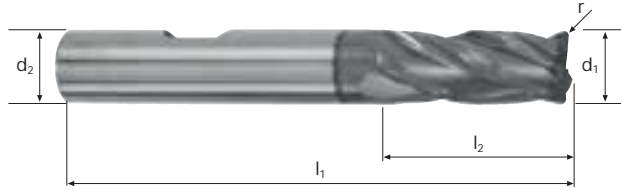
# Corner radius end mills Splinecut-Ti-R

Smooth-edged, normal version



**HM**  
**MG10**

$\lambda$  **30°**  
 $\gamma$  **8°**



Roughing



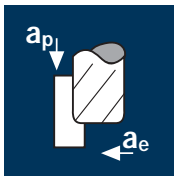
Finishing



Ti  
Titanium

Example: Order-N°.							TRIBO-N	
							N5470	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	Z		
.450	10	10	72	22	1.0	4	●	
.501	12	12	83	26	1.0	4	●	
.608	16	16	92	32	1.0	4	●	
.680	20	20	104	38	1.0	4	●	
.506	12	12	83	26	2.5	4	●	
.612	16	16	92	32	2.5	4	●	
.684	20	20	104	38	2.5	4	●	
.459	10	10	72	22	3.0	4	●	
.507	12	12	83	26	3.0	4	●	
.613	16	16	92	32	3.0	4	●	
.614	16	16	92	32	4.0	4	●	
.686	20	20	104	38	4.0	4	●	

### Application



### Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

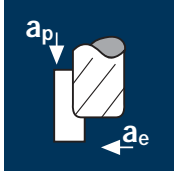
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
12	4	50	0.035	18	3	1325	185	10.0
16	4	50	0.045	24	4	995	180	17.5
20	4	50	0.055	30	5	795	175	26.5

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

12	4	70	0.035	18	3	1855	260	14.0
16	4	70	0.045	24	4	1395	250	24.0
20	4	70	0.055	30	5	1115	245	37.0



### Application



### Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
12	4	50	0.040	18	1.2	1325	210	4.5
16	4	50	0.050	24	1.6	995	200	7.5
20	4	50	0.065	30	2.0	795	205	12.5

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

12	4	70	0.040	18	1.2	1855	295	6.5
16	4	70	0.050	24	1.6	1395	280	11.0
20	4	70	0.065	30	2.0	1115	290	17.5

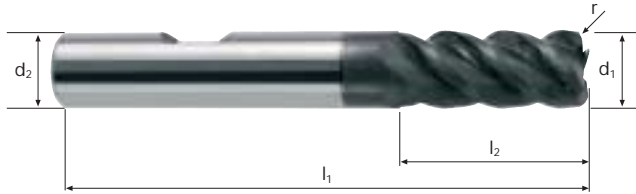


# Corner radius end mills Splinecut-Ti-F

Smooth-edged, normal version

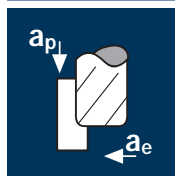


<b>HM MG10</b>	$\lambda$ 45° $\gamma$ 8°



							TRIBO-N	
Example: Order-N°. <span style="border: 1px solid black; padding: 2px;">N 5480 .501</span>							<b>N5480</b>	
Ø Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	Z		
<b>.501</b>	12	12	83	26	1.0	4	●	
<b>.610</b>	16	16	92	32	1.0	4	●	
<b>.682</b>	20	20	104	38	1.0	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	170	0.010	4.5	0.3	18040	720
4	4	170	0.015	6.0	0.4	13530	810
5	4	170	0.015	7.5	0.5	10825	650
6	4	170	0.020	9.0	0.6	9020	720
8	4	170	0.025	12.0	0.8	6765	675
10	4	170	0.035	15.0	1.0	5410	755
12	4	170	0.040	18.0	1.2	4510	720
16	4	170	0.055	24.0	1.6	3380	745
20	4	170	0.065	30.0	2.0	2705	705

3	4	110	0.010	4.5	0.3	11670	465
4	4	110	0.015	6.0	0.4	8755	525
5	4	110	0.015	7.5	0.5	7005	420
6	4	110	0.020	9.0	0.6	5835	465
8	4	110	0.025	12.0	0.8	4375	440
10	4	110	0.035	15.0	1.0	3500	490
12	4	110	0.040	18.0	1.2	2920	465
16	4	110	0.055	24.0	1.6	2190	480
20	4	110	0.065	30.0	2.0	1750	455

3	4	80	0.010	4.5	0.3	8490	340
4	4	80	0.015	6.0	0.4	6365	380
5	4	80	0.015	7.5	0.5	5095	305
6	4	80	0.020	9.0	0.6	4245	340
8	4	80	0.025	12.0	0.8	3185	320
10	4	80	0.035	15.0	1.0	2545	355
12	4	80	0.040	18.0	1.2	2120	340
16	4	80	0.055	24.0	1.6	1590	350
20	4	80	0.065	30.0	2.0	1275	330

3	4	60	0.010	4.5	0.3	6365	255
4	4	60	0.015	6.0	0.4	4775	285
5	4	60	0.015	7.5	0.5	3820	230
6	4	60	0.020	9.0	0.6	3185	255
8	4	60	0.025	12.0	0.8	2385	240
10	4	60	0.035	15.0	1.0	1910	265
12	4	60	0.040	18.0	1.2	1590	255
16	4	60	0.055	24.0	1.6	1195	265
20	4	60	0.065	30.0	2.0	955	250

## Material

Cast iron  
(lamellar / spheroidal)

Unalloyed copper

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

Heat resistant steel  
[17-4 PH]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	130	0.010	4.5	0.3	13795	550
4	4	130	0.015	6.0	0.4	10345	620
5	4	130	0.015	7.5	0.5	8275	495
6	4	130	0.020	9.0	0.6	6895	550
8	4	130	0.025	12.0	0.8	5175	520
10	4	130	0.035	15.0	1.0	4140	580
12	4	130	0.040	18.0	1.2	3450	550
16	4	130	0.055	24.0	1.6	2585	570
20	4	130	0.065	30.0	2.0	2070	540

3	4	230	0.010	4.5	0.3	24405	975
4	4	230	0.015	6.0	0.4	18305	1100
5	4	230	0.015	7.5	0.5	14645	880
6	4	230	0.020	9.0	0.6	12200	975
8	4	230	0.025	12.0	0.8	9150	915
10	4	230	0.035	15.0	1.0	7320	1025
12	4	230	0.040	18.0	1.2	6100	975
16	4	230	0.055	24.0	1.6	4575	1005
20	4	230	0.065	30.0	2.0	3660	950

3	4	80	0.010	4.5	0.3	8490	340
4	4	80	0.015	6.0	0.4	6365	380
5	4	80	0.015	7.5	0.5	5095	305
6	4	80	0.020	9.0	0.6	4245	340
8	4	80	0.025	12.0	0.8	3185	320
10	4	80	0.035	15.0	1.0	2545	355
12	4	80	0.040	18.0	1.2	2120	340
16	4	80	0.055	24.0	1.6	1590	350
20	4	80	0.065	30.0	2.0	1275	330

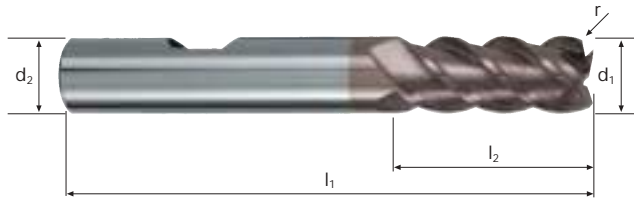
3	4	40	0.010	4.5	0.3	4245	170
4	4	40	0.015	6.0	0.4	3185	190
5	4	40	0.015	7.5	0.5	2545	155
6	4	40	0.020	9.0	0.6	2120	170
8	4	40	0.025	12.0	0.8	1590	160
10	4	40	0.035	15.0	1.0	1275	180
12	4	40	0.040	18.0	1.2	1060	170
16	4	40	0.055	24.0	1.6	795	175
20	4	40	0.065	30.0	2.0	635	165

# Corner radius end mills

Smooth-edged, normal version



<b>HM</b> <b>MG10</b>	$\lambda$ 45° $\gamma$ 15°



Roughing



Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Copper
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Example: Order-N°.								UNICUT-4X	
		Coating U	Article-N° 15340	α-Code .180				U15340	
								U15240	
∅ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	α	Z		
.180	3	6	57	8	0.5	5.5°	4	●	
.220	4	6	57	11	0.5	3.5°	4	●	
.260	5	6	57	13	0.5	2.0°	4	●	
.300	6	6	57	13	0.5	0.0°	4	●	
.391	8	8	63	19	0.5	0.0°	4	●	
.450	10	10	72	22	0.5	0.0°	4	●	
.501	12	12	83	26	0.5	0.0°	4	●	
.610	16	16	92	32	0.5	0.0°	4	●	
.682	20	20	104	38	0.5	0.0°	4	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]		
	Steel < 850 N/mm <sup>2</sup>	3	3	120	0.010	4.5	0.3	12735	380	0.5		
		4	3	120	0.015	6.0	0.4	9550	430	1.0		
		5	3	120	0.015	7.5	0.5	7640	345	1.5		
		6	3	120	0.020	9.0	0.6	6365	380	2.0		
		8	3	120	0.025	12.0	0.8	4775	360	3.5		
		10	3	120	0.035	15.0	1.0	3820	400	6.0		
		12	3	120	0.040	18.0	1.2	3185	380	8.0		
		Steel 850 - 1100 N/mm <sup>2</sup>										
		3	3	80	0.010	4.5	0.3	8490	255	0.5		
		4	3	80	0.015	6.0	0.4	6365	285	0.5		
		5	3	80	0.015	7.5	0.5	5095	230	1.0		
6	3	80	0.020	9.0	0.6	4245	255	1.5				
8	3	80	0.025	12.0	0.8	3185	240	2.5				
10	3	80	0.035	15.0	1.0	2545	265	4.0				
12	3	80	0.040	18.0	1.2	2120	255	5.5				
Cast iron (lamellar / spheroidal)												
3	3	160	0.010	4.5	0.3	16975	510	0.5				
4	3	160	0.015	6.0	0.4	12735	575	1.5				
5	3	160	0.015	7.5	0.5	10185	460	1.5				
6	3	160	0.020	9.0	0.6	8490	510	3.0				
8	3	160	0.025	12.0	0.8	6365	475	4.5				
10	3	160	0.035	15.0	1.0	5095	535	8.0				
12	3	160	0.040	18.0	1.2	4245	510	11.0				
Stainless steel [Cr-Ni/1.4301]												
3	3	50	0.010	4.5	0.3	5305	160	0.2				
4	3	50	0.015	6.0	0.4	3980	180	0.5				
5	3	50	0.015	7.5	0.5	3185	145	0.5				
6	3	50	0.020	9.0	0.6	2655	160	1.0				
8	3	50	0.025	12.0	0.8	1990	150	1.5				
10	3	50	0.035	15.0	1.0	1590	165	2.5				
12	3	50	0.040	18.0	1.2	1325	160	3.5				

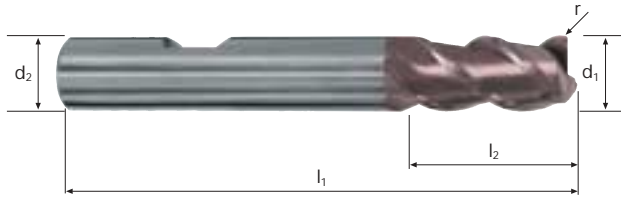
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]		
	Steel < 850 N/mm <sup>2</sup>	3	3	100	0.010	1.5	3	10610	320	1.5		
		4	3	100	0.010	2.0	4	7960	240	2.0		
		5	3	100	0.015	2.5	5	6365	285	3.5		
		6	3	100	0.015	3.0	6	5305	240	4.5		
		8	3	100	0.020	4.0	8	3980	240	7.5		
		10	3	100	0.030	5.0	10	3185	285	14.5		
		12	3	100	0.035	6.0	12	2655	280	20.0		
		Steel 850 - 1100 N/mm <sup>2</sup>										
		3	3	70	0.010	1.5	3	7425	225	1.0		
		4	3	70	0.010	2.0	4	5570	165	1.5		
		5	3	70	0.015	2.5	5	4455	200	2.5		
6	3	70	0.015	3.0	6	3715	165	3.0				
8	3	70	0.020	4.0	8	2785	165	5.5				
10	3	70	0.025	5.0	10	2230	165	8.5				
12	3	70	0.030	6.0	12	1855	165	12.0				
Cast iron (lamellar / spheroidal)												
3	3	120	0.010	1.5	3	12735	380	1.5				
4	3	120	0.010	2.0	4	9550	285	2.5				
5	3	120	0.015	2.5	5	7640	345	4.5				
6	3	120	0.020	3.0	6	6365	380	7.0				
8	3	120	0.025	4.0	8	4775	360	11.5				
10	3	120	0.030	5.0	10	3820	345	17.5				
12	3	120	0.035	6.0	12	3185	335	24.0				
Stainless steel [Cr-Ni/1.4301]												
3	3	35	0.010	1.5	3	3715	110	0.5				
4	3	35	0.010	2.0	4	2785	85	0.5				
5	3	35	0.015	2.5	5	2230	100	1.5				
6	3	35	0.015	3.0	6	1855	85	1.5				
8	3	35	0.020	4.0	8	1395	85	2.5				
10	3	35	0.025	5.0	10	1115	85	4.5				
12	3	35	0.030	6.0	12	930	85	6.0				

# Corner radius end mills

Smooth-edged, normal version



**HM**  
**MG10**     $\lambda$  45°  
                   $\gamma$  15°



Roughing

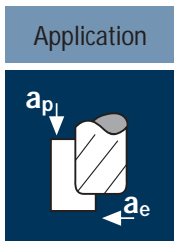


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless		<b>GG(G)</b> Copper
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Example: Order-N°.								UNICUT-4X	
		Coating	Article-N°.	α-Code				<b>U5334</b>	
		<b>U</b>	<b>5334</b>	<b>.178</b>				<b>U5234</b>	
∅ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	α	Z		
.178	3	6	57	7	0.2	6.0°	3	●	
.218	4	6	57	8	0.2	4.0°	3	●	
.258	5	6	57	10	0.2	2.0°	3	●	
.297	6	6	57	10	0.2	0.0°	3	●	
.388	8	8	63	16	0.2	0.0°	3	●	
.445	10	10	72	19	0.2	0.0°	3	●	
.496	12	12	83	22	0.2	0.0°	3	●	
.180	3	6	57	7	0.5	6.0°	3	●	
.220	4	6	57	8	0.5	4.0°	3	●	
.260	5	6	57	10	0.5	2.0°	3	●	
.300	6	6	57	10	0.5	0.0°	3	●	
.391	8	8	63	16	0.5	0.0°	3	●	
.450	10	10	72	19	0.5	0.0°	3	●	
.501	12	12	83	22	0.5	0.0°	3	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	160	0.010	4.5	1.2	16975	680	3.5
4	4	160	0.015	6.0	1.6	12735	765	7.5
5	4	160	0.025	7.5	2.0	10185	1020	15.5
6	4	160	0.025	9.0	2.4	8490	850	18.5
8	4	160	0.035	12.0	3.2	6365	890	34.0
10	4	160	0.045	15.0	4.0	5095	915	55.0
12	4	160	0.050	18.0	4.8	4245	850	73.5
16	4	160	0.065	24.0	6.4	3185	830	127.5
20	4	160	0.085	30.0	8.0	2545	865	207.5

Steel  
850 - 1100 N/mm<sup>2</sup>

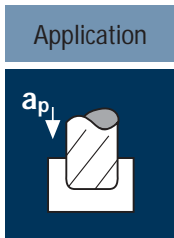
3	4	120	0.010	4.5	1.2	12735	510	3.0
4	4	120	0.015	6.0	1.6	9550	575	5.5
5	4	120	0.025	7.5	2.0	7640	765	11.5
6	4	120	0.025	9.0	2.4	6365	635	13.5
8	4	120	0.035	12.0	3.2	4775	670	25.5
10	4	120	0.045	15.0	4.0	3820	690	41.5
12	4	120	0.050	18.0	4.8	3185	635	55.0
16	4	120	0.065	24.0	6.4	2385	620	95.0
20	4	120	0.085	30.0	8.0	1910	650	156.0

Stainless steel  
[Cr-Ni/1.4301]

3	4	60	0.010	4.5	1.2	6365	255	1.5
4	4	60	0.015	6.0	1.6	4775	285	2.5
5	4	60	0.020	7.5	2.0	3820	305	4.5
6	4	60	0.025	9.0	2.4	3185	320	7.0
8	4	60	0.030	12.0	3.2	2385	285	11.0
10	4	60	0.040	15.0	4.0	1910	305	18.5
12	4	60	0.050	18.0	4.8	1590	320	27.5
16	4	60	0.060	24.0	6.4	1195	285	44.0
20	4	60	0.075	30.0	8.0	955	285	68.5

Cast iron  
(lamellar / spheroidal)

3	4	145	0.015	4.5	1.2	15385	925	5.0
4	4	145	0.020	6.0	1.6	11540	925	9.0
5	4	145	0.025	7.5	2.0	9230	925	14.0
6	4	145	0.030	9.0	2.4	7695	925	20.0
8	4	145	0.040	12.0	3.2	5770	925	35.5
10	4	145	0.050	15.0	4.0	4615	925	55.5
12	4	145	0.060	18.0	4.8	3845	925	80.0
16	4	145	0.085	24.0	6.4	2885	980	150.5
20	4	145	0.105	30.0	8.0	2310	970	233.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	145	0.010	3	3	15385	615	5.5
4	4	145	0.010	4	4	11540	460	7.5
5	4	145	0.020	5	5	9230	740	18.5
6	4	145	0.025	6	6	7695	770	27.5
8	4	145	0.030	8	8	5770	690	44.0
10	4	145	0.035	10	10	4615	645	64.5
12	4	145	0.040	12	12	3845	615	88.5
16	4	145	0.050	8	16	2885	575	73.5
20	4	145	0.060	10	20	2310	555	111.0

Steel  
850 - 1100 N/mm<sup>2</sup>

3	4	95	0.010	3	3	10080	405	3.5
4	4	95	0.010	4	4	7560	300	5.0
5	4	95	0.020	5	5	6050	485	12.0
6	4	95	0.025	6	6	5040	505	18.0
8	4	95	0.030	8	8	3780	455	29.0
10	4	95	0.035	10	10	3025	425	42.5
12	4	95	0.040	12	12	2520	405	58.5
16	4	95	0.050	8	16	1890	380	48.5
20	4	95	0.060	10	20	1510	360	72.0

Stainless steel  
[Cr-Ni/1.4301]

3	4	45	0.010	3	3	4775	190	1.5
4	4	45	0.010	4	4	3580	145	2.5
5	4	45	0.020	5	5	2865	230	6.0
6	4	45	0.025	6	6	2385	240	8.5
8	4	45	0.030	8	8	1790	215	14.0
10	4	45	0.035	10	10	1430	200	20.0
12	4	45	0.040	12	12	1195	190	27.5
16	4	45	0.050	8	16	895	180	23.0
20	4	45	0.060	10	20	715	170	34.0

Cast iron  
(lamellar / spheroidal)

3	4	130	0.010	3	3	13795	550	5.0
4	4	130	0.015	4	4	10345	620	10.0
5	4	130	0.020	5	5	8275	660	16.5
6	4	130	0.025	6	6	6895	690	25.0
8	4	130	0.030	8	8	5175	620	39.5
10	4	130	0.040	10	10	4140	660	66.0
12	4	130	0.040	12	12	3450	550	79.0
16	4	130	0.055	8	16	2585	570	73.0
20	4	130	0.070	10	20	2070	580	116.0

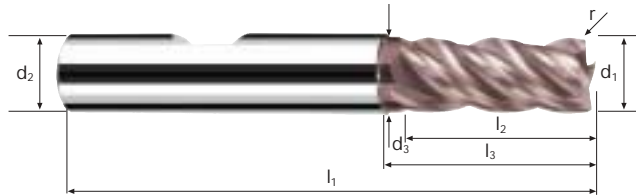


# Corner radius end mills

Smooth-edged, normal version with short neck



HM  $\lambda$  40°  
 $\gamma$  6°



**new!**

Roughing



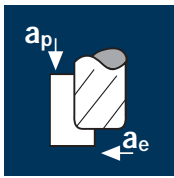
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless		GG(G) Nickel-Alloys
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Example: Order-N°.										UNICUT-4X	
										U45319	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	α	Z		
.180	3	6	2.8	57	8	14	0.5	5.5°	4	●	
.220	4	6	3.7	57	11	16	0.5	3.5°	4	●	
.260	5	6	4.6	57	13	18	0.5	2.0°	4	●	
.300	6	6	5.5	57	13	20	0.5	0.0°	4	●	
.388	8	8	7.4	63	19	26	0.5	0.0°	4	●	
.448	10	10	9.2	72	22	31	0.5	0.0°	4	●	
.498	12	12	11.0	83	26	37	0.5	0.0°	4	●	
.302	6	6	5.5	57	13	20	1.0	0.0°	4	●	
.391	8	8	7.4	63	19	26	1.0	0.0°	4	●	
.450	10	10	9.2	72	22	31	1.0	0.0°	4	●	
.501	12	12	11.0	83	26	37	1.0	0.0°	4	●	
.608	16	16	15.0	92	32	43	1.0	0.0°	4	●	
.680	20	20	19.0	104	38	53	1.0	0.0°	4	●	
.453	10	10	9.2	72	22	31	1.5	0.0°	4	●	
.503	12	12	11.0	83	26	37	1.5	0.0°	4	●	
.610	16	16	15.0	92	32	43	1.5	0.0°	4	●	
.505	12	12	11.0	83	26	37	2.0	0.0°	4	●	
.611	16	16	15.0	92	32	43	2.0	0.0°	4	●	
.683	20	20	19.0	104	38	53	2.0	0.0°	4	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

**P**  
 **P**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	180	0.065	6.0	1.5	9550	2485	22.5
8	4	180	0.090	8.0	2.0	7160	2580	41.5
10	4	180	0.110	10.0	2.5	5730	2520	63.0
12	4	180	0.135	12.0	3.0	4775	2580	93.0
16	4	180	0.180	16.0	4.0	3580	2580	165.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

**P**  
 **P**

6	4	140	0.055	6.0	1.5	7425	1635	14.5
8	4	140	0.070	8.0	2.0	5570	1560	25.0
10	4	140	0.090	10.0	2.5	4455	1605	40.0
12	4	140	0.105	12.0	3.0	3715	1560	56.0
16	4	140	0.140	16.0	4.0	2785	1560	100.0

Steel  
1300 - 1500 N/mm<sup>2</sup>

**P**

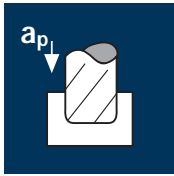
6	4	100	0.055	6.0	1.5	5305	1165	10.5
8	4	100	0.070	8.0	2.0	3980	1115	18.0
10	4	100	0.090	10.0	2.5	3185	1145	28.5
12	4	100	0.105	12.0	3.0	2655	1115	40.0
16	4	100	0.140	16.0	4.0	1990	1115	71.5

Steel  
1500 - 1800 N/mm<sup>2</sup>

**P**

6	4	80	0.045	6.0	1.5	4245	765	7.0
8	4	80	0.060	8.0	2.0	3185	765	12.0
10	4	80	0.080	10.0	2.5	2545	815	20.5
12	4	80	0.095	12.0	3.0	2120	805	29.0
16	4	80	0.125	16.0	4.0	1590	795	51.0

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

**P**  
 **P**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	140	0.055	1.8	6	7425	1635	17.5
8	4	140	0.090	2.4	8	5570	2005	38.5
10	4	140	0.110	3.0	10	4455	1960	59.0
12	4	140	0.135	3.6	12	3715	2005	86.5
16	4	140	0.180	4.8	16	2785	2005	154.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

**P**  
 **P**

6	4	100	0.055	1.8	6	5305	1165	12.5
8	4	100	0.070	2.4	8	3980	1115	21.5
10	4	100	0.090	3.0	10	3185	1145	34.5
12	4	100	0.105	3.6	12	2655	1115	48.0
16	4	100	0.140	4.8	16	1990	1115	85.5

Steel  
1300 - 1500 N/mm<sup>2</sup>

**P**

6	4	70	0.055	1.8	6	3715	815	9.0
8	4	70	0.070	2.4	8	2785	780	15.0
10	4	70	0.090	3.0	10	2230	805	24.0
12	4	70	0.105	3.6	12	1855	780	33.5
16	4	70	0.140	4.8	16	1395	780	60.0

Steel  
1500 - 1800 N/mm<sup>2</sup>

**P**

6	4	50	0.045	1.8	6	2655	480	5.0
8	4	50	0.060	2.4	8	1990	480	9.0
10	4	50	0.080	3.0	10	1590	510	15.5
12	4	50	0.095	3.6	12	1325	505	22.0
16	4	50	0.125	4.8	16	995	500	38.5

# Corner radius end mills NX-RCV

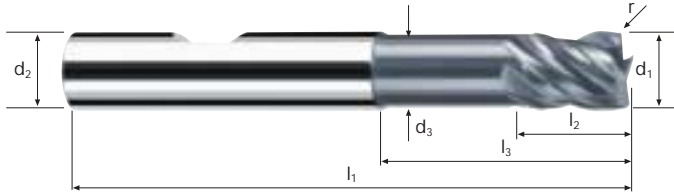
Smooth-edged, normal version with neck



HM MG10  $\lambda$  40°  
 $\gamma$  0°

Vario



Roughing



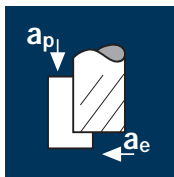
Finishing



Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56				Ti Titanium	GG(G)
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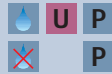
Example: Order-N°.		Coating <b>P</b>	Article-N°. <b>15321</b>	$\alpha$ -Code <b>.300</b>					<b>POLYCHROM</b>	
								<b>P15321</b>		
								<b>P15221</b>		
$\emptyset$ Code	$d_1$ e8	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ 0/+0,03	Z		
.300	6	6	5.5	57	7	20	0.5	4	●	
.391	8	8	7.4	63	9	26	0.5	4	●	
.450	10	10	9.2	72	11	31	0.5	4	●	
.501	12	12	11.0	83	13	37	0.5	4	●	
.610	16	16	15.0	92	17	43	0.5	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	180	0.025	9	3.6	9550	955	31.0
8	4	180	0.030	12	4.8	7160	860	49.5
10	4	180	0.050	15	6.0	5730	1145	103.0
12	4	180	0.055	18	7.2	4775	1050	136.0
16	4	180	0.055	24	9.6	3580	790	182.0
16	6	180	0.050	24	9.6	3580	1075	247.5
20	4	180	0.060	30	12.0	2865	690	248.5
20	6	180	0.055	30	12.0	2865	945	340.0

Steel  
850 - 1100 N/mm<sup>2</sup>



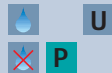
6	4	150	0.025	9	3.6	7960	795	26.0
8	4	150	0.030	12	4.8	5970	715	41.0
10	4	150	0.050	15	6.0	4775	955	86.0
12	4	150	0.055	18	7.2	3980	875	113.5
16	4	150	0.055	24	9.6	2985	655	151.0
16	6	150	0.050	24	9.6	2985	895	206.0
20	4	150	0.060	30	12.0	2385	570	205.0
20	6	150	0.055	30	12.0	2385	785	282.5

Steel  
1100 - 1300 N/mm<sup>2</sup>



6	4	120	0.025	9	3.6	6365	635	20.5
8	4	120	0.030	12	4.8	4775	575	33.0
10	4	120	0.050	15	6.0	3820	765	69.0
12	4	120	0.055	18	7.2	3185	700	90.5
16	4	120	0.055	24	9.6	2385	525	121.0
16	6	120	0.050	24	9.6	2385	715	164.5
20	4	120	0.060	30	12.0	1910	460	165.5
20	6	120	0.055	30	12.0	1910	630	227.0

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



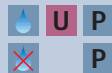
6	4	80	0.025	9	3.6	4245	425	14.0
8	4	80	0.030	12	4.8	3185	380	22.0
10	4	80	0.050	15	6.0	2545	510	46.0
12	4	80	0.055	18	7.2	2120	465	60.5
16	4	80	0.055	24	9.6	1590	350	80.5
16	6	80	0.050	24	9.6	1590	475	109.5
20	4	80	0.060	30	12.0	1275	305	110.0
20	6	80	0.055	30	12.0	1275	420	151.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



6	4	150	0.025	9	6	7960	795	43.0
8	4	150	0.030	12	8	5970	715	68.5
10	4	150	0.050	15	10	4775	955	143.5
12	4	150	0.055	18	12	3980	875	189.0
16	4	150	0.055	24	16	2985	655	251.5
20	4	150	0.060	30	20	2385	570	342.0

Steel  
850 - 1100 N/mm<sup>2</sup>



6	4	100	0.020	9	6	5305	425	23.0
8	4	100	0.025	12	8	3980	400	38.5
10	4	100	0.030	15	10	3185	380	57.0
12	4	100	0.040	18	12	2655	425	92.0
16	4	100	0.050	24	16	1990	400	153.5
20	4	100	0.055	30	20	1590	350	210.0

Steel  
1100 - 1300 N/mm<sup>2</sup>



6	4	80	0.020	9	6	4245	340	18.5
8	4	80	0.025	12	8	3185	320	30.5
10	4	80	0.030	15	10	2545	305	46.0
12	4	80	0.040	18	12	2120	340	73.5
16	4	80	0.050	24	16	1590	320	123.0
20	4	80	0.055	30	20	1275	280	168.0

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



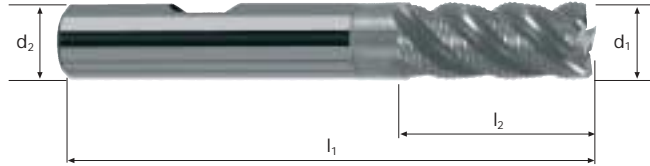
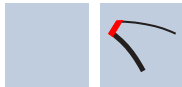
6	4	60	0.020	9	6	3185	255	14.0
8	4	60	0.025	12	8	2385	240	23.0
10	4	60	0.030	15	10	1910	230	34.5
12	4	60	0.040	18	12	1590	255	55.0
16	4	60	0.050	24	16	1195	240	92.0
20	4	60	0.055	30	20	955	210	126.0

# Cylindrical end mills NX-FP

Profiled, normal version



**HM**  
**XR**     $\lambda$  45°  
                   $\gamma$  0°



Roughing



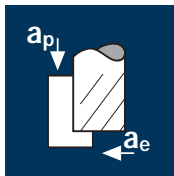
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G) Tool Steel
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Example: Order-N°.							UNICUT-4X	POLYCHROM
							U5379	P5379
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	Z		
.300	6	6	57	13	0.35	4	●	●
.391	8	8	63	19	0.45	4	●	●
.450	10	10	72	22	0.60	4	●	●
.501	12	12	83	26	0.60	4	●	●
.608	16	16	92	32	0.70	4	●	●
.610	16	16	92	32	0.70	6	●	●
.680	20	20	104	38	0.70	4	●	●
.682	20	20	104	38	0.70	6	●	●

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	180	0.025	9	3.3	9550	955	28.5
8	4	180	0.030	12	4.4	7160	860	45.5
10	4	180	0.050	15	5.5	5730	1145	94.5
12	4	180	0.055	18	6.6	4775	1050	124.5
16	4	180	0.055	24	8.8	3580	790	167.0
16	6	180	0.050	24	8.8	3580	1075	227.0
20	4	180	0.060	30	11.0	2865	690	227.5
20	6	180	0.055	30	11.0	2865	945	312.0

6	4	150	0.025	9	3.3	7960	795	23.5
8	4	150	0.030	12	4.4	5970	715	38.0
10	4	150	0.050	15	5.5	4775	955	79.0
12	4	150	0.055	18	6.6	3980	875	104.0
16	4	150	0.055	24	8.8	2985	655	138.5
16	6	150	0.050	24	8.8	2985	895	189.0
20	4	150	0.060	30	11.0	2385	570	188.0
20	6	150	0.055	30	11.0	2385	785	259.0

6	4	120	0.025	9	3.3	6365	635	19.0
8	4	120	0.030	12	4.4	4775	575	30.5
10	4	120	0.050	15	5.5	3820	765	63.0
12	4	120	0.055	18	6.6	3185	700	83.0
16	4	120	0.055	24	8.8	2385	525	111.0
16	6	120	0.050	24	8.8	2385	715	151.0
20	4	120	0.060	30	11.0	1910	460	152.0
20	6	120	0.055	30	11.0	1910	630	208.0

6	4	80	0.025	9	3.3	4245	425	12.5
8	4	80	0.030	12	4.4	3185	380	20.0
10	4	80	0.050	15	5.5	2545	510	42.0
12	4	80	0.055	18	6.6	2120	465	55.0
16	4	80	0.055	24	8.8	1590	350	74.0
16	6	80	0.050	24	8.8	1590	475	100.5
20	4	80	0.060	30	11.0	1275	305	100.5
20	6	80	0.055	30	11.0	1275	420	138.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	150	0.025	8.4	6	7960	795	40.0
8	4	150	0.030	11.2	8	5970	715	64.0
10	4	150	0.050	14.0	10	4775	955	133.5
12	4	150	0.055	16.8	12	3980	875	176.5
16	4	150	0.055	22.4	16	2985	655	235.0
20	4	150	0.060	28.0	20	2385	570	319.0

6	4	100	0.020	8.4	6	5305	425	21.5
8	4	100	0.025	11.2	8	3980	400	36.0
10	4	100	0.030	14.0	10	3185	380	53.0
12	4	100	0.040	16.8	12	2655	425	85.5
16	4	100	0.050	22.4	16	1990	400	143.5
20	4	100	0.055	28.0	20	1590	350	196.0

6	4	80	0.020	8.4	6	4245	340	17.0
8	4	80	0.025	11.2	8	3185	320	28.5
10	4	80	0.030	14.0	10	2545	305	42.5
12	4	80	0.040	16.8	12	2120	340	68.5
16	4	80	0.050	22.4	16	1590	320	114.5
20	4	80	0.055	28.0	20	1275	280	157.0

6	4	60	0.020	8.4	6	3185	255	13.0
8	4	60	0.025	11.2	8	2385	240	21.5
10	4	60	0.030	14.0	10	1910	230	32.0
12	4	60	0.040	16.8	12	1590	255	51.5
16	4	60	0.050	22.4	16	1195	240	86.0
20	4	60	0.055	28.0	20	955	210	117.5

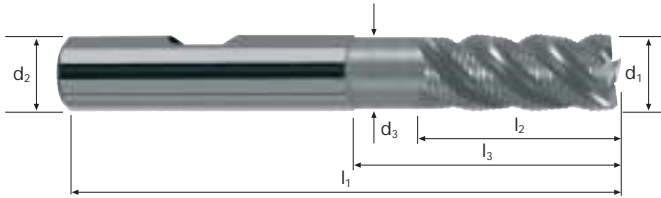
# Cylindrical end mills NX-FP

Profiled, normal version with short neck



**HM**  
**XR**

$\lambda$  45°  
 $\gamma$  0°



Roughing



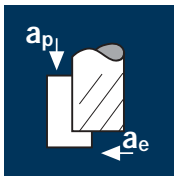
Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **GG(G)** Tool Steel

Example: Order-N°.									POLYCHROM	
									P15379	
$\emptyset$ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	z		
.300	6	6	5.5	57	13	20	0.35	4	●	
.391	8	8	7.4	63	19	26	0.45	4	●	
.450	10	10	9.2	72	22	31	0.60	4	●	
.501	12	12	11.0	83	26	37	0.60	4	●	
.608	16	16	15.0	92	32	43	0.70	4	●	
.610	16	16	15.0	92	32	43	0.70	6	●	
.680	20	20	19.0	104	38	53	0.70	4	●	
.682	20	20	19.0	104	38	53	0.70	6	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	200	0.020	9.0	2.7	10610	850	20.5
8	4	200	0.030	12.0	3.6	7960	955	41.5
10	4	200	0.040	15.0	4.5	6365	1020	69.0
12	4	200	0.045	18.0	5.4	5305	955	93.0
16	4	200	0.050	24.0	7.2	3980	795	137.5
20	4	200	0.055	30.0	9.0	3185	700	189.0

6	4	160	0.020	9.0	2.7	8490	680	16.5
8	4	160	0.030	12.0	3.6	6365	765	33.0
10	4	160	0.040	15.0	4.5	5095	815	55.0
12	4	160	0.045	18.0	5.4	4245	765	74.5
16	4	160	0.050	24.0	7.2	3185	635	109.5
20	4	160	0.055	30.0	9.0	2545	560	151.0

6	4	130	0.020	9.0	2.7	6895	550	13.5
8	4	130	0.030	12.0	3.6	5175	620	27.0
10	4	130	0.040	15.0	4.5	4140	660	44.5
12	4	130	0.045	18.0	5.4	3450	620	60.5
16	4	130	0.050	24.0	7.2	2585	515	89.0
20	4	130	0.055	30.0	9.0	2070	455	123.0

6	4	90	0.020	9.0	2.7	4775	380	9.0
8	4	90	0.030	12.0	3.6	3580	430	18.5
10	4	90	0.040	15.0	4.5	2865	460	31.0
12	4	90	0.045	18.0	5.4	2385	430	42.0
16	4	90	0.050	24.0	7.2	1790	360	62.0
20	4	90	0.055	30.0	9.0	1430	315	85.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	160	0.020	6.0	6	8490	680	24.5
8	4	160	0.025	8.0	8	6365	635	40.5
10	4	160	0.035	10.0	10	5095	715	71.5
12	4	160	0.040	12.0	12	4245	680	98.0
16	4	160	0.045	16.0	16	3185	575	147.0
20	4	160	0.050	20.0	20	2545	510	204.0

6	4	110	0.020	5.4	6	5835	465	15.0
8	4	110	0.025	7.2	8	4375	440	25.5
10	4	110	0.035	9.0	10	3500	490	44.0
12	4	110	0.040	10.8	12	2920	465	60.5
16	4	110	0.045	14.4	16	2190	395	91.0
20	4	110	0.050	18.0	20	1750	350	126.0

6	4	90	0.020	5.4	6	4775	380	12.5
8	4	90	0.025	7.2	8	3580	360	20.5
10	4	90	0.035	9.0	10	2865	400	36.0
12	4	90	0.040	10.8	12	2385	380	49.0
16	4	90	0.045	14.4	16	1790	320	73.5
20	4	90	0.050	18.0	20	1430	285	102.5

6	4	70	0.020	5.4	6	3715	295	9.5
8	4	70	0.025	7.2	8	2785	280	16.0
10	4	70	0.035	9.0	10	2230	310	28.0
12	4	70	0.040	10.8	12	1855	295	38.0
16	4	70	0.045	14.4	16	1395	250	57.5
20	4	70	0.050	18.0	20	1115	225	81.0

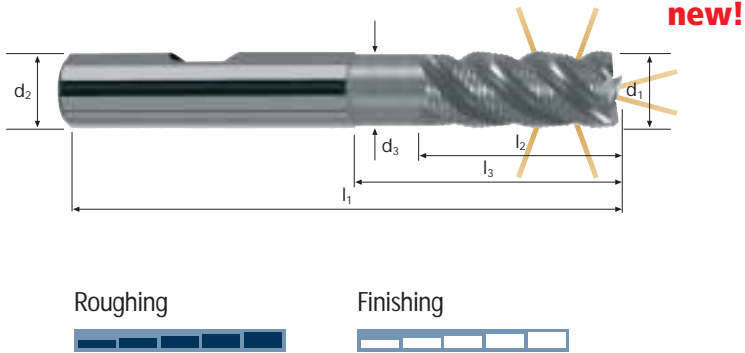


# Cylindrical end mills NX-FP

Profiled, normal version, with integral air channel

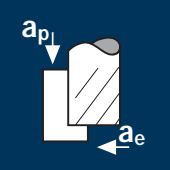











**HM**  $\lambda$  45°  
**XR**  $\gamma$  0°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel
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Example: Order-N°.							POLYCHROM	
		Coating <b>P</b>	Article-N° <b>15331</b>	α-Code <b>.300</b>			<b>P15331</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	z		
.300	6	6	57	13	0.30	4	●	
.391	8	8	63	19	0.40	4	●	
.450	10	10	72	22	0.50	4	●	
.501	12	12	83	26	0.50	4	●	
.608	16	16	92	32	0.60	4	●	
.680	20	20	104	38	0.60	4	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Hardened tool steel 42 - 48 HRC  	6	4	110	0.020	9	3.6	5835	465	15.0
		8	4	110	0.025	12	4.8	4375	440	25.5
		10	4	110	0.040	15	6.0	3500	560	50.5
		12	4	110	0.045	18	7.2	2920	525	68.0
		16	4	110	0.045	24	9.6	2190	395	91.0
		20	4	110	0.050	30	12.0	1750	350	126.0
Hardened tool steel 48 - 52 HRC  	6	4	90	0.020	9	3.6	4775	380	12.5	
	8	4	90	0.025	12	4.8	3580	360	20.5	
	10	4	90	0.040	15	6.0	2865	460	41.5	
	12	4	90	0.045	18	7.2	2385	430	55.5	
	16	4	90	0.045	24	9.6	1790	320	73.5	
	20	4	90	0.050	30	12.0	1430	285	102.5	
Hardened tool steel 52 - 56 HRC  	6	4	70	0.020	9	3.6	3715	295	9.5	
	8	4	70	0.025	12	4.8	2785	280	16.0	
	10	4	70	0.040	15	6.0	2230	355	32.0	
	12	4	70	0.045	18	7.2	1855	335	43.5	
	16	4	70	0.045	24	9.6	1395	250	57.5	
	20	4	70	0.050	30	12.0	1115	225	81.0	
Hardened tool steel 56 - 60 HRC  	6	4	45	0.015	9	3.6	2385	145	4.5	
	8	4	45	0.020	12	4.8	1790	145	8.5	
	10	4	45	0.025	15	6.0	1430	145	13.0	
	12	4	45	0.030	18	7.2	1195	145	19.0	
	16	4	45	0.030	24	9.6	895	105	24.0	
	20	4	45	0.035	30	12.0	715	100	36.0	

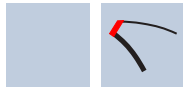
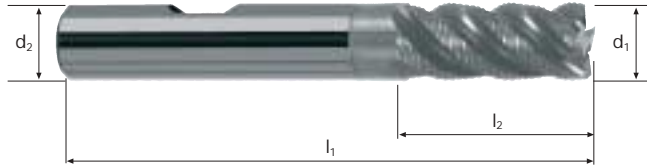
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Hardened tool steel 42 - 48 HRC  	6	4	90	0.015	9	6	4775	285	15.5
		8	4	90	0.025	12	8	3580	360	34.5
		10	4	90	0.035	15	10	2865	400	60.0
		12	4	90	0.040	18	12	2385	380	82.0
		16	4	90	0.040	24	16	1790	285	109.5
		20	4	90	0.045	30	20	1430	255	153.0
Hardened tool steel 48 - 52 HRC  	6	4	70	0.015	9	6	3715	225	12.0	
	8	4	70	0.025	12	8	2785	280	27.0	
	10	4	70	0.035	15	10	2230	310	46.5	
	12	4	70	0.040	18	12	1855	295	63.5	
	16	4	70	0.040	24	16	1395	225	86.5	
	20	4	70	0.045	30	20	1115	200	120.0	
Hardened tool steel 52 - 56 HRC  	6	4	45	0.015	9	6	2385	145	8.0	
	8	4	45	0.025	12	8	1790	180	17.5	
	10	4	45	0.035	15	10	1430	200	30.0	
	12	4	45	0.040	18	12	1195	190	41.0	
	16	4	45	0.040	24	16	895	145	55.5	
	20	4	45	0.045	30	20	715	130	78.0	
Hardened tool steel 56 - 60 HRC  	6	4	18	0.010	9	6	955	40	2.0	
	8	4	18	0.020	12	8	715	55	5.5	
	10	4	18	0.025	15	10	575	60	9.0	
	12	4	18	0.030	18	12	475	55	12.0	
	16	4	18	0.030	24	16	360	45	17.5	
	20	4	18	0.040	30	20	285	45	27.0	

# Cylindrical end mills HX-FP

Profiled, normal version



**HM** λ 45°  
**XA** γ 0°



Roughing



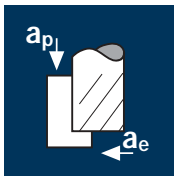
Finishing



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60				
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Example: Order-N°.							POLYCHROM	
		Coating	Article-N°.	α-Code			P15349	
		P	15349	.300				
Ø Code	d1 e8	d2 h6	l1	l2	45°	Z		
.300	6	6	57	13	0.35	4	●	
.391	8	8	63	19	0.45	4	●	
.450	10	10	72	22	0.60	4	●	
.501	12	12	83	26	0.60	4	●	
.610	16	16	92	32	0.70	4	●	
.682	20	20	104	38	0.70	4	●	

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	70	0.015	10.8	3.6	3715	225	8.5
8	4	70	0.020	14.4	4.8	2785	225	15.5
10	4	70	0.025	18.0	6.0	2230	225	24.5
12	4	70	0.030	21.6	7.2	1855	225	35.0
16	4	70	0.035	28.8	9.6	1395	195	54.0
16	6	70	0.030	28.8	9.6	1395	250	69.0
20	4	70	0.045	36.0	12.0	1115	200	86.5
20	6	70	0.040	36.0	12.0	1115	270	116.5

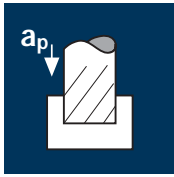
Stainless steel  
[Cr-Ni-Mo-.../1.4571]

6	4	60	0.015	10.8	3.6	3185	190	7.5
8	4	60	0.020	14.4	4.8	2385	190	13.0
10	4	60	0.025	18.0	6.0	1910	190	20.5
12	4	60	0.030	21.6	7.2	1590	190	29.5
16	4	60	0.035	28.8	9.6	1195	165	45.5
16	6	60	0.030	28.8	9.6	1195	215	59.5
20	4	60	0.045	36.0	12.0	955	170	73.5
20	6	60	0.040	36.0	12.0	955	230	99.5

Heat resistant steel  
[17-4 PH]

6	4	25	0.010	10.8	3.6	1325	55	2.0
8	4	25	0.015	14.4	4.8	995	60	4.0
10	4	25	0.020	18.0	6.0	795	65	7.0
12	4	25	0.025	21.6	7.2	665	65	10.0
16	4	25	0.030	28.8	9.6	495	60	16.5
16	6	25	0.025	28.8	9.6	495	75	20.5
20	4	25	0.045	36.0	12.0	400	70	30.0
20	6	25	0.040	36.0	12.0	400	95	41.0


## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	50	0.015	9	6	2655	160	8.5
8	4	50	0.020	12	8	1990	160	15.5
10	4	50	0.020	15	10	1590	125	19.0
12	4	50	0.025	18	12	1325	135	29.0
16	4	50	0.035	24	16	995	140	54.0
20	4	50	0.040	30	20	795	125	75.0

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

6	4	40	0.015	9	6	2120	125	7.0
8	4	40	0.020	12	8	1590	125	12.0
10	4	40	0.020	15	10	1275	100	15.0
12	4	40	0.025	18	12	1060	105	22.5
16	4	40	0.035	24	16	795	110	42.0
20	4	40	0.040	30	20	635	100	60.0

Heat resistant steel  
[17-4 PH]

6	4	20	0.010	9	6	1060	40	2.0
8	4	20	0.015	12	8	795	50	5.0
10	4	20	0.020	15	10	635	50	7.5
12	4	20	0.020	18	12	530	40	8.5
16	4	20	0.030	24	16	400	50	19.0
20	4	20	0.035	30	20	320	45	27.0


# Cylindrical end mills SX-FP

Profiled, normal version



HM  
XR     λ 35°  
          γ 0°



Roughing

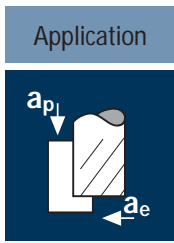


Finishing



Rm < 850     Rm 850-1100     **Inox** Stainless     Ti Titanium     Tool Steel

Example: Order-N°.							POLYCHROM	
							P15309	
∅ Code	d1 e8	d2 h6	l1	l2	45°	Z		
.300	6	6	57	13	0.35	4	●	
.391	8	8	63	19	0.45	4	●	
.450	10	10	72	22	0.60	4	●	
.501	12	12	83	26	0.60	4	●	
.610	16	16	92	32	0.70	4	●	
.612	16	16	92	32	0.70	6	●	
.682	20	20	104	38	0.70	4	●	
.684	20	20	104	38	0.70	6	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	180	0.015	3.6	1.8	19100	860	5.5
4	3	180	0.020	4.8	2.4	14325	860	10.0
5	4	180	0.025	6.0	3.0	11460	1145	20.5
6	4	180	0.030	7.2	3.6	9550	1145	29.5
8	4	180	0.040	9.6	4.8	7160	1145	53.0
10	4	180	0.050	12.0	6.0	5730	1145	82.5
12	4	180	0.055	14.4	7.2	4775	1050	109.0
16	4	180	0.055	19.2	9.6	3580	790	145.5
20	4	180	0.060	24.0	12.0	2865	690	198.5

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	130	0.015	3.6	1.8	13795	620	4.0
4	3	130	0.020	4.8	2.4	10345	620	7.0
5	4	130	0.025	6.0	3.0	8275	830	15.0
6	4	130	0.030	7.2	3.6	6895	825	21.5
8	4	130	0.040	9.6	4.8	5175	830	38.0
10	4	130	0.050	12.0	6.0	4140	830	60.0
12	4	130	0.055	14.4	7.2	3450	760	79.0
16	4	130	0.055	19.2	9.6	2585	570	105.0
20	4	130	0.060	24.0	12.0	2070	495	142.5

Titanium alloys  
>300 HB  
[Ti6Al4V]

3	3	45	0.010	3.6	1.8	4775	145	1.0
4	3	45	0.015	4.8	2.4	3580	160	2.0
5	4	45	0.020	6.0	3.0	2865	230	4.0
6	4	45	0.025	7.2	3.6	2385	240	6.0
8	4	45	0.030	9.6	4.8	1790	215	10.0
10	4	45	0.040	12.0	6.0	1430	230	16.5
12	4	45	0.045	14.4	7.2	1195	215	22.5
16	4	45	0.045	19.2	9.6	895	160	29.5
20	4	45	0.050	24.0	12.0	715	145	42.0

Stainless steel  
[Cr-Ni/1.4301]

3	3	60	0.010	3.6	1.8	6365	190	1.0
4	3	60	0.015	4.8	2.4	4775	215	2.5
5	4	60	0.020	6.0	3.0	3820	305	5.5
6	4	60	0.025	7.2	3.6	3185	320	8.5
8	4	60	0.030	9.6	4.8	2385	285	13.0
10	4	60	0.040	12.0	6.0	1910	305	22.0
12	4	60	0.045	14.4	7.2	1590	285	29.5
16	4	60	0.045	19.2	9.6	1195	215	39.5
20	4	60	0.050	24.0	12.0	955	190	54.5



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	150	0.015	3.0	3	15915	715	6.5
4	3	150	0.020	4.0	4	11935	715	11.5
5	4	150	0.025	5.0	5	9550	955	24.0
6	4	150	0.030	6.0	6	7960	955	34.5
8	4	150	0.040	8.0	8	5970	955	61.0
10	4	150	0.050	10.0	10	4775	955	95.5
12	4	150	0.055	12.0	12	3980	875	126.0
16	4	150	0.055	16.0	16	2985	655	167.5
20	4	150	0.060	20.0	20	2385	570	228.0

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	80	0.015	3.0	3	8490	380	3.5
4	3	80	0.020	4.0	4	6365	380	6.0
5	4	80	0.025	5.0	5	5095	510	13.0
6	4	80	0.030	6.0	6	4245	510	18.5
8	4	80	0.040	8.0	8	3185	510	32.5
10	4	80	0.050	10.0	10	2545	510	51.0
12	4	80	0.055	12.0	12	2120	465	67.0
16	4	80	0.055	16.0	16	1590	350	89.5
20	4	80	0.060	20.0	20	1275	305	122.0

Titanium alloys  
>300 HB  
[Ti6Al4V]

3	3	35	0.010	3.0	3	3715	110	1.0
4	3	35	0.015	4.0	4	2785	125	2.0
5	4	35	0.020	5.0	5	2230	180	4.5
6	4	35	0.025	6.0	6	1855	185	6.5
8	4	35	0.030	8.0	8	1395	165	10.5
10	4	35	0.040	10.0	10	1115	180	18.0
12	4	35	0.045	12.0	12	930	165	24.0
16	4	35	0.045	16.0	16	695	125	32.0
20	4	35	0.050	20.0	20	555	110	44.0

Stainless steel  
[Cr-Ni/1.4301]

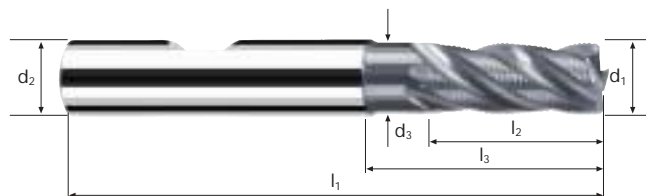
3	3	50	0.010	3.0	3	5305	160	1.5
4	3	50	0.015	4.0	4	3980	180	3.0
5	4	50	0.020	5.0	5	3185	255	6.5
6	4	50	0.025	6.0	6	2655	265	9.5
8	4	50	0.030	8.0	8	1990	240	15.5
10	4	50	0.040	10.0	10	1590	255	25.5
12	4	50	0.045	12.0	12	1325	240	34.5
16	4	50	0.045	16.0	16	995	180	46.0
20	4	50	0.050	20.0	20	795	160	64.0

# Cylindrical end mills

Profiled, normal version with short neck



**HM  
MG10**     $\lambda$  **38°**  
 $\gamma$  **0°**



**new!**

Roughing



Finishing



**Rm**  
< 850

**Rm**  
850-1100

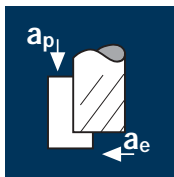
**Rm**  
1100-1300

**Inox**  
Stainless

**Ti**  
Titanium

Example: Order-N°.		Coating <b>P</b>	Article-N°. <b>15336</b>	α-Code <b>.180</b>							<b>POLYCHROM</b>	
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	α	z			
.180	3	6	2.8	57	8	14	0.20	5.5°	3	●		
.220	4	6	3.7	57	11	16	0.25	4.0°	3	●		
.260	5	6	4.6	57	13	18	0.30	2.0°	4	●		
.300	6	6	5.5	57	13	20	0.30	0.0°	4	●		
.391	8	8	7.4	63	19	26	0.40	0.0°	4	●		
.450	10	10	9.2	72	22	31	0.50	0.0°	4	●		
.501	12	12	11.0	83	26	37	0.50	0.0°	4	●		
.610	16	16	15.0	92	32	43	0.60	0.0°	4	●		
.682	20	20	19.0	104	38	53	0.60	0.0°	4	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	120	0.020	6	2.1	6365	510	6.5
8	4	120	0.025	8	2.8	4775	480	11.0
10	4	120	0.035	10	3.5	3820	535	18.5
12	4	120	0.040	12	4.2	3185	510	25.5
14	4	120	0.045	14	4.9	2730	490	33.5
16	4	120	0.055	16	5.6	2385	525	47.0
18	4	120	0.060	18	6.3	2120	510	58.0
20	4	120	0.065	20	7.0	1910	495	69.5

6	4	80	0.015	6	2.1	4245	255	3.0
8	4	80	0.025	8	2.8	3185	320	7.0
10	4	80	0.030	10	3.5	2545	305	10.5
12	4	80	0.035	12	4.2	2120	295	15.0
14	4	80	0.040	14	4.9	1820	290	20.0
16	4	80	0.045	16	5.6	1590	285	25.5
18	4	80	0.050	18	6.3	1415	285	32.5
20	4	80	0.055	20	7.0	1275	280	39.0

6	4	160	0.020	6	2.1	8490	680	8.5
8	4	160	0.025	8	2.8	6365	635	14.0
10	4	160	0.035	10	3.5	5095	715	25.0
12	4	160	0.040	12	4.2	4245	680	34.5
14	4	160	0.045	14	4.9	3640	655	45.0
16	4	160	0.055	16	5.6	3185	700	62.5
18	4	160	0.060	18	6.3	2830	680	77.0
20	4	160	0.065	20	7.0	2545	660	92.5

6	4	40	0.015	6	2.1	2120	125	1.5
8	4	40	0.025	8	2.8	1590	160	3.5
10	4	40	0.030	10	3.5	1275	155	5.5
12	4	40	0.035	12	4.2	1060	150	7.5
14	4	40	0.040	14	4.9	910	145	10.0
16	4	40	0.045	16	5.6	795	145	13.0
18	4	40	0.050	18	6.3	705	140	16.0
20	4	40	0.055	20	7.0	635	140	19.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	100	0.015	2.7	6	5305	320	5.0
8	4	100	0.025	3.6	8	3980	400	11.5
10	4	100	0.030	4.5	10	3185	380	17.0
12	4	100	0.035	5.4	12	2655	370	24.0
14	4	100	0.040	6.3	14	2275	365	32.0
16	4	100	0.045	7.2	16	1990	360	41.5
18	4	100	0.050	8.1	18	1770	355	52.0
20	4	100	0.055	9.0	20	1590	350	63.0

6	4	70	0.015	2.7	6	3715	225	3.5
8	4	70	0.020	3.6	8	2785	225	6.5
10	4	70	0.025	4.5	10	2230	225	10.0
12	4	70	0.030	5.4	12	1855	225	14.5
14	4	70	0.035	6.3	14	1590	225	20.0
16	4	70	0.040	7.2	16	1395	225	26.0
18	4	70	0.045	8.1	18	1240	225	33.0
20	4	70	0.055	9.0	20	1115	245	44.0

6	4	120	0.015	2.7	6	6365	380	6.0
8	4	120	0.025	3.6	8	4775	480	14.0
10	4	120	0.030	4.5	10	3820	460	20.5
12	4	120	0.035	5.4	12	3185	445	29.0
14	4	120	0.040	6.3	14	2730	435	38.5
16	4	120	0.045	7.2	16	2385	430	49.5
18	4	120	0.050	8.1	18	2120	425	62.0
20	4	120	0.055	9.0	20	1910	420	75.5

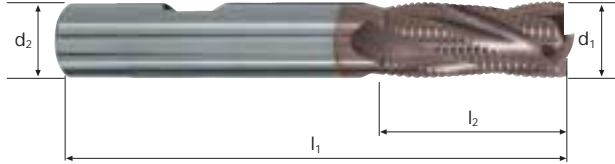
6	4	30	0.015	2.7	6	1590	95	1.5
8	4	30	0.020	3.6	8	1195	95	2.5
10	4	30	0.025	4.5	10	955	95	4.5
12	4	30	0.030	5.4	12	795	95	6.0
14	4	30	0.035	6.3	14	680	95	8.5
16	4	30	0.040	7.2	16	595	95	11.0
18	4	30	0.045	8.1	18	530	95	14.0
20	4	30	0.055	9.0	20	475	105	19.0



# Cylindrical end mills

Profiled NRF, normal version

HM  
MG10 λ 25°  
γ 10°



Roughing

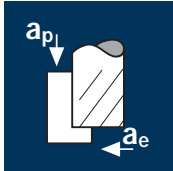
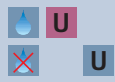
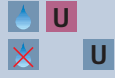
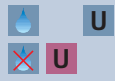




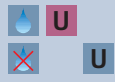
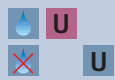
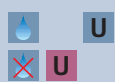

Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300							Ti Titanium	GG(G)
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Ø Code	d1 f10	d2 h6	l1	l2	45°	z	UNICUT-4X	
							U5373	
.300	6	6	57	13	0.40	4	●	
.391	8	8	63	19	0.40	4	●	
.450	10	10	72	22	0.40	4	●	
.501	12	12	83	26	0.40	4	●	
.570	14	14	83	26	0.40	4	●	
.610	16	16	92	32	0.50	4	●	
.640	18	18	92	32	0.50	4	●	
.682	20	20	104	38	0.50	4	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	6	4	110	0.020	6	2.7	5835	465	7.5
		8	4	110	0.025	8	3.6	4375	440	12.5
		10	4	110	0.030	10	4.5	3500	420	19.0
		12	4	110	0.040	12	5.4	2920	465	30.0
		16	4	110	0.050	16	7.2	2190	440	50.5
		20	4	110	0.065	20	9.0	1750	455	82.0
Steel 850 - 1100 N/mm <sup>2</sup> 	6	4	70	0.015	6	2.7	3715	225	3.5	
	8	4	70	0.020	8	3.6	2785	225	6.5	
	10	4	70	0.030	10	4.5	2230	270	12.0	
	12	4	70	0.035	12	5.4	1855	260	17.0	
	16	4	70	0.045	16	7.2	1395	250	29.0	
	20	4	70	0.055	20	9.0	1115	245	44.0	
Cast iron (lamellar / spheroidal) 	6	4	150	0.020	6	2.7	7960	635	10.5	
	8	4	150	0.025	8	3.6	5970	595	17.0	
	10	4	150	0.030	10	4.5	4775	575	26.0	
	12	4	150	0.040	12	5.4	3980	635	41.0	
	16	4	150	0.050	16	7.2	2985	595	68.5	
	20	4	150	0.065	20	9.0	2385	620	111.5	
Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	6	4	35	0.015	6	2.7	1855	110	2.0	
	8	4	35	0.020	8	3.6	1395	110	3.0	
	10	4	35	0.030	10	4.5	1115	135	6.0	
	12	4	35	0.035	12	5.4	930	130	8.5	
	16	4	35	0.045	16	7.2	695	125	14.5	
	20	4	35	0.055	20	9.0	555	120	21.5	

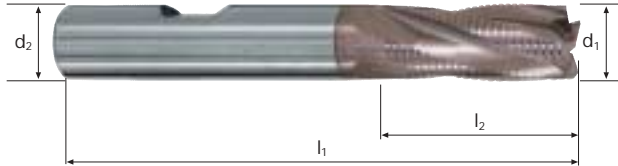
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	6	4	90	0.015	3.9	6	4775	285	6.5
		8	4	90	0.020	5.2	8	3580	285	12.0
		10	4	90	0.020	6.5	10	2865	230	15.0
		12	4	90	0.025	7.8	12	2385	240	22.5
		16	4	90	0.035	10.4	16	1790	250	41.5
		20	4	90	0.045	13.0	20	1430	255	66.5
Steel 850 - 1100 N/mm <sup>2</sup> 	6	4	60	0.015	3.9	6	3185	190	4.5	
	8	4	60	0.015	5.2	8	2385	145	6.0	
	10	4	60	0.020	6.5	10	1910	155	10.0	
	12	4	60	0.025	7.8	12	1590	160	15.0	
	16	4	60	0.035	10.4	16	1195	165	27.5	
	20	4	60	0.040	13.0	20	955	155	40.5	
Cast iron (lamellar / spheroidal) 	6	4	110	0.015	3.9	6	5835	350	8.0	
	8	4	110	0.020	5.2	8	4375	350	14.5	
	10	4	110	0.020	6.5	10	3500	280	18.0	
	12	4	110	0.025	7.8	12	2920	290	27.0	
	16	4	110	0.035	10.4	16	2190	305	51.0	
	20	4	110	0.045	13.0	20	1750	315	82.0	
Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	6	4	25	0.015	3.9	6	1325	80	2.0	
	8	4	25	0.015	5.2	8	995	60	2.5	
	10	4	25	0.020	6.5	10	795	65	4.0	
	12	4	25	0.025	7.8	12	665	65	6.0	
	16	4	25	0.035	10.4	16	495	70	11.5	
	20	4	25	0.040	13.0	20	400	65	17.0	

# Cylindrical end mills

Profiled NRC, normal version



HM  $\lambda$  20°  
 $\gamma$  8°



Roughing



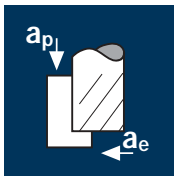
Finishing



Rm < 850
Rm 850-1100
Rm 1100-1300
Ti Titanium
GG(G)



Example: Order-N°. <span style="margin-left: 20px;">Coating</span> <span style="margin-left: 20px;">Article-N°</span> <span style="margin-left: 20px;">α-Code</span>								UNICUT-4X	
								U5370	
Ø Code	d1 e8	d2 h6	l1	l2	45°	z			
.300	6	6	57	13	0.40	4	●		
.391	8	8	63	19	0.40	4	●		
.450	10	10	72	22	0.40	4	●		
.501	12	12	83	26	0.40	4	●		
.610	16	16	92	32	0.50	4	●		
.682	20	20	104	38	0.50	4	●		

## Application




## Material



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	4	55	0.025	5	2.3	3500	350	4.0
6	4	55	0.030	6	2.7	2920	350	5.5
8	4	55	0.040	8	3.6	2190	350	10.0
10	4	55	0.050	10	4.5	1750	350	16.0
12	4	55	0.080	12	5.4	1460	465	30.0
16	4	55	0.105	16	7.2	1095	460	53.0
20	4	55	0.130	20	9.0	875	455	82.0
22	4	55	0.145	22	9.9	795	460	100.0
25	4	55	0.165	25	11.3	700	460	129.5

5	4	42	0.025	5	2.3	2675	270	3.0
6	4	42	0.030	6	2.7	2230	270	4.5
8	4	42	0.040	8	3.6	1670	265	7.5
10	4	42	0.050	10	4.5	1335	265	12.0
12	4	42	0.080	12	5.4	1115	355	23.0
16	4	42	0.105	16	7.2	835	350	40.5
20	4	42	0.130	20	9.0	670	350	63.0
22	4	42	0.145	22	9.9	610	355	77.5
25	4	42	0.165	25	11.3	535	355	100.0

5	4	25	0.025	5	2.3	1590	160	2.0
6	4	25	0.030	6	2.7	1325	160	2.5
8	4	25	0.040	8	3.6	995	160	4.5
10	4	25	0.050	10	4.5	795	160	7.0
12	4	25	0.080	12	5.4	665	215	14.0
16	4	25	0.105	16	7.2	495	210	24.0
20	4	25	0.130	20	9.0	400	210	38.0
22	4	25	0.145	22	9.9	360	210	45.5
25	4	25	0.165	25	11.3	320	210	59.0



5	4	47	0.025	5	2.3	2990	300	3.5
6	4	47	0.030	6	2.7	2495	300	5.0
8	4	47	0.040	8	3.6	1870	300	8.5
10	4	47	0.050	10	4.5	1495	300	13.5
12	4	47	0.080	12	5.4	1245	400	26.0
16	4	47	0.105	16	7.2	935	395	45.5
20	4	47	0.130	20	9.0	750	390	70.0
22	4	47	0.145	22	9.9	680	395	86.0
25	4	47	0.165	25	11.3	600	395	111.0

## Application



## Material



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>




Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	4	53	0.020	5	5	3375	270	7.0
6	4	53	0.020	6	6	2810	225	8.0
8	4	53	0.030	8	8	2110	255	16.5
10	4	53	0.035	10	10	1685	235	23.5
12	4	53	0.060	12	12	1405	335	48.0
16	4	53	0.080	16	16	1055	340	87.0
20	4	53	0.100	20	20	845	340	136.0
22	4	53	0.110	22	22	765	335	162.0
25	4	53	0.125	25	25	675	340	212.5

5	4	40	0.020	5	5	2545	205	5.0
6	4	40	0.020	6	6	2120	170	6.0
8	4	40	0.030	8	8	1590	190	12.0
10	4	40	0.035	10	10	1275	180	18.0
12	4	40	0.060	12	12	1060	255	36.5
16	4	40	0.080	16	16	795	255	65.5
20	4	40	0.100	20	20	635	255	102.0
22	4	40	0.110	22	22	580	255	123.5
25	4	40	0.125	25	25	510	255	159.5

5	4	22	0.020	5	5	1400	110	3.0
6	4	22	0.020	6	6	1165	95	3.5
8	4	22	0.030	8	8	875	105	6.5
10	4	22	0.035	10	10	700	100	10.0
12	4	22	0.060	12	12	585	140	20.0
16	4	22	0.080	16	16	440	140	36.0
20	4	22	0.100	20	20	350	140	56.0
22	4	22	0.110	22	22	320	140	68.0
25	4	22	0.125	25	25	280	140	87.5

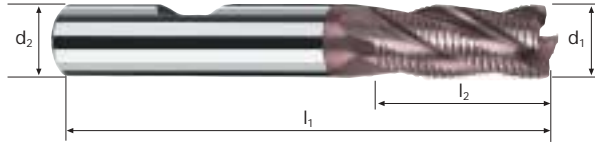
5	4	42	0.020	5	5	2675	215	5.5
6	4	42	0.020	6	6	2230	180	6.5
8	4	42	0.030	8	8	1670	200	13.0
10	4	42	0.035	10	10	1335	185	18.5
12	4	42	0.060	12	12	1115	270	39.0
16	4	42	0.080	16	16	835	265	68.0
20	4	42	0.100	20	20	670	270	108.0
22	4	42	0.110	22	22	610	270	130.5
25	4	42	0.125	25	25	535	270	169.0

# Cylindrical end mills Supracut

Profiled NRC, normal version



HSS  
PM/F  $\lambda$  30°  
 $\gamma$  12°



Roughing



Finishing



Rm  
< 850

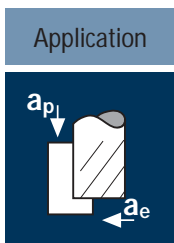
Rm  
850-1100

Rm  
1100-1300



GG(G)

Example: Order-N°.									UNICUT-4X	
									U0619	
		Coating		Article-N°.		α-Code				
		U		0619		.260				
Ø Code	d1 k8	d2 h6	l1	l2	45°	α	z			
.260	5	6	57	13	0.40	1.5°	4	●		
.300	6	6	57	13	0.40	0.0°	4	●		
.331	7	8	60	16	0.40	1.5°	4	●		
.391	8	8	63	19	0.40	0.0°	4	●		
.402	8	10	69	19	0.40	2.5°	4	●		
.420	9	10	69	19	0.40	1.5°	4	●		
.450	10	10	72	22	0.40	0.0°	4	●		
.470	11	12	79	22	0.40	1.0°	4	●		
.501	12	12	83	26	0.40	0.0°	4	●		
.570	14	12	83	26	0.40	0.0°	4	●		
.610	16	16	92	32	0.50	0.0°	4	●		
.640	18	16	92	32	0.50	0.0°	4	●		
.682	20	20	104	38	0.50	0.0°	4	●		
.710	22	20	104	38	0.70	0.0°	4	●		
.772	25	25	121	45	0.70	0.0°	4	●		



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	68	0.030	9.0	2	3610	435	9.5
8	4	68	0.040	12.0	3	2705	435	16.5
10	4	68	0.050	15.0	4	2165	435	26.0
12	4	68	0.080	18.0	5	1805	580	50.0
16	4	68	0.105	24.0	6	1355	570	87.5
20	4	68	0.130	30.0	8	1080	560	134.5
25	4	68	0.165	37.5	10	865	570	214.0

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	52	0.030	9.0	2	2760	330	7.0
8	4	52	0.040	12.0	3	2070	330	12.5
10	4	52	0.050	15.0	4	1655	330	20.0
12	4	52	0.080	18.0	5	1380	440	38.0
16	4	52	0.105	24.0	6	1035	435	67.0
20	4	52	0.130	30.0	8	830	430	103.0
25	4	52	0.165	37.5	10	660	435	163.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	40	0.030	9.0	2	2120	255	5.5
8	4	40	0.040	12.0	3	1590	255	10.0
10	4	40	0.050	15.0	4	1275	255	15.5
12	4	40	0.080	18.0	5	1060	340	29.5
16	4	40	0.105	24.0	6	795	335	51.5
20	4	40	0.130	30.0	8	635	330	79.0
25	4	40	0.165	37.5	10	510	335	125.5

Stainless steel  
[Cr-Ni/1.4301]

6	4	30	0.030	9.0	2	1590	190	4.0
8	4	30	0.040	12.0	3	1195	190	7.5
10	4	30	0.050	15.0	4	955	190	11.5
12	4	30	0.080	18.0	5	795	255	22.0
16	4	30	0.105	24.0	6	595	250	38.5
20	4	30	0.130	30.0	8	475	245	59.0
25	4	30	0.165	37.5	10	380	250	94.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	62	0.020	6	6	3290	265	9.5
8	4	62	0.030	8	8	2465	295	19.0
10	4	62	0.035	10	10	1975	275	27.5
12	4	62	0.060	12	12	1645	395	57.0
16	4	62	0.080	16	16	1235	395	101.0
20	4	62	0.100	20	20	985	395	158.0
25	4	62	0.125	25	25	790	395	247.0

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	50	0.020	6	6	2655	210	7.5
8	4	50	0.030	8	8	1990	240	15.5
10	4	50	0.035	10	10	1590	225	22.5
12	4	50	0.060	12	12	1325	320	46.0
16	4	50	0.080	16	16	995	320	82.0
20	4	50	0.100	20	20	795	320	128.0
25	4	50	0.125	25	25	635	320	200.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	37	0.020	6	6	1965	155	5.5
8	4	37	0.030	8	8	1470	175	11.0
10	4	37	0.035	10	10	1180	165	16.5
12	4	37	0.060	12	12	980	235	34.0
16	4	37	0.080	16	16	735	235	60.0
20	4	37	0.100	20	20	590	235	94.0
25	4	37	0.125	25	25	470	235	147.0

Stainless steel  
[Cr-Ni/1.4301]

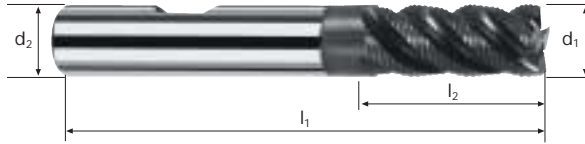
6	4	25	0.020	6	6	1325	105	4.0
8	4	25	0.030	8	8	995	120	7.5
10	4	25	0.035	10	10	795	110	11.0
12	4	25	0.060	12	12	665	160	23.0
16	4	25	0.080	16	16	495	160	41.0
20	4	25	0.100	20	20	400	160	64.0
25	4	25	0.125	25	25	320	160	100.0

# Cylindrical end mills Supracut FP

Profiled, normal version



**HSS**  
**PM/F**    λ 45°  
                  γ 2°



Roughing

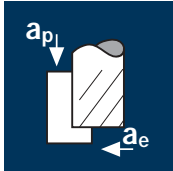



















Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless

Example: Order-N°.    Coating: <b>U</b> Article-N°: <b>0540</b> α-Code: <b>.300</b>								UNICUT-4X	POLYCHROM
								<b>U0540</b>	<b>P0540</b>
∅ Code	d1 k8	d2 h6	l1	l2	45°	z			
.300	6	6	57	13	0.35	4	●	●	
.391	8	8	63	19	0.45	4	●	●	
.450	10	10	72	22	0.60	4	●	●	
.501	12	12	83	26	0.60	4	●	●	
.610	16	16	92	32	0.70	4	●	●	
.682	20	20	104	38	0.70	4	●	●	
.772	25	25	121	45	0.85	4	●	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	5	3	60	0.025	5	2.0	3820	285	3.0
		6	3	60	0.025	6	2.4	3185	240	3.5
		8	4	60	0.035	8	3.2	2385	335	8.5
		10	4	60	0.045	10	4.0	1910	345	14.0
		12	4	60	0.070	12	4.8	1590	445	25.5
		16	4	60	0.095	16	6.4	1195	455	46.5
		20	4	60	0.115	20	8.0	955	440	70.5
		22	4	60	0.130	22	8.8	870	450	87.0
		25	4	60	0.145	25	10.0	765	445	111.5
		Steel 850 - 1100 N/mm <sup>2</sup>  	5	3	48	0.025	5	2.0	3055	230
6	3		48	0.025	6	2.4	2545	190	2.5	
8	4		48	0.035	8	3.2	1910	265	7.0	
10	4		48	0.045	10	4.0	1530	275	11.0	
12	4		48	0.070	12	4.8	1275	355	20.5	
16	4		48	0.095	16	6.4	955	365	37.5	
20	4		48	0.115	20	8.0	765	350	56.0	
22	4		48	0.130	22	8.8	695	360	69.5	
25	4		48	0.145	25	10.0	610	355	89.0	
Stainless steel [Cr-Ni/1.4301]  	5		3	25	0.025	5	2.0	1590	120	1.0
	6	3	25	0.025	6	2.4	1325	100	1.5	
	8	4	25	0.035	8	3.2	995	140	3.5	
	10	4	25	0.045	10	4.0	795	145	6.0	
	12	4	25	0.070	12	4.8	665	185	10.5	
	16	4	25	0.095	16	6.4	495	190	19.5	
	20	4	25	0.115	20	8.0	400	185	29.5	
	22	4	25	0.130	22	8.8	360	185	36.0	
	25	4	25	0.145	25	10.0	320	185	46.5	
	Cast iron (lamellar / spheroidal)  	5	3	42	0.025	5	2.0	2675	200	2.0
6		3	42	0.025	6	2.4	2230	165	2.5	
8		4	42	0.035	8	3.2	1670	235	6.0	
10		4	42	0.045	10	4.0	1335	240	9.5	
12		4	42	0.070	12	4.8	1115	310	18.0	
16		4	42	0.095	16	6.4	835	315	32.5	
20		4	42	0.115	20	8.0	670	310	49.5	
22		4	42	0.130	22	8.8	610	315	61.0	
25		4	42	0.145	25	10.0	535	310	77.5	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	5	3	55	0.015	5	5	3500	160	4.0
		6	3	55	0.020	6	6	2920	175	6.5
		8	4	55	0.025	8	8	2190	220	14.0
		10	4	55	0.035	10	10	1750	245	24.5
		12	4	55	0.055	12	12	1460	320	46.0
		16	4	55	0.070	16	16	1095	305	78.0
		20	4	55	0.090	20	20	875	315	126.0
		22	4	55	0.095	22	22	795	300	145.0
		25	4	55	0.110	25	25	700	310	194.0
		Steel 850 - 1100 N/mm <sup>2</sup>  	5	3	45	0.015	5	5	2865	130
6	3		45	0.020	6	6	2385	145	5.0	
8	4		45	0.025	8	8	1790	180	11.5	
10	4		45	0.035	10	10	1430	200	20.0	
12	4		45	0.055	12	12	1195	265	38.0	
16	4		45	0.070	16	16	895	250	64.0	
20	4		45	0.090	20	20	715	255	102.0	
22	4		45	0.095	22	22	650	245	118.5	
25	4		45	0.110	25	25	575	255	159.5	
Stainless steel [Cr-Ni/1.4301]  	5		3	22	0.015	5	5	1400	65	1.5
	6	3	22	0.020	6	6	1165	70	2.5	
	8	4	22	0.025	8	8	875	90	6.0	
	10	4	22	0.035	10	10	700	100	10.0	
	12	4	22	0.055	12	12	585	130	18.5	
	16	4	22	0.070	16	16	440	125	32.0	
	20	4	22	0.090	20	20	350	125	50.0	
	22	4	22	0.095	22	22	320	120	58.0	
	25	4	22	0.110	25	25	280	125	78.0	
	Cast iron (lamellar / spheroidal)  	5	3	36	0.015	5	5	2290	105	2.5
6		3	36	0.020	6	6	1910	115	4.0	
8		4	36	0.025	8	8	1430	145	9.5	
10		4	36	0.035	10	10	1145	160	16.0	
12		4	36	0.055	12	12	955	210	30.0	
16		4	36	0.070	16	16	715	200	51.0	
20		4	36	0.090	20	20	575	205	82.0	
22		4	36	0.095	22	22	520	200	97.0	
25		4	36	0.110	25	25	460	200	125.0	

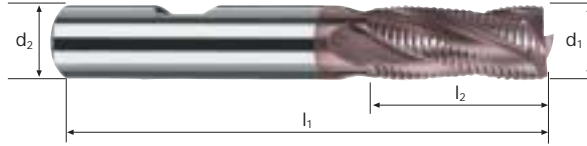


# Cylindrical end mills

Profiled NRF, normal version



**HSS-E**  
**Co8**     $\lambda$  25°  
                   $\gamma$  10°



Roughing



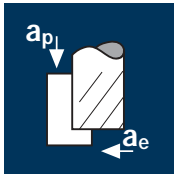
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.									UNICUT-4X	
									U0610	
$\emptyset$ Code	d1 k12	d2 h6	l1	l2	45°	$\alpha$	z			
.260	5	6	57	13	0.40	1.0°	3	●		
.300	6	6	57	13	0.40	0.0°	3	●		
.342	7	10	66	16	0.40	3.5°	3	●		
.391	8	8	63	19	0.40	0.0°	4	●		
.402	8	10	69	19	0.40	2.5°	4	●		
.420	9	10	69	19	0.40	1.5°	4	●		
.450	10	10	72	22	0.40	0.0°	4	●		
.470	11	12	79	22	0.40	1.0°	4	●		
.501	12	12	83	26	0.40	0.0°	4	●		
.540	13	12	83	26	0.40	0.0°	4	●		
.570	14	12	83	26	0.40	0.0°	4	●		
.581	15	12	83	26	0.50	0.0°	4	●		
.610	16	16	92	32	0.50	0.0°	4	●		
.640	18	16	92	32	0.50	0.0°	4	●		
.671	20	16	98	38	0.50	0.0°	4	●		
.682	20	20	104	38	0.50	0.0°	4	●		
.710	22	20	104	38	0.70	0.0°	4	●		
.741	24	20	111	45	0.70	0.0°	4	●		
.761	25	20	111	45	0.70	0.0°	4	●		
.772	25	25	121	45	0.70	0.0°	4	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
28	6	60	0.115	28	11.2	680	470	147.5
30	6	60	0.120	30	12.0	635	455	164.0
32	6	60	0.130	32	12.8	595	465	190.5
36	6	60	0.145	36	14.4	530	460	238.5
40	6	60	0.160	40	16.0	475	455	291.0

Steel  
850 - 1100 N/mm<sup>2</sup>



28	6	48	0.115	28	11.2	545	375	117.5
30	6	48	0.120	30	12.0	510	365	131.5
32	6	48	0.130	32	12.8	475	370	151.5
36	6	48	0.145	36	14.4	425	370	192.0
40	6	48	0.160	40	16.0	380	365	233.5

Stainless steel  
[Cr-Ni/1.4301]



28	6	25	0.115	28	11.2	285	195	61.0
30	6	25	0.120	30	12.0	265	190	68.5
32	6	25	0.130	32	12.8	250	195	80.0
36	6	25	0.145	36	14.4	220	190	98.5
40	6	25	0.160	40	16.0	200	190	121.5

Cast iron  
(lamellar / spheroidal)



28	6	42	0.115	28	11.2	475	330	103.5
30	6	42	0.120	30	12.0	445	320	115.0
32	6	42	0.130	32	12.8	420	330	135.0
36	6	42	0.145	36	14.4	370	320	166.0
40	6	42	0.160	40	16.0	335	320	205.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
28	6	55	0.085	28	28	625	320	251.0
30	6	55	0.090	30	30	585	315	283.5
32	6	55	0.095	32	32	545	310	317.5
36	6	55	0.105	36	36	485	305	395.5
40	6	55	0.120	40	40	440	315	504.0

Steel  
850 - 1100 N/mm<sup>2</sup>



28	6	45	0.085	28	28	510	260	204.0
30	6	45	0.090	30	30	475	255	229.5
32	6	45	0.095	32	32	450	255	261.0
36	6	45	0.105	36	36	400	250	324.0
40	6	45	0.120	40	40	360	260	416.0

Stainless steel  
[Cr-Ni/1.4301]



28	6	22	0.085	28	28	250	130	102.0
30	6	22	0.090	30	30	235	125	112.5
32	6	22	0.095	32	32	220	125	128.0
36	6	22	0.105	36	36	195	125	162.0
40	6	22	0.120	40	40	175	125	200.0

Cast iron  
(lamellar / spheroidal)



28	6	36	0.085	28	28	410	210	164.5
30	6	36	0.090	30	30	380	205	184.5
32	6	36	0.095	32	32	360	205	210.0
36	6	36	0.105	36	36	320	200	259.0
40	6	36	0.120	40	40	285	205	328.0

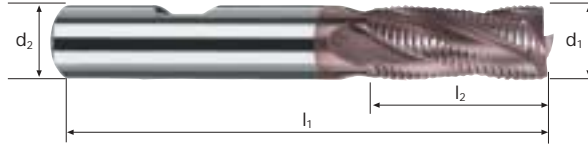
# Cylindrical end mills

Profiled NRF, normal version



HSS-E  
Co8

$\lambda$  25°  
 $\gamma$  10°



Roughing

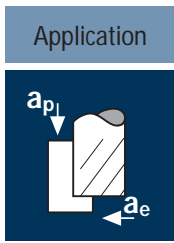


Finishing



Rm < 850
Rm 850-1100
Rm 1100-1300
Inox Stainless
Ti Titanium
GG(G)

Example: Order-N°.								UNICUT-4X	
		Coating	Article-N°	α-Code				U0610	
		U	0610	.800					
Ø Code	d1 k12	d2 h6	l1	l2	45°	z			
.800	28	25	121	45	0.70	6	●		
.810	30	25	121	45	0.70	6	●		
.832	32	32	133	53	0.70	6	●		
.860	36	32	133	53	0.90	6	●		
.881	40	32	143	63	0.90	6	●		



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	3	60	0.025	5	1.8	3820	285	2.5
6	3	60	0.025	6	2.1	3185	240	3.0
8	4	60	0.035	8	2.8	2385	335	7.5
10	4	60	0.045	10	3.5	1910	345	12.0
12	4	60	0.070	12	4.2	1590	445	22.5
16	4	60	0.095	16	5.6	1195	455	41.0
20	4	60	0.115	20	7.0	955	440	61.5
25	4	60	0.145	25	8.8	765	445	97.5

Steel  
850 - 1100 N/mm<sup>2</sup>

5	3	48	0.025	5	1.8	3055	230	2.0
6	3	48	0.025	6	2.1	2545	190	2.5
8	4	48	0.035	8	2.8	1910	265	6.0
10	4	48	0.045	10	3.5	1530	275	9.5
12	4	48	0.070	12	4.2	1275	355	18.0
16	4	48	0.095	16	5.6	955	365	32.5
20	4	48	0.115	20	7.0	765	350	49.0
25	4	48	0.145	25	8.8	610	355	77.5

Stainless steel  
[Cr-Ni/1.4301]

5	3	25	0.025	5	1.8	1590	120	1.0
6	3	25	0.025	6	2.1	1325	100	1.5
8	4	25	0.035	8	2.8	995	140	3.0
10	4	25	0.045	10	3.5	795	145	5.0
12	4	25	0.070	12	4.2	665	185	9.5
16	4	25	0.095	16	5.6	495	190	17.0
20	4	25	0.115	20	7.0	400	185	26.0
25	4	25	0.145	25	8.8	320	185	40.5

Cast iron  
(lamellar / spheroidal)

5	3	42	0.025	5	1.8	2675	200	2.0
6	3	42	0.025	6	2.1	2230	165	2.0
8	4	42	0.035	8	2.8	1670	235	5.5
10	4	42	0.045	10	3.5	1335	240	8.5
12	4	42	0.070	12	4.2	1115	310	15.5
16	4	42	0.095	16	5.6	835	315	28.0
20	4	42	0.115	20	7.0	670	310	43.5
25	4	42	0.145	25	8.8	535	310	68.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	3	55	0.015	4.5	5	3500	160	3.5
6	3	55	0.020	5.4	6	2920	175	5.5
8	4	55	0.025	7.2	8	2190	220	12.5
10	4	55	0.035	9.0	10	1750	245	22.0
12	4	55	0.055	10.8	12	1460	320	41.5
16	4	55	0.070	14.4	16	1095	305	70.5
20	4	55	0.090	18.0	20	875	315	113.5
25	4	55	0.110	22.5	25	700	310	174.5

Steel  
850 - 1100 N/mm<sup>2</sup>

5	3	45	0.015	4.5	5	2865	130	3.0
6	3	45	0.020	5.4	6	2385	145	4.5
8	4	45	0.025	7.2	8	1790	180	10.5
10	4	45	0.035	9.0	10	1430	200	18.0
12	4	45	0.055	10.8	12	1195	265	34.5
16	4	45	0.070	14.4	16	895	250	57.5
20	4	45	0.090	18.0	20	715	255	92.0
25	4	45	0.110	22.5	25	575	255	143.5

Stainless steel  
[Cr-Ni/1.4301]

5	3	22	0.015	4.5	5	1400	65	1.5
6	3	22	0.020	5.4	6	1165	70	2.5
8	4	22	0.025	7.2	8	875	90	5.0
10	4	22	0.035	9.0	10	700	100	9.0
12	4	22	0.055	10.8	12	585	130	17.0
16	4	22	0.070	14.4	16	440	125	29.0
20	4	22	0.090	18.0	20	350	125	45.0
25	4	22	0.110	22.5	25	280	125	70.5

Cast iron  
(lamellar / spheroidal)

5	3	36	0.015	4.5	5	2290	105	2.5
6	3	36	0.020	5.4	6	1910	115	3.5
8	4	36	0.025	7.2	8	1430	145	8.5
10	4	36	0.035	9.0	10	1145	160	14.5
12	4	36	0.055	10.8	12	955	210	27.0
16	4	36	0.070	14.4	16	715	200	46.0
20	4	36	0.090	18.0	20	575	205	74.0
25	4	36	0.110	22.5	25	460	200	112.5

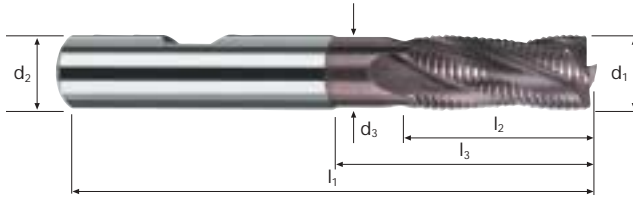
# Cylindrical end mills

Profiled NRF, normal version with short neck



HSS-E  
Co8

$\lambda$  25°  
 $\gamma$  10°



Roughing



Finishing



Rm  
< 850

Rm  
850-1100

Rm  
1100-1300

Inox  
Stainless

Ti  
Titanium

GG(G)

Example:  
Order-N°.

Coating Article-N° α-Code  
U 0611 .260

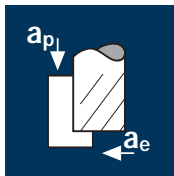


UNICUT-4X

U0611

Ø Code	d1 k12	d2 h6	d3	l1	l2	l3	45°	α	z		
.260	5	6	4.6	57	13	18	0.40	1.0°	3	●	
.300	6	6	5.5	57	13	20	0.40	0.0°	3	●	
.391	8	8	7.4	63	19	26	0.40	0.0°	4	●	
.450	10	10	9.2	72	22	31	0.40	0.0°	4	●	
.501	12	12	11.0	83	26	37	0.40	0.0°	4	●	
.610	16	16	15.0	92	32	43	0.50	0.0°	4	●	
.682	20	20	19.0	104	38	53	0.50	0.0°	4	●	
.772	25	25	24.0	121	45	64	0.70	0.0°	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	64	0.025	6	2.4	3395	340	5.0
8	4	64	0.035	8	3.2	2545	355	9.0
10	4	64	0.045	10	4.0	2035	365	14.5
12	4	64	0.070	12	4.8	1700	475	27.5
16	4	64	0.095	16	6.4	1275	485	49.5
18	4	64	0.105	18	7.2	1130	475	61.5
20	4	64	0.115	20	8.0	1020	470	75.0
25	6	64	0.145	25	10.0	815	710	177.5
32	7	64	0.130	32	12.8	635	580	237.5

6	4	52	0.025	6	2.4	2760	275	4.0
8	4	52	0.035	8	3.2	2070	290	7.5
10	4	52	0.045	10	4.0	1655	300	12.0
12	4	52	0.070	12	4.8	1380	385	22.0
16	4	52	0.095	16	6.4	1035	395	40.5
18	4	52	0.105	18	7.2	920	385	50.0
20	4	52	0.115	20	8.0	830	380	61.0
25	6	52	0.145	25	10.0	660	575	144.0
32	7	52	0.130	32	12.8	515	470	192.5

6	4	26	0.025	6	2.4	1380	140	2.0
8	4	26	0.035	8	3.2	1035	145	3.5
10	4	26	0.045	10	4.0	830	150	6.0
12	4	26	0.070	12	4.8	690	195	11.0
16	4	26	0.095	16	6.4	515	195	20.0
18	4	26	0.105	18	7.2	460	195	25.5
20	4	26	0.115	20	8.0	415	190	30.5
25	6	26	0.145	25	10.0	330	285	71.5
32	7	26	0.130	32	12.8	260	235	96.5

6	4	22	0.025	6	2.4	1165	115	1.5
8	4	22	0.035	8	3.2	875	125	3.0
10	4	22	0.045	10	4.0	700	125	5.0
12	4	22	0.070	12	4.8	585	165	9.5
16	4	22	0.095	16	6.4	440	165	17.0
18	4	22	0.105	18	7.2	390	165	21.5
20	4	22	0.115	20	8.0	350	160	25.5
25	6	22	0.145	25	10.0	280	245	61.5
32	7	22	0.130	32	12.8	220	200	82.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	58	0.020	6	6	3075	245	9.0
8	4	58	0.025	8	8	2310	230	14.5
10	4	58	0.035	10	10	1845	260	26.0
12	4	58	0.055	12	12	1540	340	49.0
16	4	58	0.070	16	16	1155	325	83.0
18	4	58	0.080	18	18	1025	330	107.0
20	4	58	0.090	20	20	925	335	134.0
25	6	58	0.110	25	25	740	490	306.5
32	7	58	0.095	32	32	575	380	389.0

6	4	48	0.020	6	6	2545	205	7.5
8	4	48	0.025	8	8	1910	190	12.0
10	4	48	0.035	10	10	1530	215	21.5
12	4	48	0.055	12	12	1275	280	40.5
16	4	48	0.070	16	16	955	265	68.0
18	4	48	0.080	18	18	850	270	87.5
20	4	48	0.090	20	20	765	275	110.0
25	6	48	0.110	25	25	610	405	253.0
32	7	48	0.095	32	32	475	315	322.5

6	4	23	0.020	6	6	1220	100	3.5
8	4	23	0.025	8	8	915	90	6.0
10	4	23	0.035	10	10	730	100	10.0
12	4	23	0.055	12	12	610	135	19.5
16	4	23	0.070	16	16	460	130	33.5
18	4	23	0.080	18	18	405	130	42.0
20	4	23	0.090	20	20	365	130	52.0
25	6	23	0.110	25	25	295	195	122.0
32	7	23	0.095	32	32	230	155	158.5

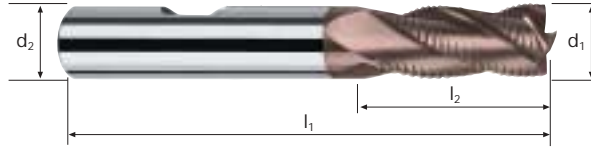
6	4	20	0.020	6	6	1060	85	3.0
8	4	20	0.025	8	8	795	80	5.0
10	4	20	0.035	10	10	635	90	9.0
12	4	20	0.055	12	12	530	115	16.5
16	4	20	0.070	16	16	400	110	28.0
18	4	20	0.080	18	18	355	115	37.5
20	4	20	0.090	20	20	320	115	46.0
25	6	20	0.110	25	25	255	170	106.5
32	7	20	0.095	32	32	200	135	138.0

# Cylindrical end mills

Profiled NRF, normal version



**HSS-E**  
**Co8**     $\lambda$  30°  
                   $\gamma$  12°



Roughing

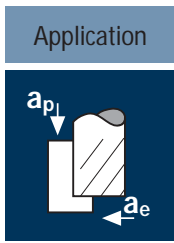


Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **GG(G)**

Example: Order-N°.								UNICUT-4X	
								U0609	
$\emptyset$ Code	d1 k12	d2 h6	l1	l2	45°	$\alpha$	Z		
.300	6	6	57	13	0.40	0.0°	4	●	
.342	7	10	66	16	0.40	3.0°	4	●	
.402	8	10	69	19	0.40	2.5°	4	●	
.420	9	10	69	19	0.40	1.5°	4	●	
.450	10	10	72	22	0.40	0.0°	4	●	
.470	11	12	79	22	0.40	1.0°	4	●	
.501	12	12	83	26	0.40	0.0°	4	●	
.540	13	12	83	26	0.40	0.0°	4	●	
.570	14	12	83	26	0.40	0.0°	4	●	
.592	15	16	86	26	0.50	1.0°	4	●	
.610	16	16	92	32	0.50	0.0°	4	●	
.640	18	16	92	32	0.50	0.0°	4	●	
.682	20	20	104	38	0.50	0.0°	4	●	
.686	20	20	104	38	0.50	0.0°	6	●	
.710	22	20	104	38	0.70	0.0°	6	●	
.772	25	25	121	45	0.70	0.0°	6	●	
.832	32	32	133	53	0.70	0.0°	7	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
8	4	65	0.035	8	3.2	2585	360	9.0
10	4	65	0.045	10	4.0	2070	375	15.0
12	4	65	0.070	12	4.8	1725	485	28.0
16	4	65	0.095	16	6.4	1295	490	50.0
20	4	65	0.115	20	8.0	1035	475	76.0
25	6	65	0.145	25	10.0	830	720	180.0
32	7	65	0.130	32	12.8	645	585	239.5

Steel  
850 - 1100 N/mm<sup>2</sup>

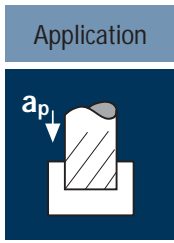
8	4	54	0.035	8	3.2	2150	300	7.5
10	4	54	0.045	10	4.0	1720	310	12.5
12	4	54	0.070	12	4.8	1430	400	23.0
16	4	54	0.095	16	6.4	1075	410	42.0
20	4	54	0.115	20	8.0	860	395	63.0
25	6	54	0.145	25	10.0	690	600	150.0
32	7	54	0.130	32	12.8	535	485	198.5

Stainless steel  
[Cr-Ni/1.4301]

8	4	28	0.035	8	3.2	1115	155	4.0
10	4	28	0.045	10	4.0	890	160	6.5
12	4	28	0.070	12	4.8	745	210	12.0
16	4	28	0.095	16	6.4	555	210	21.5
20	4	28	0.115	20	8.0	445	205	33.0
25	6	28	0.145	25	10.0	355	310	77.5
32	7	28	0.130	32	12.8	280	255	104.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

8	4	22	0.035	8	3.2	875	125	3.0
10	4	22	0.045	10	4.0	700	125	5.0
12	4	22	0.070	12	4.8	585	165	9.5
16	4	22	0.095	16	6.4	440	165	17.0
20	4	22	0.115	20	8.0	350	160	25.5
25	6	22	0.145	25	10.0	280	245	61.5
32	7	22	0.130	32	12.8	220	200	82.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
8	4	60	0.025	8	8	2385	240	15.5
10	4	60	0.035	10	10	1910	265	26.5
12	4	60	0.055	12	12	1590	350	50.5
16	4	60	0.070	16	16	1195	335	86.0
20	4	60	0.090	20	20	955	345	138.0
25	6	60	0.110	25	25	765	505	315.5
32	7	60	0.095	32	32	595	395	404.5

Steel  
850 - 1100 N/mm<sup>2</sup>

8	4	50	0.025	8	8	1990	200	13.0
10	4	50	0.035	10	10	1590	225	22.5
12	4	50	0.055	12	12	1325	290	42.0
16	4	50	0.070	16	16	995	280	71.5
20	4	50	0.090	20	20	795	285	114.0
25	6	50	0.110	25	25	635	420	262.5
32	7	50	0.095	32	32	495	330	338.0

Stainless steel  
[Cr-Ni/1.4301]

8	4	25	0.025	8	8	995	100	6.5
10	4	25	0.035	10	10	795	110	11.0
12	4	25	0.055	12	12	665	145	21.0
16	4	25	0.070	16	16	495	140	36.0
20	4	25	0.090	20	20	400	145	58.0
25	6	25	0.110	25	25	320	210	131.5
32	7	25	0.095	32	32	250	165	169.0

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

8	4	20	0.025	8	8	795	80	5.0
10	4	20	0.035	10	10	635	90	9.0
12	4	20	0.055	12	12	530	115	16.5
16	4	20	0.070	16	16	400	110	28.0
20	4	20	0.090	20	20	320	115	46.0
25	6	20	0.110	25	25	255	170	106.5
32	7	20	0.095	32	32	200	135	138.0

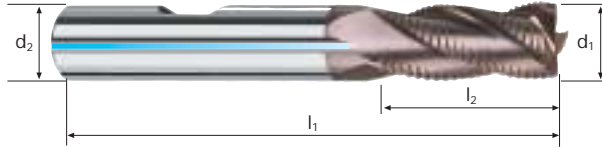


# Cylindrical end mills

Profiled NRF, normal version, Pericool



HSS-E  
Co8  $\lambda$  30°  
 $\gamma$  12°



Roughing

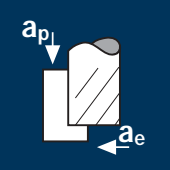



















Finishing



Rm < 850 Rm 850-1100 Rm 1100-1300 Inox Stainless Ti Titanium GG(G)

Example: Order-N°.									UNICUT-4X	
		Coating U	Article-N° 0695	α-Code .402					U0695	
Ø Code	d1 k12	d2 h6	l1	l2	45°	α	z			
.402	8	10	69	19	0.40	1.0°	4	●		
.450	10	10	72	22	0.40	0.0°	4	●		
.501	12	12	83	26	0.40	0.0°	4	●		
.610	16	16	92	32	0.50	0.0°	4	●		
.682	20	20	104	38	0.50	0.0°	4	●		
.772	25	25	121	45	0.70	0.0°	6	●		
.832	32	32	133	53	0.70	0.0°	7	●		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	6	3	60	0.025	6	2.4	3185	240	3.5
		8	3	60	0.035	8	3.2	2385	250	6.5
		10	3	60	0.045	10	4.0	1910	260	10.5
		12	3	60	0.070	12	4.8	1590	335	19.5
		16	3	60	0.095	16	6.4	1195	340	35.0
		20	3	60	0.115	20	8.0	955	330	53.0
Steel 850 - 1100 N/mm <sup>2</sup>  	6	3	48	0.025	6	2.4	2545	190	2.5	
	8	3	48	0.035	8	3.2	1910	200	5.0	
	10	3	48	0.045	10	4.0	1530	205	8.0	
	12	3	48	0.070	12	4.8	1275	270	15.5	
	16	3	48	0.095	16	6.4	955	270	27.5	
	20	3	48	0.115	20	8.0	765	265	42.5	
Stainless steel [Cr-Ni/1.4301]  	6	3	25	0.025	6	2.4	1325	100	1.5	
	8	3	25	0.035	8	3.2	995	105	2.5	
	10	3	25	0.045	10	4.0	795	105	4.0	
	12	3	25	0.070	12	4.8	665	140	8.0	
	16	3	25	0.095	16	6.4	495	140	14.5	
	20	3	25	0.115	20	8.0	400	140	22.5	
Cast iron (lamellar / spheroidal)  	6	3	42	0.025	6	2.4	2230	165	2.5	
	8	3	42	0.035	8	3.2	1670	175	4.5	
	10	3	42	0.045	10	4.0	1335	180	7.0	
	12	3	42	0.070	12	4.8	1115	235	13.5	
	16	3	42	0.095	16	6.4	835	240	24.5	
	20	3	42	0.115	20	8.0	670	230	37.0	

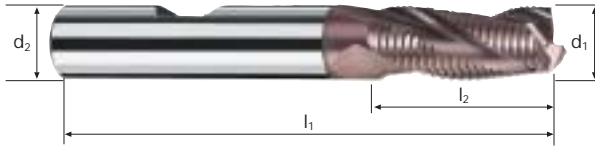
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>  	6	3	55	0.020	6	6	2920	175	6.5
		8	3	55	0.025	8	8	2190	165	10.5
		10	3	55	0.035	10	10	1750	185	18.5
		12	3	55	0.055	12	12	1460	240	34.5
		16	3	55	0.070	16	16	1095	230	59.0
		20	3	55	0.090	20	20	875	235	94.0
Steel 850 - 1100 N/mm <sup>2</sup>  	6	3	45	0.020	6	6	2385	145	5.0	
	8	3	45	0.025	8	8	1790	135	8.5	
	10	3	45	0.035	10	10	1430	150	15.0	
	12	3	45	0.055	12	12	1195	195	28.0	
	16	3	45	0.070	16	16	895	190	48.5	
	20	3	45	0.090	20	20	715	195	78.0	
Stainless steel [Cr-Ni/1.4301]  	6	3	22	0.020	6	6	1165	70	2.5	
	8	3	22	0.025	8	8	875	65	4.0	
	10	3	22	0.035	10	10	700	75	7.5	
	12	3	22	0.055	12	12	585	95	13.5	
	16	3	22	0.070	16	16	440	90	23.0	
	20	3	22	0.090	20	20	350	95	38.0	
Cast iron (lamellar / spheroidal)  	6	3	36	0.020	6	6	1910	115	4.0	
	8	3	36	0.025	8	8	1430	105	6.5	
	10	3	36	0.035	10	10	1145	120	12.0	
	12	3	36	0.055	12	12	955	160	23.0	
	16	3	36	0.070	16	16	715	150	38.5	
	20	3	36	0.090	20	20	575	155	62.0	

# Cylindrical end mills

Profiled NRF, normal version



HSS-E  
Co8  $\lambda$  30°  
 $\gamma$  12°



Roughing



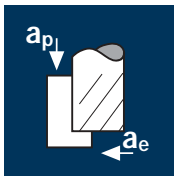
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G)
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Example: Order-N°.		Coating <b>U</b>	Article-N°. <b>0679</b>	$\alpha$ -Code <b>.300</b>				<b>UNICUT-4X</b>	
$\emptyset$ Code	$d_1$ k12	$d_2$ h6	$l_1$	$l_2$	45°	$\alpha$	Z		
.300	6	6	57	13	0.40	0.0°	3	●	
.402	8	10	69	19	0.40	2.5°	3	●	
.450	10	10	72	22	0.40	0.0°	3	●	
.501	12	12	83	26	0.40	0.0°	3	●	
.610	16	16	92	32	0.50	0.0°	3	●	
.682	20	20	104	38	0.50	0.0°	3	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	180	0.030	12	1.2	9550	1145	16.5
8	4	180	0.040	16	1.6	7160	1145	29.5
10	4	180	0.055	20	2.0	5730	1260	50.5
12	4	180	0.065	24	2.4	4775	1240	71.5
16	4	180	0.070	32	3.2	3580	1000	102.5
20	4	180	0.075	40	4.0	2865	860	137.5

6	4	150	0.030	12	1.2	7960	955	14.0
8	4	150	0.040	16	1.6	5970	955	24.5
10	4	150	0.055	20	2.0	4775	1050	42.0
12	4	150	0.065	24	2.4	3980	1035	59.5
16	4	150	0.070	32	3.2	2985	835	85.5
20	4	150	0.075	40	4.0	2385	715	114.5

6	4	120	0.030	12	1.2	6365	765	11.0
8	4	120	0.040	16	1.6	4775	765	19.5
10	4	120	0.055	20	2.0	3820	840	33.5
12	4	120	0.065	24	2.4	3185	830	48.0
16	4	120	0.070	32	3.2	2385	670	68.5
20	4	120	0.075	40	4.0	1910	575	92.0

6	4	80	0.030	12	1.2	4245	510	7.5
8	4	80	0.040	16	1.6	3185	510	13.0
10	4	80	0.055	20	2.0	2545	560	22.5
12	4	80	0.065	24	2.4	2120	550	31.5
16	4	80	0.070	32	3.2	1590	445	45.5
20	4	80	0.075	40	4.0	1275	385	61.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	150	0.020	4.2	6	7960	635	16.0
8	4	150	0.025	5.6	8	5970	595	26.5
10	4	150	0.035	7.0	10	4775	670	47.0
12	4	150	0.040	8.4	12	3980	635	64.0
16	4	150	0.050	11.2	16	2985	595	106.5
20	4	150	0.050	14.0	20	2385	475	133.0

6	4	100	0.020	4.2	6	5305	425	10.5
8	4	100	0.025	5.6	8	3980	400	18.0
10	4	100	0.035	7.0	10	3185	445	31.0
12	4	100	0.040	8.4	12	2655	425	43.0
16	4	100	0.050	11.2	16	1990	400	71.5
20	4	100	0.050	14.0	20	1590	320	89.5

6	4	80	0.020	4.2	6	4245	340	8.5
8	4	80	0.025	5.6	8	3185	320	14.5
10	4	80	0.035	7.0	10	2545	355	25.0
12	4	80	0.040	8.4	12	2120	340	34.5
16	4	80	0.050	11.2	16	1590	320	57.5
20	4	80	0.050	14.0	20	1275	255	71.5

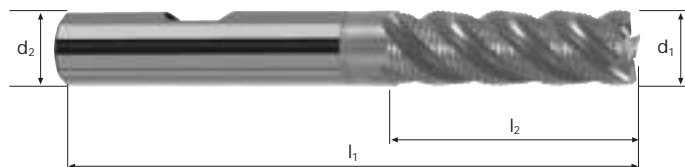
6	4	60	0.020	4.2	6	3185	255	6.5
8	4	60	0.025	5.6	8	2385	240	11.0
10	4	60	0.035	7.0	10	1910	265	18.5
12	4	60	0.040	8.4	12	1590	255	25.5
16	4	60	0.050	11.2	16	1195	240	43.0
20	4	60	0.050	14.0	20	955	190	53.0

# Cylindrical end mills NX-FP

Profiled, medium length version



HM  
XR       $\lambda$  45°  
             $\gamma$  0°



Roughing



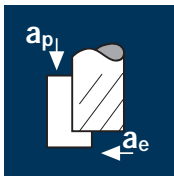
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G) Tool Steel
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Example: Order-N°.								UNICUT-4X	POLYCHROM
		Coating U	Article-N° 5173	α-Code .300				U5173	P5173
Ø Code	d1 e8	d2 h6	l1	l2	45°	z			
.300	6	6	63	19	0.35	4	●	●	
.391	8	8	72	28	0.45	4	●	●	
.450	10	10	84	34	0.60	4	●	●	
.501	12	12	97	40	0.60	4	●	●	
.610	16	16	108	48	0.70	4	●	●	
.682	20	20	122	56	0.70	4	●	●	

## Application



## Material





Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

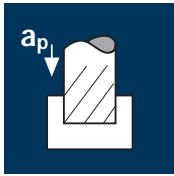
   

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	120	0.020	9	1.2	6365	510	5.5
8	4	120	0.025	12	1.6	4775	480	9.0
10	4	120	0.035	15	2.0	3820	535	16.0
12	4	120	0.040	18	2.4	3185	510	22.0
16	4	120	0.055	24	3.2	2385	525	40.5
20	4	120	0.065	30	4.0	1910	495	59.5

6	4	80	0.015	9	1.2	4245	255	3.0
8	4	80	0.025	12	1.6	3185	320	6.0
10	4	80	0.030	15	2.0	2545	305	9.0
12	4	80	0.035	18	2.4	2120	295	12.5
16	4	80	0.045	24	3.2	1590	285	22.0
20	4	80	0.055	30	4.0	1275	280	33.5


6	4	160	0.020	9	1.2	8490	680	7.5
8	4	160	0.025	12	1.6	6365	635	12.0
10	4	160	0.035	15	2.0	5095	715	21.5
12	4	160	0.040	18	2.4	4245	680	29.5
16	4	160	0.055	24	3.2	3185	700	54.0
20	4	160	0.065	30	4.0	2545	660	79.0

## Application







## Material





Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	100	0.015	2.4	6	5305	320	4.5
8	4	100	0.025	3.2	8	3980	400	10.0
10	4	100	0.030	4.0	10	3185	380	15.0
12	4	100	0.035	4.8	12	2655	370	21.5
16	4	100	0.045	6.4	16	1990	360	37.0
20	4	100	0.055	8.0	20	1590	350	56.0

6	4	70	0.015	2.4	6	3715	225	3.0
8	4	70	0.020	3.2	8	2785	225	6.0
10	4	70	0.025	4.0	10	2230	225	9.0
12	4	70	0.030	4.8	12	1855	225	13.0
16	4	70	0.040	6.4	16	1395	225	23.0
20	4	70	0.055	8.0	20	1115	245	39.0

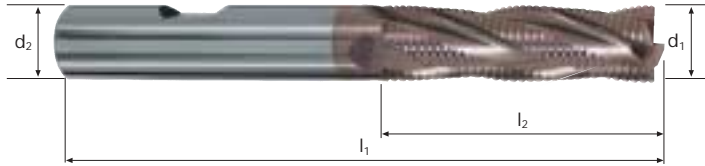
6	4	120	0.015	2.4	6	6365	380	5.5
8	4	120	0.025	3.2	8	4775	480	12.5
10	4	120	0.030	4.0	10	3820	460	18.5
12	4	120	0.035	4.8	12	3185	445	25.5
16	4	120	0.045	6.4	16	2385	430	44.0
20	4	120	0.055	8.0	20	1910	420	67.0

# Cylindrical end mills

Profiled NRF, medium length version



HM  
MG10     λ 25°  
                  γ 10°



Roughing

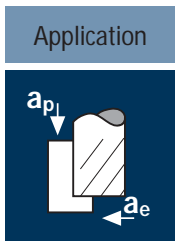


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300						Ti Titanium	GG(G)
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Example: Order-N°.							UNICUT-4X	
Coating		Article-N°.		α-Code				
U		5376		.300		U5376		
Ø Code	d1 f10	d2 h6	l1	l2	45°	Z		
.300	6	6	63	19	0.40	4	•	
.391	8	8	72	28	0.40	4	•	
.450	10	10	84	34	0.40	4	•	
.501	12	12	97	40	0.40	4	•	
.610	16	16	108	48	0.50	4	•	
.682	20	20	122	56	0.50	4	•	



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	38	0.025	12	1.5	2015	200	3.5
8	4	38	0.030	16	2.0	1510	180	6.0
10	4	38	0.040	20	2.5	1210	195	10.0
12	4	38	0.060	24	3.0	1010	240	17.5
16	4	38	0.085	32	4.0	755	255	32.5
20	4	38	0.105	40	5.0	605	255	51.0
25	4	38	0.130	50	6.3	485	250	78.0

Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	30	0.025	12	1.5	1590	160	3.0
8	4	30	0.030	16	2.0	1195	145	4.5
10	4	30	0.040	20	2.5	955	155	8.0
12	4	30	0.060	24	3.0	795	190	13.5
16	4	30	0.085	32	4.0	595	200	25.5
20	4	30	0.105	40	5.0	475	200	40.0
25	4	30	0.130	50	6.3	380	200	62.5

Material

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

6	4	24	0.025	12	1.5	1275	130	2.5
8	4	24	0.030	16	2.0	955	115	3.5
10	4	24	0.040	20	2.5	765	120	6.0
12	4	24	0.060	24	3.0	635	150	11.0
16	4	24	0.085	32	4.0	475	160	20.5
20	4	24	0.105	40	5.0	380	160	32.0
25	4	24	0.130	50	6.3	305	160	50.0

Material

Cast iron  
(lamellar / spheroidal)

6	4	34	0.025	12	1.5	1805	180	3.0
8	4	34	0.030	16	2.0	1355	165	5.5
10	4	34	0.040	20	2.5	1080	175	9.0
12	4	34	0.060	24	3.0	900	215	15.5
16	4	34	0.085	32	4.0	675	230	29.5
20	4	34	0.105	40	5.0	540	225	45.0
25	4	34	0.130	50	6.3	435	225	70.5



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	35	0.020	4	6	1855	150	4.0
8	4	35	0.030	6	8	1395	165	7.5
10	4	35	0.035	7	10	1115	155	11.0
12	4	35	0.060	8	12	930	225	22.5
16	4	35	0.080	11	16	695	220	39.5
20	4	35	0.100	14	20	555	220	61.5
25	4	35	0.125	18	25	445	225	98.5

Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	25	0.020	4	6	1325	105	2.5
8	4	25	0.030	6	8	995	120	5.5
10	4	25	0.035	7	10	795	110	7.5
12	4	25	0.060	8	12	665	160	16.0
16	4	25	0.080	11	16	495	160	28.5
20	4	25	0.100	14	20	400	160	45.0
25	4	25	0.125	18	25	320	160	70.0

Material

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

6	4	18	0.020	4	6	955	75	2.0
8	4	18	0.030	6	8	715	85	4.0
10	4	18	0.035	7	10	575	80	5.5
12	4	18	0.060	8	12	475	115	11.5
16	4	18	0.080	11	16	360	115	20.5
20	4	18	0.100	14	20	285	115	32.0
25	4	18	0.125	18	25	230	115	50.5

Material

Cast iron  
(lamellar / spheroidal)

6	4	29	0.020	4	6	1540	125	3.0
8	4	29	0.030	6	8	1155	140	6.5
10	4	29	0.035	7	10	925	130	9.0
12	4	29	0.060	8	12	770	185	18.5
16	4	29	0.080	11	16	575	185	33.0
20	4	29	0.100	14	20	460	185	52.0
25	4	29	0.125	18	25	370	185	81.0



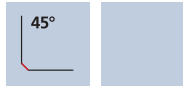
# Cylindrical end mills Supracut

Profiled NRC, medium length version



**HSS**  
**PM/F**

$\lambda$  **30°**  
 $\gamma$  **12°**



Roughing

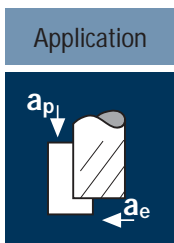


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300									GG(G)
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Example: Order-N°.							UNICUT-4X	
		Coating <b>U</b>	Article-N° <b>0659</b>	α-Code <b>.300</b>			<b>U0659</b>	
Ø Code	d1 k8	d2 h6	l1	l2	45°	Z		
.300	6	6	63	19	0.40	4	●	
.402	8	10	78	28	0.40	4	●	
.450	10	10	84	34	0.40	4	●	
.501	12	12	97	40	0.40	4	●	
.610	16	16	108	48	0.50	4	●	
.682	20	20	122	56	0.50	4	●	
.772	25	25	144	68	0.70	4	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	36	0.020	12	1.5	1910	115	2.0
8	4	36	0.030	16	2.0	1430	170	5.5
10	4	36	0.035	20	2.5	1145	160	8.0
12	4	36	0.055	24	3.0	955	210	15.0
16	4	36	0.075	32	4.0	715	215	27.5
20	4	36	0.095	40	5.0	575	220	44.0
25	4	36	0.115	50	6.3	460	210	65.5
30	6	36	0.095	60	7.5	380	215	97.0
32	6	36	0.105	64	8.0	360	225	115.0

Steel  
850 - 1100 N/mm<sup>2</sup>

6	3	30	0.020	12	1.5	1590	95	1.5
8	4	30	0.030	16	2.0	1195	145	4.5
10	4	30	0.035	20	2.5	955	135	7.0
12	4	30	0.055	24	3.0	795	175	12.5
16	4	30	0.075	32	4.0	595	180	23.0
20	4	30	0.095	40	5.0	475	180	36.0
25	4	30	0.115	50	6.3	380	175	54.5
30	6	30	0.095	60	7.5	320	180	81.0
32	6	30	0.105	64	8.0	300	190	97.5

Stainless steel  
[Cr-Ni/1.4301]

6	3	15	0.020	12	1.5	795	50	1.0
8	4	15	0.030	16	2.0	595	70	2.0
10	4	15	0.035	20	2.5	475	65	3.5
12	4	15	0.055	24	3.0	400	90	6.5
16	4	15	0.075	32	4.0	300	90	11.5
20	4	15	0.095	40	5.0	240	90	18.0
25	4	15	0.115	50	6.3	190	85	26.5
30	6	15	0.095	60	7.5	160	90	40.5
32	6	15	0.105	64	8.0	150	95	48.5

Cast iron  
(lamellar / spheroidal)

6	3	28	0.020	12	1.5	1485	90	1.5
8	4	28	0.030	16	2.0	1115	135	4.5
10	4	28	0.035	20	2.5	890	125	6.5
12	4	28	0.055	24	3.0	745	165	12.0
16	4	28	0.075	32	4.0	555	165	21.0
20	4	28	0.095	40	5.0	445	170	34.0
25	4	28	0.115	50	6.3	355	165	51.5
30	6	28	0.095	60	7.5	295	170	76.5
32	6	28	0.105	64	8.0	280	175	89.5



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	30	0.020	4.2	6	1590	95	2.5
8	4	30	0.025	5.6	8	1195	120	5.5
10	4	30	0.035	7.0	10	955	135	9.5
12	4	30	0.055	8.4	12	795	175	17.5
16	4	30	0.070	11.2	16	595	165	29.5
20	4	30	0.090	14.0	20	475	170	47.5
25	4	30	0.110	17.5	25	380	165	72.0
30	6	30	0.090	21.0	30	320	175	110.5
32	6	30	0.095	22.4	32	300	170	122.0

Steel  
850 - 1100 N/mm<sup>2</sup>

6	3	26	0.020	4.2	6	1380	85	2.0
8	4	26	0.025	5.6	8	1035	105	4.5
10	4	26	0.035	7.0	10	830	115	8.0
12	4	26	0.055	8.4	12	690	150	15.0
16	4	26	0.070	11.2	16	515	145	26.0
20	4	26	0.090	14.0	20	415	150	42.0
25	4	26	0.110	17.5	25	330	145	63.5
30	6	26	0.090	21.0	30	275	150	94.5
32	6	26	0.095	22.4	32	260	150	107.5

Stainless steel  
[Cr-Ni/1.4301]

6	3	14	0.020	4.2	6	745	45	1.0
8	4	14	0.025	5.6	8	555	55	2.5
10	4	14	0.035	7.0	10	445	60	4.0
12	4	14	0.055	8.4	12	370	80	8.0
16	4	14	0.070	11.2	16	280	80	14.5
20	4	14	0.090	14.0	20	225	80	22.5
25	4	14	0.110	17.5	25	180	80	35.0
30	6	14	0.090	21.0	30	150	80	50.5
32	6	14	0.095	22.4	32	140	80	57.5

Cast iron  
(lamellar / spheroidal)

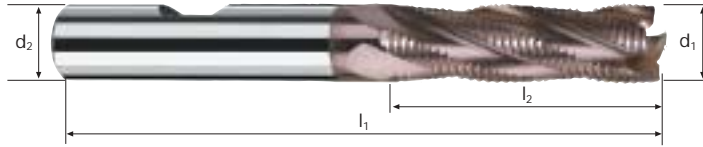
6	3	22	0.020	4.2	6	1165	70	2.0
8	4	22	0.025	5.6	8	875	90	4.0
10	4	22	0.035	7.0	10	700	100	7.0
12	4	22	0.055	8.4	12	585	130	13.0
16	4	22	0.070	11.2	16	440	125	22.5
20	4	22	0.090	14.0	20	350	125	35.0
25	4	22	0.110	17.5	25	280	125	54.5
30	6	22	0.090	21.0	30	235	125	79.0
32	6	22	0.095	22.4	32	220	125	89.5

# Cylindrical end mills

Profiled NRF, medium length version



**HSS-E**  $\lambda$  25°  
**Co8**  $\gamma$  10°



Roughing



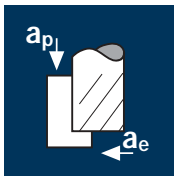
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.								UNICUT-4X	
								U0650	
$\emptyset$ Code	d1 k12	d2 h6	l1	l2	45°	$\alpha$	Z		
.260	5	6	63	19	0.40	1.5°	3	●	
.300	6	6	63	19	0.40	0.0°	3	●	
.402	8	10	78	28	0.40	2.0°	4	●	
.450	10	10	84	34	0.40	0.0°	4	●	
.501	12	12	97	40	0.40	0.0°	4	●	
.570	14	12	97	40	0.40	0.0°	4	●	
.610	16	16	108	48	0.50	0.0°	4	●	
.640	18	16	108	48	0.50	0.0°	4	●	
.682	20	20	122	56	0.50	0.0°	4	●	
.710	22	20	122	56	0.70	0.0°	4	●	
.772	25	25	144	68	0.70	0.0°	4	●	
.800	28	25	144	68	0.70	0.0°	6	●	
.810	30	25	144	68	0.70	0.0°	6	●	
.832	32	32	160	80	0.70	0.0°	6	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	180	0.030	9	1.8	9550	1145	18.5
8	4	180	0.040	12	2.4	7160	1145	33.0
10	4	180	0.055	15	3.0	5730	1260	56.5
12	4	180	0.065	18	3.6	4775	1240	80.5
16	4	180	0.070	24	4.8	3580	1000	115.0
20	4	180	0.075	30	6.0	2865	860	155.0

6	4	150	0.030	9	1.8	7960	955	15.5
8	4	150	0.040	12	2.4	5970	955	27.5
10	4	150	0.055	15	3.0	4775	1050	47.5
12	4	150	0.065	18	3.6	3980	1035	67.0
16	4	150	0.070	24	4.8	2985	835	96.0
20	4	150	0.075	30	6.0	2385	715	128.5

6	4	120	0.030	9	1.8	6365	765	12.5
8	4	120	0.040	12	2.4	4775	765	22.0
10	4	120	0.055	15	3.0	3820	840	38.0
12	4	120	0.065	18	3.6	3185	830	54.0
16	4	120	0.070	24	4.8	2385	670	77.0
20	4	120	0.075	30	6.0	1910	575	103.5

6	4	80	0.030	9	1.8	4245	510	8.5
8	4	80	0.040	12	2.4	3185	510	14.5
10	4	80	0.055	15	3.0	2545	560	25.0
12	4	80	0.065	18	3.6	2120	550	35.5
16	4	80	0.070	24	4.8	1590	445	51.5
20	4	80	0.075	30	6.0	1275	385	69.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	150	0.025	4.8	6	7960	795	23.0
8	4	150	0.030	6.4	8	5970	715	36.5
10	4	150	0.040	8.0	10	4775	765	61.0
12	4	150	0.050	9.6	12	3980	795	91.5
16	4	150	0.060	12.8	16	2985	715	146.5
20	4	150	0.060	16.0	20	2385	570	182.5

6	4	100	0.020	4.8	6	5305	425	12.0
8	4	100	0.025	6.4	8	3980	400	20.5
10	4	100	0.035	8.0	10	3185	445	35.5
12	4	100	0.040	9.6	12	2655	425	49.0
16	4	100	0.050	12.8	16	1990	400	82.0
20	4	100	0.050	16.0	20	1590	320	102.5

6	4	80	0.020	4.8	6	4245	340	10.0
8	4	80	0.025	6.4	8	3185	320	16.5
10	4	80	0.035	8.0	10	2545	355	28.5
12	4	80	0.040	9.6	12	2120	340	39.0
16	4	80	0.050	12.8	16	1590	320	65.5
20	4	80	0.050	16.0	20	1275	255	81.5

6	4	60	0.020	4.8	6	3185	255	7.5
8	4	60	0.025	6.4	8	2385	240	12.5
10	4	60	0.035	8.0	10	1910	265	21.0
12	4	60	0.040	9.6	12	1590	255	29.5
16	4	60	0.050	12.8	16	1195	240	49.0
20	4	60	0.050	16.0	20	955	190	61.0

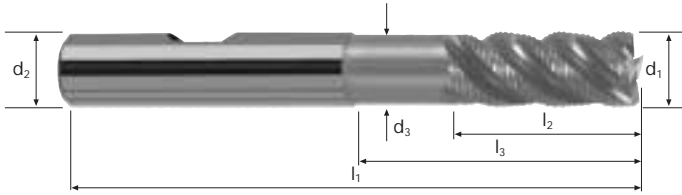
# Cylindrical end mills NX-FP

Profiled, medium length version with neck



**HM**  
**XR**
 $\lambda$  45°  
 $\gamma$  0°

45°



Roughing



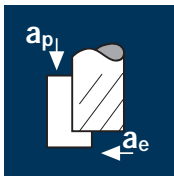
Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel
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Example: Order-N°.										UNICUT-4X	POLYCHROM	
										<b>U5174</b>	<b>P5174</b>	
$\emptyset$ Code	$d_1$ e8	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$45^\circ$	$z$				
<b>.300</b>	6	6	5.5	63	13	26	0.35	4	●	●		
<b>.391</b>	8	8	7.4	72	19	35	0.45	4	●	●		
<b>.450</b>	10	10	9.2	84	22	43	0.60	4	●	●		
<b>.501</b>	12	12	11.0	97	26	51	0.60	4	●	●		
<b>.610</b>	16	16	15.0	108	32	59	0.70	4	●	●		
<b>.682</b>	20	20	19.0	122	38	71	0.70	4	●	●		

## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	70	0.015	10.8	3.3	3715	225	8.0
8	4	70	0.020	14.4	4.4	2785	225	14.5
10	4	70	0.020	18.0	5.5	2230	180	18.0
12	4	70	0.025	21.6	6.6	1855	185	26.5
16	4	70	0.030	28.8	8.8	1395	165	42.0
20	4	70	0.040	36.0	11.0	1115	180	71.5

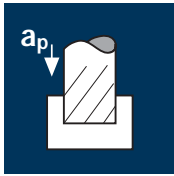
Stainless steel  
[Cr-Ni-Mo-.../1.4571]

6	4	60	0.015	10.8	3.3	3185	190	7.0
8	4	60	0.020	14.4	4.4	2385	190	12.0
10	4	60	0.020	18.0	5.5	1910	155	15.5
12	4	60	0.025	21.6	6.6	1590	160	23.0
16	4	60	0.030	28.8	8.8	1195	145	36.5
20	4	60	0.040	36.0	11.0	955	155	61.5

Heat resistant steel  
[17-4 PH]

6	4	25	0.010	10.8	3.3	1325	55	2.0
8	4	25	0.015	14.4	4.4	995	60	4.0
10	4	25	0.020	18.0	5.5	795	65	6.5
12	4	25	0.020	21.6	6.6	665	55	8.0
16	4	25	0.030	28.8	8.8	495	60	15.0
20	4	25	0.035	36.0	11.0	400	55	22.0


## Application



## Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	50	0.015	6	6	2655	160	6.0
8	4	50	0.020	8	8	1990	160	10.0
10	4	50	0.020	10	10	1590	125	12.5
12	4	50	0.025	12	12	1325	135	19.5
16	4	50	0.035	16	16	995	140	36.0
20	4	50	0.045	20	20	795	145	58.0

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

6	4	40	0.015	6	6	2120	125	4.5
8	4	40	0.020	8	8	1590	125	8.0
10	4	40	0.020	10	10	1275	100	10.0
12	4	40	0.025	12	12	1060	105	15.0
16	4	40	0.035	16	16	795	110	28.0
20	4	40	0.045	20	20	635	115	46.0

Heat resistant steel  
[17-4 PH]

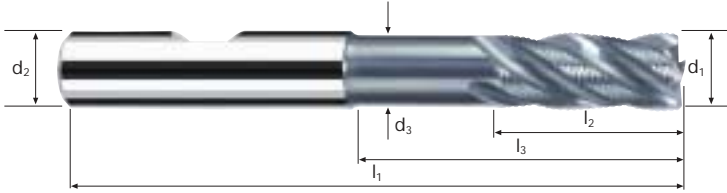
6	4	15	0.010	6	6	795	30	1.0
8	4	15	0.015	8	8	595	35	2.0
10	4	15	0.020	10	10	475	40	4.0
12	4	15	0.025	12	12	400	40	6.0
16	4	15	0.030	16	16	300	35	9.0
20	4	15	0.040	20	20	240	40	16.0


# Cylindrical end mills SX-FP

Profiled, medium length version with neck



HM  
XR    λ 35°  
          γ 0°



Roughing



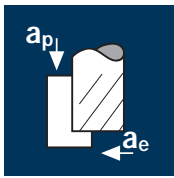
Finishing



Rm < 850	Rm 850-1100						<b>Inox</b> Stainless	Ti Titanium	<b>Tool Steel</b>
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Example: Order-N°.										POLYCHROM	
										P15304	
										P	
										15304	
										.300	
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	z			
.300	6	6	5.5	63	13	26	0.35	4	●		
.391	8	8	7.4	72	19	35	0.45	4	●		
.450	10	10	9.2	84	22	43	0.60	4	●		
.501	12	12	11.0	97	26	51	0.60	4	●		
.610	16	16	15.0	108	32	59	0.70	4	●		
.682	20	20	19.0	122	38	71	0.70	4	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**U** **P**  
 **P**

Steel  
850 - 1100 N/mm<sup>2</sup>

**U** **P**  
 **P**

Steel  
1100 - 1300 N/mm<sup>2</sup>

**U** **P**  
 **P**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**U**  
 **P**

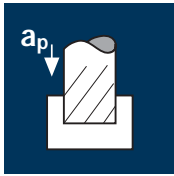
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	4	180	0.050	10	8.0	5730	1145	91.5
12	4	180	0.060	12	9.6	4775	1145	132.0
16	4	180	0.065	16	12.8	3580	930	190.5
20	4	180	0.080	20	16.0	2865	915	293.0

10	4	150	0.050	10	8.0	4775	955	76.5
12	4	150	0.060	12	9.6	3980	955	110.0
16	4	150	0.065	16	12.8	2985	775	158.5
20	4	150	0.080	20	16.0	2385	765	245.0

10	4	120	0.050	10	8.0	3820	765	61.0
12	4	120	0.055	12	9.6	3185	700	80.5
16	4	120	0.050	16	12.8	2385	475	97.5
20	4	120	0.060	20	16.0	1910	460	147.0

10	4	80	0.050	10	8.0	2545	510	41.0
12	4	80	0.055	12	9.6	2120	465	53.5
16	4	80	0.050	16	12.8	1590	320	65.5
20	4	80	0.060	20	16.0	1275	305	97.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**U** **P**  
 **P**

Steel  
850 - 1100 N/mm<sup>2</sup>

**U** **P**  
 **P**

Steel  
1100 - 1300 N/mm<sup>2</sup>

**U** **P**  
 **P**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**U**  
 **P**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	4	150	0.050	10	10	4775	955	95.5
12	4	150	0.050	12	12	3980	795	114.5
16	4	150	0.055	16	16	2985	655	167.5
20	4	150	0.060	20	20	2385	570	228.0

10	4	100	0.050	10	10	3185	635	63.5
12	4	100	0.050	12	12	2655	530	76.5
16	4	100	0.055	16	16	1990	440	112.5
20	4	100	0.060	20	20	1590	380	152.0

10	4	80	0.050	10	10	2545	510	51.0
12	4	80	0.050	12	12	2120	425	61.0
16	4	80	0.055	16	16	1590	350	89.5
20	4	80	0.060	20	20	1275	305	122.0

10	4	60	0.050	10	10	1910	380	38.0
12	4	60	0.050	12	12	1590	320	46.0
16	4	60	0.055	16	16	1195	265	68.0
20	4	60	0.060	20	20	955	230	92.0

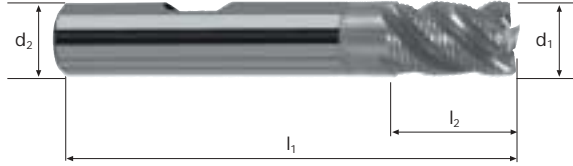


# Cylindrical end mills NX-FP

Profiled, short version



HM  
XR     $\lambda$  45°  
           $\gamma$  0°



Roughing



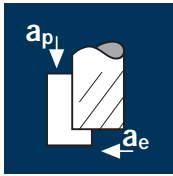
Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G) Tool Steel
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Example: Order-N°.							UNICUT-4X	POLYCHROM
		Coating <b>U</b>	Article-N°. <b>5176</b>	α-Code <b>.450</b>			<b>U5176</b>	<b>P5176</b>
∅ Code	d1 e8	d2 h6	l1	l2	45°	z		
.450	10	10	66	14	0.60	4	●	●
.501	12	12	73	16	0.60	4	●	●
.610	16	16	82	22	0.70	4	●	●
.682	20	20	92	26	0.70	4	●	●

### Application





### Material

Stainless steel  
[Cr-Ni/1.4301]


d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	4	70	0.030	12.0	8.0	2230	270	26.0
12	4	70	0.035	14.4	9.6	1855	260	36.0
16	4	70	0.045	19.2	12.8	1395	250	61.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

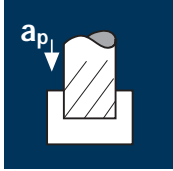
10	4	60	0.030	12.0	8.0	1910	230	22.0
12	4	60	0.035	14.4	9.6	1590	225	31.0
16	4	60	0.045	19.2	12.8	1195	215	53.0

Heat resistant steel  
[17-4 PH]

10	4	25	0.025	12.0	8.0	795	80	7.5
12	4	25	0.030	14.4	9.6	665	80	11.0
16	4	25	0.040	19.2	12.8	495	80	19.5


### Application





### Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	4	50	0.020	12.0	10	1590	125	15.0
12	4	50	0.025	14.4	12	1325	135	23.5
16	4	50	0.035	19.2	16	995	140	43.0

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

10	4	40	0.020	12.0	10	1275	100	12.0
12	4	40	0.025	14.4	12	1060	105	18.0
16	4	40	0.035	19.2	16	795	110	34.0

Heat resistant steel  
[17-4 PH]

10	4	20	0.020	12.0	10	635	50	6.0
12	4	20	0.025	14.4	12	530	55	9.5
16	4	20	0.030	19.2	16	400	50	15.5


# Cylindrical end mills SX-FP

Profiled, short version



<b>HM</b>	$\lambda$ <b>35°</b>
<b>XR</b>	$\gamma$ <b>0°</b>




Roughing

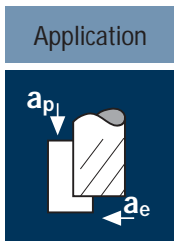


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Tool Steel</b>
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Example: Order-N°.							POLYCHROM	
		Coating	Article-N°.	α-Code				
		<b>P</b>	<b>15306</b>	<b>.450</b>				
Ø Code	d1 e8	d2 h6	l1	l2	45°	z		
<b>.450</b>	10	10	66	14	0.60	4	●	
<b>.501</b>	12	12	73	16	0.60	4	●	
<b>.610</b>	16	16	82	22	0.70	4	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	3	60	0.025	5	2.0	3820	285	3.0
6	3	60	0.030	6	2.4	3185	285	4.0
8	4	60	0.045	8	3.2	2385	430	11.0
10	4	60	0.055	10	4.0	1910	420	17.0
12	4	60	0.085	12	4.8	1590	540	31.0
16	4	60	0.110	16	6.4	1195	525	54.0
20	4	60	0.140	20	8.0	955	535	85.5
25	4	60	0.175	25	10.0	765	535	134.0
32	6	60	0.155	32	12.8	595	555	227.5

Steel  
850 - 1100 N/mm<sup>2</sup>

5	3	48	0.025	5	2.0	3055	230	2.5
6	3	48	0.030	6	2.4	2545	230	3.5
8	4	48	0.045	8	3.2	1910	345	9.0
10	4	48	0.055	10	4.0	1530	335	13.5
12	4	48	0.085	12	4.8	1275	435	25.0
16	4	48	0.110	16	6.4	955	420	43.0
20	4	48	0.140	20	8.0	765	430	69.0
25	4	48	0.175	25	10.0	610	425	106.5
32	6	48	0.155	32	12.8	475	440	180.0

Stainless steel  
[Cr-Ni/1.4301]

5	3	25	0.025	5	2.0	1590	120	1.0
6	3	25	0.030	6	2.4	1325	120	1.5
8	4	25	0.045	8	3.2	995	180	4.5
10	4	25	0.055	10	4.0	795	175	7.0
12	4	25	0.085	12	4.8	665	225	13.0
16	4	25	0.110	16	6.4	495	220	22.5
20	4	25	0.140	20	8.0	400	225	36.0
25	4	25	0.175	25	10.0	320	225	56.5
32	6	25	0.155	32	12.8	250	230	94.0

Cast iron  
(lamellar / spheroidal)

5	3	42	0.025	5	2.0	2675	200	2.0
6	3	42	0.030	6	2.4	2230	200	3.0
8	4	42	0.045	8	3.2	1670	300	7.5
10	4	42	0.055	10	4.0	1335	295	12.0
12	4	42	0.085	12	4.8	1115	380	22.0
16	4	42	0.110	16	6.4	835	365	37.5
20	4	42	0.140	20	8.0	670	375	60.0
25	4	42	0.175	25	10.0	535	375	94.0
32	6	42	0.155	32	12.8	420	390	159.5



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
5	3	55	0.020	5.0	5	3500	210	5.5
6	3	55	0.025	6.0	6	2920	220	8.0
8	4	55	0.030	8.0	8	2190	265	17.0
10	4	55	0.040	10.0	10	1750	280	28.0
12	4	55	0.065	12.0	12	1460	380	54.5
16	4	55	0.085	16.0	16	1095	370	94.5
20	4	55	0.105	20.0	20	875	370	148.0
25	4	55	0.130	25.0	25	700	365	228.0
32	6	55	0.115	32.0	32	545	375	384.0

Steel  
850 - 1100 N/mm<sup>2</sup>

5	3	45	0.020	5.0	5	2865	170	4.5
6	3	45	0.025	6.0	6	2385	180	6.5
8	4	45	0.030	8.0	8	1790	215	14.0
10	4	45	0.040	10.0	10	1430	230	23.0
12	4	45	0.065	12.0	12	1195	310	44.5
16	4	45	0.085	16.0	16	895	305	78.0
20	4	45	0.105	20.0	20	715	300	120.0
25	4	45	0.130	25.0	25	575	300	187.5
32	6	45	0.115	32.0	32	450	310	317.5

Stainless steel  
[Cr-Ni/1.4301]

5	3	22	0.020	5.0	5	1400	85	2.0
6	3	22	0.025	6.0	6	1165	85	3.0
8	4	22	0.030	8.0	8	875	105	6.5
10	4	22	0.040	10.0	10	700	110	11.0
12	4	22	0.065	12.0	12	585	150	21.5
16	4	22	0.085	16.0	16	440	150	38.5
20	4	22	0.105	20.0	20	350	145	58.0
25	4	22	0.130	25.0	25	280	145	90.5
32	6	22	0.115	32.0	32	220	150	153.5

Cast iron  
(lamellar / spheroidal)

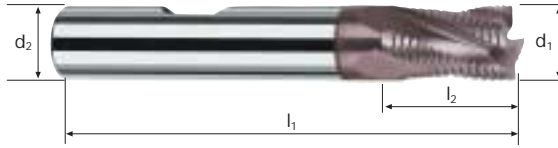
5	3	36	0.020	5.0	5	2290	135	3.5
6	3	36	0.025	6.0	6	1910	145	5.0
8	4	36	0.030	8.0	8	1430	170	11.0
10	4	36	0.040	10.0	10	1145	185	18.5
12	4	36	0.065	12.0	12	955	250	36.0
16	4	36	0.085	16.0	16	715	245	62.5
20	4	36	0.105	20.0	20	575	240	96.0
25	4	36	0.130	25.0	25	460	240	150.0
32	6	36	0.115	32.0	32	360	250	256.0

# Cylindrical end mills

Profiled NRF, short version



**HSS-E**  $\lambda$  25°  
**Co8**  $\gamma$  10°



Roughing



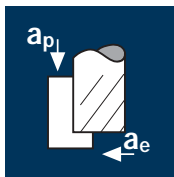
Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **GG(G)**

Example: Order-N°.									UNICUT-4X	
									U0640	
$\emptyset$ Code	d1 k12	d2 h6	l1	l2	45°	$\alpha$	z	UNICUT-4X		
.260	5	6	52	8	0.40	2.0°	3	●		
.300	6	6	52	8	0.40	0.0°	3	●		
.391	8	8	55	11	0.40	0.0°	4	●		
.450	10	10	63	13	0.40	0.0°	4	●		
.501	12	12	73	16	0.40	0.0°	4	●		
.610	16	16	79	19	0.50	0.0°	4	●		
.682	20	20	88	22	0.50	0.0°	4	●		
.772	25	25	102	26	0.70	0.0°	4	●		
.832	32	32	112	32	0.70	0.0°	6	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	28	0.020	15	2.4	1485	90	3.0
8	4	28	0.030	20	3.2	1115	135	8.5
10	4	28	0.035	25	4.0	890	125	12.5
12	4	28	0.055	30	4.8	745	165	24.0
16	4	28	0.075	40	6.4	555	165	42.0
20	4	28	0.095	50	8.0	445	170	68.0
25	4	28	0.115	63	10.0	355	165	103.0
32	6	28	0.105	80	12.8	280	175	179.0
40	6	28	0.130	100	16.0	225	175	280.0

6	3	22	0.020	15	2.4	1165	70	2.5
8	4	22	0.030	20	3.2	875	105	6.5
10	4	22	0.035	25	4.0	700	100	10.0
12	4	22	0.055	30	4.8	585	130	18.5
16	4	22	0.075	40	6.4	440	130	33.5
20	4	22	0.095	50	8.0	350	135	54.0
25	4	22	0.115	63	10.0	280	130	81.5
32	6	22	0.105	80	12.8	220	140	143.5
40	6	22	0.130	100	16.0	175	135	216.0

6	3	11	0.020	15	2.4	585	35	1.5
8	4	11	0.030	20	3.2	440	55	3.5
10	4	11	0.035	25	4.0	350	50	5.0
12	4	11	0.055	30	4.8	290	65	9.5
16	4	11	0.075	40	6.4	220	65	16.5
20	4	11	0.095	50	8.0	175	65	26.0
25	4	11	0.115	63	10.0	140	65	40.5
32	6	11	0.105	80	12.8	110	70	71.5
40	6	11	0.130	100	16.0	90	70	112.0

6	3	20	0.020	15	2.4	1060	65	2.5
8	4	20	0.030	20	3.2	795	95	6.0
10	4	20	0.035	25	4.0	635	90	9.0
12	4	20	0.055	30	4.8	530	115	16.5
16	4	20	0.075	40	6.4	400	120	30.5
20	4	20	0.095	50	8.0	320	120	48.0
25	4	20	0.115	63	10.0	255	115	72.0
32	6	20	0.105	80	12.8	200	125	128.0
40	6	20	0.130	100	16.0	160	125	200.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	25	0.020	3.0	6	1325	80	1.5
8	4	25	0.025	4.0	8	995	100	3.0
10	4	25	0.035	5.0	10	795	110	5.5
12	4	25	0.055	6.0	12	665	145	10.5
16	4	25	0.070	8.0	16	495	140	18.0
20	4	25	0.090	10.0	20	400	145	29.0
25	4	25	0.110	12.5	25	320	140	44.0
32	6	25	0.095	16.0	32	250	145	74.0
40	6	25	0.120	20.0	40	200	145	116.0

6	3	18	0.020	3.0	6	955	55	1.0
8	4	18	0.025	4.0	8	715	70	2.0
10	4	18	0.035	5.0	10	575	80	4.0
12	4	18	0.055	6.0	12	475	105	7.5
16	4	18	0.070	8.0	16	360	100	13.0
20	4	18	0.090	10.0	20	285	105	21.0
25	4	18	0.110	12.5	25	230	100	31.5
32	6	18	0.095	16.0	32	180	105	54.0
40	6	18	0.120	20.0	40	145	105	84.0

6	3	10	0.020	3.0	6	530	30	0.5
8	4	10	0.025	4.0	8	400	40	1.5
10	4	10	0.035	5.0	10	320	45	2.5
12	4	10	0.055	6.0	12	265	60	4.5
16	4	10	0.070	8.0	16	200	55	7.0
20	4	10	0.090	10.0	20	160	60	12.0
25	4	10	0.110	12.5	25	125	55	17.0
32	6	10	0.095	16.0	32	100	55	28.0
40	6	10	0.120	20.0	40	80	60	48.0

6	3	16	0.020	3.0	6	850	50	1.0
8	4	16	0.025	4.0	8	635	65	2.0
10	4	16	0.035	5.0	10	510	70	3.5
12	4	16	0.055	6.0	12	425	95	7.0
16	4	16	0.070	8.0	16	320	90	11.5
20	4	16	0.090	10.0	20	255	90	18.0
25	4	16	0.110	12.5	25	205	90	28.0
32	6	16	0.095	16.0	32	160	90	46.0
40	6	16	0.120	20.0	40	125	90	72.0

# Cylindrical end mills

Profiled NRF, long version



HSS-E  
Co8    λ 25°  
          γ 10°



Roughing

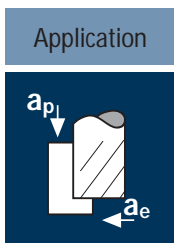


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless		GG(G)
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Example: Order-N°.									UNICUT-4X	
									U0665	
∅ Code	d1 k12	d2 h6	l1	l2	45°	α	z			
.260	5	6	68	24	0.40	1.0°	3	●		
.300	6	6	68	24	0.40	0.0°	3	●		
.342	7	10	80	30	0.40	2.5°	3	●		
.391	8	8	82	38	0.40	0.0°	4	●		
.402	8	10	88	38	0.40	1.0°	4	●		
.420	9	10	88	38	0.40	0.0°	4	●		
.450	10	10	95	45	0.40	0.0°	4	●		
.470	11	12	102	45	0.40	0.0°	4	●		
.501	12	12	110	53	0.40	0.0°	4	●		
.540	13	12	110	53	0.40	0.0°	4	●		
.570	14	12	110	53	0.40	0.0°	4	●		
.610	16	16	123	63	0.50	0.0°	4	●		
.640	18	16	123	63	0.50	0.0°	4	●		
.682	20	20	141	75	0.50	0.0°	4	●		
.710	22	20	141	75	0.70	0.0°	4	●		
.772	25	25	166	90	0.70	0.0°	4	●		
.800	28	25	166	90	0.70	0.0°	6	●		
.810	30	25	166	90	0.70	0.0°	6	●		
.832	32	32	186	106	0.70	0.0°	6	●		
.860	36	32	186	106	0.90	0.0°	6	●		
.892	40	40	217	125	0.90	0.0°	6	●		



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	27	0.015	6	1.2	1430	85	0.5
8	4	27	0.020	8	1.6	1075	85	1.0
10	4	27	0.025	10	2.0	860	85	1.5
12	4	27	0.035	12	2.4	715	100	3.0
16	4	27	0.050	16	3.2	535	105	5.5
20	4	27	0.060	20	4.0	430	105	8.5
25	4	27	0.080	25	5.0	345	110	14.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	22	0.015	6	1.2	1165	70	0.5
8	4	22	0.020	8	1.6	875	70	1.0
10	4	22	0.025	10	2.0	700	70	1.5
12	4	22	0.035	12	2.4	585	80	2.5
16	4	22	0.050	16	3.2	440	90	4.5
20	4	22	0.060	20	4.0	350	85	7.0
25	4	22	0.080	25	5.0	280	90	11.5

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

6	4	16	0.015	6	1.2	850	50	0.5
8	4	16	0.020	8	1.6	635	50	0.5
10	4	16	0.025	10	2.0	510	50	1.0
12	4	16	0.035	12	2.4	425	60	1.5
16	4	16	0.050	16	3.2	320	65	3.5
20	4	16	0.060	20	4.0	255	60	5.0
25	4	16	0.080	25	5.0	205	65	8.0

Cast iron  
(lamellar / spheroidal)

6	4	24	0.015	6	1.2	1275	75	0.5
8	4	24	0.020	8	1.6	955	75	1.0
10	4	24	0.025	10	2.0	765	75	1.5
12	4	24	0.035	12	2.4	635	90	2.5
16	4	24	0.050	16	3.2	475	95	5.0
20	4	24	0.060	20	4.0	380	90	7.0
25	4	24	0.080	25	5.0	305	100	12.5



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	24	0.020	3	6	1275	100	2.0
8	4	24	0.025	4	8	955	95	3.0
10	4	24	0.030	5	10	765	90	4.5
12	4	24	0.045	6	12	635	115	8.5
16	4	24	0.065	8	16	475	125	16.0
20	4	24	0.080	10	20	380	120	24.0
25	4	24	0.100	13	25	305	120	37.5

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	20	0.020	3	6	1060	85	1.5
8	4	20	0.025	4	8	795	80	2.5
10	4	20	0.030	5	10	635	75	4.0
12	4	20	0.045	6	12	530	95	7.0
16	4	20	0.065	8	16	400	105	13.5
20	4	20	0.080	10	20	320	100	20.0
25	4	20	0.100	13	25	255	100	31.5

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

6	4	14	0.020	3	6	745	60	1.0
8	4	14	0.025	4	8	555	55	2.0
10	4	14	0.030	5	10	445	55	3.0
12	4	14	0.045	6	12	370	65	4.5
16	4	14	0.065	8	16	280	75	9.5
20	4	14	0.080	10	20	225	70	14.0
25	4	14	0.100	13	25	180	70	22.0

Cast iron  
(lamellar / spheroidal)

6	4	21	0.020	3	6	1115	90	1.5
8	4	21	0.025	4	8	835	85	2.5
10	4	21	0.030	5	10	670	80	4.0
12	4	21	0.045	6	12	555	100	7.0
16	4	21	0.065	8	16	420	110	14.0
20	4	21	0.080	10	20	335	105	21.0
25	4	21	0.100	13	25	265	105	33.0



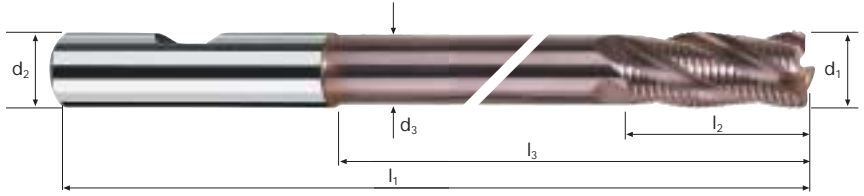
# Cylindrical end mills Supracut

Profiled NRC, extra-long version with neck



**HSS PM/F**     $\lambda$  **30°**  
                      $\gamma$  **12°**

**45°**



Roughing



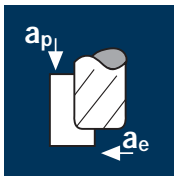
Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    GG(G)

Example: Order-N°.										UNICUT-4X	
										<b>U0621</b>	
$\emptyset$ Code	d1 k8	d2 h6	d3	l1	l2	l3	45°	z			
<b>.300</b>	6	6	5.5	81	13	44	0.40	4	●		
<b>.391</b>	8	8	7.4	101	19	64	0.40	4	●		
<b>.450</b>	10	10	9.2	117	22	76	0.40	4	●		
<b>.501</b>	12	12	11.0	136	26	90	0.40	4	●		
<b>.610</b>	16	16	14.5	155	32	106	0.50	4	●		
<b>.682</b>	20	20	18.0	179	38	128	0.50	4	●		
<b>.772</b>	25	25	23.0	211	45	154	0.70	4	●		

### Application



### Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

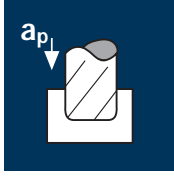
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	50	0.025	9	3.6	2655	265	8.5
8	4	50	0.035	12	4.8	1990	280	16.0
10	4	50	0.045	15	6.0	1590	285	25.5
12	4	50	0.050	18	7.2	1325	265	34.5
16	4	50	0.050	24	9.6	995	200	46.0
20	4	50	0.055	30	12.0	795	175	63.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

6	4	70	0.025	9	3.6	3715	370	12.0
8	4	70	0.035	12	4.8	2785	390	22.5
10	4	70	0.045	15	6.0	2230	400	36.0
12	4	70	0.050	18	7.2	1855	370	48.0
16	4	70	0.050	24	9.6	1395	280	64.5
20	4	70	0.055	30	12.0	1115	245	88.0



### Application



### Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	40	0.015	9	6	2120	125	7.0
8	4	40	0.025	12	8	1590	160	15.5
10	4	40	0.030	15	10	1275	155	23.5
12	4	40	0.040	18	12	1060	170	36.5
16	4	40	0.040	24	16	795	125	48.0
20	4	40	0.045	30	20	635	115	69.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

6	4	60	0.015	9	6	3185	190	10.5
8	4	60	0.025	12	8	2385	240	23.0
10	4	60	0.030	15	10	1910	230	34.5
12	4	60	0.040	18	12	1590	255	55.0
16	4	60	0.040	24	16	1195	190	73.0
20	4	60	0.045	30	20	955	170	102.0

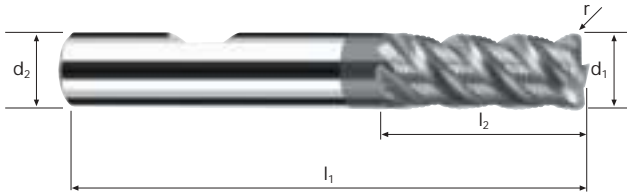


# Corner radius end mills TX-FP

Profiled, normal version



**HM**  $\lambda$  45°  
**XR**  $\gamma$  0°



Roughing



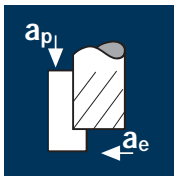
Finishing



**Ti**  
Titanium

Example: Order-N°.							TRIBO-N	
							N15389	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	Z		
.302	6	6	57	13	1.0	4	●	
.391	8	8	63	19	1.0	4	●	
.450	10	10	72	22	1.0	4	●	
.501	12	12	83	26	1.0	4	●	
.608	16	16	92	32	1.0	4	●	
.680	20	20	104	38	1.0	4	●	
.457	10	10	72	22	2.5	4	●	
.506	12	12	83	26	2.5	4	●	
.612	16	16	92	32	2.5	4	●	
.684	20	20	104	38	2.5	4	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	5	180	0.010	5	0.05	19100	955
4	5	180	0.010	6	0.05	14325	715
5	5	180	0.015	8	0.05	11460	860
6	5	180	0.015	9	0.10	9550	715
8	7	180	0.025	12	0.10	7160	1255
10	7	180	0.030	15	0.10	5730	1205
12	7	180	0.035	18	0.10	4775	1170
16	7	180	0.045	24	0.20	3580	1130
20	7	180	0.055	30	0.20	2865	1105

3	5	150	0.010	5	0.05	15915	795
4	5	150	0.010	6	0.05	11935	595
5	5	150	0.015	8	0.05	9550	715
6	5	150	0.015	9	0.10	7960	595
8	7	150	0.025	12	0.10	5970	1045
10	7	150	0.030	15	0.10	4775	1005
12	7	150	0.035	18	0.10	3980	975
16	7	150	0.045	24	0.20	2985	940
20	7	150	0.055	30	0.20	2385	920

3	5	120	0.008	5	0.05	12735	510
4	5	120	0.010	6	0.05	9550	480
5	5	120	0.012	8	0.05	7640	460
6	5	120	0.016	9	0.10	6365	510
8	7	120	0.020	12	0.10	4775	670
10	7	120	0.026	15	0.10	3820	695
12	7	120	0.030	18	0.10	3185	670
16	7	120	0.040	24	0.20	2385	670
20	7	120	0.050	30	0.20	1910	670

3	5	180	0.010	5	0.05	19100	955
4	5	180	0.010	6	0.05	14325	715
5	5	180	0.015	8	0.05	11460	860
6	5	180	0.015	9	0.10	9550	715
8	7	180	0.025	12	0.10	7160	1255
10	7	180	0.030	15	0.10	5730	1205
12	7	180	0.035	18	0.10	4775	1170
16	7	180	0.045	24	0.20	3580	1130
20	7	180	0.055	30	0.20	2865	1105

## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	5	70	0.010	5	0.05	7425	370
4	5	70	0.010	6	0.05	5570	280
5	5	70	0.015	8	0.05	4455	335
6	5	70	0.015	9	0.10	3715	280
8	7	70	0.025	12	0.10	2785	485
10	7	70	0.030	15	0.10	2230	470
12	7	70	0.035	18	0.10	1855	455
16	7	70	0.045	24	0.20	1395	440
20	7	70	0.055	30	0.20	1115	430

3	5	80	0.010	5	0.05	8490	425
4	5	80	0.010	6	0.05	6365	320
5	5	80	0.015	8	0.05	5095	380
6	5	80	0.015	9	0.10	4245	320
8	7	80	0.025	12	0.10	3185	555
10	7	80	0.030	15	0.10	2545	535
12	7	80	0.035	18	0.10	2120	520
16	7	80	0.045	24	0.20	1590	500
20	7	80	0.055	30	0.20	1275	490

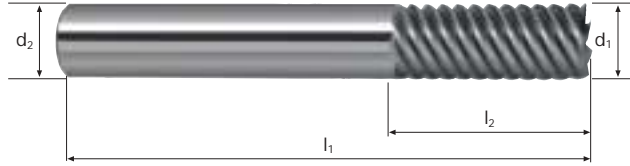


# Cylindrical end mills Multicut XF

Finishing, normal version



**HM**  
**XA**    λ **65°**  
          γ **8°**



**new!**

Roughing



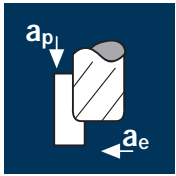
Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **GG(G)**

Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z	POLYCHROM	
Example: Order-N°.    Coating: <b>P</b> Article-N°. <b>15250</b> α-Code: <b>.180</b>								P15250	
<b>.180</b>	3	6	57	8	-	6.0°	5	●	
<b>.220</b>	4	6	57	11	-	4.0°	5	●	
<b>.260</b>	5	6	57	13	-	2.0°	5	●	
<b>.300</b>	6	6	57	13	0.15	0.0°	5	●	
<b>.391</b>	8	8	63	19	0.15	0.0°	7	●	
<b>.450</b>	10	10	72	22	0.20	0.0°	7	●	
<b>.501</b>	12	12	83	26	0.20	0.0°	7	●	
<b>.610</b>	16	16	92	32	0.20	0.0°	7	●	
<b>.682</b>	20	20	104	38	0.20	0.0°	7	●	

# Application



# Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	150	0.008	4.5	0.1	15915	510
4	4	150	0.012	6.0	0.1	11935	575
5	5	150	0.014	7.5	0.1	9550	670
6	6	150	0.015	9.0	0.1	7960	715
8	6	150	0.025	12.0	0.1	5970	895
10	6	150	0.030	15.0	0.1	4775	860
12	6	150	0.035	18.0	0.1	3980	835
16	6	150	0.045	24.0	0.2	2985	805

Hardened tool steel  
48 - 52 HRC



3	4	120	0.008	4.5	0.1	12735	410
4	4	120	0.012	6.0	0.1	9550	460
5	5	120	0.014	7.5	0.1	7640	535
6	6	120	0.015	9.0	0.1	6365	575
8	6	120	0.025	12.0	0.1	4775	715
10	6	120	0.030	15.0	0.1	3820	690
12	6	120	0.035	18.0	0.1	3185	670
16	6	120	0.045	24.0	0.2	2385	645

Hardened tool steel  
52 - 56 HRC



3	4	100	0.008	4.5	0.1	10610	340
4	4	100	0.012	6.0	0.1	7960	380
5	5	100	0.014	7.5	0.1	6365	445
6	6	100	0.015	9.0	0.1	5305	475
8	6	100	0.025	12.0	0.1	3980	595
10	6	100	0.030	15.0	0.1	3185	575
12	6	100	0.035	18.0	0.1	2655	560
16	6	100	0.045	24.0	0.2	1990	535

Hardened tool steel  
56 - 60 HRC



3	4	80	0.008	4.5	0.1	8490	270
4	4	80	0.010	6.0	0.1	6365	255
5	5	80	0.012	7.5	0.1	5095	305
6	6	80	0.016	9.0	0.1	4245	410
8	6	80	0.020	12.0	0.1	3185	380
10	6	80	0.026	15.0	0.1	2545	395
12	6	80	0.030	18.0	0.1	2120	380
16	6	80	0.040	24.0	0.2	1590	380

# Material

Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	180	0.008	4.5	0.1	19100	610
4	4	180	0.012	6.0	0.1	14325	690
5	5	180	0.014	7.5	0.1	11460	800
6	6	180	0.015	9.0	0.1	9550	860
8	6	180	0.025	12.0	0.1	7160	1075
10	6	180	0.030	15.0	0.1	5730	1030
12	6	180	0.035	18.0	0.1	4775	1005
16	6	180	0.045	24.0	0.2	3580	965

Titanium alloys  
>300 HB  
[Ti6Al4V]



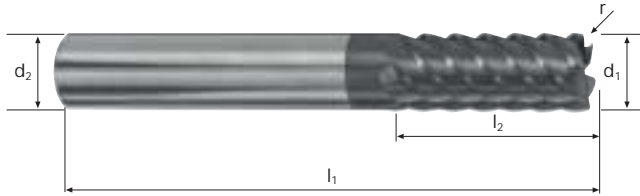
3	4	70	0.008	4.5	0.1	7425	240
4	4	70	0.012	6.0	0.1	5570	265
5	5	70	0.014	7.5	0.1	4455	310
6	6	70	0.015	9.0	0.1	3715	335
8	6	70	0.025	12.0	0.1	2785	420
10	6	70	0.030	15.0	0.1	2230	400
12	6	70	0.035	18.0	0.1	1855	390
16	6	70	0.045	24.0	0.2	1395	375

# Cylindrical end mills Multicut HX-R

Finishing, normal version



**HM**  
**MG10**     $\lambda$  55°  
                   $\gamma$ -10°



Roughing



Finishing



**Rm**  
1300-1500

**HRC**  
48-56

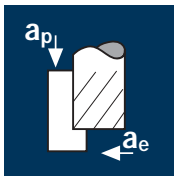
**HRC**  
56-60

**Ti**  
Titanium

**GG(G)**

Example: Order-N°.								DURO-S	
								D5264	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	r 0/+0,03	$\alpha$	Z		
.178	3	6	57	8	0.2	6.0°	4	●	
.218	4	6	57	11	0.2	4.0°	4	●	
.258	5	6	57	13	0.2	2.0°	5	●	
.297	6	6	57	13	0.2	0.0°	6	●	
.388	8	8	63	19	0.2	0.0°	6	●	
.445	10	10	72	22	0.2	0.0°	6	●	
.496	12	12	83	26	0.2	0.0°	6	●	
.605	16	16	92	32	0.2	0.0°	6	●	
.180	3	6	57	8	0.5	6.0°	4	●	
.220	4	6	57	11	0.5	4.0°	4	●	
.260	5	6	57	13	0.5	2.0°	5	●	
.300	6	6	57	13	0.5	0.0°	6	●	
.391	8	8	63	19	0.5	0.0°	6	●	
.450	10	10	72	22	0.5	0.0°	6	●	
.501	12	12	83	26	0.5	0.0°	6	●	
.610	16	16	92	32	0.5	0.0°	6	●	

## Application



## Material

Hardened tool steel  
48 - 52 HRC

**D**

Hardened tool steel  
52 - 56 HRC

**D**

Hardened tool steel  
56 - 60 HRC

**D**

Hardened tool steel  
> 60 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	150	0.008	4.5	0.1	15915	510
4	4	150	0.010	6.0	0.1	11935	475
5	5	150	0.014	7.5	0.1	9550	670
6	6	150	0.016	9.0	0.1	7960	765
8	6	150	0.022	12.0	0.1	5970	790
10	6	150	0.028	15.0	0.1	4775	800
12	6	150	0.032	18.0	0.1	3980	765
16	6	150	0.044	24.0	0.2	2985	790
20	8	150	0.054	30.0	0.2	2385	1030

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	120	0.008	4.5	0.1	12735	410
4	4	120	0.010	6.0	0.1	9550	380
5	5	120	0.014	7.5	0.1	7640	535
6	6	120	0.016	9.0	0.1	6365	610
8	6	120	0.022	12.0	0.1	4775	630
10	6	120	0.028	15.0	0.1	3820	640
12	6	120	0.032	18.0	0.1	3185	610
16	6	120	0.044	24.0	0.2	2385	630
20	8	120	0.054	30.0	0.2	1910	825

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	100	0.008	4.5	0.1	10610	340
4	4	100	0.010	6.0	0.1	7960	320
5	5	100	0.014	7.5	0.1	6365	445
6	6	100	0.016	9.0	0.1	5305	510
8	6	100	0.022	12.0	0.1	3980	525
10	6	100	0.028	15.0	0.1	3185	535
12	6	100	0.032	18.0	0.1	2655	510
16	6	100	0.044	24.0	0.2	1990	525
20	8	100	0.054	30.0	0.2	1590	685

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	80	0.008	4.5	0.1	8490	270
4	4	80	0.010	6.0	0.1	6365	255
5	5	80	0.012	7.5	0.1	5095	305
6	6	80	0.016	9.0	0.1	4245	410
8	6	80	0.020	12.0	0.1	3185	380
10	6	80	0.026	15.0	0.1	2545	395
12	6	80	0.030	18.0	0.1	2120	380
16	6	80	0.040	24.0	0.2	1590	380
20	8	80	0.050	30.0	0.2	1275	510

## Material

High speed steel,  
hardened

**D**

Cast iron  
(lamellar / spheroidal)

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	50	0.008	4.5	0.1	5305	170
4	4	50	0.010	6.0	0.1	3980	160
5	5	50	0.012	7.5	0.1	3185	190
6	6	50	0.016	9.0	0.1	2655	255
8	6	50	0.020	12.0	0.1	1990	240
10	6	50	0.026	15.0	0.1	1590	250
12	6	50	0.030	18.0	0.1	1325	240
16	6	50	0.040	24.0	0.2	995	240
20	8	50	0.050	30.0	0.2	795	320

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	220	0.008	4.5	0.1	23345	745
4	4	220	0.010	6.0	0.1	17510	700
5	5	220	0.014	7.5	0.1	14005	980
6	6	220	0.016	9.0	0.1	11670	1120
8	6	220	0.022	12.0	0.1	8755	1155
10	6	220	0.028	15.0	0.1	7005	1175
12	6	220	0.032	18.0	0.1	5835	1120
16	6	220	0.044	24.0	0.2	4375	1155
20	8	220	0.054	30.0	0.2	3500	1510

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]

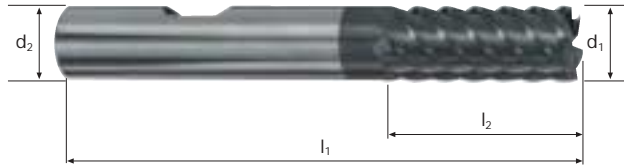


# Cylindrical end mills Multicut HX-H

Finishing, normal version



**HM  
XA**     $\lambda$  **55°**  
            $\gamma$  **-10°**



Roughing



Finishing



**HRC**  
48-56

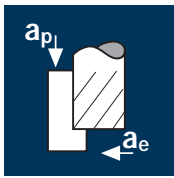
**HRC**  
56-60

**HRC**  
> 60

HSS  
GG(G)




Example: Order-N°.		Coating <b>D</b>	Article-N°. <b>5366</b>	$\alpha$ -Code <b>.180</b>				DURO-S	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z	<b>D5366</b>	<b>D5266</b>
<b>.180</b>	3	6	57	8	0.10	6.0°	4	●	
<b>.220</b>	4	6	57	11	0.10	4.0°	4	●	
<b>.260</b>	5	6	57	13	0.15	2.0°	5	●	
<b>.300</b>	6	6	57	13	0.15	0.0°	6	●	
<b>.391</b>	8	8	63	19	0.15	0.0°	6	●	
<b>.450</b>	10	10	72	22	0.20	0.0°	6	●	
<b>.501</b>	12	12	83	26	0.20	0.0°	6	●	
<b>.610</b>	16	16	92	32	0.20	0.0°	6	●	
<b>.682</b>	20	20	104	38	0.20	0.0°	8	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>





Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	140	0.015	9	0.1	7425	670
8	6	140	0.025	12	0.1	5570	835
10	6	140	0.030	15	0.1	4455	800
12	6	140	0.035	18	0.1	3715	780
16	8	140	0.045	24	0.2	2785	1005
20	10	140	0.055	30	0.2	2230	1225



6	6	120	0.015	9	0.1	6365	575
8	6	120	0.025	12	0.1	4775	715
10	6	120	0.030	15	0.1	3820	690
12	6	120	0.035	18	0.1	3185	670
16	8	120	0.045	24	0.2	2385	860
20	10	120	0.055	30	0.2	1910	1050

6	6	80	0.016	9	0.1	4245	410
8	6	80	0.020	12	0.1	3185	380
10	6	80	0.026	15	0.1	2545	395
12	6	80	0.030	18	0.1	2120	380
16	8	80	0.040	24	0.2	1590	510
20	10	80	0.050	30	0.2	1275	640



6	6	140	0.015	9	0.1	7425	670
8	6	140	0.025	12	0.1	5570	835
10	6	140	0.030	15	0.1	4455	800
12	6	140	0.035	18	0.1	3715	780
16	8	140	0.045	24	0.2	2785	1005
20	10	140	0.055	30	0.2	2230	1225

## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	60	0.015	9	0.1	3185	285
8	6	60	0.025	12	0.1	2385	360
10	6	60	0.030	15	0.1	1910	345
12	6	60	0.035	18	0.1	1590	335
16	8	60	0.045	24	0.2	1195	430
20	10	60	0.055	30	0.2	955	525

6	6	200	0.015	9	0.1	10610	955
8	6	200	0.025	12	0.1	7960	1195
10	6	200	0.030	15	0.1	6365	1145
12	6	200	0.035	18	0.1	5305	1115
16	8	200	0.045	24	0.2	3980	1435
20	10	200	0.055	30	0.2	3185	1750

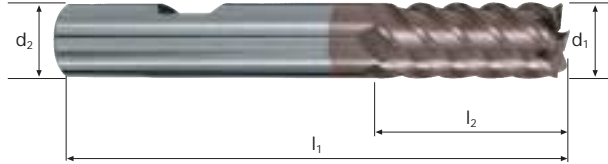


# Cylindrical end mills Multicut N

Finishing, normal version



**HM**  
**MG10**      $\lambda$  45°  
                       $\gamma$  8°



Roughing



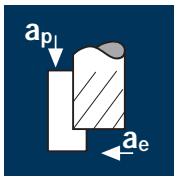
Finishing



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500					<b>Ti</b> Titanium	<b>GG(G)</b> Copper
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Example: Order-N°.							UNICUT-4X	
	Coating <b>U</b>		Article-N°. <b>5360</b>		α-Code <b>.300</b>			<b>U5360</b>
								<b>U5260</b>
∅ Code	d1 e8	d2 h6	l1	l2	45°	z		
<b>.300</b>	6	6	57	13	0.15	6	●	
<b>.391</b>	8	8	63	19	0.15	6	●	
<b>.450</b>	10	10	72	22	0.20	6	●	
<b>.501</b>	12	12	83	26	0.20	6	●	
<b>.610</b>	16	16	92	32	0.20	8	●	
<b>.682</b>	20	20	104	38	0.20	10	●	

## Application



## Material




Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	120	0.016	9	0.1	6365	610
8	6	120	0.020	12	0.1	4775	575
10	6	120	0.026	15	0.1	3820	595
12	6	120	0.030	18	0.1	3185	575
16	6	120	0.040	24	0.2	2385	570
20	6	120	0.050	30	0.2	1910	575



6	6	100	0.016	9	0.1	5305	510
8	6	100	0.020	12	0.1	3980	480
10	6	100	0.026	15	0.1	3185	495
12	6	100	0.030	18	0.1	2655	480
16	6	100	0.040	24	0.2	1990	480
20	6	100	0.050	30	0.2	1590	475

6	6	120	0.016	9	0.1	6365	610
8	6	120	0.020	12	0.1	4775	575
10	6	120	0.026	15	0.1	3820	595
12	6	120	0.030	18	0.1	3185	575
16	6	120	0.040	24	0.2	2385	570
20	6	120	0.050	30	0.2	1910	575

6	6	50	0.016	9	0.1	2655	255
8	6	50	0.020	12	0.1	1990	240
10	6	50	0.026	15	0.1	1590	250
12	6	50	0.030	18	0.1	1325	240
16	6	50	0.040	24	0.2	995	240
20	6	50	0.050	30	0.2	795	240

## Material

Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	180	0.016	9	0.1	9550	915
8	6	180	0.020	12	0.1	7160	860
10	6	180	0.026	15	0.1	5730	895
12	6	180	0.030	18	0.1	4775	860
16	6	180	0.040	24	0.2	3580	860
20	6	180	0.050	30	0.2	2865	860

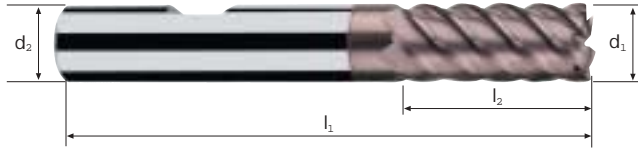



# Cylindrical end mills

Finishing, normal version



<b>HM</b>	$\lambda$ <b>45°</b> $\gamma$ <b>8°</b>

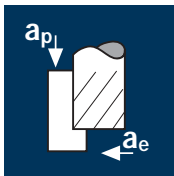


<b>Roughing</b>	<b>Finishing</b>

<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Ti</b> Titanium	<b>GG(G)</b> <b>Copper</b>
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							<b>UNICUT-4X</b>	
Example: Order-N°.							<b>U45360</b>	
	Coating <b>U</b>		Article-N° <b>45360</b>		ø-Code <b>.300</b>			
Ø Code	d1 e8	d2 h6	l1	l2	45°	z		
<b>.300</b>	6	6	57	13	0.15	6	●	
<b>.391</b>	8	8	63	19	0.15	6	●	
<b>.450</b>	10	10	72	22	0.20	6	●	
<b>.501</b>	12	12	83	26	0.20	6	●	
<b>.610</b>	16	16	92	32	0.20	6	●	
<b>.682</b>	20	20	104	38	0.20	6	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

**P**  
 **P**

Steel  
1100 - 1300 N/mm<sup>2</sup>

**P**  
 **P**

Steel  
1300 - 1500 N/mm<sup>2</sup>

**P**  
 **P**

Cast iron  
(lamellar / spheroidal)

**P**  
 **P**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	5	150	0.015	15	0.15	7960	595
8	7	150	0.025	20	0.15	5970	1045
10	7	150	0.030	25	0.15	4775	1005
12	7	150	0.035	30	0.15	3980	975
16	7	150	0.045	40	0.25	2985	940
20	7	150	0.055	50	0.25	2385	920

6	5	120	0.015	15	0.15	6365	475
8	7	120	0.025	20	0.15	4775	835
10	7	120	0.030	25	0.15	3820	800
12	7	120	0.035	30	0.15	3185	780
16	7	120	0.045	40	0.25	2385	750
20	7	120	0.055	50	0.25	1910	735

6	5	100	0.016	15	0.15	5305	425
8	7	100	0.020	20	0.15	3980	555
10	7	100	0.026	25	0.15	3185	580
12	7	100	0.030	30	0.15	2655	560
16	7	100	0.040	40	0.25	1990	555
20	7	100	0.050	50	0.25	1590	555

6	5	150	0.015	15	0.15	7960	595
8	7	150	0.025	20	0.15	5970	1045
10	7	150	0.030	25	0.15	4775	1005
12	7	150	0.035	30	0.15	3980	975
16	7	150	0.045	40	0.25	2985	940
20	7	150	0.055	50	0.25	2385	920

## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

**P**

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

**P**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	5	60	0.015	15	0.15	3185	240
8	7	60	0.025	20	0.15	2385	415
10	7	60	0.030	25	0.15	1910	400
12	7	60	0.035	30	0.15	1590	390
16	7	60	0.045	40	0.25	1195	375
20	7	60	0.055	50	0.25	955	370

6	5	70	0.015	15	0.15	3715	280
8	7	70	0.025	20	0.15	2785	485
10	7	70	0.030	25	0.15	2230	470
12	7	70	0.035	30	0.15	1855	455
16	7	70	0.045	40	0.25	1395	440
20	7	70	0.055	50	0.25	1115	430

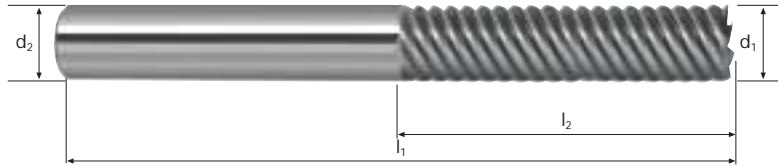


# Cylindrical end mills Multicut XF

Finishing, medium length version



**HM XA**     $\lambda$  65°  
                    $\gamma$  8°



new!

Roughing

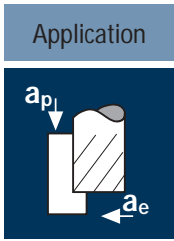


Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500			<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.							<b>POLYCHROM</b>	
			<u>Coating</u> <b>P</b>	<u>Article-N°.</u> <b>15251</b>	<u>α-Code</u> <b>.300</b>	<input type="text"/>	<b>P15251</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	Z		
.300	6	6	63	19	0.15	5	●	
.391	8	8	72	28	0.15	7	●	
.450	10	10	84	34	0.20	7	●	
.501	12	12	97	40	0.20	7	●	
.610	16	16	108	48	0.20	7	●	
.682	20	20	122	56	0.20	7	●	



Material

Hardened tool steel  
48 - 52 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	120	0.016	15	0.15	6365	610
8	6	120	0.022	20	0.15	4775	630
10	6	120	0.028	25	0.15	3820	640
12	6	120	0.032	30	0.15	3185	610
16	6	120	0.044	40	0.25	2385	630
20	8	120	0.054	50	0.25	1910	825

Hardened tool steel  
52 - 56 HRC

**D**

6	6	100	0.016	15	0.15	5305	510
8	6	100	0.022	20	0.15	3980	525
10	6	100	0.028	25	0.15	3185	535
12	6	100	0.032	30	0.15	2655	510
16	6	100	0.044	40	0.25	1990	525
20	8	100	0.054	50	0.25	1590	685

Hardened tool steel  
56 - 60 HRC

**D**

6	6	80	0.016	15	0.15	4245	410
8	6	80	0.022	20	0.15	3185	420
10	6	80	0.028	25	0.15	2545	430
12	6	80	0.032	30	0.15	2120	405
16	6	80	0.044	40	0.25	1590	420
20	8	80	0.054	50	0.25	1275	550

Hardened tool steel  
> 60 HRC

**D**

6	6	50	0.016	15	0.15	2655	255
8	6	50	0.020	20	0.15	1990	240
10	6	50	0.026	25	0.15	1590	250
12	6	50	0.030	30	0.15	1325	240
16	6	50	0.040	40	0.25	995	240
20	8	50	0.050	50	0.25	795	320

Material

High speed steel,  
hardened

**D**

Cast iron  
(lamellar / spheroidal)

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	40	0.016	15	0.15	2120	205
8	6	40	0.020	20	0.15	1590	190
10	6	40	0.026	25	0.15	1275	200
12	6	40	0.030	30	0.15	1060	190
16	6	40	0.040	40	0.25	795	190
20	8	40	0.050	50	0.25	635	255

6	6	180	0.016	15	0.15	9550	915
8	6	180	0.022	20	0.15	7160	945
10	6	180	0.028	25	0.15	5730	965
12	6	180	0.032	30	0.15	4775	915
16	6	180	0.044	40	0.25	3580	945
20	8	180	0.054	50	0.25	2865	1240



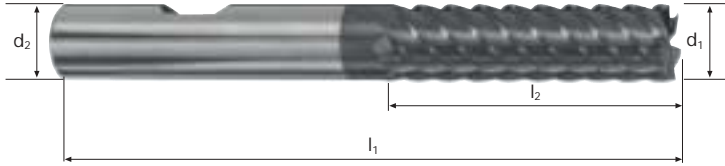


# Cylindrical end mills Multicut HX-H

Finishing, medium length version



<b>HM XA</b>	λ <b>55°</b> γ <b>-10°</b>
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Roughing



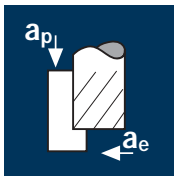
Finishing



			<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60			<b>HSS</b> GG(G)
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Ø Code	d1 e8	d2 h6	l1	l2	45°	z	DURO-S	
							<b>D15366</b>	<b>D15266</b>
<b>.300</b>	6	6	63	19	0.15	6	●	
<b>.391</b>	8	8	72	28	0.15	6	●	
<b>.450</b>	10	10	84	34	0.20	6	●	
<b>.501</b>	12	12	97	40	0.20	6	●	
<b>.610</b>	16	16	108	48	0.20	6	●	
<b>.682</b>	20	20	122	56	0.20	8	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>





Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	120	0.015	15	0.15	6365	575
8	6	120	0.025	20	0.15	4775	715
10	6	120	0.030	25	0.15	3820	690
12	6	120	0.035	30	0.15	3185	670
16	8	120	0.045	40	0.25	2385	860
20	10	120	0.055	50	0.25	1910	1050



6	6	100	0.015	15	0.15	5305	475
8	6	100	0.025	20	0.15	3980	595
10	6	100	0.030	25	0.15	3185	575
12	6	100	0.035	30	0.15	2655	560
16	8	100	0.045	40	0.25	1990	715
20	10	100	0.055	50	0.25	1590	875

6	6	60	0.016	15	0.15	3185	305
8	6	60	0.020	20	0.15	2385	285
10	6	60	0.026	25	0.15	1910	300
12	6	60	0.030	30	0.15	1590	285
16	8	60	0.040	40	0.25	1195	380
20	10	60	0.050	50	0.25	955	480



6	6	120	0.015	15	0.15	6365	575
8	6	120	0.025	20	0.15	4775	715
10	6	120	0.030	25	0.15	3820	690
12	6	120	0.035	30	0.15	3185	670
16	8	120	0.045	40	0.25	2385	860
20	10	120	0.055	50	0.25	1910	1050

## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]

Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	50	0.015	15	0.15	2655	240
8	6	50	0.025	20	0.15	1990	300
10	6	50	0.030	25	0.15	1590	285
12	6	50	0.035	30	0.15	1325	280
16	8	50	0.045	40	0.25	995	360
20	10	50	0.055	50	0.25	795	435

6	6	160	0.015	15	0.15	8490	765
8	6	160	0.025	20	0.15	6365	955
10	6	160	0.030	25	0.15	5095	915
12	6	160	0.035	30	0.15	4245	890
16	8	160	0.045	40	0.25	3185	1145
20	10	160	0.055	50	0.25	2545	1400



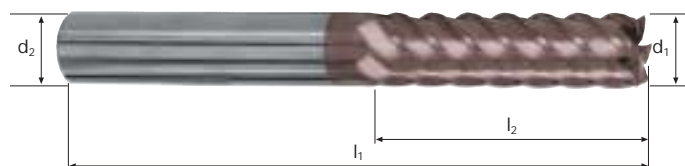
# Cylindrical end mills Multicut N

Finishing, medium length version



**HM**  
**MG10**

$\lambda$  **45°**  
 $\gamma$  **8°**



Roughing



Finishing



**Rm**  
850-1100

**Rm**  
1100-1300

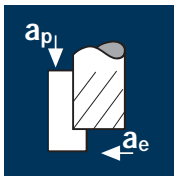
**Rm**  
1300-1500

**Ti**  
Titanium

**GG(G)**  
**Copper**

$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	z	UNICUT-4X	
							<b>U5265</b>	
<b>.300</b>	6	6	63	19	0.15	6	•	
<b>.391</b>	8	8	72	28	0.15	6	•	
<b>.450</b>	10	10	84	34	0.20	6	•	
<b>.501</b>	12	12	97	40	0.20	6	•	
<b>.610</b>	16	16	108	48	0.20	8	•	
<b>.682</b>	20	20	122	56	0.20	10	•	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	100	0.016	15	0.15	5305	510
8	6	100	0.020	20	0.15	3980	480
10	6	100	0.026	25	0.15	3185	495
12	6	100	0.030	30	0.15	2655	480
16	6	100	0.040	40	0.25	1990	480
20	6	100	0.050	50	0.25	1590	475

6	6	80	0.016	15	0.15	4245	410
8	6	80	0.020	20	0.15	3185	380
10	6	80	0.026	25	0.15	2545	395
12	6	80	0.030	30	0.15	2120	380
16	6	80	0.040	40	0.25	1590	380
20	6	80	0.050	50	0.25	1275	385

6	6	100	0.016	15	0.15	5305	510
8	6	100	0.020	20	0.15	3980	480
10	6	100	0.026	25	0.15	3185	495
12	6	100	0.030	30	0.15	2655	480
16	6	100	0.040	40	0.25	1990	480
20	6	100	0.050	50	0.25	1590	475

6	6	40	0.016	15	0.15	2120	205
8	6	40	0.020	20	0.15	1590	190
10	6	40	0.026	25	0.15	1275	200
12	6	40	0.030	30	0.15	1060	190
16	6	40	0.040	40	0.25	795	190
20	6	40	0.050	50	0.25	635	190

## Material

Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	6	150	0.016	15	0.15	7960	765
8	6	150	0.020	20	0.15	5970	715
10	6	150	0.026	25	0.15	4775	745
12	6	150	0.030	30	0.15	3980	715
16	6	150	0.040	40	0.25	2985	715
20	6	150	0.050	50	0.25	2385	715





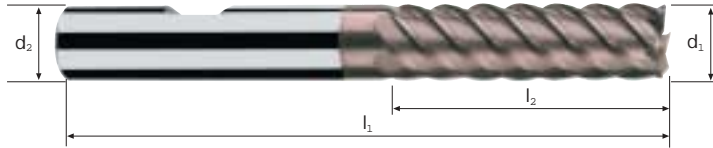


# Cylindrical end mills

Finishing, medium length version



**HM**    λ **45°**  
          γ **8°**



Roughing



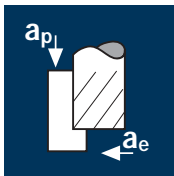
Finishing



**Rm** 850-1100    **Rm** 1100-1300    **Ti** Titanium    **GG(G) Copper**




Example: Order-N°.							UNICUT-4X	
		Coating <b>U</b>	Article-N°. <b>45362</b>	α-Code <b>.300</b>			<b>U45362</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	z		
.300	6	6	63	19	0.15	6	•	
.391	8	8	72	28	0.15	6	•	
.450	10	10	84	34	0.20	6	•	
.501	12	12	97	40	0.20	6	•	
.610	16	16	108	48	0.20	6	•	
.682	20	20	122	56	0.20	6	•	

## Application



## Material




Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>

Cast iron  
(lamellar / spheroidal)

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
10	6	30	0.026	40	0.15	955	150
12	6	30	0.030	48	0.15	795	145
16	8	30	0.040	64	0.25	595	190
20	10	30	0.050	80	0.25	475	240
25	12	30	0.062	100	0.25	380	285

10	6	20	0.026	40	0.15	635	100
12	6	20	0.030	48	0.15	530	95
16	8	20	0.040	64	0.25	400	130
20	10	20	0.050	80	0.25	320	160
25	12	20	0.062	100	0.25	255	190

10	6	30	0.026	40	0.15	955	150
12	6	30	0.030	48	0.15	795	145
16	8	30	0.040	64	0.25	595	190
20	10	30	0.050	80	0.25	475	240
25	12	30	0.062	100	0.25	380	285

10	6	20	0.026	40	0.15	635	100
12	6	20	0.030	48	0.15	530	95
16	8	20	0.040	64	0.25	400	130
20	10	20	0.050	80	0.25	320	160
25	12	20	0.062	100	0.25	255	190

## Material

Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
10	6	30	0.026	40	0.15	955	150
12	6	30	0.030	48	0.15	795	145
16	8	30	0.040	64	0.25	595	190
20	10	30	0.050	80	0.25	475	240
25	12	30	0.062	100	0.25	380	285





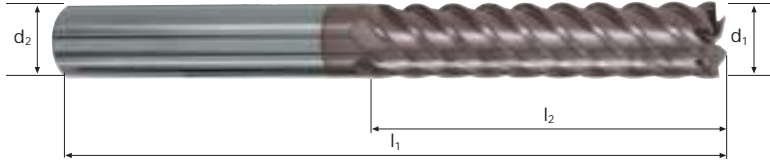


# Cylindrical end mills Multicut N

Finishing, long version



HM  
MG10     λ 45°  
                   γ 8°



Roughing

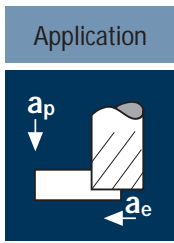


Finishing



Rm 850-1100	Rm 1100-1300						Ti Titanium	GG(G) Copper
----------------	-----------------	--	--	--	--	--	----------------	-----------------

							UNICUT-4X	
Example: Order-N°.		Coating <b>U</b>	Article-N°. <b>5268</b>	α-Code <b>.450</b>			<b>U5268</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	z		
.450	10	10	95	45	0.20	6	●	
.501	12	12	110	53	0.20	6	●	
.610	16	16	123	63	0.20	8	●	
.615	16	16	135	80	0.20	8	●	
.682	20	20	141	75	0.20	10	●	
.685	20	20	166	100	0.20	10	●	
.688	20	20	191	125	0.20	10	●	
.772	25	25	255	175	0.25	12	●	



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	140	0.005	0.01	0.04	60000	600	0.0
0.5	2	140	0.015	0.03	0.10	60000	1800	5.5
0.8	2	140	0.020	0.05	0.16	55705	2230	18.0
1.0	2	140	0.025	0.06	0.20	44565	2230	27.0
1.2	2	140	0.030	0.07	0.24	37135	2230	37.5
1.5	2	140	0.040	0.09	0.30	29710	2375	64.0
2.0	2	140	0.050	0.12	0.40	22280	2230	107.0
2.5	2	140	0.065	0.15	0.50	17825	2315	173.5
3.0	2	140	0.075	0.18	0.60	14855	2230	241.0

Hardened tool steel  
48 - 52 HRC

**D**

0.2	2	120	0.004	0.01	0.04	60000	480	0.0
0.5	2	120	0.014	0.03	0.10	60000	1680	5.0
0.8	2	120	0.020	0.05	0.16	47750	1910	15.5
1.0	2	120	0.024	0.06	0.20	38200	1835	22.0
1.2	2	120	0.028	0.07	0.24	31830	1780	30.0
1.5	2	120	0.038	0.09	0.30	25465	1935	52.0
2.0	2	120	0.048	0.12	0.40	19100	1835	88.0
2.5	2	120	0.062	0.15	0.50	15280	1895	142.0
3.0	2	120	0.072	0.18	0.60	12735	1835	198.0

Hardened tool steel  
52 - 56 HRC

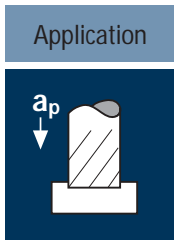
**D**

0.2	2	100	0.004	0.01	0.04	60000	480	0.0
0.5	2	100	0.014	0.03	0.10	60000	1680	5.0
0.8	2	100	0.018	0.05	0.16	39790	1430	11.5
1.0	2	100	0.022	0.06	0.20	31830	1400	17.0
1.2	2	100	0.026	0.07	0.24	26525	1380	23.0
1.5	2	100	0.036	0.09	0.30	21220	1530	41.5
2.0	2	100	0.044	0.12	0.40	15915	1400	67.0
2.5	2	100	0.058	0.15	0.50	12735	1475	110.5
3.0	2	100	0.066	0.18	0.60	10610	1400	151.0

Hardened tool steel  
56 - 60 HRC

**D**

0.2	2	60	0.004	0.01	0.04	60000	480	0.0
0.5	2	60	0.012	0.03	0.10	38200	915	2.5
0.8	2	60	0.016	0.05	0.16	23875	765	6.0
1.0	2	60	0.020	0.06	0.20	19100	765	9.0
1.2	2	60	0.024	0.07	0.24	15915	765	13.0
1.5	2	60	0.032	0.09	0.30	12735	815	22.0
2.0	2	60	0.040	0.12	0.40	9550	765	36.5
2.5	2	60	0.052	0.15	0.50	7640	795	59.5
3.0	2	60	0.060	0.18	0.60	6365	765	82.5



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	120	0.005	0.02	0.2	60000	600	2.5
0.5	2	120	0.010	0.06	0.5	60000	1200	36.0
0.8	2	120	0.020	0.09	0.8	47750	1910	137.5
1.0	2	120	0.020	0.11	1.0	38200	1530	168.5
1.2	2	120	0.025	0.13	1.2	31830	1590	248.0
1.5	2	120	0.035	0.17	1.5	25465	1785	455.0
2.0	2	120	0.045	0.22	2.0	19100	1720	757.0
2.5	2	120	0.055	0.28	2.5	15280	1680	1176.0
3.0	2	120	0.065	0.33	3.0	12735	1655	1638.5

Hardened tool steel  
48 - 52 HRC

**D**

0.2	2	100	0.004	0.02	0.2	60000	480	2.0
0.5	2	100	0.010	0.06	0.5	60000	1200	36.0
0.8	2	100	0.020	0.09	0.8	39790	1590	114.5
1.0	2	100	0.020	0.11	1.0	31830	1275	140.5
1.2	2	100	0.024	0.13	1.2	26525	1275	199.0
1.5	2	100	0.034	0.17	1.5	21220	1445	368.5
2.0	2	100	0.042	0.22	2.0	15915	1335	587.5
2.5	2	100	0.052	0.28	2.5	12735	1325	927.5
3.0	2	100	0.062	0.33	3.0	10610	1315	1302.0

Hardened tool steel  
52 - 56 HRC

**D**

0.2	2	80	0.004	0.02	0.2	60000	480	2.0
0.5	2	80	0.008	0.06	0.5	50930	815	24.5
0.8	2	80	0.018	0.09	0.8	31830	1145	82.5
1.0	2	80	0.018	0.11	1.0	25465	915	100.5
1.2	2	80	0.022	0.13	1.2	21220	935	146.0
1.5	2	80	0.030	0.17	1.5	16975	1020	260.0
2.0	2	80	0.040	0.22	2.0	12735	1020	449.0
2.5	2	80	0.048	0.28	2.5	10185	980	686.0
3.0	2	80	0.058	0.33	3.0	8490	985	975.0

Hardened tool steel  
56 - 60 HRC

**D**

0.2	2	40	0.004	0.02	0.2	60000	480	2.0
0.5	2	40	0.008	0.06	0.5	25465	405	12.0
0.8	2	40	0.016	0.09	0.8	15915	510	36.5
1.0	2	40	0.016	0.11	1.0	12735	410	45.0
1.2	2	40	0.020	0.13	1.2	10610	425	66.5
1.5	2	40	0.028	0.17	1.5	8490	475	121.0
2.0	2	40	0.036	0.22	2.0	6365	460	202.5
2.5	2	40	0.044	0.28	2.5	5095	450	315.0
3.0	2	40	0.052	0.33	3.0	4245	440	435.5



# Cylindrical end mills Microcut-C1H


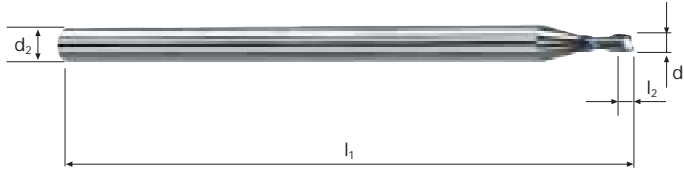
Shank  $\varnothing$  3mm, 1xd



**HM**  
**XA**

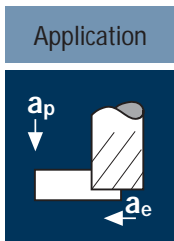
$\lambda$  **25°**  
 $\gamma$  **-10°**

**45°**

**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **HRC** 48-56    **HRC** 56-60    **HRC** > 60    **Ti** Titanium

Example: Order-N°.										DURO-S	
										<b>D15711</b>	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$l_1$	$l_2$	45°	$\alpha$	$z$				
<b>.020</b>	0.2	3	40	0.24	-	15.0°	2	●			
<b>.030</b>	0.3	3	40	0.36	-	14.0°	2	●			
<b>.040</b>	0.4	3	40	0.48	-	14.0°	2	●			
<b>.050</b>	0.5	3	40	0.60	-	14.0°	2	●			
<b>.060</b>	0.6	3	40	0.72	-	13.0°	2	●			
<b>.080</b>	0.8	3	40	0.96	-	13.0°	2	●			
<b>.100</b>	1.0	3	50	1.20	0.07	12.0°	2	●			
<b>.108</b>	1.2	3	50	1.40	0.07	11.0°	2	●			
<b>.120</b>	1.5	3	50	1.80	0.07	10.0°	2	●			
<b>.140</b>	2.0	3	50	2.40	0.10	7.0°	2	●			
<b>.160</b>	2.5	3	50	3.00	0.10	4.0°	2	●			
<b>.180</b>	3.0	3	50	3.60	0.10	0.0°	2	●			



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	180	0.004	0.16	0.03	60000	480	2.5
0.5	2	180	0.012	0.40	0.08	60000	1440	46.0
0.8	2	180	0.018	0.64	0.12	60000	2160	166.0
1.0	2	180	0.022	0.80	0.15	57295	2520	302.5
1.2	2	180	0.026	0.96	0.18	47750	2485	429.5
1.5	2	180	0.034	1.20	0.23	38200	2600	717.5
2.0	2	180	0.044	1.60	0.30	28650	2520	1209.5
2.5	2	180	0.056	2.00	0.38	22920	2565	1949.5
3.0	2	180	0.066	2.40	0.45	19100	2520	2721.5

Steel  
1100 - 1300 N/mm<sup>2</sup>

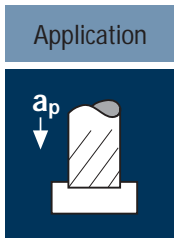
0.2	2	160	0.004	0.16	0.03	60000	480	2.5
0.5	2	160	0.010	0.40	0.08	60000	1200	38.5
0.8	2	160	0.016	0.64	0.12	60000	1920	147.5
1.0	2	160	0.020	0.80	0.15	50930	2035	244.0
1.2	2	160	0.024	0.96	0.18	42445	2035	351.5
1.5	2	160	0.030	1.20	0.23	33955	2035	561.5
2.0	2	160	0.040	1.60	0.30	25465	2035	977.0
2.5	2	160	0.050	2.00	0.38	20370	2035	1546.5
3.0	2	160	0.060	2.40	0.45	16975	2035	2198.0

Stainless steel  
[Cr-Ni/1.4301]

0.2	2	80	0.004	0.16	0.03	60000	480	2.5
0.5	2	80	0.010	0.40	0.08	50930	1020	32.5
0.8	2	80	0.014	0.64	0.12	31830	890	68.5
1.0	2	80	0.018	0.80	0.15	25465	915	110.0
1.2	2	80	0.020	0.96	0.18	21220	850	147.0
1.5	2	80	0.028	1.20	0.23	16975	950	262.0
2.0	2	80	0.036	1.60	0.30	12735	915	439.0
2.5	2	80	0.044	2.00	0.38	10185	895	680.0
3.0	2	80	0.052	2.40	0.45	8490	885	956.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

0.2	2	60	0.002	0.16	0.03	60000	240	1.0
0.5	2	60	0.008	0.40	0.08	38200	610	19.5
0.8	2	60	0.012	0.64	0.12	23875	575	44.0
1.0	2	60	0.016	0.80	0.15	19100	610	73.0
1.2	2	60	0.018	0.96	0.18	15915	575	99.5
1.5	2	60	0.024	1.20	0.23	12735	610	168.5
2.0	2	60	0.030	1.60	0.30	9550	575	276.0
2.5	2	60	0.040	2.00	0.38	7640	610	463.5
3.0	2	60	0.046	2.40	0.45	6365	585	632.0



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	160	0.004	0.02	0.2	60000	480	2.0
0.5	2	160	0.010	0.06	0.5	60000	1200	36.0
0.8	2	160	0.014	0.10	0.8	60000	1680	134.5
1.0	2	160	0.018	0.12	1.0	50930	1835	220.0
1.2	2	160	0.022	0.14	1.2	42445	1870	314.0
1.5	2	160	0.028	0.18	1.5	33955	1900	513.0
2.0	2	160	0.036	0.24	2.0	25465	1835	881.0
2.5	2	160	0.046	0.30	2.5	20370	1875	1406.5
3.0	2	160	0.054	0.36	3.0	16975	1835	1982.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

0.2	2	140	0.004	0.02	0.2	60000	480	2.0
0.5	2	140	0.010	0.06	0.5	60000	1200	36.0
0.8	2	140	0.014	0.10	0.8	55705	1560	125.0
1.0	2	140	0.018	0.12	1.0	44565	1605	192.5
1.2	2	140	0.020	0.14	1.2	37135	1485	249.5
1.5	2	140	0.026	0.18	1.5	29710	1545	417.0
2.0	2	140	0.034	0.24	2.0	22280	1515	727.0
2.5	2	140	0.044	0.30	2.5	17825	1570	1177.5
3.0	2	140	0.052	0.36	3.0	14855	1545	1668.5

Stainless steel  
[Cr-Ni/1.4301]

0.2	2	70	0.004	0.02	0.2	60000	480	2.0
0.5	2	70	0.008	0.06	0.5	44565	715	21.5
0.8	2	70	0.012	0.10	0.8	27855	670	53.5
1.0	2	70	0.016	0.12	1.0	22280	715	86.0
1.2	2	70	0.020	0.14	1.2	18570	745	125.0
1.5	2	70	0.024	0.18	1.5	14855	715	193.0
2.0	2	70	0.032	0.24	2.0	11140	715	343.0
2.5	2	70	0.040	0.30	2.5	8915	715	536.5
3.0	2	70	0.048	0.36	3.0	7425	715	772.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

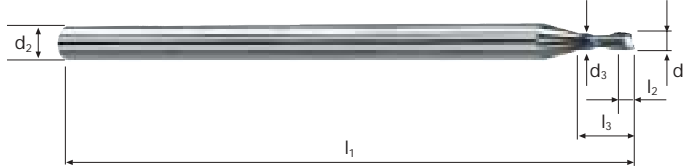
0.2	2	50	0.004	0.02	0.2	60000	480	2.0
0.5	2	50	0.008	0.06	0.5	31830	510	15.5
0.8	2	50	0.012	0.10	0.8	19895	475	38.0
1.0	2	50	0.014	0.12	1.0	15915	445	53.5
1.2	2	50	0.018	0.14	1.2	13265	480	80.5
1.5	2	50	0.022	0.18	1.5	10610	465	125.5
2.0	2	50	0.028	0.24	2.0	7960	445	213.5
2.5	2	50	0.036	0.30	2.5	6365	460	345.0
3.0	2	50	0.044	0.36	3.0	5305	465	502.0

# Cylindrical end mills Microcut-C3

Shank  $\varnothing$  3mm, cylindrical neck, 3xd

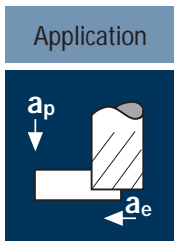


**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **Cobalt-Chrome** Gold / Platinum Copper

Example: Order-N°.										MICRO	
										5712	M5712
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ $h_6$	$d_3$	$l_1$	$l_2$	$l_3$	45°	$\alpha$	z		
.020	0.2	3	0.18	40	0.2	0.6	-	10.0°	2	●	●
.030	0.3	3	0.25	40	0.3	0.9	-	9.0°	2	●	●
.040	0.4	3	0.35	40	0.5	1.2	-	9.0°	2	●	●
.050	0.5	3	0.45	40	0.6	1.5	-	12.0°	2	●	●
.060	0.6	3	0.55	40	0.7	1.8	-	11.0°	2	●	●
.080	0.8	3	0.75	40	0.9	2.4	-	10.0°	2	●	●
.100	1.0	3	0.95	50	1.2	3.0	0.07	9.0°	2	●	●
.108	1.2	3	1.15	50	1.4	3.6	0.07	8.0°	2	●	●
.120	1.5	3	1.45	50	1.8	4.5	0.07	8.0°	2	●	●
.140	2.0	3	1.95	50	2.4	6.0	0.10	4.0°	2	●	●
.160	2.5	3	2.45	50	3.0	7.5	0.10	2.0°	2	●	●
.180	3.0	3	2.95	50	3.6	9.0	0.10	0.0°	2	●	●



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.015	0.03	0.10	60000	1800	5.5
0.6	2	140	0.015	0.03	0.12	60000	1800	6.5
0.8	2	140	0.020	0.04	0.16	55705	2230	14.5
1.0	2	140	0.025	0.06	0.20	44565	2230	27.0
1.2	2	140	0.030	0.07	0.24	37135	2230	37.5
1.5	2	140	0.040	0.08	0.30	29710	2375	57.0
2.0	2	140	0.050	0.11	0.40	22280	2230	98.0
2.5	2	140	0.065	0.14	0.50	17825	2315	162.0
3.0	2	140	0.075	0.17	0.60	14855	2230	227.5

Material

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	120	0.014	0.03	0.10	60000	1680	5.0
0.6	2	120	0.014	0.03	0.12	60000	1680	6.0
0.8	2	120	0.020	0.04	0.16	47750	1910	12.0
1.0	2	120	0.024	0.06	0.20	38200	1835	22.0
1.2	2	120	0.028	0.07	0.24	31830	1780	30.0
1.5	2	120	0.038	0.08	0.30	25465	1935	46.5
2.0	2	120	0.048	0.11	0.40	19100	1835	80.5
2.5	2	120	0.062	0.14	0.50	15280	1895	132.5
3.0	2	120	0.072	0.17	0.60	12735	1835	187.0

Material

Hardened tool steel  
52 - 56 HRC

**D**

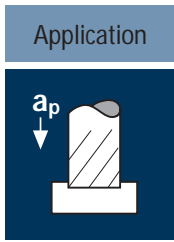
0.5	2	100	0.014	0.03	0.10	60000	1680	5.0
0.6	2	100	0.014	0.03	0.12	53055	1485	5.5
0.8	2	100	0.018	0.04	0.16	39790	1430	9.0
1.0	2	100	0.022	0.06	0.20	31830	1400	17.0
1.2	2	100	0.026	0.07	0.24	26525	1380	23.0
1.5	2	100	0.036	0.08	0.30	21220	1530	36.5
2.0	2	100	0.044	0.11	0.40	15915	1400	61.5
2.5	2	100	0.058	0.14	0.50	12735	1475	103.5
3.0	2	100	0.066	0.17	0.60	10610	1400	143.0

Material

Hardened tool steel  
56 - 60 HRC

**D**

0.5	2	60	0.012	0.03	0.10	38200	915	2.5
0.6	2	60	0.012	0.03	0.12	31830	765	3.0
0.8	2	60	0.016	0.04	0.16	23875	765	5.0
1.0	2	60	0.020	0.06	0.20	19100	765	9.0
1.2	2	60	0.024	0.07	0.24	15915	765	13.0
1.5	2	60	0.032	0.08	0.30	12735	815	19.5
2.0	2	60	0.040	0.11	0.40	9550	765	33.5
2.5	2	60	0.052	0.14	0.50	7640	795	55.5
3.0	2	60	0.060	0.17	0.60	6365	765	78.0



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	120	0.010	0.05	0.5	60000	1200	30.0
0.6	2	120	0.015	0.05	0.6	60000	1800	54.0
0.8	2	120	0.020	0.07	0.8	47750	1910	107.0
1.0	2	120	0.020	0.09	1.0	38200	1530	137.5
1.2	2	120	0.025	0.11	1.2	31830	1590	210.0
1.5	2	120	0.035	0.14	1.5	25465	1785	375.0
2.0	2	120	0.045	0.18	2.0	19100	1720	619.0
2.5	2	120	0.055	0.23	2.5	15280	1680	966.0
3.0	2	120	0.065	0.27	3.0	12735	1655	1340.5

Material

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	100	0.010	0.05	0.5	60000	1200	30.0
0.6	2	100	0.014	0.05	0.6	53055	1485	44.5
0.8	2	100	0.020	0.07	0.8	39790	1590	89.0
1.0	2	100	0.020	0.09	1.0	31830	1275	115.0
1.2	2	100	0.024	0.11	1.2	26525	1275	168.5
1.5	2	100	0.034	0.14	1.5	21220	1445	303.5
2.0	2	100	0.042	0.18	2.0	15915	1335	480.5
2.5	2	100	0.052	0.23	2.5	12735	1325	762.0
3.0	2	100	0.062	0.27	3.0	10610	1315	1065.0

Material

Hardened tool steel  
52 - 56 HRC

**D**

0.5	2	80	0.008	0.05	0.5	50930	815	20.5
0.6	2	80	0.014	0.05	0.6	42445	1190	35.5
0.8	2	80	0.018	0.07	0.8	31830	1145	64.0
1.0	2	80	0.018	0.09	1.0	25465	915	82.5
1.2	2	80	0.022	0.11	1.2	21220	935	123.5
1.5	2	80	0.030	0.14	1.5	16975	1020	214.0
2.0	2	80	0.040	0.18	2.0	12735	1020	367.0
2.5	2	80	0.048	0.23	2.5	10185	980	563.5
3.0	2	80	0.058	0.27	3.0	8490	985	798.0

Material

Hardened tool steel  
56 - 60 HRC

**D**

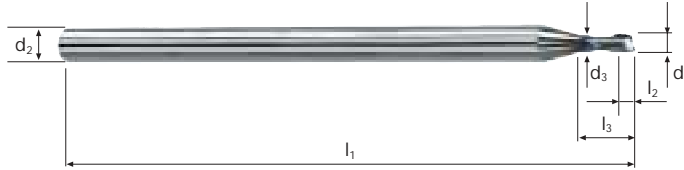
0.5	2	40	0.008	0.05	0.5	25465	405	10.0
0.6	2	40	0.012	0.05	0.6	21220	510	15.5
0.8	2	40	0.016	0.07	0.8	15915	510	28.5
1.0	2	40	0.016	0.09	1.0	12735	410	37.0
1.2	2	40	0.020	0.11	1.2	10610	425	56.0
1.5	2	40	0.028	0.14	1.5	8490	475	100.0
2.0	2	40	0.036	0.18	2.0	6365	460	165.5
2.5	2	40	0.044	0.23	2.5	5095	450	259.0
3.0	2	40	0.052	0.27	3.0	4245	440	356.5

# Cylindrical end mills Microcut-C3H

Shank  $\varnothing$  3mm, cylindrical neck, 3xd

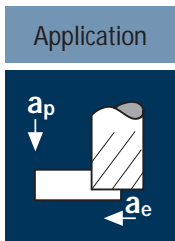


**HM**  $\lambda$  25°  
**XA**  $\gamma$ -10°



Rm < 850
Rm 850-1100
Rm 1100-1300
Rm 1300-1500
HRC 48-56
HRC 56-60
HRC > 60
Ti Titanium

										DURO-S	
Example: Order-N°.										D5722	
										DURO-S	
$\varnothing$ Code	d1 $\pm 0.01$	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.050	0.5	3	0.45	40	0.6	1.5	-	12.0°	2	●	
.060	0.6	3	0.55	40	0.7	1.8	-	11.0°	2	●	
.080	0.8	3	0.75	40	1.0	2.4	-	10.0°	2	●	
.100	1.0	3	0.95	50	1.2	3.0	0.07	9.0°	2	●	
.108	1.2	3	1.15	50	1.4	3.6	0.07	8.0°	2	●	
.120	1.5	3	1.45	50	1.8	4.5	0.07	6.0°	2	●	
.140	2.0	3	1.95	50	2.4	6.0	0.10	4.0°	2	●	
.160	2.5	3	2.45	50	3.0	7.5	0.10	2.0°	2	●	
.180	3.0	3	2.95	50	3.6	9.0	0.10	0.0°	2	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.3	2	180	0.006	0.24	0.05	60000	720	8.5
0.5	2	180	0.010	0.40	0.08	60000	1200	38.5
0.6	2	180	0.010	0.48	0.09	60000	1200	52.0
0.8	2	180	0.014	0.64	0.12	60000	1680	129.0
1.0	2	180	0.018	0.80	0.15	57295	2065	248.0
1.2	2	180	0.022	0.96	0.18	47750	2100	363.0
1.5	2	180	0.028	1.20	0.23	38200	2140	590.5
1.8	2	180	0.032	1.44	0.27	31830	2035	791.0
2.0	2	180	0.036	1.60	0.30	28650	2065	991.0

Steel  
850 - 1100 N/mm<sup>2</sup>

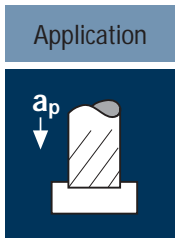
0.3	2	160	0.006	0.24	0.05	60000	720	8.5
0.5	2	160	0.010	0.40	0.08	60000	1200	38.5
0.6	2	160	0.010	0.48	0.09	60000	1200	52.0
0.8	2	160	0.012	0.64	0.12	60000	1440	110.5
1.0	2	160	0.016	0.80	0.15	50930	1630	195.5
1.2	2	160	0.020	0.96	0.18	42445	1700	294.0
1.5	2	160	0.026	1.20	0.23	33955	1765	487.0
1.8	2	160	0.028	1.44	0.27	28295	1585	616.0
2.0	2	160	0.032	1.60	0.30	25465	1630	782.5

Stainless steel  
[Cr-Ni/1.4301]

0.3	2	70	0.004	0.24	0.05	60000	480	6.0
0.5	2	70	0.008	0.40	0.08	44565	715	23.0
0.6	2	70	0.008	0.48	0.09	37135	595	25.5
0.8	2	70	0.012	0.64	0.12	27855	670	51.5
1.0	2	70	0.014	0.80	0.15	22280	625	75.0
1.2	2	70	0.018	0.96	0.18	18570	670	116.0
1.5	2	70	0.022	1.20	0.23	14855	655	181.0
1.8	2	70	0.026	1.44	0.27	12380	645	251.0
2.0	2	70	0.028	1.60	0.30	11140	625	300.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

0.3	2	50	0.004	0.24	0.05	53055	425	5.0
0.5	2	50	0.008	0.40	0.08	31830	510	16.5
0.6	2	50	0.008	0.48	0.09	26525	425	18.5
0.8	2	50	0.010	0.64	0.12	19895	400	30.5
1.0	2	50	0.012	0.80	0.15	15915	380	45.5
1.2	2	50	0.016	0.96	0.18	13265	425	73.5
1.5	2	50	0.020	1.20	0.23	10610	425	117.5
1.8	2	50	0.022	1.44	0.27	8840	390	151.5
2.0	2	50	0.026	1.60	0.30	7960	415	199.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.3	2	160	0.006	0.04	0.3	60000	720	8.5
0.5	2	160	0.008	0.06	0.5	60000	960	29.0
0.6	2	160	0.010	0.07	0.6	60000	1200	50.5
0.8	2	160	0.014	0.10	0.8	60000	1680	134.5
1.0	2	160	0.016	0.12	1.0	50930	1630	195.5
1.2	2	160	0.020	0.14	1.2	42445	1700	285.5
1.5	2	160	0.026	0.18	1.5	33955	1765	476.5
1.8	2	160	0.030	0.22	1.8	28295	1700	673.0
2.0	2	160	0.034	0.24	2.0	25465	1730	830.5

Steel  
850 - 1100 N/mm<sup>2</sup>

0.3	2	140	0.006	0.04	0.3	60000	720	8.5
0.5	2	140	0.008	0.06	0.5	60000	960	29.0
0.6	2	140	0.010	0.07	0.6	60000	1200	50.5
0.8	2	140	0.014	0.10	0.8	55705	1560	125.0
1.0	2	140	0.016	0.12	1.0	44565	1425	171.0
1.2	2	140	0.020	0.14	1.2	37135	1485	249.5
1.5	2	140	0.024	0.18	1.5	29710	1425	385.0
1.8	2	140	0.028	0.22	1.8	24760	1385	548.5
2.0	2	140	0.032	0.24	2.0	22280	1425	684.0

Stainless steel  
[Cr-Ni/1.4301]

0.3	2	60	0.006	0.04	0.3	60000	720	8.5
0.5	2	60	0.008	0.06	0.5	38200	610	18.5
0.6	2	60	0.008	0.07	0.6	31830	510	21.5
0.8	2	60	0.012	0.10	0.8	23875	575	46.0
1.0	2	60	0.014	0.12	1.0	19100	535	64.0
1.2	2	60	0.018	0.14	1.2	15915	575	96.5
1.5	2	60	0.022	0.18	1.5	12735	560	151.0
1.8	2	60	0.026	0.22	1.8	10610	550	218.0
2.0	2	60	0.030	0.24	2.0	9550	575	276.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

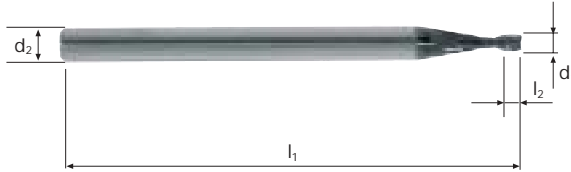
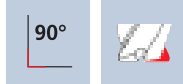
0.3	2	40	0.004	0.04	0.3	42445	340	4.0
0.5	2	40	0.006	0.06	0.5	25465	305	9.0
0.6	2	40	0.008	0.07	0.6	21220	340	14.5
0.8	2	40	0.012	0.10	0.8	15915	380	30.5
1.0	2	40	0.012	0.12	1.0	12735	305	36.5
1.2	2	40	0.016	0.14	1.2	10610	340	57.0
1.5	2	40	0.020	0.18	1.5	8490	340	92.0
1.8	2	40	0.024	0.22	1.8	7075	340	134.5
2.0	2	40	0.028	0.24	2.0	6365	355	170.5

# Cylindrical end mills

Shank  $\varnothing$  3mm, 3xd

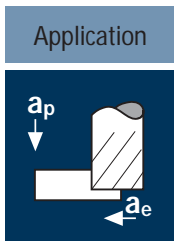


**HM**  $\lambda$  30°  
 $\gamma$  12°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **Copper Aluminium**

Example: Order-N°.								MICRO	
								5710	M45710
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ $h_6$	$l_1$	$l_2$	$\alpha$	Z			
.030	0.3	3	39	1.0	9.0°	2	●	●	
.040	0.4	3	39	1.0	9.0°	2	●	●	
.050	0.5	3	39	1.5	9.0°	2	●	●	
.060	0.6	3	39	1.5	9.0°	2	●	●	
.070	0.7	3	39	2.0	8.0°	2	●	●	
.080	0.8	3	39	2.0	8.0°	2	●	●	
.090	0.9	3	39	2.5	8.0°	2	●	●	
.100	1.0	3	39	3.0	7.0°	2	●	●	
.104	1.1	3	39	3.0	7.0°	2	●	●	
.108	1.2	3	39	4.0	6.0°	2	●	●	
.112	1.3	3	39	4.0	6.0°	2	●	●	
.116	1.4	3	39	4.0	6.0°	2	●	●	
.120	1.5	3	39	4.0	6.0°	2	●	●	
.123	1.6	3	39	5.0	5.0°	2	●	●	
.126	1.7	3	39	5.0	6.0°	2	●	●	
.130	1.8	3	39	5.0	6.0°	2	●	●	
.135	1.9	3	39	5.0	5.0°	2	●	●	
.140	2.0	3	39	5.0	5.0°	2	●	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
2.1	2	180	0.038	1.68	0.32	27285	2075	1115.5
2.2	2	180	0.040	1.76	0.33	26045	2085	1211.0
2.3	2	180	0.042	1.84	0.35	24910	2090	1346.0
2.4	2	180	0.044	1.92	0.36	23875	2100	1451.5
2.5	2	180	0.046	2.00	0.38	22920	2110	1603.5
3.0	2	180	0.054	2.40	0.45	19100	2065	2230.0

Steel  
850 - 1100 N/mm<sup>2</sup>

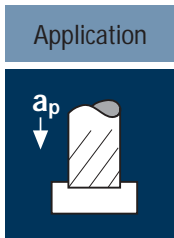
2.1	2	160	0.034	1.68	0.32	24255	1650	887.0
2.2	2	160	0.036	1.76	0.33	23150	1665	967.0
2.3	2	160	0.038	1.84	0.35	22145	1685	1085.0
2.4	2	160	0.040	1.92	0.36	21220	1700	1175.0
2.5	2	160	0.042	2.00	0.38	20370	1710	1299.5
3.0	2	160	0.048	2.40	0.45	16975	1630	1760.5

Stainless steel  
[Cr-Ni/1.4301]

2.1	2	70	0.030	1.68	0.32	10610	635	341.5
2.2	2	70	0.032	1.76	0.33	10130	650	377.5
2.3	2	70	0.034	1.84	0.35	9690	660	425.0
2.4	2	70	0.036	1.92	0.36	9285	670	463.0
2.5	2	70	0.038	2.00	0.38	8915	640	486.5
3.0	2	70	0.044	2.40	0.45	7425	655	707.5

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

2.1	2	50	0.026	1.68	0.32	7580	395	212.5
2.2	2	50	0.028	1.76	0.33	7235	405	235.0
2.3	2	50	0.030	1.84	0.35	6920	415	267.5
2.4	2	50	0.032	1.92	0.36	6630	400	276.5
2.5	2	50	0.034	2.00	0.38	6365	405	308.0
3.0	2	50	0.038	2.40	0.45	5305	405	437.5



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
2.1	2	160	0.036	0.25	2.1	24255	1745	916.0
2.2	2	160	0.036	0.26	2.2	23150	1665	952.5
2.3	2	160	0.038	0.28	2.3	22145	1685	1085.0
2.4	2	160	0.040	0.29	2.4	21220	1700	1183.0
2.5	2	160	0.042	0.30	2.5	20370	1710	1282.5
3.0	2	160	0.050	0.36	3.0	16975	1700	1836.0

Steel  
850 - 1100 N/mm<sup>2</sup>

2.1	2	140	0.034	0.25	2.1	21220	1445	758.5
2.2	2	140	0.034	0.26	2.2	20255	1375	786.5
2.3	2	140	0.036	0.28	2.3	19375	1395	898.5
2.4	2	140	0.038	0.29	2.4	18570	1410	981.5
2.5	2	140	0.040	0.30	2.5	17825	1425	1069.0
3.0	2	140	0.048	0.36	3.0	14855	1425	1539.0

Stainless steel  
[Cr-Ni/1.4301]

2.1	2	60	0.032	0.25	2.1	9095	580	304.5
2.2	2	60	0.032	0.26	2.2	8680	555	317.5
2.3	2	60	0.034	0.28	2.3	8305	565	364.0
2.4	2	60	0.036	0.29	2.4	7960	575	400.0
2.5	2	60	0.038	0.30	2.5	7640	550	412.5
3.0	2	60	0.044	0.36	3.0	6365	560	605.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

2.1	2	40	0.028	0.25	2.1	6065	340	178.5
2.2	2	40	0.028	0.26	2.2	5790	325	186.0
2.3	2	40	0.030	0.28	2.3	5535	330	212.5
2.4	2	40	0.032	0.29	2.4	5305	340	236.5
2.5	2	40	0.034	0.30	2.5	5095	345	259.0
3.0	2	40	0.040	0.36	3.0	4245	340	367.0



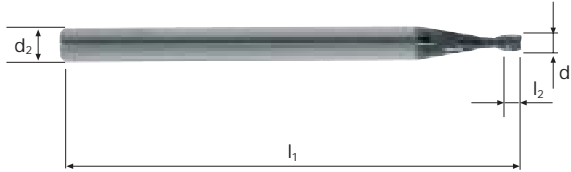
# Cylindrical end mills

Shank  $\varnothing$  3mm, 3xd



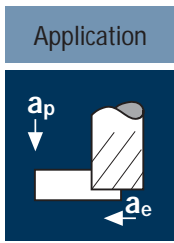
**HM**  $\lambda$  30°  
 $\gamma$  12°

90°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **Copper Aluminium**

Example: Order-N°.								MICRO	
Coating: <b>M</b> Article-N°: <b>45710</b> $\alpha$ -Code: <b>.143</b>								<b>5710</b>	<b>M45710</b>
$\varnothing$ Code	d1 ±0.01	d2 h6	l1	l2	$\alpha$	Z			
.143	2.1	3	39	6.0	4.0°	2	●	●	
.146	2.2	3	39	6.0	4.0°	2	●	●	
.150	2.3	3	39	6.0	3.0°	2	●	●	
.155	2.4	3	39	6.0	3.0°	2	●	●	
.160	2.5	3	39	7.0	2.0°	2	●	●	
.180	3.0	4	44	10.0	3.0°	2	●	●	



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	3	80	0.010	0.40	0.08	50930	1530	49.0
0.6	3	80	0.012	0.48	0.09	42445	1530	66.0
0.8	3	80	0.016	0.64	0.12	31830	1530	117.5
1.0	3	80	0.020	0.80	0.15	25465	1530	183.5
1.2	3	80	0.024	0.96	0.18	21220	1530	264.5
1.5	3	80	0.030	1.20	0.23	16975	1530	422.5
2.0	3	80	0.040	1.60	0.30	12735	1530	734.5
2.5	3	80	0.050	2.00	0.38	10185	1530	1163.0
3.0	3	80	0.060	2.40	0.45	8490	1530	1652.5

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

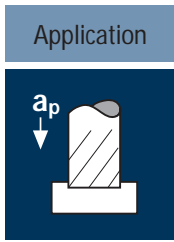
0.5	3	50	0.008	0.40	0.08	31830	765	24.5
0.6	3	50	0.010	0.48	0.09	26525	795	34.5
0.8	3	50	0.012	0.64	0.12	19895	715	55.0
1.0	3	50	0.016	0.80	0.15	15915	765	92.0
1.2	3	50	0.020	0.96	0.18	13265	795	137.5
1.5	3	50	0.024	1.20	0.23	10610	765	211.0
2.0	3	50	0.032	1.60	0.30	7960	765	367.0
2.5	3	50	0.040	2.00	0.38	6365	765	581.5
3.0	3	50	0.048	2.40	0.45	5305	765	826.0

Gold

0.5	3	180	0.012	0.40	0.08	60000	2160	69.0
0.6	3	180	0.014	0.48	0.09	60000	2520	109.0
0.8	3	180	0.020	0.64	0.12	60000	3600	276.5
1.0	3	180	0.024	0.80	0.15	57295	4125	495.0
1.2	3	180	0.028	0.96	0.18	47750	4010	693.0
1.5	3	180	0.036	1.20	0.23	38200	4125	1138.5
2.0	3	180	0.048	1.60	0.30	28650	4125	1980.0
2.5	3	180	0.060	2.00	0.38	22920	4125	3135.0
3.0	3	180	0.072	2.40	0.45	19100	4125	4455.0

Steel  
850 - 1300 N/mm<sup>2</sup>

0.5	3	120	0.010	0.40	0.08	60000	1800	57.5
0.6	3	120	0.012	0.48	0.09	60000	2160	93.5
0.8	3	120	0.016	0.64	0.12	47750	2290	176.0
1.0	3	120	0.020	0.80	0.15	38200	2290	275.0
1.2	3	120	0.024	0.96	0.18	31830	2290	395.5
1.5	3	120	0.030	1.20	0.23	25465	2290	632.0
2.0	3	120	0.040	1.60	0.30	19100	2290	1099.0
2.5	3	120	0.050	2.00	0.38	15280	2290	1740.5
3.0	3	120	0.060	2.40	0.45	12735	2290	2473.0



Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	3	60	0.008	0.06	0.5	38200	915	27.5
0.6	3	60	0.008	0.07	0.6	31830	765	32.0
0.8	3	60	0.012	0.10	0.8	23875	860	69.0
1.0	3	60	0.014	0.12	1.0	19100	800	96.0
1.2	3	60	0.018	0.14	1.2	15915	860	144.5
1.5	3	60	0.022	0.18	1.5	12735	840	227.0
2.0	3	60	0.028	0.24	2.0	9550	800	384.0
2.5	3	60	0.036	0.30	2.5	7640	825	619.0
3.0	3	60	0.042	0.36	3.0	6365	800	864.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

0.5	3	40	0.006	0.06	0.5	25465	460	14.0
0.6	3	40	0.006	0.07	0.6	21220	380	16.0
0.8	3	40	0.010	0.10	0.8	15915	475	38.0
1.0	3	40	0.012	0.12	1.0	12735	460	55.0
1.2	3	40	0.014	0.14	1.2	10610	445	75.0
1.5	3	40	0.018	0.18	1.5	8490	460	124.0
2.0	3	40	0.022	0.24	2.0	6365	420	201.5
2.5	3	40	0.028	0.30	2.5	5095	430	322.5
3.0	3	40	0.034	0.36	3.0	4245	435	470.0

Gold

0.5	3	160	0.010	0.06	0.5	60000	1800	54.0
0.6	3	160	0.010	0.07	0.6	60000	1800	75.5
0.8	3	160	0.014	0.10	0.8	60000	2520	201.5
1.0	3	160	0.016	0.12	1.0	50930	2445	293.5
1.2	3	160	0.022	0.14	1.2	42445	2800	470.5
1.5	3	160	0.026	0.18	1.5	33955	2650	715.5
2.0	3	160	0.034	0.24	2.0	25465	2595	1245.5
2.5	3	160	0.044	0.30	2.5	20370	2690	2017.5
3.0	3	160	0.050	0.36	3.0	16975	2545	2748.5

Steel  
850 - 1300 N/mm<sup>2</sup>

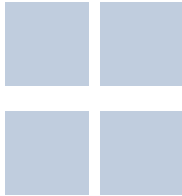
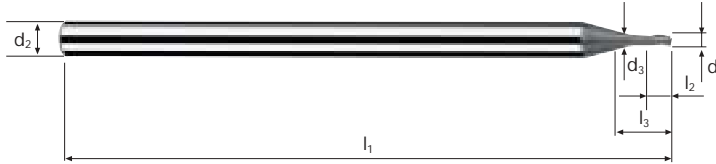
0.5	3	100	0.008	0.06	0.5	60000	1440	43.0
0.6	3	100	0.008	0.07	0.6	53055	1275	53.5
0.8	3	100	0.012	0.10	0.8	39790	1430	114.5
1.0	3	100	0.014	0.12	1.0	31830	1335	160.0
1.2	3	100	0.018	0.14	1.2	26525	1430	240.0
1.5	3	100	0.022	0.18	1.5	21220	1400	378.0
2.0	3	100	0.028	0.24	2.0	15915	1335	641.0
2.5	3	100	0.036	0.30	2.5	12735	1375	1031.5
3.0	3	100	0.042	0.36	3.0	10610	1335	1442.0

# Cylindrical end mills Microcut-C3

Shank  $\varnothing$  3mm, cylindrical neck, 3xd

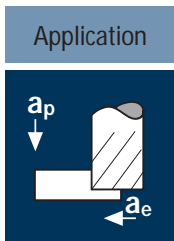


**HM**  $\lambda$  25°  
**XA**  $\gamma$ -10°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **Cobalt-Chrome** Gold / Platinum Copper

Example: Order-N°. <span style="margin-left: 50px;">Coating</span> <span style="margin-left: 20px;">Article-N°.</span> <span style="margin-left: 20px;">α-Code</span>										MICRO
M 15752 .050										M15752
∅ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	α	Z		
.050	0.5	3	0.45	40	0.6	1.5	12.0°	3	●	
.060	0.6	3	0.55	40	0.7	1.8	11.0°	3	●	
.080	0.8	3	0.75	40	0.9	2.4	10.0°	3	●	
.100	1.0	3	0.95	50	1.2	3.0	9.0°	3	●	
.108	1.2	3	1.15	50	1.4	3.6	8.0°	3	●	
.120	1.5	3	1.45	60	1.8	4.5	6.0°	3	●	
.140	2.0	3	1.95	60	2.4	6.0	4.0°	3	●	
.160	2.5	3	2.45	60	3.0	7.5	2.0°	3	●	
.180	3.0	3	2.95	60	3.6	9.0	0.0°	3	●	



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	180	0.012	0.40	0.07	60000	1440	40.5
0.6	2	180	0.014	0.48	0.08	60000	1680	64.5
0.8	2	180	0.018	0.64	0.10	60000	2160	138.0
1.0	2	180	0.022	0.80	0.13	57295	2520	262.0
1.2	2	180	0.026	0.96	0.16	47750	2485	381.5
1.5	2	180	0.034	1.20	0.20	38200	2600	624.0
2.0	2	180	0.044	1.60	0.26	28650	2520	1048.5
2.5	2	180	0.056	2.00	0.33	22920	2565	1693.0
3.0	2	180	0.066	2.40	0.39	19100	2520	2358.5

Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

0.5	2	160	0.010	0.40	0.07	60000	1200	33.5
0.6	2	160	0.012	0.48	0.08	60000	1440	55.5
0.8	2	160	0.016	0.64	0.10	60000	1920	123.0
1.0	2	160	0.020	0.80	0.13	50930	2035	211.5
1.2	2	160	0.024	0.96	0.16	42445	2035	312.5
1.5	2	160	0.030	1.20	0.20	33955	2035	488.5
2.0	2	160	0.040	1.60	0.26	25465	2035	846.5
2.5	2	160	0.050	2.00	0.33	20370	2035	1343.0
3.0	2	160	0.060	2.40	0.39	16975	2035	1905.0

Material

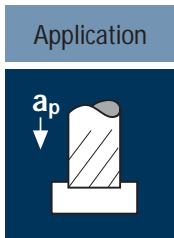
Stainless steel  
[Cr-Ni/1.4301]

0.5	2	80	0.010	0.40	0.07	50930	1020	28.5
0.6	2	80	0.012	0.48	0.08	42445	1020	39.0
0.8	2	80	0.014	0.64	0.10	31830	890	57.0
1.0	2	80	0.018	0.80	0.13	25465	915	95.0
1.2	2	80	0.020	0.96	0.16	21220	850	130.5
1.5	2	80	0.028	1.20	0.20	16975	950	228.0
2.0	2	80	0.036	1.60	0.26	12735	915	380.5
2.5	2	80	0.044	2.00	0.33	10185	895	590.5
3.0	2	80	0.052	2.40	0.39	8490	885	828.5

Material

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

0.5	2	60	0.008	0.40	0.07	38200	610	17.0
0.6	2	60	0.010	0.48	0.08	31830	635	24.5
0.8	2	60	0.012	0.64	0.10	23875	575	37.0
1.0	2	60	0.016	0.80	0.13	19100	610	63.5
1.2	2	60	0.018	0.96	0.16	15915	575	88.5
1.5	2	60	0.024	1.20	0.20	12735	610	146.5
2.0	2	60	0.030	1.60	0.26	9550	575	239.0
2.5	2	60	0.040	2.00	0.33	7640	610	402.5
3.0	2	60	0.046	2.40	0.39	6365	585	547.5



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	160	0.010	0.06	0.5	60000	1200	36.0
0.6	2	160	0.010	0.07	0.6	60000	1200	50.5
0.8	2	160	0.014	0.09	0.8	60000	1680	121.0
1.0	2	160	0.018	0.11	1.0	50930	1835	202.0
1.2	2	160	0.022	0.13	1.2	42445	1870	291.5
1.5	2	160	0.028	0.17	1.5	33955	1900	484.5
2.0	2	160	0.036	0.22	2.0	25465	1835	807.5
2.5	2	160	0.046	0.28	2.5	20370	1875	1312.5
3.0	2	160	0.054	0.33	3.0	16975	1835	1816.5

Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

0.5	2	140	0.010	0.06	0.5	60000	1200	36.0
0.6	2	140	0.010	0.07	0.6	60000	1200	50.5
0.8	2	140	0.014	0.09	0.8	55705	1560	112.5
1.0	2	140	0.018	0.11	1.0	44565	1605	176.5
1.2	2	140	0.020	0.13	1.2	37135	1485	231.5
1.5	2	140	0.026	0.17	1.5	29710	1545	394.0
2.0	2	140	0.034	0.22	2.0	22280	1515	666.5
2.5	2	140	0.044	0.28	2.5	17825	1570	1099.0
3.0	2	140	0.052	0.33	3.0	14855	1545	1529.5

Material

Stainless steel  
[Cr-Ni/1.4301]

0.5	2	70	0.008	0.06	0.5	44565	715	21.5
0.6	2	70	0.008	0.07	0.6	37135	595	25.0
0.8	2	70	0.012	0.09	0.8	27855	670	48.0
1.0	2	70	0.016	0.11	1.0	22280	715	78.5
1.2	2	70	0.020	0.13	1.2	18570	745	116.0
1.5	2	70	0.024	0.17	1.5	14855	715	182.5
2.0	2	70	0.032	0.22	2.0	11140	715	314.5
2.5	2	70	0.040	0.28	2.5	8915	715	500.5
3.0	2	70	0.048	0.33	3.0	7425	715	708.0

Material

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

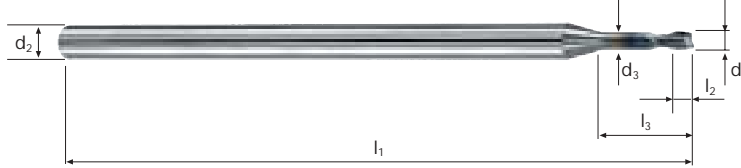
0.5	2	50	0.008	0.06	0.5	31830	510	15.5
0.6	2	50	0.008	0.07	0.6	26525	425	18.0
0.8	2	50	0.012	0.09	0.8	19895	475	34.0
1.0	2	50	0.014	0.11	1.0	15915	445	49.0
1.2	2	50	0.018	0.13	1.2	13265	480	75.0
1.5	2	50	0.022	0.17	1.5	10610	465	118.5
2.0	2	50	0.028	0.22	2.0	7960	445	196.0
2.5	2	50	0.036	0.28	2.5	6365	460	322.0
3.0	2	50	0.044	0.33	3.0	5305	465	460.5

# Cylindrical end mills Microcut-C5

Shank  $\varnothing$  3mm, cylindrical neck, 5xd

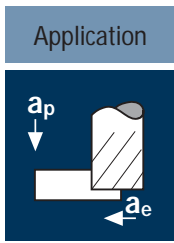


**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **Cobalt-Chrome**    **Gold / Platinum**    **Copper**

										MICRO	
Example: Order-N°.										5714	M5714
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	45°	$\alpha$	z		
.050	0.5	3	0.45	40	0.6	2.5	-	10.0°	2	●	●
.060	0.6	3	0.55	40	0.7	3.0	-	10.0°	2	●	●
.070	0.7	3	0.65	40	0.8	3.5	-	9.0°	2	●	●
.080	0.8	3	0.75	40	1.0	4.0	-	8.0°	2	●	●
.090	0.9	3	0.85	40	1.1	4.5	-	8.0°	2	●	●
.100	1.0	3	0.95	50	1.2	5.0	0.07	7.0°	2	●	●
.108	1.2	3	1.15	50	1.4	6.0	0.07	6.0°	2	●	●
.120	1.5	3	1.45	50	1.8	7.5	0.07	5.0°	2	●	●
.132	1.8	3	1.75	50	2.2	9.0	0.07	4.0°	2	●	●
.140	2.0	3	1.95	50	2.4	10.0	0.10	3.0°	2	●	●
.152	2.3	3	2.25	50	2.8	11.5	0.10	2.0°	2	●	●
.160	2.5	3	2.45	50	3.0	12.5	0.10	1.5°	2	●	●
.172	2.8	3	2.75	50	3.4	14.0	0.10	1.0°	2	●	●
.180	3.0	3	2.95	50	3.6	15.0	0.10	0.0°	2	●	●



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.015	0.03	0.10	60000	1800	5.5
0.6	2	140	0.015	0.03	0.12	60000	1800	6.5
0.8	2	140	0.020	0.04	0.16	55705	2230	14.5
1.0	2	140	0.025	0.05	0.20	44565	2230	22.5
1.2	2	140	0.030	0.06	0.24	37135	2230	32.0
1.5	2	140	0.040	0.08	0.30	29710	2375	57.0
2.0	2	140	0.050	0.10	0.40	22280	2230	89.0
2.5	2	140	0.065	0.13	0.50	17825	2315	150.5
3.0	2	140	0.075	0.15	0.60	14855	2230	200.5

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	120	0.014	0.03	0.10	60000	1680	5.0
0.6	2	120	0.014	0.03	0.12	60000	1680	6.0
0.8	2	120	0.020	0.04	0.16	47750	1910	12.0
1.0	2	120	0.024	0.05	0.20	38200	1835	18.5
1.2	2	120	0.028	0.06	0.24	31830	1780	25.5
1.5	2	120	0.038	0.08	0.30	25465	1935	46.5
2.0	2	120	0.048	0.10	0.40	19100	1835	73.5
2.5	2	120	0.062	0.13	0.50	15280	1895	123.0
3.0	2	120	0.072	0.15	0.60	12735	1835	165.0

Hardened tool steel  
52 - 56 HRC

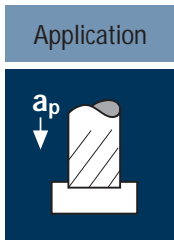
**D**

0.5	2	100	0.014	0.03	0.10	60000	1680	5.0
0.6	2	100	0.014	0.03	0.12	53055	1485	5.5
0.8	2	100	0.018	0.04	0.16	39790	1430	9.0
1.0	2	100	0.022	0.05	0.20	31830	1400	14.0
1.2	2	100	0.026	0.06	0.24	26525	1380	20.0
1.5	2	100	0.036	0.08	0.30	21220	1530	36.5
2.0	2	100	0.044	0.10	0.40	15915	1400	56.0
2.5	2	100	0.058	0.13	0.50	12735	1475	96.0
3.0	2	100	0.066	0.15	0.60	10610	1400	126.0

Hardened tool steel  
56 - 60 HRC

**D**

0.5	2	60	0.012	0.03	0.10	38200	915	2.5
0.6	2	60	0.012	0.03	0.12	31830	765	3.0
0.8	2	60	0.016	0.04	0.16	23875	765	5.0
1.0	2	60	0.020	0.05	0.20	19100	765	7.5
1.2	2	60	0.024	0.06	0.24	15915	765	11.0
1.5	2	60	0.032	0.08	0.30	12735	815	19.5
2.0	2	60	0.040	0.10	0.40	9550	765	30.5
2.5	2	60	0.052	0.13	0.50	7640	795	51.5
3.0	2	60	0.060	0.15	0.60	6365	765	69.0



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	120	0.010	0.04	0.5	60000	1200	24.0
0.6	2	120	0.015	0.04	0.6	60000	1800	43.0
0.8	2	120	0.020	0.06	0.8	47750	1910	91.5
1.0	2	120	0.020	0.07	1.0	38200	1530	107.0
1.2	2	120	0.025	0.08	1.2	31830	1590	152.5
1.5	2	120	0.035	0.11	1.5	25465	1785	294.5
2.0	2	120	0.045	0.14	2.0	19100	1720	481.5
2.5	2	120	0.055	0.18	2.5	15280	1680	756.0
3.0	2	120	0.065	0.21	3.0	12735	1655	1042.5

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	100	0.010	0.04	0.5	60000	1200	24.0
0.6	2	100	0.014	0.04	0.6	53055	1485	35.5
0.8	2	100	0.020	0.06	0.8	39790	1590	76.5
1.0	2	100	0.020	0.07	1.0	31830	1275	89.5
1.2	2	100	0.024	0.08	1.2	26525	1275	122.5
1.5	2	100	0.034	0.11	1.5	21220	1445	238.5
2.0	2	100	0.042	0.14	2.0	15915	1335	374.0
2.5	2	100	0.052	0.18	2.5	12735	1325	596.0
3.0	2	100	0.062	0.21	3.0	10610	1315	828.5

Hardened tool steel  
52 - 56 HRC

**D**

0.5	2	80	0.008	0.04	0.5	50930	815	16.5
0.6	2	80	0.014	0.04	0.6	42445	1190	28.5
0.8	2	80	0.018	0.06	0.8	31830	1145	55.0
1.0	2	80	0.018	0.07	1.0	25465	915	64.0
1.2	2	80	0.022	0.08	1.2	21220	935	90.0
1.5	2	80	0.030	0.11	1.5	16975	1020	168.5
2.0	2	80	0.040	0.14	2.0	12735	1020	285.5
2.5	2	80	0.048	0.18	2.5	10185	980	441.0
3.0	2	80	0.058	0.21	3.0	8490	985	620.5

Hardened tool steel  
56 - 60 HRC

**D**

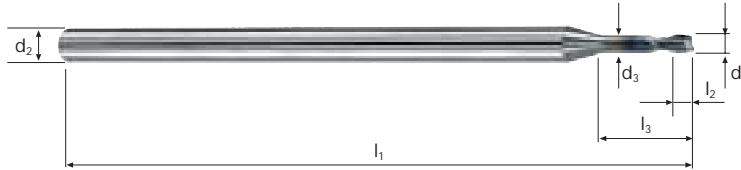
0.5	2	40	0.008	0.04	0.5	25465	405	8.0
0.6	2	40	0.012	0.04	0.6	21220	510	12.0
0.8	2	40	0.016	0.06	0.8	15915	510	24.5
1.0	2	40	0.016	0.07	1.0	12735	410	28.5
1.2	2	40	0.020	0.08	1.2	10610	425	41.0
1.5	2	40	0.028	0.11	1.5	8490	475	78.5
2.0	2	40	0.036	0.14	2.0	6365	460	129.0
2.5	2	40	0.044	0.18	2.5	5095	450	202.5
3.0	2	40	0.052	0.21	3.0	4245	440	277.0

# Cylindrical end mills Microcut-C5H

Shank  $\varnothing$  3mm, cylindrical neck, 5xd

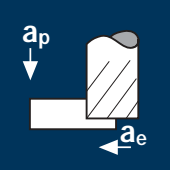














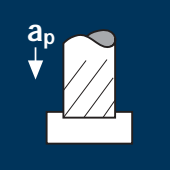












**HM**  $\lambda$  25°  
**XA**  $\gamma$ -10°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Ti</b> Titanium
--------------------	-----------------------	------------------------	------------------------	---------------------	---------------------	--------------------	-----------------------

										DURO-S	
Example: Order-N°.										DURO-S	
										D5724	
$\varnothing$ Code	d1 $\pm 0.01$	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.050	0.5	3	0.45	40	0.6	2.5	-	10.0°	2	●	
.060	0.6	3	0.55	40	0.7	3.0	-	10.0°	2	●	
.070	0.7	3	0.65	40	0.8	3.5	-	9.0°	2	●	
.080	0.8	3	0.75	40	1.0	4.0	-	8.0°	2	●	
.090	0.9	3	0.85	40	1.1	4.5	-	8.0°	2	●	
.100	1.0	3	0.95	50	1.2	5.0	0.07	7.0°	2	●	
.108	1.2	3	1.15	50	1.4	6.0	0.07	6.0°	2	●	
.120	1.5	3	1.45	50	1.8	7.5	0.07	5.0°	2	●	
.132	1.8	3	1.75	50	2.2	9.0	0.07	4.0°	2	●	
.140	2.0	3	1.95	50	2.4	10.0	0.10	3.0°	2	●	
.152	2.3	3	2.25	50	2.8	11.5	0.10	2.0°	2	●	
.160	2.5	3	2.45	50	3.0	12.5	0.10	1.5°	2	●	
.172	2.8	3	2.75	50	3.4	14.0	0.10	1.0°	2	●	
.180	3.0	3	2.95	50	3.6	15.0	0.10	0.0°	2	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]	
	Stainless steel [Cr-Ni/1.4301]   	0.5	3	80	0.010	0.40	0.07	50930	1530	43.0	
		0.6	3	80	0.010	0.48	0.08	42445	1275	49.0	
		0.8	3	80	0.014	0.64	0.10	31830	1335	85.5	
		1.0	3	80	0.018	0.80	0.13	25465	1375	143.0	
		1.2	3	80	0.022	0.96	0.16	21220	1400	215.0	
		1.5	3	80	0.028	1.20	0.20	16975	1425	342.0	
		2.0	3	80	0.036	1.60	0.26	12735	1375	572.0	
		2.5	3	80	0.046	2.00	0.33	10185	1405	927.5	
		3.0	3	80	0.054	2.40	0.39	8490	1375	1287.0	
		Titanium alloys up to 300 HB [Ti5Al2.5Sn]   	0.5	3	50	0.008	0.40	0.07	31830	765	21.5
			0.6	3	50	0.008	0.48	0.08	26525	635	24.5
			0.8	3	50	0.012	0.64	0.10	19895	715	46.0
1.0	3		50	0.014	0.80	0.13	15915	670	69.5		
1.2	3		50	0.018	0.96	0.16	13265	715	110.0		
1.5	3		50	0.022	1.20	0.20	10610	700	168.0		
2.0	3		50	0.028	1.60	0.26	7960	670	278.5		
2.5	3		50	0.036	2.00	0.33	6365	685	452.0		
3.0	3		50	0.044	2.40	0.39	5305	700	655.0		
Gold     	0.5		3	180	0.012	0.40	0.07	60000	2160	60.5	
	0.6		3	180	0.012	0.48	0.08	60000	2160	83.0	
	0.8		3	180	0.016	0.64	0.10	60000	2880	184.5	
	1.0	3	180	0.022	0.80	0.13	57295	3780	393.0		
	1.2	3	180	0.026	0.96	0.16	47750	3725	572.0		
	1.5	3	180	0.034	1.20	0.20	38200	3895	935.0		
	2.0	3	180	0.044	1.60	0.26	28650	3780	1572.5		
	2.5	3	180	0.056	2.00	0.33	22920	3850	2541.0		
	3.0	3	180	0.064	2.40	0.39	19100	3665	3430.5		
	Steel 850 - 1300 N/mm <sup>2</sup>     	0.5	3	120	0.010	0.40	0.07	60000	1800	50.5	
		0.6	3	120	0.010	0.48	0.08	60000	1800	69.0	
		0.8	3	120	0.014	0.64	0.10	47750	2005	128.5	
1.0		3	120	0.018	0.80	0.13	38200	2065	215.0		
1.2		3	120	0.022	0.96	0.16	31830	2100	322.5		
1.5		3	120	0.028	1.20	0.20	25465	2140	513.5		
2.0		3	120	0.036	1.60	0.26	19100	2065	859.0		
2.5		3	120	0.046	2.00	0.33	15280	2110	1392.5		
3.0		3	120	0.054	2.40	0.39	12735	2065	1933.0		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]	
	Stainless steel [Cr-Ni/1.4301]   	0.5	3	60	0.006	0.05	0.5	38200	690	17.5	
		0.6	3	60	0.008	0.06	0.6	31830	765	27.5	
		0.8	3	60	0.010	0.08	0.8	23875	715	46.0	
		1.0	3	60	0.014	0.10	1.0	19100	800	80.0	
		1.2	3	60	0.016	0.12	1.2	15915	765	110.0	
		1.5	3	60	0.020	0.15	1.5	12735	765	172.0	
		2.0	3	60	0.026	0.20	2.0	9550	745	298.0	
		2.5	3	60	0.034	0.25	2.5	7640	780	487.5	
		3.0	3	60	0.040	0.30	3.0	6365	765	688.5	
		Titanium alloys up to 300 HB [Ti5Al2.5Sn]   	0.5	3	40	0.004	0.05	0.5	25465	305	7.5
			0.6	3	40	0.006	0.06	0.6	21220	380	13.5
			0.8	3	40	0.008	0.08	0.8	15915	380	24.5
1.0	3		40	0.012	0.10	1.0	12735	460	46.0		
1.2	3		40	0.012	0.12	1.2	10610	380	54.5		
1.5	3		40	0.016	0.15	1.5	8490	410	92.0		
2.0	3		40	0.020	0.20	2.0	6365	380	152.0		
2.5	3		40	0.028	0.25	2.5	5095	430	269.0		
3.0	3		40	0.032	0.30	3.0	4245	410	369.0		
Gold     	0.5		3	160	0.008	0.05	0.5	60000	1440	36.0	
	0.6		3	160	0.010	0.06	0.6	60000	1800	65.0	
	0.8		3	160	0.012	0.08	0.8	60000	2160	138.0	
	1.0	3	160	0.016	0.10	1.0	50930	2445	244.5		
	1.2	3	160	0.020	0.12	1.2	42445	2545	366.5		
	1.5	3	160	0.024	0.15	1.5	33955	2445	550.0		
	2.0	3	160	0.032	0.20	2.0	25465	2445	978.0		
	2.5	3	160	0.040	0.25	2.5	20370	2445	1528.0		
	3.0	3	160	0.048	0.30	3.0	16975	2445	2200.5		
	Steel 850 - 1300 N/mm <sup>2</sup>     	0.5	3	100	0.006	0.05	0.5	60000	1080	27.0	
		0.6	3	100	0.008	0.06	0.6	53055	1275	46.0	
		0.8	3	100	0.010	0.08	0.8	39790	1195	76.5	
1.0		3	100	0.014	0.10	1.0	31830	1335	133.5		
1.2		3	100	0.016	0.12	1.2	26525	1275	183.5		
1.5		3	100	0.020	0.15	1.5	21220	1275	287.0		
2.0		3	100	0.026	0.20	2.0	15915	1240	496.0		
2.5		3	100	0.034	0.25	2.5	12735	1300	812.5		
3.0		3	100	0.040	0.30	3.0	10610	1275	1147.5		

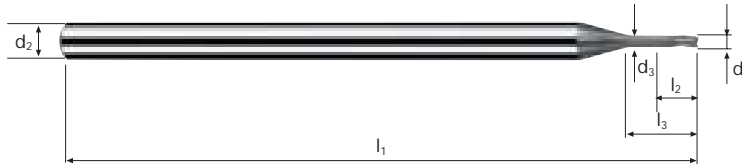
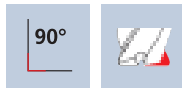


# Cylindrical end mills Microcut-C5

Shank Ø 3mm, cylindrical neck, 5xd

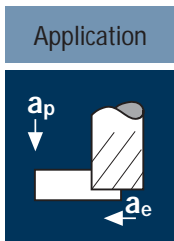


HM  
XA λ 25°  
γ-10°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	Cobalt-Chrome Gold / Platinum Copper
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Example: Order-N°. <span style="margin-left: 20px;">Coating</span> <span style="margin-left: 20px;">Article-N°.</span> <span style="margin-left: 20px;">α-Code</span>									MICRO				
									<b>M</b>	<b>15754</b>	<b>.050</b>		
∅ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	α	Z					
.050	0.5	3	0.45	40	0.6	2.5	10.0°	3	●				
.060	0.6	3	0.55	40	0.7	3.0	10.0°	3	●				
.080	0.8	3	0.75	40	0.9	4.0	8.0°	3	●				
.100	1.0	3	0.95	50	1.2	5.0	7.0°	3	●				
.108	1.2	3	1.15	50	1.4	6.0	6.0°	3	●				
.120	1.5	3	1.45	60	1.8	7.5	5.0°	3	●				
.140	2.0	3	1.95	60	2.4	10.0	3.0°	3	●				
.160	2.5	3	2.45	60	3.0	12.5	1.5°	3	●				
.180	3.0	3	2.95	60	3.6	15.0	0.0°	3	●				



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	180	0.012	0.30	0.06	60000	1440	26.0
0.6	2	180	0.014	0.36	0.07	60000	1680	42.5
0.8	2	180	0.018	0.48	0.09	60000	2160	93.5
1.0	2	180	0.022	0.60	0.11	57295	2520	166.5
1.2	2	180	0.026	0.72	0.13	47750	2485	232.5
1.5	2	180	0.034	0.90	0.17	38200	2600	398.0
2.0	2	180	0.044	1.20	0.22	28650	2520	665.5
2.5	2	180	0.056	1.50	0.28	22920	2565	1077.5
3.0	2	180	0.066	1.80	0.33	19100	2520	1497.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

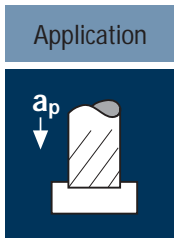
0.5	2	160	0.010	0.30	0.06	60000	1200	21.5
0.6	2	160	0.012	0.36	0.07	60000	1440	36.5
0.8	2	160	0.016	0.48	0.09	60000	1920	83.0
1.0	2	160	0.020	0.60	0.11	50930	2035	134.5
1.2	2	160	0.024	0.72	0.13	42445	2035	190.5
1.5	2	160	0.030	0.90	0.17	33955	2035	311.5
2.0	2	160	0.040	1.20	0.22	25465	2035	537.0
2.5	2	160	0.050	1.50	0.28	20370	2035	854.5
3.0	2	160	0.060	1.80	0.33	16975	2035	1209.0

Stainless steel  
[Cr-Ni/1.4301]

0.5	2	80	0.010	0.30	0.06	50930	1020	18.5
0.6	2	80	0.012	0.36	0.07	42445	1020	25.5
0.8	2	80	0.014	0.48	0.09	31830	890	38.5
1.0	2	80	0.018	0.60	0.11	25465	915	60.5
1.2	2	80	0.020	0.72	0.13	21220	850	79.5
1.5	2	80	0.028	0.90	0.17	16975	950	145.5
2.0	2	80	0.036	1.20	0.22	12735	915	241.5
2.5	2	80	0.044	1.50	0.28	10185	895	376.0
3.0	2	80	0.052	1.80	0.33	8490	885	525.5

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

0.5	2	60	0.008	0.30	0.06	38200	610	11.0
0.6	2	60	0.010	0.36	0.07	31830	635	16.0
0.8	2	60	0.012	0.48	0.09	23875	575	25.0
1.0	2	60	0.016	0.60	0.11	19100	610	40.5
1.2	2	60	0.018	0.72	0.13	15915	575	54.0
1.5	2	60	0.024	0.90	0.17	12735	610	93.5
2.0	2	60	0.030	1.20	0.22	9550	575	152.0
2.5	2	60	0.040	1.50	0.28	7640	610	256.0
3.0	2	60	0.046	1.80	0.33	6365	585	347.5



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	160	0.010	0.05	0.5	60000	1200	30.0
0.6	2	160	0.010	0.06	0.6	60000	1200	43.0
0.8	2	160	0.014	0.08	0.8	60000	1680	107.5
1.0	2	160	0.018	0.10	1.0	50930	1835	183.5
1.2	2	160	0.022	0.12	1.2	42445	1870	269.5
1.5	2	160	0.028	0.15	1.5	33955	1900	427.5
2.0	2	160	0.036	0.20	2.0	25465	1835	734.0
2.5	2	160	0.046	0.25	2.5	20370	1875	1172.0
3.0	2	160	0.054	0.30	3.0	16975	1835	1651.5

Steel  
1100 - 1300 N/mm<sup>2</sup>

0.5	2	140	0.010	0.05	0.5	60000	1200	30.0
0.6	2	140	0.010	0.06	0.6	60000	1200	43.0
0.8	2	140	0.014	0.08	0.8	55705	1560	100.0
1.0	2	140	0.018	0.10	1.0	44565	1605	160.5
1.2	2	140	0.020	0.12	1.2	37135	1485	214.0
1.5	2	140	0.026	0.15	1.5	29710	1545	347.5
2.0	2	140	0.034	0.20	2.0	22280	1515	606.0
2.5	2	140	0.044	0.25	2.5	17825	1570	981.5
3.0	2	140	0.052	0.30	3.0	14855	1545	1390.5

Stainless steel  
[Cr-Ni/1.4301]

0.5	2	70	0.008	0.05	0.5	44565	715	18.0
0.6	2	70	0.008	0.06	0.6	37135	595	21.5
0.8	2	70	0.012	0.08	0.8	27855	670	43.0
1.0	2	70	0.016	0.10	1.0	22280	715	71.5
1.2	2	70	0.020	0.12	1.2	18570	745	107.5
1.5	2	70	0.024	0.15	1.5	14855	715	161.0
2.0	2	70	0.032	0.20	2.0	11140	715	286.0
2.5	2	70	0.040	0.25	2.5	8915	715	447.0
3.0	2	70	0.048	0.30	3.0	7425	715	643.5

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

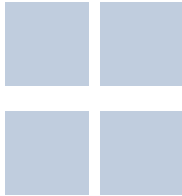
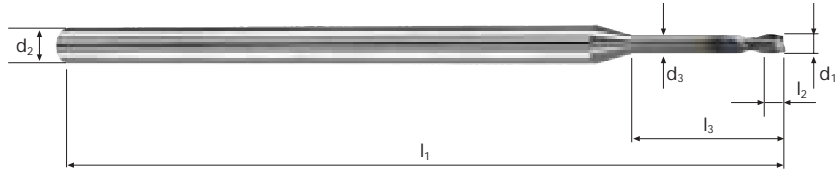
0.5	2	50	0.008	0.05	0.5	31830	510	13.0
0.6	2	50	0.008	0.06	0.6	26525	425	15.5
0.8	2	50	0.012	0.08	0.8	19895	475	30.5
1.0	2	50	0.014	0.10	1.0	15915	445	44.5
1.2	2	50	0.018	0.12	1.2	13265	480	69.0
1.5	2	50	0.022	0.15	1.5	10610	465	104.5
2.0	2	50	0.028	0.20	2.0	7960	445	178.0
2.5	2	50	0.036	0.25	2.5	6365	460	287.5
3.0	2	50	0.044	0.30	3.0	5305	465	418.5

# Cylindrical end mills Microcut-C8

Shank  $\varnothing$  3mm, cylindrical neck, 8xd

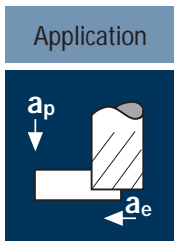


**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



**Rm** < 850   **Rm** 850-1100   **Rm** 1100-1300   **Rm** 1300-1500   **Inox** Stainless   **Ti** Titanium   **Cobalt-Chrome** Gold / Platinum Copper

Example: Order-N°.										MICRO	
										M5716	
$\varnothing$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.050	0.5	3	0.45	40	0.6	4.0	-	9.0°	2	●	
.060	0.6	3	0.55	40	0.7	4.8	-	8.0°	2	●	
.080	0.8	3	0.75	40	1.0	6.4	-	6.0°	2	●	
.100	1.0	3	0.95	50	1.2	8.0	0.07	5.0°	2	●	
.108	1.2	3	1.15	50	1.4	9.6	0.07	4.0°	2	●	
.120	1.5	3	1.45	60	1.8	12.0	0.07	3.0°	2	●	
.140	2.0	3	1.95	60	2.4	16.0	0.10	2.0°	2	●	
.160	2.5	3	2.45	60	3.0	20.0	0.10	1.0°	2	●	
.180	3.0	3	2.95	60	3.6	24.0	0.10	0.0°	2	●	



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.015	0.02	0.09	60000	1800	3.0
0.6	2	140	0.015	0.02	0.11	60000	1800	4.0
0.8	2	140	0.020	0.03	0.14	55705	2230	9.5
1.0	2	140	0.025	0.04	0.18	44565	2230	16.0
1.2	2	140	0.030	0.05	0.22	37135	2230	24.5
1.5	2	140	0.040	0.06	0.27	29710	2375	38.5
2.0	2	140	0.050	0.08	0.36	22280	2230	64.0
2.5	2	140	0.065	0.10	0.45	17825	2315	104.0
3.0	2	140	0.075	0.12	0.54	14855	2230	144.5

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	120	0.014	0.02	0.09	60000	1680	3.0
0.6	2	120	0.014	0.02	0.11	60000	1680	3.5
0.8	2	120	0.020	0.03	0.14	47750	1910	8.0
1.0	2	120	0.024	0.04	0.18	38200	1835	13.0
1.2	2	120	0.028	0.05	0.22	31830	1780	19.5
1.5	2	120	0.038	0.06	0.27	25465	1935	31.5
2.0	2	120	0.048	0.08	0.36	19100	1835	53.0
2.5	2	120	0.062	0.10	0.45	15280	1895	85.5
3.0	2	120	0.072	0.12	0.54	12735	1835	119.0

Hardened tool steel  
52 - 56 HRC

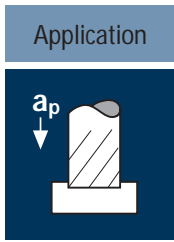
**D**

0.5	2	100	0.014	0.02	0.09	60000	1680	3.0
0.6	2	100	0.014	0.02	0.11	53055	1485	3.5
0.8	2	100	0.018	0.03	0.14	39790	1430	6.0
1.0	2	100	0.022	0.04	0.18	31830	1400	10.0
1.2	2	100	0.026	0.05	0.22	26525	1380	15.0
1.5	2	100	0.036	0.06	0.27	21220	1530	25.0
2.0	2	100	0.044	0.08	0.36	15915	1400	40.5
2.5	2	100	0.058	0.10	0.45	12735	1475	66.5
3.0	2	100	0.066	0.12	0.54	10610	1400	90.5

Hardened tool steel  
56 - 60 HRC

**D**

0.5	2	60	0.012	0.02	0.09	38200	915	1.5
0.6	2	60	0.012	0.02	0.11	31830	765	1.5
0.8	2	60	0.016	0.03	0.14	23875	765	3.0
1.0	2	60	0.020	0.04	0.18	19100	765	5.5
1.2	2	60	0.024	0.05	0.22	15915	765	8.5
1.5	2	60	0.032	0.06	0.27	12735	815	13.0
2.0	2	60	0.040	0.08	0.36	9550	765	22.0
2.5	2	60	0.052	0.10	0.45	7640	795	36.0
3.0	2	60	0.060	0.12	0.54	6365	765	49.5



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	120	0.010	0.02	0.5	60000	1200	12.0
0.6	2	120	0.015	0.02	0.6	60000	1800	21.5
0.8	2	120	0.020	0.03	0.8	47750	1910	46.0
1.0	2	120	0.020	0.04	1.0	38200	1530	61.0
1.2	2	120	0.025	0.05	1.2	31830	1590	95.5
1.5	2	120	0.035	0.06	1.5	25465	1785	160.5
2.0	2	120	0.045	0.08	2.0	19100	1720	275.0
2.5	2	120	0.055	0.10	2.5	15280	1680	420.0
3.0	2	120	0.065	0.12	3.0	12735	1655	596.0

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	100	0.010	0.02	0.5	60000	1200	12.0
0.6	2	100	0.014	0.02	0.6	53055	1485	18.0
0.8	2	100	0.020	0.03	0.8	39790	1590	38.0
1.0	2	100	0.020	0.04	1.0	31830	1275	51.0
1.2	2	100	0.024	0.05	1.2	26525	1275	76.5
1.5	2	100	0.034	0.06	1.5	21220	1445	130.0
2.0	2	100	0.042	0.08	2.0	15915	1335	213.5
2.5	2	100	0.052	0.10	2.5	12735	1325	331.5
3.0	2	100	0.062	0.12	3.0	10610	1315	473.5

Hardened tool steel  
52 - 56 HRC

**D**

0.5	2	80	0.008	0.02	0.5	50930	815	8.0
0.6	2	80	0.014	0.02	0.6	42445	1190	14.5
0.8	2	80	0.018	0.03	0.8	31830	1145	27.5
1.0	2	80	0.018	0.04	1.0	25465	915	36.5
1.2	2	80	0.022	0.05	1.2	21220	935	56.0
1.5	2	80	0.030	0.06	1.5	16975	1020	92.0
2.0	2	80	0.040	0.08	2.0	12735	1020	163.0
2.5	2	80	0.048	0.10	2.5	10185	980	245.0
3.0	2	80	0.058	0.12	3.0	8490	985	354.5

Hardened tool steel  
56 - 60 HRC

**D**

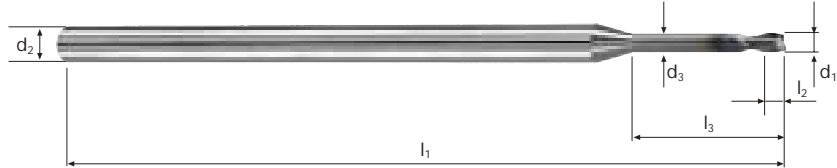
0.5	2	40	0.008	0.02	0.5	25465	405	4.0
0.6	2	40	0.012	0.02	0.6	21220	510	6.0
0.8	2	40	0.016	0.03	0.8	15915	510	12.0
1.0	2	40	0.016	0.04	1.0	12735	410	16.5
1.2	2	40	0.020	0.05	1.2	10610	425	25.5
1.5	2	40	0.028	0.06	1.5	8490	475	43.0
2.0	2	40	0.036	0.08	2.0	6365	460	73.5
2.5	2	40	0.044	0.10	2.5	5095	450	112.5
3.0	2	40	0.052	0.12	3.0	4245	440	158.5

# Cylindrical end mills Microcut-C8H

Shank  $\varnothing$  3mm, cylindrical neck, 8xd

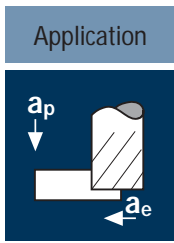


HM  
XA  $\lambda$  25°  
 $\gamma$ -10°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium
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Example: Order-N°.										DURO-S	
										D5726	
$\varnothing$ Code	d1 $\pm 0.01$	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.050	0.5	3	0.45	40	0.6	4.0	-	9.0°	2	●	
.060	0.6	3	0.55	40	0.7	4.8	-	8.0°	2	●	
.080	0.8	3	0.75	40	1.0	6.4	-	6.0°	2	●	
.100	1.0	3	0.95	50	1.2	8.0	0.07	5.0°	2	●	
.108	1.2	3	1.15	50	1.4	9.6	0.07	4.0°	2	●	
.120	1.5	3	1.45	60	1.8	12.0	0.07	3.0°	2	●	
.140	2.0	3	1.95	60	2.4	16.0	0.10	2.0°	2	●	
.160	2.5	3	2.45	60	3.0	20.0	0.10	1.0°	2	●	
.180	3.0	3	2.95	60	3.6	24.0	0.10	0.0°	2	●	



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	180	0.012	0.25	0.06	60000	1440	21.5
0.6	2	180	0.014	0.30	0.07	60000	1680	35.5
0.8	2	180	0.018	0.40	0.09	60000	2160	78.0
1.0	2	180	0.022	0.50	0.11	57295	2520	138.5
1.2	2	180	0.026	0.60	0.13	47750	2485	194.0
1.5	2	180	0.034	0.75	0.17	38200	2600	331.5
2.0	2	180	0.044	1.00	0.22	28650	2520	554.5
2.5	2	180	0.056	1.25	0.28	22920	2565	898.0
3.0	2	180	0.066	1.50	0.33	19100	2520	1247.5

Steel  
1100 - 1300 N/mm<sup>2</sup>

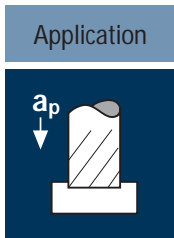
0.5	2	160	0.010	0.25	0.06	60000	1200	18.0
0.6	2	160	0.012	0.30	0.07	60000	1440	30.0
0.8	2	160	0.016	0.40	0.09	60000	1920	69.0
1.0	2	160	0.020	0.50	0.11	50930	2035	112.0
1.2	2	160	0.024	0.60	0.13	42445	2035	158.5
1.5	2	160	0.030	0.75	0.17	33955	2035	259.5
2.0	2	160	0.040	1.00	0.22	25465	2035	447.5
2.5	2	160	0.050	1.25	0.28	20370	2035	712.5
3.0	2	160	0.060	1.50	0.33	16975	2035	1007.5

Stainless steel  
[Cr-Ni/1.4301]

0.5	2	80	0.010	0.25	0.06	50930	1020	15.5
0.6	2	80	0.012	0.30	0.07	42445	1020	21.5
0.8	2	80	0.014	0.40	0.09	31830	890	32.0
1.0	2	80	0.018	0.50	0.11	25465	915	50.5
1.2	2	80	0.020	0.60	0.13	21220	850	66.5
1.5	2	80	0.028	0.75	0.17	16975	950	121.0
2.0	2	80	0.036	1.00	0.22	12735	915	201.5
2.5	2	80	0.044	1.25	0.28	10185	895	313.5
3.0	2	80	0.052	1.50	0.33	8490	885	438.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

0.5	2	60	0.008	0.25	0.06	38200	610	9.0
0.6	2	60	0.010	0.30	0.07	31830	635	13.5
0.8	2	60	0.012	0.40	0.09	23875	575	20.5
1.0	2	60	0.016	0.50	0.11	19100	610	33.5
1.2	2	60	0.018	0.60	0.13	15915	575	45.0
1.5	2	60	0.024	0.75	0.17	12735	610	78.0
2.0	2	60	0.030	1.00	0.22	9550	575	126.5
2.5	2	60	0.040	1.25	0.28	7640	610	213.5
3.0	2	60	0.046	1.50	0.33	6365	585	289.5



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	160	0.010	0.04	0.5	60000	1200	24.0
0.6	2	160	0.010	0.05	0.6	60000	1200	36.0
0.8	2	160	0.014	0.06	0.8	60000	1680	80.5
1.0	2	160	0.018	0.08	1.0	50930	1835	147.0
1.2	2	160	0.022	0.10	1.2	42445	1870	224.5
1.5	2	160	0.028	0.12	1.5	33955	1900	342.0
2.0	2	160	0.036	0.16	2.0	25465	1835	587.0
2.5	2	160	0.046	0.20	2.5	20370	1875	937.5
3.0	2	160	0.054	0.24	3.0	16975	1835	1321.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

0.5	2	140	0.010	0.04	0.5	60000	1200	24.0
0.6	2	140	0.010	0.05	0.6	60000	1200	36.0
0.8	2	140	0.014	0.06	0.8	55705	1560	75.0
1.0	2	140	0.018	0.08	1.0	44565	1605	128.5
1.2	2	140	0.020	0.10	1.2	37135	1485	178.0
1.5	2	140	0.026	0.12	1.5	29710	1545	278.0
2.0	2	140	0.034	0.16	2.0	22280	1515	485.0
2.5	2	140	0.044	0.20	2.5	17825	1570	785.0
3.0	2	140	0.052	0.24	3.0	14855	1545	1112.5

Stainless steel  
[Cr-Ni/1.4301]

0.5	2	70	0.008	0.04	0.5	44565	715	14.5
0.6	2	70	0.008	0.05	0.6	37135	595	18.0
0.8	2	70	0.012	0.06	0.8	27855	670	32.0
1.0	2	70	0.016	0.08	1.0	22280	715	57.0
1.2	2	70	0.020	0.10	1.2	18570	745	89.5
1.5	2	70	0.024	0.12	1.5	14855	715	128.5
2.0	2	70	0.032	0.16	2.0	11140	715	229.0
2.5	2	70	0.040	0.20	2.5	8915	715	357.5
3.0	2	70	0.048	0.24	3.0	7425	715	515.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

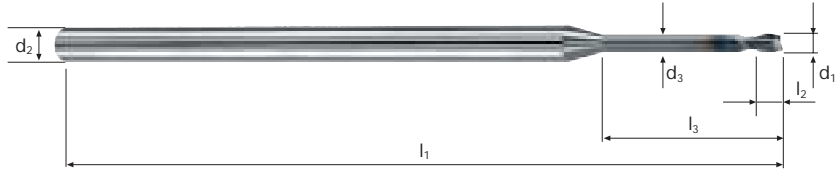
0.5	2	50	0.008	0.04	0.5	31830	510	10.0
0.6	2	50	0.008	0.05	0.6	26525	425	13.0
0.8	2	50	0.012	0.06	0.8	19895	475	23.0
1.0	2	50	0.014	0.08	1.0	15915	445	35.5
1.2	2	50	0.018	0.10	1.2	13265	480	57.5
1.5	2	50	0.022	0.12	1.5	10610	465	83.5
2.0	2	50	0.028	0.16	2.0	7960	445	142.5
2.5	2	50	0.036	0.20	2.5	6365	460	230.0
3.0	2	50	0.044	0.24	3.0	5305	465	335.0

# Cylindrical end mills Microcut-C10

Shank Ø 3mm, cylindrical neck, 10xd

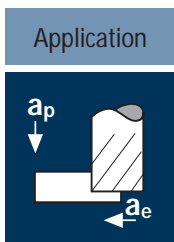


**HM**    λ 25°  
**Micro**    γ 6°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500		<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Gold / Platinum</b> <b>Copper</b>
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										MICRO	
Example: Order-N°.										M5717	
										MICRO	
Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	45°	α	z		
.050	0.5	3	0.45	40	0.6	5.0	-	8.0°	2	●	
.060	0.6	3	0.55	40	0.7	6.0	-	7.0°	2	●	
.080	0.8	3	0.75	40	1.0	8.0	-	6.0°	2	●	
.100	1.0	3	0.95	50	1.2	10.0	0.07	5.0°	2	●	
.108	1.2	3	1.15	50	1.4	12.0	0.07	4.0°	2	●	
.120	1.5	3	1.45	60	1.8	15.0	0.07	3.0°	2	●	
.140	2.0	3	1.95	60	2.4	20.0	0.10	2.0°	2	●	
.160	2.5	3	2.45	60	3.0	25.0	0.10	1.0°	2	●	
.180	3.0	3	2.95	60	3.6	30.0	0.10	0.0°	2	●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
1.0	2	180	0.022	0.40	0.09	57295	2520	90.5
1.2	2	180	0.026	0.48	0.11	47750	2485	131.0
1.5	2	180	0.034	0.60	0.14	38200	2600	218.5
2.0	2	180	0.044	0.80	0.18	28650	2520	363.0
2.5	2	180	0.056	1.00	0.23	22920	2565	590.0
3.0	2	180	0.066	1.20	0.27	19100	2520	816.5

Steel  
1100 - 1300 N/mm<sup>2</sup>

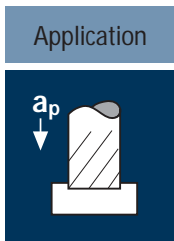
1.0	2	160	0.020	0.40	0.09	50930	2035	73.5
1.2	2	160	0.024	0.48	0.11	42445	2035	107.5
1.5	2	160	0.030	0.60	0.14	33955	2035	171.0
2.0	2	160	0.040	0.80	0.18	25465	2035	293.0
2.5	2	160	0.050	1.00	0.23	20370	2035	468.0
3.0	2	160	0.060	1.20	0.27	16975	2035	659.5

Stainless steel  
[Cr-Ni/1.4301]

1.0	2	80	0.018	0.40	0.09	25465	915	33.0
1.2	2	80	0.020	0.48	0.11	21220	850	45.0
1.5	2	80	0.028	0.60	0.14	16975	950	80.0
2.0	2	80	0.036	0.80	0.18	12735	915	132.0
2.5	2	80	0.044	1.00	0.23	10185	895	206.0
3.0	2	80	0.052	1.20	0.27	8490	885	286.5

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

1.0	2	60	0.016	0.40	0.09	19100	610	22.0
1.2	2	60	0.018	0.48	0.11	15915	575	30.5
1.5	2	60	0.024	0.60	0.14	12735	610	51.0
2.0	2	60	0.030	0.80	0.18	9550	575	83.0
2.5	2	60	0.040	1.00	0.23	7640	610	140.5
3.0	2	60	0.046	1.20	0.27	6365	585	189.5



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
1.0	2	160	0.018	0.06	1.0	50930	1835	110.0
1.2	2	160	0.022	0.07	1.2	42445	1870	157.0
1.5	2	160	0.028	0.09	1.5	33955	1900	256.5
2.0	2	160	0.036	0.12	2.0	25465	1835	440.5
2.5	2	160	0.046	0.15	2.5	20370	1875	703.0
3.0	2	160	0.054	0.18	3.0	16975	1835	991.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

1.0	2	140	0.018	0.06	1.0	44565	1605	96.5
1.2	2	140	0.020	0.07	1.2	37135	1485	124.5
1.5	2	140	0.026	0.09	1.5	29710	1545	208.5
2.0	2	140	0.034	0.12	2.0	22280	1515	363.5
2.5	2	140	0.044	0.15	2.5	17825	1570	589.0
3.0	2	140	0.052	0.18	3.0	14855	1545	834.5

Stainless steel  
[Cr-Ni/1.4301]

1.0	2	70	0.016	0.06	1.0	22280	715	43.0
1.2	2	70	0.020	0.07	1.2	18570	745	62.5
1.5	2	70	0.024	0.09	1.5	14855	715	96.5
2.0	2	70	0.032	0.12	2.0	11140	715	171.5
2.5	2	70	0.040	0.15	2.5	8915	715	268.0
3.0	2	70	0.048	0.18	3.0	7425	715	386.0

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

1.0	2	50	0.014	0.06	1.0	15915	445	26.5
1.2	2	50	0.018	0.07	1.2	13265	480	40.5
1.5	2	50	0.022	0.09	1.5	10610	465	63.0
2.0	2	50	0.028	0.12	2.0	7960	445	107.0
2.5	2	50	0.036	0.15	2.5	6365	460	172.5
3.0	2	50	0.044	0.18	3.0	5305	465	251.0

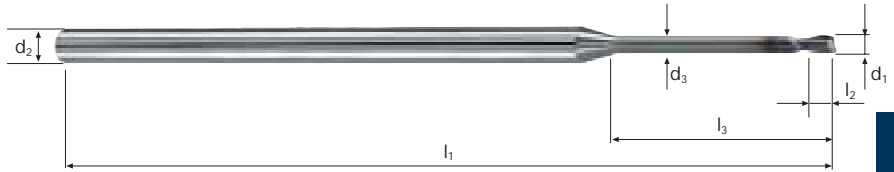


# Cylindrical end mills Microcut-C12

Shank Ø 3mm, cylindrical neck, 12xd



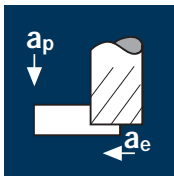
**HM**  
Micro  $\lambda$  25°  
 $\gamma$  6°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	Gold / Platinum Copper
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										MICRO	
Example: Order-N°.										M5721	
Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	45°	α	z		
.100	1.0	3	0.95	50	1.2	12.0	0.07	4.0°	2	●	
.108	1.2	3	1.15	60	1.4	14.4	0.07	3.0°	2	●	
.120	1.5	3	1.45	60	1.8	18.0	0.07	3.0°	2	●	
.140	2.0	3	1.95	60	2.4	24.0	0.10	2.0°	2	●	
.160	2.5	3	2.45	70	3.0	30.0	0.10	1.0°	2	●	
.180	3.0	3	2.95	70	3.6	36.0	0.10	0.0°	2	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

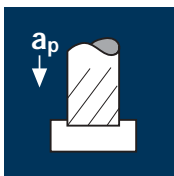
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
1.0	2	180	0.018	0.30	0.09	57295	2065	56.0
1.2	2	180	0.022	0.36	0.11	47750	2100	83.0
1.5	2	180	0.028	0.45	0.14	38200	2140	135.0
2.0	2	180	0.036	0.60	0.18	28650	2065	223.0
2.5	2	180	0.046	0.75	0.23	22920	2110	364.0
3.0	2	180	0.054	0.90	0.27	19100	2065	502.0

1.0	2	160	0.016	0.30	0.09	50930	1630	44.0
1.2	2	160	0.020	0.36	0.11	42445	1700	67.5
1.5	2	160	0.026	0.45	0.14	33955	1765	111.0
2.0	2	160	0.032	0.60	0.18	25465	1630	176.0
2.5	2	160	0.042	0.75	0.23	20370	1710	295.0
3.0	2	160	0.048	0.90	0.27	16975	1630	396.0

1.0	2	80	0.014	0.30	0.09	25465	715	19.5
1.2	2	80	0.018	0.36	0.11	21220	765	30.5
1.5	2	80	0.022	0.45	0.14	16975	745	47.0
2.0	2	80	0.028	0.60	0.18	12735	715	77.0
2.5	2	80	0.036	0.75	0.23	10185	735	127.0
3.0	2	80	0.044	0.90	0.27	8490	745	181.0

1.0	2	60	0.012	0.30	0.09	19100	460	12.5
1.2	2	60	0.016	0.36	0.11	15915	510	20.0
1.5	2	60	0.020	0.45	0.14	12735	510	32.0
2.0	2	60	0.026	0.60	0.18	9550	495	53.5
2.5	2	60	0.032	0.75	0.23	7640	490	84.5
3.0	2	60	0.038	0.90	0.27	6365	485	118.0

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
1.0	2	160	0.016	0.04	1.0	50930	1630	65.0
1.2	2	160	0.018	0.05	1.2	42445	1530	92.0
1.5	2	160	0.024	0.06	1.5	33955	1630	146.5
2.0	2	160	0.030	0.08	2.0	25465	1530	245.0
2.5	2	160	0.038	0.10	2.5	20370	1550	387.5
3.0	2	160	0.046	0.12	3.0	16975	1560	561.5

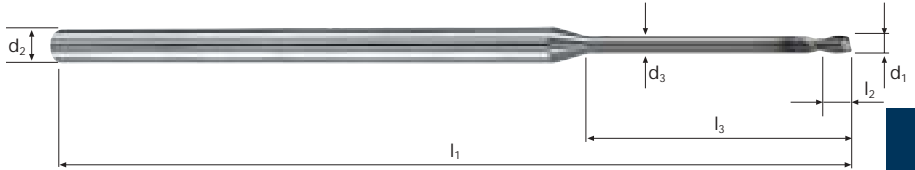
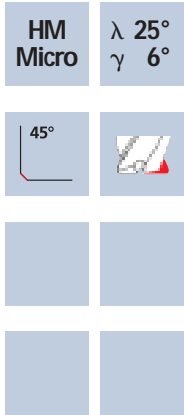
1.0	2	140	0.016	0.04	1.0	44565	1425	57.0
1.2	2	140	0.018	0.05	1.2	37135	1335	80.0
1.5	2	140	0.022	0.06	1.5	29710	1305	117.5
2.0	2	140	0.028	0.08	2.0	22280	1250	200.0
2.5	2	140	0.036	0.10	2.5	17825	1285	321.5
3.0	2	140	0.044	0.12	3.0	14855	1305	470.0

1.0	2	70	0.014	0.04	1.0	22280	625	25.0
1.2	2	70	0.016	0.05	1.2	18570	595	35.5
1.5	2	70	0.022	0.06	1.5	14855	655	59.0
2.0	2	70	0.026	0.08	2.0	11140	580	93.0
2.5	2	70	0.034	0.10	2.5	8915	605	151.5
3.0	2	70	0.040	0.12	3.0	7425	595	214.0

1.0	2	50	0.012	0.04	1.0	15915	380	15.0
1.2	2	50	0.014	0.05	1.2	13265	370	22.0
1.5	2	50	0.020	0.06	1.5	10610	425	38.5
2.0	2	50	0.024	0.08	2.0	7960	380	61.0
2.5	2	50	0.030	0.10	2.5	6365	380	95.0
3.0	2	50	0.036	0.12	3.0	5305	380	137.0

# Cylindrical end mills Microcut-C15

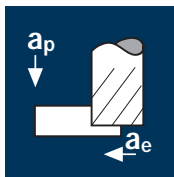
Shank Ø 3mm, cylindrical neck, 15xd



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	Gold / Platinum Copper
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											MICRO	
Example: Order-N°. <span style="margin-left: 100px;">M</span> <span style="margin-left: 20px;">5723</span> <span style="margin-left: 20px;">.100</span>												
Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	45°	α	z			
.100	1.0	3	0.95	60	1.2	15.0	0.07	4.0°	2	●		
.108	1.2	3	1.15	60	1.4	18.0	0.07	3.0°	2	●		
.120	1.5	3	1.45	70	1.8	22.5	0.07	2.0°	2	●		
.140	2.0	3	1.95	70	2.4	30.0	0.10	1.0°	2	●		
.160	2.5	3	2.45	70	3.0	37.5	0.10	1.0°	2	●		
.180	3.0	3	2.95	80	3.6	45.0	0.10	0.0°	2	●		

### Application



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Stainless steel  
[Cr-Ni/1.4301]

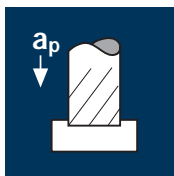


Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
1.0	2	180	0.018	0.20	0.07	57295	2065	29.0
1.2	2	180	0.022	0.24	0.08	47750	2100	40.5
1.5	2	180	0.028	0.30	0.11	38200	2140	70.5
2.0	2	180	0.036	0.40	0.14	28650	2065	115.5
2.5	2	180	0.046	0.50	0.18	22920	2110	190.0
3.0	2	180	0.054	0.60	0.21	19100	2065	260.0
1.0	2	160	0.016	0.20	0.07	50930	1630	23.0
1.2	2	160	0.020	0.24	0.08	42445	1700	32.5
1.5	2	160	0.026	0.30	0.11	33955	1765	58.0
2.0	2	160	0.032	0.40	0.14	25465	1630	91.5
2.5	2	160	0.042	0.50	0.18	20370	1710	154.0
3.0	2	160	0.048	0.60	0.21	16975	1630	205.5
1.0	2	80	0.014	0.20	0.07	25465	715	10.0
1.2	2	80	0.018	0.24	0.08	21220	765	14.5
1.5	2	80	0.022	0.30	0.11	16975	745	24.5
2.0	2	80	0.028	0.40	0.14	12735	715	40.0
2.5	2	80	0.036	0.50	0.18	10185	735	66.0
3.0	2	80	0.044	0.60	0.21	8490	745	94.0
1.0	2	60	0.012	0.20	0.07	19100	460	6.5
1.2	2	60	0.016	0.24	0.08	15915	510	10.0
1.5	2	60	0.020	0.30	0.11	12735	510	17.0
2.0	2	60	0.026	0.40	0.14	9550	495	27.5
2.5	2	60	0.032	0.50	0.18	7640	490	44.0
3.0	2	60	0.038	0.60	0.21	6365	485	61.0

### Application



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Stainless steel  
[Cr-Ni/1.4301]



Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



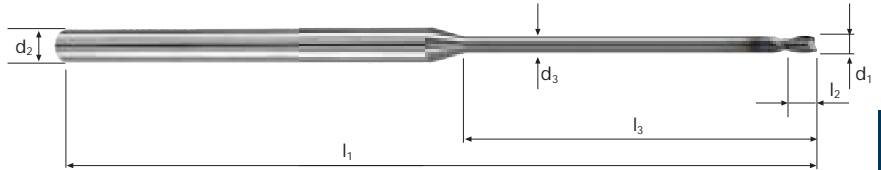
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
1.0	2	160	0.016	0.03	1.0	50930	1630	49.0
1.2	2	160	0.018	0.04	1.2	42445	1530	73.5
1.5	2	160	0.024	0.05	1.5	33955	1630	122.5
2.0	2	160	0.030	0.06	2.0	25465	1530	183.5
2.5	2	160	0.038	0.08	2.5	20370	1550	310.0
3.0	2	160	0.046	0.09	3.0	16975	1560	421.0
1.0	2	140	0.016	0.03	1.0	44565	1425	43.0
1.2	2	140	0.018	0.04	1.2	37135	1335	64.0
1.5	2	140	0.022	0.05	1.5	29710	1305	98.0
2.0	2	140	0.028	0.06	2.0	22280	1250	150.0
2.5	2	140	0.036	0.08	2.5	17825	1285	257.0
3.0	2	140	0.044	0.09	3.0	14855	1305	352.5
1.0	2	70	0.014	0.03	1.0	22280	625	19.0
1.2	2	70	0.016	0.04	1.2	18570	595	28.5
1.5	2	70	0.022	0.05	1.5	14855	655	49.0
2.0	2	70	0.026	0.06	2.0	11140	580	69.5
2.5	2	70	0.034	0.08	2.5	8915	605	121.0
3.0	2	70	0.040	0.09	3.0	7425	595	160.5
1.0	2	50	0.012	0.03	1.0	15915	380	11.5
1.2	2	50	0.014	0.04	1.2	13265	370	18.0
1.5	2	50	0.020	0.05	1.5	10610	425	32.0
2.0	2	50	0.024	0.06	2.0	7960	380	45.5
2.5	2	50	0.030	0.08	2.5	6365	380	76.0
3.0	2	50	0.036	0.09	3.0	5305	380	102.5

# Cylindrical end mills Microcut-C20

Shank  $\emptyset$  3mm, cylindrical neck, 20xd

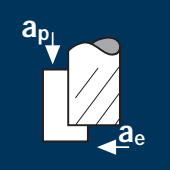








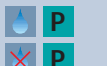


**HM**  
Micro      $\lambda$  25°  
                   $\gamma$  6°



**Rm** < 850     **Rm** 850-1100     **Rm** 1100-1300     Gold / Platinum Copper

Example: Order-N°.										MICRO		
		Coating	Article-N°.	$\alpha$ -Code								
		<b>M</b>	<b>15725</b>	<b>.100</b>							<b>M15725</b>	
$\emptyset$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z			
.100	1.0	3	0.95	60	1.2	20.0	0.07	3.0°	2	●		
.108	1.2	3	1.15	60	1.4	24.0	0.07	2.0°	2	●		
.120	1.5	3	1.45	70	1.8	30.0	0.07	2.0°	2	●		
.140	2.0	3	1.95	80	2.4	40.0	0.10	1.0°	2	●		
.160	2.5	3	2.45	80	3.0	50.0	0.10	1.0°	2	●		
.180	3.0	3	2.95	90	3.6	60.0	0.10	0.0°	2	●		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	
	Steel < 850 N/mm <sup>2</sup> 	2	3	120	0.005	2	0.2	19100	285	
		3	3	120	0.010	3	0.3	12735	380	
		4	3	120	0.015	4	0.4	9550	430	
		5	3	120	0.015	5	0.5	7640	345	
		6	3	120	0.020	6	0.6	6365	380	
		8	3	120	0.025	8	0.8	4775	360	
		10	3	120	0.035	10	1.0	3820	400	
	Steel 850 - 1100 N/mm <sup>2</sup> 	2	3	80	0.005	2	0.2	12735	190	
		3	3	80	0.010	3	0.3	8490	255	
		4	3	80	0.015	4	0.4	6365	285	
		5	3	80	0.015	5	0.5	5095	230	
		6	3	80	0.020	6	0.6	4245	255	
		8	3	80	0.025	8	0.8	3185	240	
		10	3	80	0.035	10	1.0	2545	265	
	Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	2	3	50	0.005	2	0.2	7960	120	
		3	3	50	0.010	3	0.3	5305	160	
		4	3	50	0.015	4	0.4	3980	180	
		5	3	50	0.015	5	0.5	3185	145	
		6	3	50	0.020	6	0.6	2655	160	
		8	3	50	0.025	8	0.8	1990	150	
		10	3	50	0.035	10	1.0	1590	165	
	Stainless steel [Cr-Ni/1.4301] 	2	3	60	0.005	2	0.2	9550	145	
		3	3	60	0.010	3	0.3	6365	190	
		4	3	60	0.015	4	0.4	4775	215	
		5	3	60	0.015	5	0.5	3820	170	
		6	3	60	0.020	6	0.6	3185	190	
		8	3	60	0.025	8	0.8	2385	180	
		10	3	60	0.035	10	1.0	1910	200	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Steel < 850 N/mm <sup>2</sup> 	2	3	100	0.005	1.0	2	15915	240	0.5	
		3	3	100	0.010	1.5	3	10610	320	1.5	
		4	3	100	0.010	2.0	4	7960	240	2.0	
		5	3	100	0.015	2.5	5	6365	285	3.5	
		6	3	100	0.015	3.0	6	5305	240	4.5	
		8	3	100	0.020	4.0	8	3980	240	7.5	
		10	3	100	0.030	5.0	10	3185	285	14.5	
	Steel 850 - 1100 N/mm <sup>2</sup> 	2	3	70	0.005	1.0	2	11140	165	0.5	
		3	3	70	0.010	1.5	3	7425	225	1.0	
		4	3	70	0.010	2.0	4	5570	165	1.5	
		5	3	70	0.015	2.5	5	4455	200	2.5	
		6	3	70	0.015	3.0	6	3715	165	3.0	
		8	3	70	0.020	4.0	8	2785	165	5.5	
		10	3	70	0.025	5.0	10	2230	165	8.5	
	Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	2	3	35	0.005	1.0	2	5570	85	0.2	
		3	3	35	0.010	1.5	3	3715	110	0.5	
		4	3	35	0.010	2.0	4	2785	85	0.5	
		5	3	35	0.015	2.5	5	2230	100	1.5	
		6	3	35	0.015	3.0	6	1855	85	1.5	
		8	3	35	0.020	4.0	8	1395	85	2.5	
		10	3	35	0.025	5.0	10	1115	85	4.5	
	Stainless steel [Cr-Ni/1.4301] 	2	3	40	0.005	1.0	2	6365	95	0.2	
		3	3	40	0.010	1.5	3	4245	125	0.5	
		4	3	40	0.010	2.0	4	3185	95	1.0	
		5	3	40	0.015	2.5	5	2545	115	1.5	
		6	3	40	0.015	3.0	6	2120	95	1.5	
		8	3	40	0.020	4.0	8	1590	95	3.0	
		10	3	40	0.025	5.0	10	1275	95	5.0	

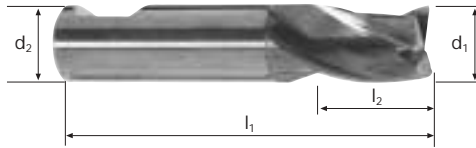
# Cylindrical end mills Cut-X

Smooth-edged, short-shank version



**HM**  
**MG10**     $\lambda$  30°  
                   $\gamma$  12°

90°



Roughing

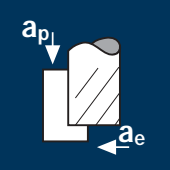

























Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **GG(G)** Nickel-Alloys

Ø Code	d1 e8	d2 h6	l1	l2	α	Z	Coating		
							Article-N°	α-Code	
Example: Order-N°.							P	5336 .120	
							<b>POLYCHROM</b>	<b>TRIBO</b>	
							<b>P5336</b>	<b>T5336</b>	
.120	1.5	6	38	3	11.5°	3	●	●	
.140	2.0	6	38	3	11.0°	3	●	●	
.160	2.5	6	38	3	10.0°	3	●	●	
.180	3.0	6	38	4	8.0°	3	●	●	
.200	3.5	6	38	4	7.0°	3	●	●	
.220	4.0	6	38	5	5.0°	3	●	●	
.240	4.5	6	38	5	4.0°	3	●	●	
.260	5.0	6	38	6	3.0°	3	●	●	
.300	6.0	6	38	7	0.0°	3	●	●	
.331	7.0	8	41	8	2.5°	3	●	●	
.391	8.0	8	41	9	0.0°	3	●	●	
.420	9.0	10	48	10	2.0°	3	●	●	
.450	10.0	10	48	11	0.0°	3	●	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	
	Steel < 850 N/mm <sup>2</sup>    	3	3	120	0.010	3	0.3	12735	380	
		4	3	120	0.015	4	0.4	9550	430	
		5	3	120	0.015	5	0.5	7640	345	
		6	3	120	0.020	6	0.6	6365	380	
		8	3	120	0.025	8	0.8	4775	360	
		10	3	120	0.035	10	1.0	3820	400	
	Steel 850 - 1100 N/mm <sup>2</sup>    	3	3	80	0.010	3	0.3	8490	255	
		4	3	80	0.015	4	0.4	6365	285	
		5	3	80	0.015	5	0.5	5095	230	
		6	3	80	0.020	6	0.6	4245	255	
		8	3	80	0.025	8	0.8	3185	240	
		10	3	80	0.035	10	1.0	2545	265	
	Titanium alloys up to 300 HB [Ti5Al2.5Sn]   	3	3	50	0.010	3	0.3	5305	160	
		4	3	50	0.015	4	0.4	3980	180	
		5	3	50	0.015	5	0.5	3185	145	
		6	3	50	0.020	6	0.6	2655	160	
		8	3	50	0.025	8	0.8	1990	150	
		10	3	50	0.035	10	1.0	1590	165	
	Stainless steel [Cr-Ni/1.4301]    	3	3	60	0.010	3	0.3	6365	190	
		4	3	60	0.015	4	0.4	4775	215	
		5	3	60	0.015	5	0.5	3820	170	
		6	3	60	0.020	6	0.6	3185	190	
		8	3	60	0.025	8	0.8	2385	180	
		10	3	60	0.035	10	1.0	1910	200	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Steel < 850 N/mm <sup>2</sup>    	3	3	100	0.010	1.5	3	10610	320	1.5	
		4	3	100	0.010	2.0	4	7960	240	2.0	
		5	3	100	0.015	2.5	5	6365	285	3.5	
		6	3	100	0.015	3.0	6	5305	240	4.5	
		8	3	100	0.020	4.0	8	3980	240	7.5	
		10	3	100	0.030	5.0	10	3185	285	14.5	
	Steel 850 - 1100 N/mm <sup>2</sup>    	3	3	70	0.010	1.5	3	7425	225	1.0	
		4	3	70	0.010	2.0	4	5570	165	1.5	
		5	3	70	0.015	2.5	5	4455	200	2.5	
		6	3	70	0.015	3.0	6	3715	165	3.0	
		8	3	70	0.020	4.0	8	2785	165	5.5	
		10	3	70	0.025	5.0	10	2230	165	8.5	
	Titanium alloys up to 300 HB [Ti5Al2.5Sn]   	3	3	35	0.010	1.5	3	3715	110	0.5	
		4	3	35	0.010	2.0	4	2785	85	0.5	
		5	3	35	0.015	2.5	5	2230	100	1.5	
		6	3	35	0.015	3.0	6	1855	85	1.5	
		8	3	35	0.020	4.0	8	1395	85	2.5	
		10	3	35	0.025	5.0	10	1115	85	4.5	
	Stainless steel [Cr-Ni/1.4301]    	3	3	40	0.010	1.5	3	4245	125	0.6	
		4	3	40	0.010	2.0	4	3185	95	1.0	
		5	3	40	0.015	2.5	5	2545	115	1.5	
		6	3	40	0.015	3.0	6	2120	95	1.5	
		8	3	40	0.020	4.0	8	1590	95	3.0	
		10	3	40	0.025	5.0	10	1275	95	5.0	

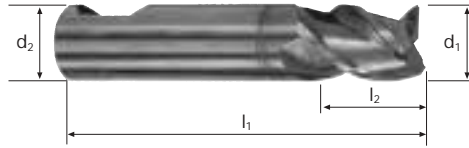


# Cylindrical end mills Cut-X 45

Smooth-edged, short-shank version



**HM**  
**MG10**    λ 45°  
                  γ 12°



Roughing



Finishing



**Rm**  
< 850

**Rm**  
850-1100

**Rm**  
1100-1300

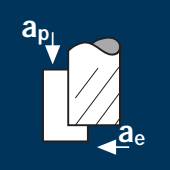







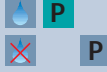
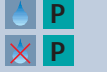
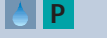

**Inox**  
Stainless

**Ti**  
Titanium

**GG(G)**  
**Nickel-Alloys**

Example: Order-N°.	Coating			Article-N°.		α-Code		45°	α	z	POLYCHROM	TRIBO
	P	5339	.180			P5339	T5339					
∅ Code	d1 e8	d2 h6	l1	l2								
.180	3	6	38	4			0.10	8.0°	3	●	●	
.220	4	6	38	5			0.10	5.0°	3	●	●	
.260	5	6	38	6			0.15	3.0°	3	●	●	
.300	6	6	38	7			0.15	0.0°	3	●	●	
.391	8	8	41	9			0.15	0.0°	3	●	●	
.450	10	10	48	11			0.20	0.0°	3	●	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	
	Steel < 850 N/mm <sup>2</sup> 	2	3	120	0.005	2	0.2	19100	285	
		3	3	120	0.010	3	0.3	12735	380	
		4	3	120	0.015	4	0.4	9550	430	
		5	3	120	0.015	5	0.5	7640	345	
		6	3	120	0.020	6	0.6	6365	380	
		8	3	120	0.025	8	0.8	4775	360	
		10	3	120	0.035	10	1.0	3820	400	
	Steel 850 - 1100 N/mm <sup>2</sup> 	2	3	80	0.005	2	0.2	12735	190	
		3	3	80	0.010	3	0.3	8490	255	
		4	3	80	0.015	4	0.4	6365	285	
		5	3	80	0.015	5	0.5	5095	230	
		6	3	80	0.020	6	0.6	4245	255	
		8	3	80	0.025	8	0.8	3185	240	
		10	3	80	0.035	10	1.0	2545	265	
	Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	2	3	50	0.005	2	0.2	7960	120	
		3	3	50	0.010	3	0.3	5305	160	
		4	3	50	0.015	4	0.4	3980	180	
		5	3	50	0.015	5	0.5	3185	145	
		6	3	50	0.020	6	0.6	2655	160	
		8	3	50	0.025	8	0.8	1990	150	
		10	3	50	0.035	10	1.0	1590	165	
	Stainless steel [Cr-Ni/1.4301] 	2	3	60	0.005	2	0.2	9550	145	
		3	3	60	0.010	3	0.3	6365	190	
		4	3	60	0.015	4	0.4	4775	215	
		5	3	60	0.015	5	0.5	3820	170	
		6	3	60	0.020	6	0.6	3185	190	
		8	3	60	0.025	8	0.8	2385	180	
		10	3	60	0.035	10	1.0	1910	200	

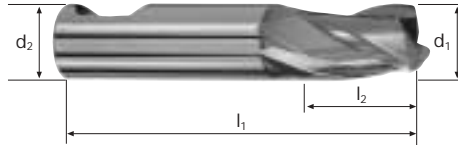
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Steel < 850 N/mm <sup>2</sup> 	2	3	100	0.005	1.0	2	15915	240	0.5	
		3	3	100	0.010	1.5	3	10610	320	1.5	
		4	3	100	0.010	2.0	4	7960	240	2.0	
		5	3	100	0.015	2.5	5	6365	285	3.5	
		6	3	100	0.015	3.0	6	5305	240	4.5	
		8	3	100	0.020	4.0	8	3980	240	7.5	
		10	3	100	0.030	5.0	10	3185	285	14.5	
	Steel 850 - 1100 N/mm <sup>2</sup> 	2	3	70	0.005	1.0	2	11140	165	0.5	
		3	3	70	0.010	1.5	3	7425	225	1.0	
		4	3	70	0.010	2.0	4	5570	165	1.5	
		5	3	70	0.015	2.5	5	4455	200	2.5	
		6	3	70	0.015	3.0	6	3715	165	3.0	
		8	3	70	0.020	4.0	8	2785	165	5.5	
		10	3	70	0.025	5.0	10	2230	165	8.5	
	Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	2	3	35	0.005	1.0	2	5570	85	0.2	
		3	3	35	0.010	1.5	3	3715	110	0.5	
		4	3	35	0.010	2.0	4	2785	85	0.5	
		5	3	35	0.015	2.5	5	2230	100	1.5	
		6	3	35	0.015	3.0	6	1855	85	1.5	
		8	3	35	0.020	4.0	8	1395	85	2.5	
		10	3	35	0.025	5.0	10	1115	85	4.5	
	Stainless steel [Cr-Ni/1.4301] 	2	3	40	0.005	1.0	2	6365	95	0.2	
		3	3	40	0.010	1.5	3	4245	125	0.5	
		4	3	40	0.010	2.0	4	3185	95	1.0	
		5	3	40	0.015	2.5	5	2545	115	1.5	
		6	3	40	0.015	3.0	6	2120	95	1.5	
		8	3	40	0.020	4.0	8	1590	95	3.0	
		10	3	40	0.025	5.0	10	1275	95	5.0	

# Cylindrical end mills Cut-X

Smooth-edged, short-shank version



**HM**  
**MG10**     $\lambda$  30°  
                   $\gamma$  12°



Roughing

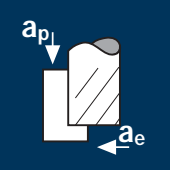

























Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **GG(G)** Nickel-Alloys

Example: Order-N°.		Coating <b>P</b>	Article-N°. <b>5335</b>	$\alpha$ -Code <b>.140</b>				<b>POLYCHROM</b>	<b>TRIBO</b>
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z	<b>P5335</b>	<b>T5335</b>
<b>.140</b>	2	6	38	3	0.10	11.0°	3	●	●
<b>.180</b>	3	6	38	4	0.10	8.0°	3	●	●
<b>.220</b>	4	6	38	5	0.10	5.0°	3	●	●
<b>.260</b>	5	6	38	6	0.15	3.0°	3	●	●
<b>.300</b>	6	6	38	7	0.15	0.0°	3	●	●
<b>.391</b>	8	8	41	9	0.15	0.0°	3	●	●
<b>.450</b>	10	10	48	11	0.20	0.0°	3	●	●

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	
	Steel < 850 N/mm <sup>2</sup>  	2	3	110	0.005	2	0.1	17510	265	
		3	3	110	0.010	3	0.2	11670	350	
		4	3	110	0.015	4	0.2	8755	395	
		5	3	110	0.015	5	0.3	7005	315	
		6	3	110	0.020	6	0.3	5835	350	
		7	3	110	0.025	7	0.4	5000	375	
		8	3	110	0.025	8	0.4	4375	330	
		10	3	110	0.035	10	0.5	3500	370	
		Steel 850 - 1100 N/mm <sup>2</sup>    	2	3	70	0.005	2	0.1	11140	165
			3	3	70	0.010	3	0.2	7425	225
4	3		70	0.015	4	0.2	5570	250		
5	3		70	0.015	5	0.3	4455	200		
6	3		70	0.020	6	0.3	3715	225		
7	3		70	0.025	7	0.4	3185	240		
8	3		70	0.025	8	0.4	2785	210		
10	3		70	0.035	10	0.5	2230	235		
Gold   	2		3	160	0.005	2	0.1	25465	380	
	3		3	160	0.010	3	0.2	16975	510	
	4	3	160	0.015	4	0.2	12735	575		
	5	3	160	0.015	5	0.3	10185	460		
	6	3	160	0.020	6	0.3	8490	510		
	7	3	160	0.025	7	0.4	7275	545		
	8	3	160	0.025	8	0.4	6365	475		
	10	3	150	0.035	10	0.5	4775	500		
	Stainless steel [Cr-Ni/1.4301]  	2	3	50	0.005	2	0.1	7960	120	
		3	3	50	0.010	3	0.2	5305	160	
4		3	50	0.015	4	0.2	3980	180		
5		3	50	0.015	5	0.3	3185	145		
6		3	50	0.020	6	0.3	2655	160		
7		3	50	0.025	7	0.4	2275	170		
8		3	50	0.025	8	0.4	1990	150		
10		3	50	0.035	10	0.5	1590	165		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Steel < 850 N/mm <sup>2</sup>  	2	3	90	0.005	0.8	2	14325	215	0.5	
		3	3	90	0.010	1.2	3	9550	285	1.0	
		4	3	90	0.010	1.6	4	7160	215	1.5	
		5	3	90	0.015	2.0	5	5730	260	2.5	
		6	3	90	0.015	2.4	6	4775	215	3.0	
		7	3	90	0.020	2.8	7	4095	245	5.0	
		8	3	90	0.020	3.2	8	3580	215	5.5	
		10	3	90	0.030	4.0	10	2865	260	10.5	
		Steel 850 - 1100 N/mm <sup>2</sup>    	2	3	60	0.005	0.8	2	9550	145	0.2
			3	3	60	0.010	1.2	3	6365	190	0.5
4	3		60	0.010	1.6	4	4775	145	1.0		
5	3		60	0.015	2.0	5	3820	170	1.5		
6	3		60	0.015	2.4	6	3185	145	2.0		
7	3		60	0.020	2.8	7	2730	165	3.0		
8	3		60	0.020	3.2	8	2385	145	3.5		
10	3		60	0.025	4.0	10	1910	145	6.0		
Gold   	2		3	140	0.005	0.8	2	22280	335	0.5	
	3		3	140	0.010	1.2	3	14855	445	1.5	
	4	3	140	0.010	1.6	4	11140	335	2.0		
	5	3	140	0.015	2.0	5	8915	400	4.0		
	6	3	140	0.020	2.4	6	7425	445	6.5		
	7	3	140	0.020	2.8	7	6365	380	7.5		
	8	3	140	0.025	3.2	8	5570	420	11.0		
	10	3	110	0.030	4.0	10	3500	315	12.5		
	Stainless steel [Cr-Ni/1.4301]  	2	3	35	0.005	0.8	2	5570	85	0.1	
		3	3	35	0.010	1.2	3	3715	110	0.5	
4		3	35	0.010	1.6	4	2785	85	0.5		
5		3	35	0.015	2.0	5	2230	100	1.0		
6		3	35	0.015	2.4	6	1855	85	1.0		
7		3	35	0.020	2.8	7	1590	95	2.0		
8		3	35	0.020	3.2	8	1395	85	2.0		
10		3	35	0.025	4.0	10	1115	85	3.5		

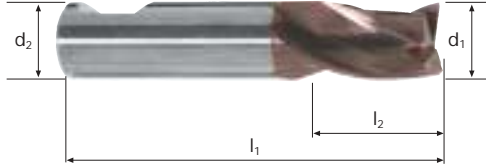
# Cylindrical end mills

Smooth-edged, short-shank version



HM  $\lambda$  30°  
 $\gamma$  12°

90°



Roughing

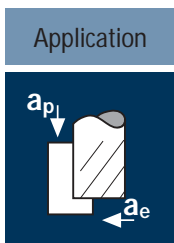


Finishing



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless		Aluminium Copper Gold / Platinum
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Example: Order-N°.								UNICUT-4X	
								5336	U45336
∅ Code	d1 e8	d2 h6	l1	l2	α	Z			
.120	1.5	6	38	3	11.5°	3	●	●	
.140	2.0	6	38	3	11.0°	3	●	●	
.160	2.5	6	38	3	10.0°	3	●	●	
.180	3.0	6	38	4	8.0°	3	●	●	
.200	3.5	6	38	4	7.0°	3	●	●	
.220	4.0	6	38	5	5.0°	3	●	●	
.240	4.5	6	38	5	4.0°	3	●	●	
.260	5.0	6	38	6	3.0°	3	●	●	
.300	6.0	6	38	7	0.0°	3	●	●	
.331	7.0	8	41	8	2.5°	3	●	●	
.391	8.0	8	41	9	0.0°	3	●	●	
.420	9.0	10	48	10	2.0°	3	●	●	
.450	10.0	10	48	11	0.0°	3	●	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	3	110	0.010	3	0.2	11670	350
4	3	110	0.015	4	0.3	8755	395
5	3	110	0.015	5	0.4	7005	315
6	3	110	0.020	6	0.5	5835	350
8	3	110	0.025	8	0.6	4375	330
10	3	110	0.035	10	0.8	3500	370

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	70	0.010	3	0.2	7425	225
4	3	70	0.015	4	0.3	5570	250
5	3	70	0.015	5	0.4	4455	200
6	3	70	0.020	6	0.5	3715	225
8	3	70	0.025	8	0.6	2785	210
10	3	70	0.035	10	0.8	2230	235

Unalloyed copper

3	3	180	0.010	3	0.2	19100	575
4	3	180	0.015	4	0.3	14325	645
5	3	180	0.015	5	0.4	11460	515
6	3	180	0.020	6	0.5	9550	575
8	3	180	0.025	8	0.6	7160	535
10	3	180	0.035	10	0.8	5730	600

Stainless steel  
[Cr-Ni/1.4301]

3	3	50	0.010	3	0.2	5305	160
4	3	50	0.015	4	0.3	3980	180
5	3	50	0.015	5	0.4	3185	145
6	3	50	0.020	6	0.5	2655	160
8	3	50	0.025	8	0.6	1990	150
10	3	50	0.035	10	0.8	1590	165



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	90	0.010	1.4	3	9550	285	1.0
4	3	90	0.010	1.8	4	7160	215	1.5
5	3	90	0.015	2.3	5	5730	260	3.0
6	3	90	0.015	2.7	6	4775	215	3.5
8	3	90	0.020	3.6	8	3580	215	6.0
10	3	90	0.030	4.5	10	2865	260	11.5

Steel  
850 - 1100 N/mm<sup>2</sup>

3	3	60	0.010	1.4	3	6365	190	1.0
4	3	60	0.010	1.8	4	4775	145	1.0
5	3	60	0.015	2.3	5	3820	170	2.0
6	3	60	0.015	2.7	6	3185	145	2.5
8	3	60	0.020	3.6	8	2385	145	4.0
10	3	60	0.025	4.5	10	1910	145	6.5

Unalloyed copper

3	3	160	0.010	1.4	3	16975	510	2.0
4	3	160	0.010	1.8	4	12735	380	2.5
5	3	160	0.015	2.3	5	10185	460	5.5
6	3	160	0.020	2.7	6	8490	510	8.5
8	3	160	0.025	3.6	8	6365	475	13.5
10	3	160	0.030	4.5	10	5095	460	20.5

Stainless steel  
[Cr-Ni/1.4301]

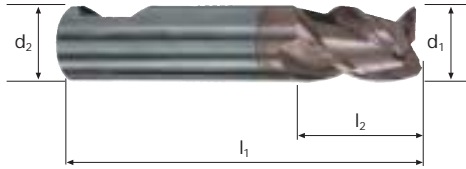
3	3	35	0.010	1.4	3	3715	110	0.5
4	3	35	0.010	1.8	4	2785	85	0.5
5	3	35	0.015	2.3	5	2230	100	1.0
6	3	35	0.015	2.7	6	1855	85	1.5
8	3	35	0.020	3.6	8	1395	85	2.5
10	3	35	0.025	4.5	10	1115	85	4.0

# Cylindrical end mills

Smooth-edged, short-shank version



**HM**    λ 45°  
             γ 12°



Roughing



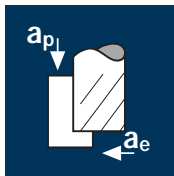
Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Copper**

Example: Order-N°.									UNICUT-4X	
									U45339	
∅ Code	d1 e8	d2 h6	l1	l2	45°	α	z			
.180	3	6	38	4	0.10	8.0°	3	●		
.220	4	6	38	5	0.10	5.0°	3	●		
.260	5	6	38	6	0.15	3.0°	3	●		
.300	6	6	38	7	0.15	0.0°	3	●		
.391	8	8	41	9	0.15	0.0°	3	●		
.450	10	10	48	11	0.20	0.0°	3	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Unalloyed copper

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	3	110	0.005	2	0.2	17510	265
3	3	110	0.010	3	0.2	11670	350
4	3	110	0.015	4	0.3	8755	395
5	3	110	0.015	5	0.4	7005	315
6	3	110	0.020	6	0.5	5835	350
8	3	110	0.025	8	0.6	4375	330
10	3	110	0.035	10	0.8	3500	370

2	3	70	0.005	2	0.2	11140	165
3	3	70	0.010	3	0.2	7425	225
4	3	70	0.015	4	0.3	5570	250
5	3	70	0.015	5	0.4	4455	200
6	3	70	0.020	6	0.5	3715	225
8	3	70	0.025	8	0.6	2785	210
10	3	70	0.035	10	0.8	2230	235

2	3	180	0.005	2	0.2	28650	430
3	3	180	0.010	3	0.2	19100	575
4	3	180	0.015	4	0.3	14325	645
5	3	180	0.015	5	0.4	11460	515
6	3	180	0.020	6	0.5	9550	575
8	3	180	0.025	8	0.6	7160	535
10	3	180	0.035	10	0.8	5730	600

2	3	50	0.005	2	0.2	7960	120
3	3	50	0.010	3	0.2	5305	160
4	3	50	0.015	4	0.3	3980	180
5	3	50	0.015	5	0.4	3185	145
6	3	50	0.020	6	0.5	2655	160
8	3	50	0.025	8	0.6	1990	150
10	3	50	0.035	10	0.8	1590	165

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Unalloyed copper

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2	3	90	0.005	0.9	2	14325	215	0.5
3	3	90	0.010	1.4	3	9550	285	1.0
4	3	90	0.010	1.8	4	7160	215	1.5
5	3	90	0.015	2.3	5	5730	260	3.0
6	3	90	0.015	2.7	6	4775	215	3.5
8	3	90	0.020	3.6	8	3580	215	6.0
10	3	90	0.030	4.5	10	2865	260	11.5

2	3	60	0.005	0.9	2	9550	145	0.5
3	3	60	0.010	1.4	3	6365	190	1.0
4	3	60	0.010	1.8	4	4775	145	1.0
5	3	60	0.015	2.3	5	3820	170	2.0
6	3	60	0.015	2.7	6	3185	145	2.5
8	3	60	0.020	3.6	8	2385	145	4.0
10	3	60	0.025	4.5	10	1910	145	6.5

2	3	160	0.005	0.9	2	25465	380	0.5
3	3	160	0.010	1.4	3	16975	510	2.0
4	3	160	0.010	1.8	4	12735	380	2.5
5	3	160	0.015	2.3	5	10185	460	5.0
6	3	160	0.020	2.7	6	8490	510	8.5
8	3	160	0.025	3.6	8	6365	475	13.5
10	3	160	0.030	4.5	10	5095	460	20.5

2	3	35	0.005	0.9	2	5570	85	0.2
3	3	35	0.010	1.4	3	3715	110	0.5
4	3	35	0.010	1.8	4	2785	85	0.5
5	3	35	0.015	2.3	5	2230	100	1.0
6	3	35	0.015	2.7	6	1855	85	1.5
8	3	35	0.020	3.6	8	1395	85	2.5
10	3	35	0.025	4.5	10	1115	85	4.0

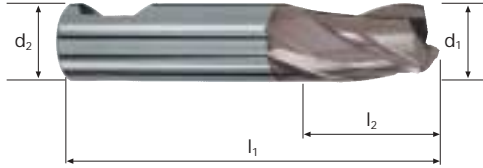


# Cylindrical end mills

Smooth-edged, short-shank version



**HM**     $\lambda$  30°  
             $\gamma$  12°



Roughing

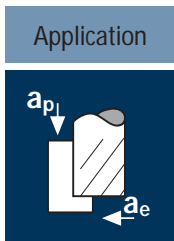


Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Copper**

Example: Order-N°.								UNICUT-4X	
								U45335	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	45°	$\alpha$	z		
.140	2	6	38	3	0.10	11.0°	3	●	
.180	3	6	38	4	0.10	8.0°	3	●	
.220	4	6	38	5	0.10	5.0°	3	●	
.260	5	6	38	6	0.15	3.0°	3	●	
.300	6	6	38	7	0.15	0.0°	3	●	
.391	8	8	41	9	0.15	0.0°	3	●	
.450	10	10	48	11	0.20	0.0°	3	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	3	60	0.005	1.0	0.1	19100	285
2.0	3	60	0.010	2.0	0.2	9550	285
2.5	3	60	0.010	2.5	0.3	7640	230
3.0	3	60	0.010	3.0	0.3	6365	190
4.0	3	60	0.015	4.0	0.4	4775	215
5.0	3	60	0.020	5.0	0.5	3820	230
5.5	3	60	0.020	5.5	0.6	3475	210
6.0	3	60	0.025	6.0	0.6	3185	240
7.0	3	60	0.030	7.0	0.7	2730	245

Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	3	48	0.005	1.0	0.1	15280	230
2.0	3	48	0.010	2.0	0.2	7640	230
2.5	3	48	0.010	2.5	0.3	6110	185
3.0	3	48	0.010	3.0	0.3	5095	155
4.0	3	48	0.015	4.0	0.4	3820	170
5.0	3	48	0.020	5.0	0.5	3055	185
5.5	3	48	0.020	5.5	0.6	2780	165
6.0	3	48	0.025	6.0	0.6	2545	190
7.0	3	48	0.030	7.0	0.7	2185	195

Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	3	25	0.005	1.0	0.1	7960	120
2.0	3	25	0.010	2.0	0.2	3980	120
2.5	3	25	0.010	2.5	0.3	3185	95
3.0	3	25	0.010	3.0	0.3	2655	80
4.0	3	25	0.015	4.0	0.4	1990	90
5.0	3	25	0.020	5.0	0.5	1590	95
5.5	3	25	0.020	5.5	0.6	1445	85
6.0	3	25	0.025	6.0	0.6	1325	100
7.0	3	25	0.030	7.0	0.7	1135	100

Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
1.0	3	22	0.005	1.0	0.1	7005	105
2.0	3	22	0.010	2.0	0.2	3500	105
2.5	3	22	0.010	2.5	0.3	2800	85
3.0	3	22	0.010	3.0	0.3	2335	70
4.0	3	22	0.015	4.0	0.4	1750	80
5.0	3	22	0.020	5.0	0.5	1400	85
5.5	3	22	0.020	5.5	0.6	1275	75
6.0	3	22	0.025	6.0	0.6	1165	85
7.0	3	22	0.030	7.0	0.7	1000	90



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1.0	3	55	0.005	0.6	1.0	17510	265	0.2
2.0	3	55	0.010	1.0	2.0	8755	265	0.5
2.5	3	55	0.010	1.3	2.5	7005	210	0.5
3.0	3	55	0.010	1.5	3.0	5835	175	1.0
4.0	3	55	0.015	2.0	4.0	4375	195	1.5
5.0	3	55	0.020	2.5	5.0	3500	210	2.5
5.5	3	55	0.020	2.8	5.5	3185	190	3.0
6.0	3	55	0.025	3.0	6.0	2920	220	4.0
7.0	3	55	0.030	3.5	7.0	2500	225	5.5

Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1.0	3	45	0.005	0.6	1.0	14325	215	0.1
2.0	3	45	0.010	1.0	2.0	7160	215	0.5
2.5	3	45	0.010	1.3	2.5	5730	170	0.5
3.0	3	45	0.010	1.5	3.0	4775	145	0.5
4.0	3	45	0.015	2.0	4.0	3580	160	1.5
5.0	3	45	0.020	2.5	5.0	2865	170	2.0
5.5	3	45	0.020	2.8	5.5	2605	155	2.5
6.0	3	45	0.025	3.0	6.0	2385	180	3.0
7.0	3	45	0.030	3.5	7.0	2045	185	4.5

Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1.0	3	22	0.005	0.6	1.0	7005	105	0.1
2.0	3	22	0.010	1.0	2.0	3500	105	0.2
2.5	3	22	0.010	1.3	2.5	2800	85	0.5
3.0	3	22	0.010	1.5	3.0	2335	70	0.5
4.0	3	22	0.015	2.0	4.0	1750	80	0.5
5.0	3	22	0.020	2.5	5.0	1400	85	1.0
5.5	3	22	0.020	2.8	5.5	1275	75	1.0
6.0	3	22	0.025	3.0	6.0	1165	85	1.5
7.0	3	22	0.030	3.5	7.0	1000	90	2.0

Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

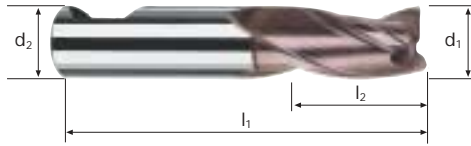
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1.0	3	20	0.005	0.6	1.0	6365	95	0.1
2.0	3	20	0.010	1.0	2.0	3185	95	0.2
2.5	3	20	0.010	1.3	2.5	2545	75	0.2
3.0	3	20	0.010	1.5	3.0	2120	65	0.5
4.0	3	20	0.015	2.0	4.0	1590	70	0.5
5.0	3	20	0.020	2.5	5.0	1275	75	1.0
5.5	3	20	0.020	2.8	5.5	1160	70	1.0
6.0	3	20	0.025	3.0	6.0	1060	80	1.5
7.0	3	20	0.030	3.5	7.0	910	80	2.0

# Cylindrical end mills

Smooth-edged, short-shank version



**HSS**  
**PM/F**     $\lambda$  30°  
                   $\gamma$  15°



Roughing



Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100					<b>Inox</b> Stainless	<b>Copper</b>
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Example: Order-N°.							UNICUT-4X	
		Coating	Article-N°.	α-Code			U0400	
		U	0400	.100				
Ø Code	d1 f8	d2 h6	l1	l2	α	Z		
.100	1.00	6	34	3	14.0°	3	●	
.120	1.50	6	34	3	13.0°	3	●	
.130	1.80	6	35	4	11.5°	3	●	
.140	2.00	6	35	4	11.0°	3	●	
.150	2.30	6	36	5	9.0°	3	●	
.160	2.50	6	36	5	8.5°	3	●	
.170	2.80	6	36	5	8.0°	3	●	
.180	3.00	6	36	5	7.5°	3	●	
.190	3.30	6	37	6	6.0°	3	●	
.200	3.50	6	37	6	5.5°	3	●	
.210	3.80	6	38	7	4.5°	3	●	
.220	4.00	6	38	7	4.5°	3	●	
.230	4.30	6	38	7	3.5°	3	●	
.240	4.50	6	38	7	3.5°	3	●	
.250	4.80	6	39	8	2.5°	3	●	
.260	5.00	6	39	8	2.0°	3	●	
.270	5.30	6	39	8	1.5°	3	●	
.280	5.50	6	39	8	1.0°	3	●	
.290	5.75	6	39	8	0.0°	3	●	
.300	6.00	6	39	8	0.0°	3	●	
.311	6.50	8	42	10	2.5°	3	●	
.331	7.00	8	42	10	2.0°	3	●	
.351	7.50	8	42	10	1.0°	3	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
	Steel < 850 N/mm <sup>2</sup> 	8.0	3	60	0.030	8.0	0.8	2385	215
		8.5	3	60	0.035	8.5	0.9	2245	235
		9.0	3	60	0.035	9.0	0.9	2120	225
		9.5	3	60	0.040	9.5	1.0	2010	240
		10.0	3	60	0.040	10.0	1.0	1910	230
		12.0	3	60	0.050	12.0	1.2	1590	240
		16.0	3	60	0.065	16.0	1.6	1195	235
		20.0	3	60	0.080	20.0	2.0	955	230
Steel 850 - 1100 N/mm <sup>2</sup> 	8.0	3	48	0.030	8.0	0.8	1910	170	
	8.5	3	48	0.035	8.5	0.9	1800	190	
	9.0	3	48	0.035	9.0	0.9	1700	180	
	9.5	3	48	0.040	9.5	1.0	1610	195	
	10.0	3	48	0.040	10.0	1.0	1530	185	
	12.0	3	48	0.050	12.0	1.2	1275	190	
	16.0	3	48	0.065	16.0	1.6	955	185	
	20.0	3	48	0.080	20.0	2.0	765	185	
Stainless steel [Cr-Ni/1.4301] 	8.0	3	25	0.030	8.0	0.8	995	90	
	8.5	3	25	0.035	8.5	0.9	935	100	
	9.0	3	25	0.035	9.0	0.9	885	95	
	9.5	3	25	0.040	9.5	1.0	840	100	
	10.0	3	25	0.040	10.0	1.0	795	95	
	12.0	3	25	0.050	12.0	1.2	665	100	
	16.0	3	25	0.065	16.0	1.6	495	95	
	20.0	3	25	0.080	20.0	2.0	400	95	
Stainless steel [Cr-Ni-Mo-.../1.4571] 	8.0	3	22	0.030	8.0	0.8	875	80	
	8.5	3	22	0.035	8.5	0.9	825	85	
	9.0	3	22	0.035	9.0	0.9	780	80	
	9.5	3	22	0.040	9.5	1.0	735	90	
	10.0	3	22	0.040	10.0	1.0	700	85	
	12.0	3	22	0.050	12.0	1.2	585	90	
	16.0	3	22	0.065	16.0	1.6	440	85	
	20.0	3	22	0.080	20.0	2.0	350	85	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup> 	8.0	3	55	0.030	4.0	8.0	2190	195	6.0
		8.5	3	55	0.035	4.3	8.5	2060	215	8.0
		9.0	3	55	0.035	4.5	9.0	1945	205	8.5
		9.5	3	55	0.040	4.8	9.5	1845	220	10.0
		10.0	3	55	0.040	5.0	10.0	1750	210	10.5
		12.0	3	55	0.050	6.0	12.0	1460	220	16.0
		16.0	3	55	0.065	8.0	16.0	1095	215	27.5
		20.0	3	55	0.080	10.0	20.0	875	210	42.0
Steel 850 - 1100 N/mm <sup>2</sup> 	8.0	3	45	0.030	4.0	8.0	1790	160	5.0	
	8.5	3	45	0.035	4.3	8.5	1685	175	6.5	
	9.0	3	45	0.035	4.5	9.0	1590	165	6.5	
	9.5	3	45	0.040	4.8	9.5	1510	180	8.0	
	10.0	3	45	0.040	5.0	10.0	1430	170	8.5	
	12.0	3	45	0.050	6.0	12.0	1195	180	13.0	
	16.0	3	45	0.065	8.0	16.0	895	175	22.5	
	20.0	3	45	0.080	10.0	20.0	715	170	34.0	
Stainless steel [Cr-Ni/1.4301] 	8.0	3	22	0.030	4.0	8.0	875	80	2.5	
	8.5	3	22	0.035	4.3	8.5	825	85	3.0	
	9.0	3	22	0.035	4.5	9.0	780	80	3.0	
	9.5	3	22	0.040	4.8	9.5	735	90	4.0	
	10.0	3	22	0.040	5.0	10.0	700	85	4.5	
	12.0	3	22	0.050	6.0	12.0	585	90	6.5	
	16.0	3	22	0.065	8.0	16.0	440	85	11.0	
	20.0	3	22	0.080	10.0	20.0	350	85	17.0	
Stainless steel [Cr-Ni-Mo-.../1.4571] 	8.0	3	20	0.030	4.0	8.0	795	70	2.2	
	8.5	3	20	0.035	4.3	8.5	750	80	3.0	
	9.0	3	20	0.035	4.5	9.0	705	75	3.0	
	9.5	3	20	0.040	4.8	9.5	670	80	3.5	
	10.0	3	20	0.040	5.0	10.0	635	75	4.0	
	12.0	3	20	0.050	6.0	12.0	530	80	6.0	
	16.0	3	20	0.065	8.0	16.0	400	80	10.0	
	20.0	3	20	0.080	10.0	20.0	320	75	15.0	

# Cylindrical end mills

Smooth-edged, short-shank version



**HSS**  
**PM/F**

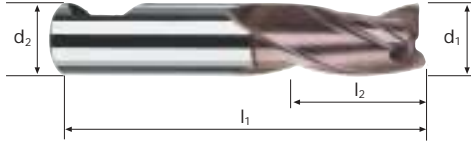
$\lambda$  30°  
 $\gamma$  15°

90°

[Blank]

[Blank]

[Blank]



Roughing



Finishing



**Rm**  
 < 850

**Rm**  
 850-1100

[Blank]

[Blank]

[Blank]

[Blank]

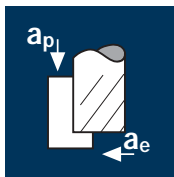
**Inox**  
 Stainless

[Blank]

**Copper**



Ø Code	d1 f8	d2 h6	l1	l2	$\alpha$	Z	UNICUT-4X	
							U0400	[Blank]
.391	8.00	8	43	11	0.0°	3	●	[Blank]
.410	8.50	10	48	11	2.5°	3	●	[Blank]
.420	9.00	10	48	11	1.5°	3	●	[Blank]
.430	9.50	10	48	11	1.0°	3	●	[Blank]
.450	10.00	10	50	13	0.0°	3	●	[Blank]
.501	12.00	12	73	16	0.0°	3	●	[Blank]
.610	16.00	16	79	19	0.0°	3	●	[Blank]
.682	20.00	20	88	22	0.0°	3	●	[Blank]
[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]
[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]
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[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]	[Blank]

## Application





## Material



Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
2	3	60	0.005	3	0.2	9550	145
3	3	60	0.010	5	0.3	6365	190
5	3	60	0.015	8	0.5	3820	170
6	3	60	0.020	9	0.6	3185	190
8	3	60	0.025	12	0.8	2385	180
10	3	60	0.035	15	1.0	1910	200
12	3	60	0.040	18	1.2	1590	190
16	3	60	0.055	24	1.6	1195	195
20	3	60	0.065	30	2.0	955	185

2	3	48	0.005	3	0.2	7640	115
3	3	48	0.010	5	0.3	5095	155
5	3	48	0.015	8	0.5	3055	135
6	3	48	0.020	9	0.6	2545	155
8	3	48	0.025	12	0.8	1910	145
10	3	48	0.035	15	1.0	1530	160
12	3	48	0.040	18	1.2	1275	155
16	3	48	0.055	24	1.6	955	160
20	3	48	0.065	30	2.0	765	150

2	3	25	0.005	3	0.2	3980	60
3	3	25	0.010	5	0.3	2655	80
5	3	25	0.015	8	0.5	1590	70
6	3	25	0.020	9	0.6	1325	80
8	3	25	0.025	12	0.8	995	75
10	3	25	0.035	15	1.0	795	85
12	3	25	0.040	18	1.2	665	80
16	3	25	0.055	24	1.6	495	80
20	3	25	0.065	30	2.0	400	80



2	3	22	0.005	3	0.2	3500	55
3	3	22	0.010	5	0.3	2335	70
5	3	22	0.015	8	0.5	1400	65
6	3	22	0.020	9	0.6	1165	70
8	3	22	0.025	12	0.8	875	65
10	3	22	0.035	15	1.0	700	75
12	3	22	0.040	18	1.2	585	70
16	3	22	0.055	24	1.6	440	75
20	3	22	0.065	30	2.0	350	70

## Application





## Material



Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
2	3	55	0.005	1.0	2	8755	130	0.5
3	3	55	0.010	1.5	3	5835	175	1.0
5	3	55	0.015	2.5	5	3500	160	2.0
6	3	55	0.015	3.0	6	2920	130	2.5
8	3	55	0.025	4.0	8	2190	165	5.5
10	3	55	0.030	5.0	10	1750	160	8.0
12	3	55	0.035	6.0	12	1460	155	11.0
16	3	55	0.045	8.0	16	1095	150	19.0
20	3	55	0.055	10.0	20	875	145	29.0

2	3	45	0.005	1.0	2	7160	105	0.2
3	3	45	0.010	1.5	3	4775	145	0.5
5	3	45	0.015	2.5	5	2865	130	1.5
6	3	45	0.015	3.0	6	2385	105	2.0
8	3	45	0.025	4.0	8	1790	135	4.5
10	3	45	0.030	5.0	10	1430	130	6.5
12	3	45	0.035	6.0	12	1195	125	9.0
16	3	45	0.045	8.0	16	895	120	15.5
20	3	45	0.055	10.0	20	715	120	24.0

2	3	22	0.005	1.0	2	3500	55	0.1
3	3	22	0.010	1.5	3	2335	70	0.5
5	3	22	0.015	2.5	5	1400	65	1.0
6	3	22	0.015	3.0	6	1165	50	1.0
8	3	22	0.025	4.0	8	875	65	2.0
10	3	22	0.030	5.0	10	700	65	3.5
12	3	22	0.035	6.0	12	585	60	4.5
16	3	22	0.045	8.0	16	440	60	7.5
20	3	22	0.055	10.0	20	350	60	12.0

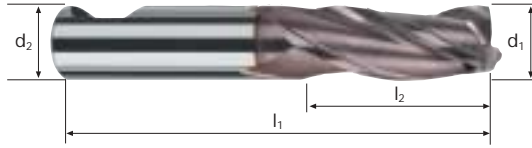
2	3	20	0.005	1.0	2	3185	50	0.1
3	3	20	0.010	1.5	3	2120	65	0.5
5	3	20	0.015	2.5	5	1275	55	0.5
6	3	20	0.015	3.0	6	1060	50	1.0
8	3	20	0.025	4.0	8	795	60	2.0
10	3	20	0.030	5.0	10	635	55	3.0
12	3	20	0.035	6.0	12	530	55	4.0
16	3	20	0.045	8.0	16	400	55	7.0
20	3	20	0.055	10.0	20	320	55	11.0

# Cylindrical end mills

Smooth-edged, short-shank version



**HSS**  
**PM/F**     $\lambda$  30°  
                   $\gamma$  15°



Roughing



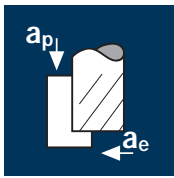
Finishing



**Rm** < 850    **Rm** 850-1100    **Inox** Stainless    **Copper**

Example: Order-N°.							UNICUT-4X	
		Coating	Article-N°.	α-Code				U0410
		U	0410	.140				
Ø Code	d1 f8	d2 h6	l1	l2	α	Z		
.140	2.0	6	38	7	8.5°	3	●	
.160	2.5	6	39	8	7.0°	3	●	
.180	3.0	6	39	8	6.0°	3	●	
.200	3.5	6	41	10	4.5°	3	●	
.220	4.0	6	42	11	3.5°	3	●	
.240	4.5	6	42	11	2.5°	3	●	
.260	5.0	6	44	13	1.5°	3	●	
.280	5.5	6	44	13	1.0°	3	●	
.300	6.0	6	44	13	0.0°	3	●	
.311	6.5	8	48	16	2.0°	3	●	
.331	7.0	8	48	16	1.5°	3	●	
.351	7.5	8	48	16	1.0°	3	●	
.391	8.0	8	51	19	0.0°	3	●	
.410	8.5	10	56	19	2.0°	3	●	
.420	9.0	10	56	19	1.5°	3	●	
.430	9.5	10	56	19	1.0°	3	●	
.450	10.0	10	59	22	0.0°	3	●	
.501	12.0	12	83	26	0.0°	3	●	
.610	16.0	16	92	32	0.0°	3	●	
.682	20.0	20	104	38	0.0°	3	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	170	0.010	3	0.2	18040	720
4	4	170	0.010	4	0.2	13530	540
5	4	170	0.015	5	0.3	10825	650
6	6	170	0.015	6	0.3	9020	810
8	6	170	0.025	8	0.4	6765	1015
10	6	170	0.030	10	0.5	5410	975

3	4	110	0.010	3	0.2	11670	465
4	4	110	0.010	4	0.2	8755	350
5	4	110	0.015	5	0.3	7005	420
6	6	110	0.015	6	0.3	5835	525
8	6	110	0.025	8	0.4	4375	655
10	6	110	0.030	10	0.5	3500	630

3	4	80	0.010	3	0.2	8490	340
4	4	80	0.010	4	0.2	6365	255
5	4	80	0.015	5	0.3	5095	305
6	6	80	0.015	6	0.3	4245	380
8	6	80	0.025	8	0.4	3185	480
10	6	80	0.030	10	0.5	2545	460

3	4	70	0.010	3	0.2	7425	295
4	4	70	0.010	4	0.2	5570	225
5	4	70	0.015	5	0.3	4455	265
6	6	70	0.015	6	0.3	3715	335
8	6	70	0.025	8	0.4	2785	420
10	6	70	0.030	10	0.5	2230	400

## Material

Cast iron  
(lamellar / spheroidal)



Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



Heat resistant steel  
[17-4 PH]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	130	0.010	3	0.2	13795	550
4	4	130	0.010	4	0.2	10345	415
5	4	130	0.015	5	0.3	8275	495
6	6	130	0.015	6	0.3	6895	620
8	6	130	0.025	8	0.4	5175	775
10	6	130	0.030	10	0.5	4140	745

3	4	75	0.010	3	0.2	7960	320
4	4	75	0.010	4	0.2	5970	240
5	4	75	0.015	5	0.3	4775	285
6	6	75	0.015	6	0.3	3980	360
8	6	75	0.025	8	0.4	2985	450
10	6	75	0.030	10	0.5	2385	430

3	4	80	0.010	3	0.2	8490	340
4	4	80	0.010	4	0.2	6365	255
5	4	80	0.015	5	0.3	5095	305
6	6	80	0.015	6	0.3	4245	380
8	6	80	0.025	8	0.4	3185	480
10	6	80	0.030	10	0.5	2545	460

3	4	40	0.010	3	0.2	4245	170
4	4	40	0.010	4	0.2	3185	125
5	4	40	0.015	5	0.3	2545	155
6	6	40	0.015	6	0.3	2120	190
8	6	40	0.025	8	0.4	1590	240
10	6	40	0.030	10	0.5	1275	230



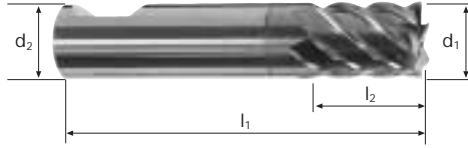
# Cylindrical end mills Cut-X multi

Finishing, short-shank version



**HM**  
**MG10**     $\lambda$  45°  
                   $\gamma$  10°

90°



Roughing

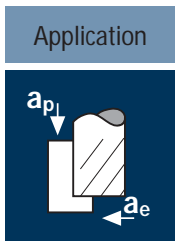


Finishing



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Inox** Stainless    **Ti** Titanium    **GG(G)** Tool Steel

Example: Order-N°.								<b>POLYCHROM</b>	<b>TRIBO</b>
		Coating <b>P</b>	Article-N°. <b>5337</b>	α-Code <b>.180</b>				<b>P5337</b>	<b>T5337</b>
Ø Code	d1 e8	d2 h6	l1	l2	α	Z			
.180	3	6	38	4	8.0°	4	●	●	
.220	4	6	38	5	5.0°	4	●	●	
.260	5	6	38	6	3.0°	4	●	●	
.300	6	6	38	7	0.0°	6	●	●	
.391	8	8	41	9	0.0°	6	●	●	
.450	10	10	48	11	0.0°	6	●	●	



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	170	0.010	3	0.2	18040	720
4	4	170	0.010	4	0.2	13530	540
5	4	170	0.015	5	0.3	10825	650
6	6	170	0.015	6	0.3	9020	810
8	6	170	0.025	8	0.4	6765	1015
10	6	170	0.030	10	0.5	5410	975

Steel  
850 - 1100 N/mm<sup>2</sup>

3	4	110	0.010	3	0.2	11670	465
4	4	110	0.010	4	0.2	8755	350
5	4	110	0.015	5	0.3	7005	420
6	6	110	0.015	6	0.3	5835	525
8	6	110	0.025	8	0.4	4375	655
10	6	110	0.030	10	0.5	3500	630

Steel  
1100 - 1300 N/mm<sup>2</sup>

3	4	80	0.010	3	0.2	8490	340
4	4	80	0.010	4	0.2	6365	255
5	4	80	0.015	5	0.3	5095	305
6	6	80	0.015	6	0.3	4245	380
8	6	80	0.025	8	0.4	3185	480
10	6	80	0.030	10	0.5	2545	460

Stainless steel  
[Cr-Ni/1.4301]

3	4	70	0.010	3	0.2	7425	295
4	4	70	0.010	4	0.2	5570	225
5	4	70	0.015	5	0.3	4455	265
6	6	70	0.015	6	0.3	3715	335
8	6	70	0.025	8	0.4	2785	420
10	6	70	0.030	10	0.5	2230	400

Material

Cast iron  
(lamellar / spheroidal)

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	130	0.010	3	0.2	13795	550
4	4	130	0.010	4	0.2	10345	415
5	4	130	0.015	5	0.3	8275	495
6	6	130	0.015	6	0.3	6895	620
8	6	130	0.025	8	0.4	5175	775
10	6	130	0.030	10	0.5	4140	745

3	4	75	0.010	3	0.2	7960	320
4	4	75	0.010	4	0.2	5970	240
5	4	75	0.015	5	0.3	4775	285
6	6	75	0.015	6	0.3	3980	360
8	6	75	0.025	8	0.4	2985	450
10	6	75	0.030	10	0.5	2385	430

3	4	80	0.010	3	0.2	8490	340
4	4	80	0.010	4	0.2	6365	255
5	4	80	0.015	5	0.3	5095	305
6	6	80	0.015	6	0.3	4245	380
8	6	80	0.025	8	0.4	3185	480
10	6	80	0.030	10	0.5	2545	460

Heat resistant steel  
[17-4 PH]

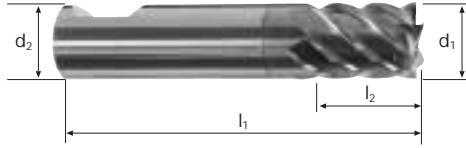
3	4	40	0.010	3	0.2	4245	170
4	4	40	0.010	4	0.2	3185	125
5	4	40	0.015	5	0.3	2545	155
6	6	40	0.015	6	0.3	2120	190
8	6	40	0.025	8	0.4	1590	240
10	6	40	0.030	10	0.5	1275	230

# Cylindrical end mills Cut-X multi

Finishing, short-shank version



**HM**  
**MG10**     $\lambda$  **45°**  
                   $\gamma$  **10°**



Roughing



Finishing



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Tool Steel
--------------------	-----------------------	------------------------	--	--	--	--------------------------	-----------------------	----------------------------

Example: Order-N°.	Coating		Article-N°.		α-Code		∅ Code	d1 e8	d2 h6	l1	l2	45°	α	z	POLYCHROM		TRIBO	
	P		5338	.180											P5338	T5338		
															●	●		
.180	3	6	38	4	0.10	8.0°	4	●	●						●	●		
.220	4	6	38	5	0.10	5.0°	4	●	●						●	●		
.260	5	6	38	6	0.15	3.0°	4	●	●						●	●		
.300	6	6	38	7	0.15	0.0°	6	●	●						●	●		
.391	8	8	41	9	0.15	0.0°	6	●	●						●	●		
.450	10	10	48	11	0.20	0.0°	6	●	●						●	●		

# End milling tools for 3D machining

## Ball nose

### Assortment list







Ball nose end mills CARBIDE/CBN

292 - 298

Corner radius end mills CARBIDE/CBN

299 - 303

### Tolerance r ±0.005

N° 7420	d1 1 - 12		X-Generation <b>X</b>	HM XT	3xd	Rm 1100-1500	HRC 48-60		305
N° 7400	d1 1 - 12		X-Generation <b>X</b>	HM XA	3xd	Rm 1100-1500	HRC 48->60		307
N° 7424	d1 1 - 12		X-Generation <b>X</b>	HM XT	6xd	Rm 1100-1500	HRC 48-60		309
N° 7404	d1 1 - 12		X-Generation <b>X</b>	HM XA	6xd	Rm 1100-1500	HRC 48->60		311
N° 7428	d1 1 - 12		X-Generation <b>X</b>	HM XT	9xd	Rm 1100-1500	HRC 48-60		313
N° 7408	d1 1 - 12		X-Generation <b>X</b>	HM XA	9xd	Rm 1100-1500	HRC 48- > 60		315


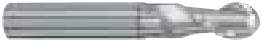







### Tolerance r js8 (±)

N° 5100	d1 1.0 - 12.0		X-Generation <b>X</b>	HM XA	3xd	Rm 1300-1500	HRC 48- > 60		317
N° 5140	d1 6 - 12		X-Generation <b>X</b>	HM XA	3xd	Rm 1300-1500	HRC 48- > 60		319



# End milling tools for 3D machining

## Ball nose

### Tolerance r f8 (-/-)









N° 5286	d1 1.0 - 16.0		Base-X <b>B</b>	HM Plus	3xd	Rm 1100-1500	HRC 48-56		321
N° 5290	d1 2 - 20		Base-X <b>B</b>	HM MG10	3xd	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	323
N° 5220	d1 4 - 16		Base-X <b>B</b>	HM MG10	3xd	Rm 850-1500			325
N° 45298	d1 3 - 12		Favora® <b>F</b>	HM	3xd	Rm 850-1300			327
N° 5288	d1 1 - 16		Base-X <b>B</b>	HM Plus	3xd	Rm 1100-1500	HRC 48-56		329
N° 5292	d1 3 - 16		Base-X <b>B</b>	HM MG10	3xd	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	331
N° 5222	d1 4 - 12		Base-X <b>B</b>	HM MG10	3xd	Rm 850-1500			333
N° 5223	d1 3 - 12		Base-X <b>B</b>	HM MG10	1xd	Rm 850-1300			335
N° 5289	d1 3 - 12		Base-X <b>B</b>	HM Plus	5xd	Rm 1100-1500	HRC 48-56		337



### HSS

N° 0830	d1 1.0 - 12.0		HSS	HSS-E Co8	1xd	Rm <850-1100			339
N° 0800	d1 3 - 20		HSS	HSS-E Co8	2xd	Rm <850-1100			341

# End milling tools for 3D machining

## Corner radius

Normal version								
N° 7200		d1 2 - 12 r 0.5, r 1.0	X-Generation <b>X</b>	HM XT	3xd	Rm 1100-1500	HRC 48- > 60	343
N° 5250 / 5350		d1 3 - 12 r 0.5, r 0.8, r 1.0, r 1.5	X-Generation <b>X</b>	HM MG10	3xd	Rm <850-1300		345
N° 5253 / 5353		d1 6 - 16 r 1.0	X-Generation <b>X</b>	HM MG10	3xd	Rm 1300-1500	HRC 48-60	347
N° 5254 / 5354		d1 8 - 16 r 1.5	X-Generation <b>X</b>	HM MG10	3xd	Rm 1300-1500	HRC 48-60	349
N° 5256 / 5356		d1 6 - 16 r 1.5, r 2.0, r 2.5, r 3.0, r 3.5, r 4.0	X-Generation <b>X</b>	HM MG10	3xd	Rm 1300-1500	HRC 48-60	351
N° 5267 / 5367		d1 3 - 16 r 1.0	X-Generation <b>X</b>	HM XT	3xd	HRC 48- > 60		353
N° 5245 / 5345		d1 6 - 16 r 1.0, r 1.5, r 2.0	Base-X <b>B</b>	HM MG10	3xd	Rm <850-1100		355
N° 5246 / 5346		d1 6 - 16 r 1.5, r 2.0, r 2.5, r 3.0, r 4.0	Base-X <b>B</b>	HM MG10	3xd	Rm <850-1100		357

Medium length version								
N° 5252 / 5352		d1 6 - 16 r 0.8, r 1.0, r 1.5	X-Generation <b>X</b>	HM MG10	5xd	Rm <850-1300		359
N° 5257 / 5357		d1 6 - 16 r 1.5, r 2.0, r 2.5, r 3.0, r 3.5	X-Generation <b>X</b>	HM MG10	5xd	Rm 1300-1500	HRC 48-60	361

Long version								
N° 7204		d1 2 - 12 r 0.5, r 1.0	X-Generation <b>X</b>	HM XT	6xd	Rm 1100-1500	HRC 48- > 60	363

# End milling tools for 3D machining

## HFC

### Normal version

N° 7600

d1 3 - 16



X-Generation

**X**

HM  
XT

3xd

**Rm**  
850-1500

**HRC**  
48- > 60

365

### Long version

N° 7604

d1 3 - 16



X-Generation

**X**

HM  
XT

6xd

**Rm**  
850-1500

**HRC**  
48- > 60

367

### Extra-long version

N° 7608

d1 3 - 16



X-Generation

**X**

HM  
XT

9xd

**Rm**  
850-1500

**HRC**  
48- > 60

369

||

# End milling tools for 3D machining

## CBN

### Ball nose

N° 31700

d1 4 - 12



CBN

3xd

**HRC**  
56- > 60

371

### Corner radius

N° 31420

d1 4 - 12



r 0.5



CBN

3xd

**HRC**  
56- > 60

373

N° 31410

d1 4 - 12



r 1.0 - 3.0 (r = 0.25 x d<sub>1</sub>)



CBN

3xd









**HRC**  
56- > 60







375



# End milling tools for 3D machining








## Micro with ball nose

Shank Ø 6mm										
N° 6562	d1 0.2 - 3.0		X-Generation	X	HM XA	3xd	Rm 850-1500	HRC 48-60	Inox Ti	377
N° 6564	d1 0.5 - 3.0		X-Generation	X	HM XA	5xd	Rm 850-1500	HRC 48-60	Inox Ti	379
N° 6566	d1 0.5 - 3.0		X-Generation	X	HM XA	8xd	Rm 850-1500	HRC 48-60	Inox Ti	381
N° 6568	d1 0.5 - 3.0		X-Generation	X	HM XA	10xd	Rm 850-1500	HRC 48-60	Inox Ti	383
N° 6766	d1 0.5 - 3.0		X-Generation	X	HM XA	8xd	Rm 850-1500	HRC 48-60	Inox Ti	385
N° 6768	d1 0.5 - 3.0		X-Generation	X	HM XA	10xd	Rm 850-1500	HRC 48-60	Inox Ti	387
N° 6770	d1 0.5 - 3.0		X-Generation	X	HM XA	12xd	Rm 850-1500	HRC 48-60	Inox Ti	389
N° 6772	d1 0.5 - 3.0		X-Generation	X	HM XA	15xd	Rm 850-1500	HRC 48-60	Inox Ti	391

Shank Ø 3mm										
N° 15781	d1 0.2 - 3.0		X-Generation	X	HM XA	1xd	Rm 1100-1500	HRC 48-60		393
N° 5782	d1 0.2 - 3.0		Base-X	B	HM Micro	3xd	Rm <850-1300	Inox Stainless	Ti Titanium	395
N° 5792	d1 0.5 - 3.0		X-Generation	X	HM XA	3xd	Rm 1100-1500	HRC 48-60		397
N° 45785	d1 0.3 - 3.0		Favora®	F	HM	3xd	Rm <850-1100			399
N° 5784	d1 0.5 - 3.0		Base-X	B	HM Micro	5xd	Rm <850-1300	Inox Stainless	Ti Titanium	401
N° 5794	d1 0.5 - 3.0		X-Generation	X	HM XA	5xd	Rm 1100-1500	HRC 48-60		403








# End milling tools for 3D machining








## Micro with ball nose

Shank Ø 3mm									
N° 5786	d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	8xd	Rm <850-1300	Inox Stainless	Ti Titanium	405
N° 5796	d1 0.5 - 3.0		X-Generation <b>X</b>	HM XA	8xd	Rm 1100-1500	HRC 48-60		407
N° 5787	d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	10xd	Rm <850-1300			409
N° 5791	d1 1.0 - 3.0		Base-X <b>B</b>	HM Micro	12xd	Rm <850-1300			411
N° 5793	d1 1.0 - 3.0		Base-X <b>B</b>	HM Micro	15xd	Rm <850-1300			413
N° 15795	d1 1.0 - 3.0		Base-X <b>B</b>	HM Micro	20xd	Rm <850-1100			415
N° 5788	d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	2xd	Rm <850-1300	Inox Stainless	Ti Titanium	417

# End milling tools for 3D machining

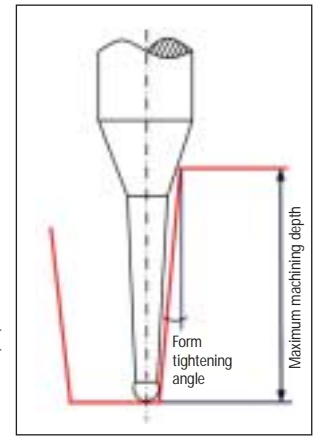
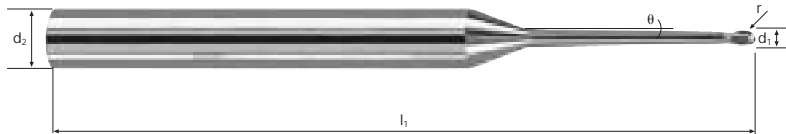
## Micro with corner radius

Shank Ø 6mm									
N° 6532		d1 0.5 – 3.0 r 0.1, r 0.2, r 0.5	X-Generation <b>X</b>	HM XA	3xd	<b>Rm</b> 850-1500	<b>HRC</b> 48-60	Inox Ti	419
N° 6534		d1 0.5 – 3.0 r 0.1, r 0.2, r 0.5	X-Generation <b>X</b>	HM XA	5xd	<b>Rm</b> 850-1500	<b>HRC</b> 48-60	Inox Ti	421
N° 6536		d1 0.5 – 3.0 r 0.1, r 0.2, r 0.5	X-Generation <b>X</b>	HM XA	8xd	<b>Rm</b> 850-1500	<b>HRC</b> 48-60	Inox Ti	423
N° 6736		d1 0.5 – 3.0 r 0.1, r 0.2, r 0.5	X-Generation <b>X</b>	HM XA	8xd	<b>Rm</b> 850-1500	<b>HRC</b> 48-60	Inox Ti	425
N° 6738		d1 0.5 – 3.0 r 0.1, r 0.2, r 0.5	X-Generation <b>X</b>	HM XA	10xd	<b>Rm</b> 850-1500	<b>HRC</b> 48-60	Inox Ti	427
N° 6740		d1 0.5 – 3.0 r 0.1, r 0.2, r 0.5	X-Generation <b>X</b>	HM XA	12xd	<b>Rm</b> 850-1500	<b>HRC</b> 48-60	Inox Ti	429
N° 6742		d1 0.5 – 3.0 r 0.1, r 0.2, r 0.5	X-Generation <b>X</b>	HM XA	15xd	<b>Rm</b> 850-1500	<b>HRC</b> 48-60	Inox Ti	431

Shank Ø 3mm									
N° 15751		d1 1.0 – 3.0 r 0.2	X-Generation <b>X</b>	HM XA	1xd	<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		433
N° 5752		d1 1.0 – 3.0 r 0.2	Base-X <b>B</b>	HM Micro	3xd	<b>Rm</b> <850-1300	<b>Inox</b> Stainless	<b>Ti</b> Titanium	435
N° 5762		d1 1.0 – 3.0 r 0.2	X-Generation <b>X</b>	HM XA	3xd	<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		437
N° 5754		d1 1.0 – 3.0 r 0.2	Base-X <b>B</b>	HM Micro	5xd	<b>Rm</b> <850-1300	<b>Inox</b> Stainless	<b>Ti</b> Titanium	439
N° 5764		d1 1.0 – 3.0 r 0.2	X-Generation <b>X</b>	HM XA	5xd	<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		441
N° 5756		d1 1.0 – 3.0 r 0.2	Base-X <b>B</b>	HM Micro	8xd	<b>Rm</b> <850-1300	<b>Inox</b> Stainless	<b>Ti</b> Titanium	443
N° 5766		d1 1.0 – 3.0 r 0.2	X-Generation <b>X</b>	HM XA	8xd	<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		445

# Assortment list for ball nose end mills

## CARBIDE/CBN



Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle - = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
0.2	3	40	2	0.10	0°	0.10	0.10	0.11	0.12	0.13	D15781020	393
	3	40	2	0.10	0°	0.56	0.59	0.62	0.70	0.79	M5782020	395
	6	57	2	0.10	0°	0.56	0.59	0.62	0.70	0.79	X6562020	377
0.3	3	40	2	0.15	0°	0.30	0.31	0.32	0.34	0.36	D15781030	393
	3	39	2	0.15	0°	0.90	0.94	0.99	1.11	1.26	M45785030	399
	3	40	2	0.15	0°	0.94	0.99	1.04	1.16	1.32	M5782030	395
	6	57	2	0.15	0°	0.94	0.99	1.04	1.16	1.32	X6562030	377
0.4	3	40	2	0.20	0°	0.40	0.41	0.42	0.45	0.47	D15781040	393
	3	39	2	0.20	0°	0.90	0.94	0.99	1.10	1.24	M45785040	399
	3	40	2	0.20	0°	1.24	1.30	1.37	1.53	1.73	M5782040	395
	6	57	2	0.20	0°	1.24	1.30	1.37	1.53	1.73	X6562040	377
0.5	3	40	2	0.25	0°	0.50	0.51	0.53	0.55	0.59	D15781050	393
	3	39	2	0.25	0°	1.40	1.47	1.54	1.71	1.93	M45785050	399
	6	57	2	0.25	0°	1.49	1.54	1.59	1.70	1.82	X6562050	377
	3	40	2	0.25	0°	1.49	1.54	1.59	1.70	1.82	D5792050	397
	3	40	2	0.25	0°	1.49	1.54	1.59	1.70	1.82	M5782050	395
	3	60	2	0.25	0°	1.47	1.80	2.36	6.77	-	M5788050	417
	3	40	2	0.25	0°	2.49	2.57	2.66	2.85	3.07	M5784050	401
	6	57	2	0.25	0°	2.49	2.57	2.66	2.85	3.07	X6564050	379
	3	40	2	0.25	0°	2.49	2.57	2.66	2.85	3.07	D5794050	403
	6	57	2	0.25	0.9°	1.94	3.91	4.04	4.33	4.67	X6766050	385
	6	57	2	0.25	0°	3.99	4.12	4.26	4.57	4.93	X6566050	381
	3	40	2	0.25	0°	3.99	4.12	4.26	4.57	4.93	M5786050	405
	3	40	2	0.25	0°	3.99	4.12	4.26	4.57	4.93	D5796050	407
	3	40	2	0.25	0°	4.99	5.16	5.33	5.72	6.17	M5787050	409
	6	57	2	0.25	0.9°	1.83	3.78	5.03	5.40	5.83	X6768050	387
	6	57	2	0.25	0°	4.99	5.17	5.33	5.72	6.17	X6568050	383
	6	57	2	0.25	0.9°	1.95	4.38	6.06	6.51	7.02	X6770050	389
	6	61	2	0.25	0.9°	1.91	4.19	7.57	8.12	8.77	X6772050	391
0.6	3	40	2	0.30	0°	0.60	0.61	0.63	0.66	0.70	D15781060	393
	3	39	2	0.30	0°	1.40	1.46	1.53	1.70	1.91	M45785060	399
	3	40	2	0.30	0°	1.79	1.85	1.90	2.03	2.18	M5782060	395
	6	57	2	0.30	0°	1.79	1.85	1.90	2.03	2.18	X6562060	377
	3	40	2	0.30	0°	1.79	1.85	1.90	2.03	2.18	D5792060	397
	3	60	2	0.30	0°	1.67	2.04	2.66	7.58	-	M5788060	417
	3	40	2	0.30	0°	2.99	3.09	3.19	3.41	3.67	M5784060	401
	6	57	2	0.30	0°	2.99	3.09	3.19	3.41	3.67	X6564060	379

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification		
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page	
0.6	3	40	2	0.30	0°	2.99	3.09	3.19	3.41	3.67	D5794060	403	
	6	57	2	0.30	0.9°	2.05	4.59	4.85	5.20	5.61	X6766060	385	
	3	40	2	0.30	0°	4.79	4.95	5.11	5.48	5.91	M5786060	405	
	6	57	2	0.30	0°	4.79	4.95	5.11	5.48	5.91	X6566060	381	
	3	40	2	0.30	0°	4.79	4.95	5.11	5.48	5.91	D5796060	407	
	6	57	2	0.30	0.9°	1.93	3.90	6.04	6.48	6.99	X6768060	387	
0.6	3	40	2	0.30	0°	5.99	6.19	6.40	6.86	7.40	M5787060	409	
	6	57	2	0.30	0°	5.99	6.19	6.40	6.86	7.40	X6568060	383	
	3	39	2	0.35	0°	1.90	1.99	2.08	2.31	2.60	M45785070	399	
0.7	3	40	2	0.35	0°	3.49	3.60	2.96	3.98	4.28	M5784070	401	
	3	40	2	0.35	0°	3.49	3.60	3.72	3.98	4.28	D5794070	403	
	3	60	2	0.35	0°	1.87	2.28	3.72	8.38	-	M5788070	417	
0.8	3	40	2	0.40	0°	0.90	0.92	0.94	0.99	1.05	D15781080	393	
	3	39	2	0.40	0°	1.90	1.98	2.08	2.30	2.58	M45785080	399	
	3	40	2	0.40	0°	2.39	2.46	2.54	2.71	2.91	M5782080	395	
	6	57	2	0.40	0°	2.39	2.46	2.54	2.71	2.91	X6562080	377	
	3	40	2	0.40	0°	2.39	2.46	2.54	2.71	2.91	D5792080	397	
	3	60	2	0.40	0°	2.07	2.52	3.26	9.18	-	M5788080	417	
	3	40	2	0.40	0°	3.99	4.12	4.25	4.55	4.89	M5784080	401	
	6	57	2	0.40	0°	3.99	4.12	4.25	4.55	4.89	X6564080	379	
	3	40	2	0.40	0°	3.99	4.12	4.25	4.55	4.89	D5794080	403	
	6	57	2	0.40	0.9°	2.18	4.51	6.46	6.92	7.46	X6766080	385	
	3	40	2	0.40	0°	6.39	6.60	6.82	7.31	7.88	M5786080	405	
	6	57	2	0.40	0°	6.39	6.60	6.82	7.31	7.88	X6566080	381	
	3	40	2	0.40	0°	6.39	6.60	6.82	7.31	7.88	D5796080	407	
	6	61	2	0.40	0.9°	2.12	4.18	8.05	8.63	9.31	X6768080	387	
	3	40	2	0.40	0°	7.99	8.25	8.53	9.15	9.87	M5787080	409	
	6	61	2	0.40	0°	7.99	8.25	8.53	9.15	9.87	X6568080	383	
	6	61	2	0.40	0.9°	2.19	4.55	9.68	10.39	11.21	X6770080	389	
	6	66	2	0.40	0.9°	2.17	4.44	12.09	12.97	14.00	X6772080	391	
	0.9	3	39	2	0.45	0°	2.40	2.51	2.63	2.91	3.27	M45785090	399
		3	40	2	0.45	0°	4.49	4.63	4.78	5.12	5.50	M5784090	401
		3	40	2	0.45	0°	4.49	4.63	4.78	5.12	5.50	D5794090	403
1.0	3	40	2	0.50	0°	0.90	0.92	0.94	1.00	1.07	5286100	321	
	3	60	2	0.50	0°	0.90	0.92	0.94	1.00	1.07	5288100	329	
	3	50	2	0.50	0°	1.10	1.12	1.15	1.21	1.27	D15781100	393	
	6	57	2	0.50	0°	2.99	3.08	3.17	3.38	3.63	X6562100	377	
	3	50	2	0.50	0°	2.99	3.08	3.17	3.38	3.63	D5792100	397	
	3	50	2	0.50	0°	2.99	3.08	3.17	3.38	3.63	M5782100	395	
	3	39	2	0.50	0°	2.90	3.03	3.18	3.52	3.96	M45785100	399	
	6	57	2	0.50	0°	3.02	3.13	3.25	3.53	3.88	D5100100	317	
	6	57	2	0.50	0°	3.02	3.13	3.25	3.53	3.88	X7420100	305	
	6	57	2	0.50	0°	3.02	3.13	3.25	3.53	3.88	X7400100	307	
	3	60	2	0.50	0°	2.47	2.99	3.86	10.79	-	M5788100	417	
	3	50	2	0.50	0°	4.99	5.15	5.31	5.68	6.11	M5784100	401	
	6	57	2	0.50	0°	4.99	5.15	5.31	5.68	6.11	X6564100	379	
	3	50	2	0.50	0°	4.99	5.15	5.31	5.68	6.11	D5794100	403	
	6	66	2	0.50	0°	6.02	6.26	6.52	7.12	7.86	X7424100	309	
	6	66	2	0.50	0°	6.02	6.26	6.52	7.12	7.86	X7404100	311	
	6	61	2	0.50	0.9°	2.27	4.51	8.06	8.64	9.31	X6766100	385	
	3	50	2	0.50	0°	7.99	8.25	8.52	9.13	9.84	M5786100	405	
	6	61	2	0.50	0°	7.99	8.25	8.52	9.13	9.84	X6566100	381	
	3	50	2	0.50	0°	7.99	8.25	8.52	9.13	9.84	D5796100	407	
	6	69	2	0.50	0°	9.02	9.39	9.79	10.71	11.84	X7428100	313	
6	69	2	0.50	0°	9.02	9.39	9.79	10.71	11.84	X7408100	315		

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification		
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page	
1.0	6	61	2	0.50	0.9°	2.23	4.35	10.06	10.79	11.63	X6768100	387	
	3	50	2	0.50	0°	9.99	10.32	10.66	11.43	12.33	M5787100	409	
	6	61	2	0.50	0°	9.99	10.32	10.66	11.43	12.33	X6568100	383	
	6	66	2	0.50	0.9°	2.30	4.71	12.10	12.98	14.00	X6770100	389	
	3	50	2	0.50	0°	11.99	12.38	12.80	13.73	14.81	M5791100	411	
	6	66	2	0.50	0.9°	2.28	4.58	15.11	16.22	17.50	X6772100	391	
	3	60	2	0.50	0°	14.99	15.49	16.01	17.18	18.55	M5793100	413	
	3	60	2	0.50	0°	19.99	20.65	21.36	22.93	-	M15795100	415	
	1.2	3	50	2	0.60	0°	1.30	1.33	1.36	1.42	1.50	D15781108	393
	6	57	2	0.60	0°	3.59	3.70	3.81	4.06	4.35	X6562108	377	
	3	50	2	0.60	0°	3.59	3.70	3.81	4.06	4.35	D5792108	397	
	3	50	2	0.60	0°	3.59	3.70	3.81	4.06	4.35	M5782108	395	
	3	39	2	0.60	0°	3.90	4.08	4.27	4.74	5.35	M45785108	399	
	3	60	2	0.60	0°	2.87	3.47	4.46	12.39	-	M5788108	417	
	3	50	2	0.60	0°	5.99	6.18	6.38	6.82	7.33	M5784108	401	
	6	57	2	0.60	0°	5.99	6.18	6.38	6.82	7.33	X6564108	379	
	3	50	2	0.60	0°	5.99	6.18	6.38	6.82	7.33	D5794108	403	
	6	61	2	0.60	0.9°	2.49	4.99	9.69	10.38	11.18	X6766108	385	
	3	50	2	0.60	0°	9.59	9.90	10.23	10.96	11.81	M5786108	405	
	6	61	2	0.60	0°	9.59	9.90	10.23	10.96	11.81	X6566108	381	
	3	50	2	0.60	0°	9.59	9.90	10.23	10.96	11.81	D5796108	407	
	6	66	2	0.60	0.9°	2.43	4.63	12.08	12.95	13.96	X6768108	387	
	3	50	2	0.60	0°	11.99	12.38	12.80	13.72	14.79	M5787108	409	
	6	66	2	0.60	0°	11.99	12.38	12.80	13.72	14.79	X6568108	383	
	6	66	2	0.60	0.9°	2.50	5.01	14.52	15.58	16.80	X6770108	389	
	3	60	2	0.60	0°	14.39	14.86	15.36	16.48	-	M5791108	411	
	6	69	2	0.60	0.9°	2.47	4.89	18.14	19.46	21.00	X6772108	391	
	3	60	2	0.60	0°	17.99	18.58	19.21	20.62	-	M5793108	413	
	3	60	2	0.60	0°	23.99	24.78	25.63	-	-	M15795108	415	
	1.5	3	50	2	0.75	0°	1.70	1.74	1.77	1.86	1.96	D15781120	393
	3	40	2	0.75	0°	1.90	1.95	2.01	2.15	2.32	5286120	321	
	3	39	2	0.75	0°	3.90	4.07	4.26	4.71	5.28	M45785120	399	
	3	50	2	0.75	0°	4.49	4.62	4.76	5.07	5.43	M5782120	395	
	6	57	2	0.75	0°	4.49	4.62	4.76	5.07	5.43	X6562120	377	
	3	50	2	0.75	0°	4.49	4.62	4.76	5.07	5.43	D5792120	397	
	6	57	2	0.75	0°	4.64	4.81	4.99	5.42	5.95	D5100120	317	
	3	60	2	0.75	0°	3.47	4.18	5.36	14.80	-	M5788120	417	
	3	50	2	0.75	0°	7.49	7.72	7.97	8.52	9.16	M5784120	401	
	6	61	2	0.75	0°	7.49	7.72	7.97	8.52	9.16	X6564120	379	
	3	50	2	0.75	0°	7.49	7.72	7.97	8.52	9.16	D5794120	403	
	6	61	2	0.75	0.9°	2.69	5.23	12.11	12.97	13.97	X6766120	385	
	3	60	2	0.75	0°	11.99	12.38	12.78	13.70	14.76	M5786120	405	
	6	61	2	0.75	0°	11.99	12.38	12.78	13.70	14.76	X6566120	381	
	3	60	2	0.75	0°	11.99	12.38	12.78	13.70	14.76	D5796120	407	
	6	66	2	0.75	0.9°	2.63	4.92	15.10	16.18	17.44	X6768120	387	
	3	60	2	0.75	0°	14.99	15.48	15.99	17.15	-	M5787120	409	
	6	66	2	0.75	0°	14.99	15.48	15.99	17.15	18.49	X6568120	383	
	6	69	2	0.75	0.9°	2.69	5.21	18.14	19.46	20.99	X6770120	389	
	3	60	2	0.75	0°	17.99	18.58	19.20	-	-	M5791120	411	
	6	75	2	0.75	0.9°	2.69	5.24	22.68	24.33	26.26	X6772120	391	
	3	70	2	0.75	0°	22.49	23.23	24.02	-	-	M5793120	413	
	3	70	2	0.75	0°	29.99	30.98	32.04	-	-	M15795120	415	
	1.8	3	39	2	0.90	0°	4.90	5.00	5.11	5.34	5.59	M45785130	399
	3	50	2	0.90	0°	8.99	9.27	9.56	10.22	10.99	M5784132	401	
	3	50	2	0.90	0°	8.99	9.27	9.56	10.22	10.99	D5794132	403	

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
2.0	3	50	2	1.00	0°	2.30	2.35	2.40	2.51	2.65	D15781140	393
	3	40	2	1.00	0°	2.40	2.46	2.54	2.70	2.90	5286138	321
	3	60	2	1.00	0°	2.40	2.46	2.54	2.70	2.90	5288138	329
	3	39	2	1.00	0°	4.90	5.00	5.10	5.33	5.58	M45785140	399
	3	50	2	1.00	0°	5.99	6.17	6.35	6.76	7.24	M5782140	395
	6	57	2	1.00	0°	5.99	6.17	6.35	6.76	7.24	X6562140	377
	3	50	2	1.00	0°	5.99	6.17	6.35	6.76	7.24	D5792140	397
	6	57	2	1.00	0°	6.37	6.61	6.86	7.45	8.17	D5100140	317
	6	57	2	1.00	0°	6.37	6.61	6.86	7.45	8.17	5286140	321
	6	57	2	1.00	0°	6.37	6.61	6.86	7.45	8.17	C5290140	323
	6	75	2	1.00	0°	6.37	6.61	6.86	7.49	8.17	5288140	329
	6	57	2	1.00	0°	6.37	6.61	6.86	7.45	8.17	X7420140	305
	6	57	2	1.00	0°	6.37	6.61	6.86	7.45	8.17	X7400140	307
	6	61	2	1.00	0°	9.99	10.30	10.63	11.36	12.21	X6564140	379
	3	50	2	1.00	0°	9.99	10.30	10.63	11.36	-	D5794140	403
	3	50	2	1.00	0°	9.99	10.30	10.63	11.36	-	M5784140	401
	3	60	2	1.00	0°	4.86	6.83	12.78	-	-	M5788140	417
	6	66	2	1.00	0°	12.37	12.86	13.40	14.63	16.13	X7424140	309
	6	66	2	1.00	0°	12.37	12.86	13.40	14.63	16.13	X7404140	311
	6	66	2	1.00	0.9°	3.07	5.68	16.13	17.27	18.60	X6766140	385
	3	60	2	1.00	0°	15.99	16.50	17.05	-	-	M5786140	405
	6	66	2	1.00	0°	15.99	16.50	17.05	18.26	19.67	X6566140	381
	3	60	2	1.00	0°	15.99	16.50	17.05	-	-	D5796140	407
	6	69	2	1.00	0°	18.37	19.12	19.93	21.81	24.10	X7428140	313
	6	69	2	1.00	0°	18.37	19.12	19.93	21.81	24.10	X7408140	315
	6	69	2	1.00	0.9°	3.03	5.50	20.13	21.57	23.25	X6768140	387
	3	60	2	1.00	0°	19.99	20.64	21.32	-	-	M5787140	409
	6	69	2	1.00	0°	19.99	20.64	21.32	22.86	24.64	X6568140	383
	6	75	2	1.00	0.9°	3.08	5.75	24.19	25.93	27.97	X6770140	389
	3	60	2	1.00	0°	23.99	24.77	25.60	-	-	M5791140	411
	6	80	2	1.00	0.9°	3.08	5.75	30.23	32.43	34.99	X6772140	391
	3	70	2	1.00	0°	29.99	30.97	-	-	-	M5793140	413
	3	80	2	1.00	0°	39.99	41.31	-	-	-	M15795140	415
2.3	6	57	2	1.15	0°	6.89	7.09	7.30	7.77	8.32	X6562152	377
	3	50	2	1.15	0°	11.49	11.85	12.22	-	-	M5784152	401
	6	61	2	1.15	0°	11.49	11.85	12.22	13.06	14.04	X6564152	379
	3	50	2	1.15	0°	11.49	11.85	12.22	-	-	D5794152	403
2.5	3	50	2	1.25	0°	2.90	2.96	3.02	3.17	3.33	D15781160	393
	3	39	2	1.25	0°	6.90	7.04	7.19	7.51	-	M45785160	399
	3	50	2	1.25	0°	7.49	7.71	7.94	-	-	M5782160	395
	6	57	2	1.25	0°	7.49	7.71	7.94	8.45	9.04	X6562160	377
	3	50	2	1.25	0°	7.49	7.71	7.94	-	-	D5792160	397
	6	57	2	1.25	0°	7.87	8.16	8.47	9.20	10.08	D5100160	317
	3	50	2	1.25	0°	12.49	12.88	13.28	-	-	M5784160	401
	6	61	2	1.25	0°	12.49	12.88	13.28	14.20	15.26	X6564160	379
	3	50	2	1.25	0°	12.49	12.88	13.28	-	-	D5794160	403
	6	69	2	1.25	0.9°	3.45	6.18	20.15	21.58	23.24	X6766160	385
	6	69	2	1.25	0°	19.99	20.63	21.31	22.82	24.58	X6566160	381
	6	75	2	1.25	0.9°	3.45	6.19	25.18	26.98	29.08	X6768160	387
	6	75	2	1.25	0°	24.99	25.80	26.66	28.57	30.80	X6568160	383
	6	80	2	1.25	0.9°	3.47	6.31	30.23	32.41	-	X6770160	389
	6	87	2	1.25	0.9°	3.47	6.30	37.77	40.52	-	X6772160	391
	3	60	2	1.25	0°	19.99	20.63	-	-	-	M5786160	405
	3	60	2	1.25	0°	19.99	20.63	-	-	-	D5796160	407
	3	60	2	1.25	0°	24.99	25.80	-	-	-	M5787160	409

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
2.5	3	70	2	1.25	0°	29.99	-	-	-	-	M5791160	411
	3	70	2	1.25	0°	37.49	-	-	-	-	M5793160	413
	3	80	2	1.25	0°	49.99	-	-	-	-	M15795160	415
2.8	6	57	2	1.40	0°	8.39	8.63	8.89	9.46	10.13	X6562172	377
	6	61	2	1.40	0°	13.99	14.42	14.88	15.90	17.09	X6564172	379
	3	50	2	1.40	0°	13.99	-	-	-	-	M5784172	401
	3	50	2	1.40	0°	13.99	-	-	-	-	D5794172	403
3.0	6	57	2	1.50	0°	3.90	4.01	4.12	4.40	4.73	U45298180	327
	6	65	2	1.50	0°	5.90	6.09	6.30	6.79	7.39	U5223180	335
	6	57	2	1.50	0°	8.99	9.25	9.52	10.13	10.85	X6562180	377
	6	57	2	1.50	0°	9.37	9.71	10.09	10.94	11.99	D5100180	317
	6	57	2	1.50	0°	9.37	9.71	10.09	10.94	11.99	5286180	321
	6	57	2	1.50	0°	9.37	9.71	10.09	10.94	12.00	C5290180	323
	6	75	2	1.50	0°	9.37	9.71	10.09	10.94	11.99	5288180	329
	6	75	2	1.50	0°	9.37	9.71	10.09	10.94	12.00	C5292180	331
	6	57	2	1.50	0°	9.37	9.71	10.09	10.94	11.99	X7420180	305
	6	57	2	1.50	0°	9.37	9.71	10.09	10.94	11.99	X7400180	307
	4	44	2	1.50	0°	9.90	10.11	10.33	10.81	-	M45785180	399
	6	66	2	1.50	0°	14.99	15.45	15.94	17.03	18.31	X6564180	379
	6	66	2	1.50	0°	18.37	19.09	19.89	21.71	23.94	X7424180	309
	6	66	2	1.50	0°	18.37	19.09	19.89	21.71	23.94	X7404180	311
	6	75	2	1.50	0.9°	3.87	6.84	24.19	25.90	27.90	X6766180	385
	6	75	2	1.50	0°	23.99	24.75	25.57	27.38	29.50	X6566180	381
	6	90	2	1.50	0°	24.37	25.35	26.43	28.89	-	5289180	337
	6	75	2	1.50	0°	27.37	28.48	29.70	32.48	-	X7428180	313
	6	75	2	1.50	0°	27.37	28.48	29.70	32.48	-	X7408180	315
	6	75	2	1.50	0.9°	3.85	6.75	30.21	32.37	34.89	X6768180	387
	6	80	2	1.50	0°	29.90	30.96	31.99	34.28	-	X6568180	383
	6	87	2	1.50	0.9°	3.87	6.87	36.27	38.89	-	X6770180	389
	6	100	2	1.50	0.9°	3.88	6.92	45.34	-	-	X6772180	391
	3	50	2	1.50	0°	3.50	-	-	-	-	D15781180	393
	3	40	2	1.50	0°	3.90	-	-	-	-	5286178	321
	3	60	2	1.50	0°	3.90	-	-	-	-	5288178	329
	3	60	2	1.50	0°	5.90	-	-	-	-	M5788180	417
	3	50	2	1.50	0°	8.90	-	-	-	-	M5782180	395
	3	50	2	1.50	0°	8.90	-	-	-	-	D5792180	397
	3	50	2	1.50	0°	14.90	-	-	-	-	D5794180	403
	3	50	2	1.50	0°	14.90	-	-	-	-	M5784180	401
	3	60	2	1.50	0°	23.90	-	-	-	-	M5786180	405
	3	60	2	1.50	0°	23.90	-	-	-	-	D5796180	407
	3	60	2	1.50	0°	29.90	-	-	-	-	M5787180	409
	3	70	2	1.50	0°	35.90	-	-	-	-	M5791180	411
	3	80	2	1.50	0°	44.90	-	-	-	-	M5793180	413
	3	90	2	1.50	0°	59.90	-	-	-	-	M15795180	415
4.0	6	57	2	2.00	0°	4.90	5.03	5.17	5.50	5.90	U45298220	327
	6	70	2	2.00	0°	6.90	7.11	7.35	7.89	8.55	U5223220	335
	6	57	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	D5100220	317
	6	57	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	5286220	321
	6	57	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	C5290220	323
	6	57	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	5220220	325
	6	75	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	5288220	329
	6	75	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	C5292220	331
	6	75	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	5222220	333
	6	57	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	X7420220	305
	6	57	2	2.00	0°	12.61	13.06	13.57	14.72	16.13	X7400220	307

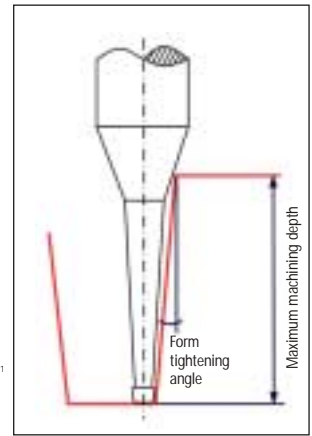
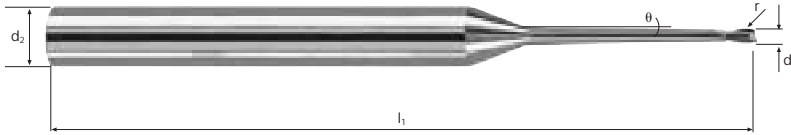


Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
4.0	6	80	2	2.00	0°	12.75	13.32	13.95	15.44	17.36	31700220	371
	6	69	2	2.00	0°	24.61	25.58	26.64	29.08	-	X7424220	309
	6	69	2	2.00	0°	24.61	25.58	26.64	29.08	-	X7404220	311
	6	90	2	2.00	0°	27.61	28.71	29.91	-	-	5289220	337
	6	80	2	2.00	0°	36.61	38.09	39.71	-	-	X7428220	313
	6	80	2	2.00	0°	36.61	38.09	39.71	-	-	X7408220	315
5.0	6	57	2	2.50	0°	5.90	6.05	6.22	6.60	7.07	U45298260	327
	8	75	2	2.50	0°	7.90	8.14	8.39	8.99	9.72	U5223260	335
	6	57	2	2.50	0°	15.84	16.42	17.05	-	-	D5100260	317
	6	57	2	2.50	0°	15.84	16.42	17.05	-	-	5286260	321
	6	57	2	2.50	0°	15.84	16.42	17.05	-	-	C5290260	323
	6	57	2	2.50	0°	15.84	16.42	17.05	-	-	5220260	325
	6	80	2	2.50	0°	15.84	16.42	17.05	-	-	5288260	329
	6	80	2	2.50	0°	15.84	16.42	17.05	-	-	C5292260	331
	6	80	2	2.50	0°	15.84	16.42	17.05	-	-	5222260	333
	6	57	2	2.50	0°	15.84	16.42	17.05	-	-	X7420260	305
	6	57	2	2.50	0°	15.84	16.42	17.05	-	-	X7400260	307
	6	80	2	2.50	0°	16.03	16.74	17.54	-	-	31700260	371
	6	75	2	2.50	0°	30.84	32.06	-	-	-	X7424260	309
	6	75	2	2.50	0°	30.84	32.06	-	-	-	X7404260	311
	6	110	2	2.50	0°	45.84	47.70	-	-	-	5289260	337
	6	87	2	2.50	0°	45.84	47.70	-	-	-	X7428260	313
	6	87	2	2.50	0°	45.84	47.70	-	-	-	X7408260	315
6.0	8	80	2	3.00	0°	8.90	9.16	9.44	10.09	10.89	U5223300	335
	6	57	2	3.00	0°	6.90	-	-	-	-	U45298300	327
	6	57	2	3.00	0°	19.90	-	-	-	-	D5100300	317
	6	57	2	3.00	0°	19.90	-	-	-	-	5286300	321
	6	57	2	3.00	0°	19.90	-	-	-	-	C5290300	323
	6	57	2	3.00	0°	19.90	-	-	-	-	5220300	325
	6	80	2	3.00	0°	19.90	-	-	-	-	5288300	329
	6	80	2	3.00	0°	19.90	-	-	-	-	C5292300	331
	6	80	2	3.00	0°	19.90	-	-	-	-	5222300	333
	6	57	2	3.00	0°	19.90	-	-	-	-	X7420300	305
	6	57	2	3.00	0°	19.90	-	-	-	-	X7400300	307
	6	80	2	3.00	0°	20.83	-	-	-	-	31700300	371
	6	80	2	3.00	0°	24.90	-	-	-	-	D5140300	319
	6	80	2	3.00	0°	42.90	-	-	-	-	X7424300	309
	6	80	2	3.00	0°	42.90	-	-	-	-	X7404300	311
	6	110	2	3.00	0°	49.90	-	-	-	-	5289300	337
	6	100	2	3.00	0°	62.90	-	-	-	-	X7428300	313
	6	100	2	3.00	0°	62.90	-	-	-	-	X7408300	315
8.0	10	90	2	4.00	0°	11.90	12.24	12.62	13.49	14.55	U5223391	335
	8	63	2	4.00	0°	8.90	-	-	-	-	U45298391	327
	8	63	2	4.00	0°	25.90	-	-	-	-	D5100391	317
	8	63	2	4.00	0°	25.90	-	-	-	-	5286391	321
	8	63	2	4.00	0°	25.90	-	-	-	-	C5290391	323
	8	63	2	4.00	0°	25.90	-	-	-	-	5220391	325
	8	90	2	4.00	0°	25.90	-	-	-	-	5288391	329
	8	90	2	4.00	0°	25.90	-	-	-	-	C5292391	331
	8	90	2	4.00	0°	25.90	-	-	-	-	5222391	333
	8	63	2	4.00	0°	25.90	-	-	-	-	X7420391	305
	8	63	2	4.00	0°	25.90	-	-	-	-	X7400391	307
	8	100	2	4.00	0°	27.02	-	-	-	-	31700391	371
	8	90	2	4.00	0°	30.90	-	-	-	-	D5140391	319
	8	110	2	4.00	0°	45.90	-	-	-	-	5289391	337

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
8.0	8	90	2	4.00	0°	52.90	-	-	-	-	X7424391	309
	8	90	2	4.00	0°	52.90	-	-	-	-	X7404391	311
	8	120	2	4.00	0°	82.90	-	-	-	-	X7428391	313
	8	120	2	4.00	0°	82.90	-	-	-	-	X7408391	315
10.0	12	100	2	5.00	0°	13.90	14.29	14.71	15.69	16.89	U5223450	335
	10	72	2	5.00	0°	10.90	-	-	-	-	U45298450	327
	10	72	2	5.00	0°	30.90	-	-	-	-	D5100450	317
	10	72	2	5.00	0°	30.90	-	-	-	-	5286450	321
	10	72	2	5.00	0°	30.90	-	-	-	-	C5290450	323
	10	72	2	5.00	0°	30.90	-	-	-	-	5220450	325
	10	100	2	5.00	0°	30.90	-	-	-	-	5288450	329
	10	100	2	5.00	0°	30.90	-	-	-	-	C5292450	331
	10	100	2	5.00	0°	30.90	-	-	-	-	5222450	333
	10	72	2	5.00	0°	30.90	-	-	-	-	X7420450	305
	10	72	2	5.00	0°	30.90	-	-	-	-	X7400450	307
	10	100	2	5.00	0°	32.39	-	-	-	-	31700450	371
	10	100	2	5.00	0°	35.90	-	-	-	-	D5140450	319
	10	130	2	5.00	0°	60.90	-	-	-	-	5289450	337
	10	105	2	5.00	0°	63.90	-	-	-	-	X7424450	309
	10	105	2	5.00	0°	63.90	-	-	-	-	X7404450	311
	10	135	2	5.00	0°	93.90	-	-	-	-	X7428450	313
	10	135	2	5.00	0°	93.90	-	-	-	-	X7408450	315
12.0	16	120	2	6.00	0°	15.90	16.33	16.80	17.89	19.22	U5223501	335
	12	83	2	6.00	0°	11.90	-	-	-	-	U45298501	327
	12	83	2	6.00	0°	36.90	-	-	-	-	D5100501	317
	12	83	2	6.00	0°	36.90	-	-	-	-	5286501	321
	12	83	2	6.00	0°	36.90	-	-	-	-	C5290501	323
	12	83	2	6.00	0°	36.90	-	-	-	-	5220501	325
	12	120	2	6.00	0°	36.90	-	-	-	-	5288501	329
	12	120	2	6.00	0°	36.90	-	-	-	-	C5292501	331
	12	120	2	6.00	0°	36.90	-	-	-	-	5222501	333
	12	83	2	6.00	0°	36.90	-	-	-	-	X7420501	305
	12	83	2	6.00	0°	36.90	-	-	-	-	X7400501	307
	12	120	2	6.00	0°	38.77	-	-	-	-	31700501	371
	12	120	2	6.00	0°	41.90	-	-	-	-	D5140501	319
	12	140	2	6.00	0°	56.90	-	-	-	-	5289501	337
	12	120	2	6.00	0°	73.90	-	-	-	-	X7424501	309
	12	120	2	6.00	0°	73.90	-	-	-	-	X7404501	311
	12	160	2	6.00	0°	113.90	-	-	-	-	X7428501	313
	12	160	2	6.00	0°	113.90	-	-	-	-	X7408501	315
16.0	16	92	2	8.00	0°	42.90	-	-	-	-	5286610	321
	16	92	2	8.00	0°	42.90	-	-	-	-	C5290610	323
	16	92	2	8.00	0°	42.90	-	-	-	-	5220610	325
	16	140	2	8.00	0°	42.90	-	-	-	-	5288610	329
	16	140	2	8.00	0°	42.90	-	-	-	-	C5292610	331
20.0	20	104	2	10.00	0°	52.90	-	-	-	-	C5290682	323

# Assortment list for corner radius end mills

## CARBIDE/CBN



Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle - = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
0.5	6	57	2	0.10	0°	1.49	1.54	1.60	1.72	1.86	X6532050	419
	6	57	2	0.10	0°	2.49	2.58	2.67	2.87	3.10	X6534050	421
	6	57	2	0.10	0.9°	1.94	3.92	4.05	4.36	4.71	X6736050	425
	6	57	2	0.10	0°	3.99	4.13	4.27	4.59	4.97	X6536050	423
	6	57	2	0.10	0.9°	1.83	3.95	5.04	5.42	5.86	X6738050	427
	6	57	2	0.10	0.9°	1.95	4.58	6.07	6.53	7.06	X6740050	429
0.8	6	61	2	0.10	0.9°	1.91	4.38	7.58	8.14	8.81	X6742050	431
	6	57	2	0.10	0°	2.39	2.47	2.56	2.75	2.98	X6532080	419
	6	57	2	0.10	0°	3.99	4.13	4.27	4.59	4.97	X6534080	421
	6	57	2	0.10	0.9°	2.18	6.26	6.48	6.97	7.53	X6736080	425
	6	57	2	0.10	0°	6.39	6.61	6.84	7.35	7.95	X6536080	423
	6	61	2	0.10	0.9°	2.12	4.52	8.07	8.68	9.38	X6738080	427
1.0	6	61	2	0.10	0.9°	2.19	4.92	9.70	10.43	11.28	X6740080	429
	6	66	2	0.10	0.9°	2.17	4.80	12.11	13.02	14.08	X6742080	431
	3	50	2	0.20	0°	1.10	1.13	1.17	1.25	1.34	D15751100	433
	3	50	2	0.20	0°	2.99	3.09	3.20	3.43	3.70	M5752100	435
	3	50	2	0.20	0°	2.99	3.09	3.20	3.43	3.70	D5762100	437
	6	57	2	0.20	0°	2.99	3.09	3.20	3.43	3.70	X6532100	419
	3	50	2	0.20	0°	4.99	5.16	5.33	5.73	6.18	M5754100	439
	3	50	2	0.20	0°	4.99	5.16	5.33	5.73	6.18	D5764100	441
	6	57	2	0.20	0°	4.99	5.16	5.33	5.73	6.18	X6534100	421
	6	61	2	0.20	0.9°	2.27	4.87	8.08	8.68	9.38	X6736100	425
1.2	6	61	2	0.20	0°	7.99	8.26	8.54	9.18	9.91	X6536100	423
	3	50	2	0.20	0°	7.99	8.26	8.54	9.18	9.91	M5756100	443
	3	50	2	0.20	0°	7.99	8.26	8.54	9.18	9.91	D5766100	445
	6	61	2	0.20	0.9°	2.23	4.69	10.08	10.83	11.70	X6738100	427
	6	66	2	0.20	0.9°	2.30	5.08	12.12	13.03	14.07	X6740100	429
	6	66	2	0.20	0.9°	2.28	4.95	15.13	16.26	17.57	X6742100	431
	3	50	2	0.20	0°	1.30	1.34	1.38	1.48	1.59	D15751108	433
	3	50	2	0.20	0°	3.59	3.71	3.84	4.12	4.44	M5752108	435
	3	50	2	0.20	0°	3.59	3.71	3.84	4.12	4.44	D5762108	437
	6	57	2	0.20	0°	3.59	3.71	3.84	4.12	4.44	X6532108	419
	3	50	2	0.20	0°	5.99	6.19	6.40	6.88	7.43	M5754108	439
	3	50	2	0.20	0°	5.99	6.19	6.40	6.88	7.43	D5764108	441
	6	57	2	0.20	0°	5.99	6.19	6.40	6.88	7.43	X6534108	421
	6	61	2	0.20	0.9°	2.49	5.49	9.72	10.44	11.28	X6736108	425
6	61	2	0.20	0°	9.59	9.91	10.26	11.02	11.90	X6536108	423	

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification		
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page	
1.2	3	50	2	0.20	0°	9.59	9.91	10.26	11.02	11.90	M5756108	443	
	3	50	2	0.20	0°	9.59	9.91	10.26	11.02	11.90	D5766108	445	
	6	66	2	0.20	0.9°	2.43	5.09	12.10	13.00	14.05	X6738108	427	
	6	66	2	0.20	0.9°	2.50	5.51	14.55	15.64	16.90	X6740108	429	
	6	69	2	0.20	0.9°	2.47	5.37	18.16	19.52	21.09	X6742108	431	
1.5	3	50	2	0.20	0°	1.70	1.75	1.81	1.94	2.09	D15751120	433	
	3	50	2	0.20	0°	4.49	4.64	4.80	5.15	5.56	M5752120	435	
	3	50	2	0.20	0°	4.49	4.64	4.80	5.15	5.56	D5762120	437	
	6	57	2	0.20	0°	4.49	4.64	4.80	5.15	5.56	X6532120	419	
	3	50	2	0.20	0°	7.49	7.74	8.01	8.60	9.29	M5754120	439	
	3	50	2	0.20	0°	7.49	7.74	8.01	8.60	9.29	D5764120	441	
	6	61	2	0.20	0°	7.49	7.74	8.01	8.60	9.29	X6534120	421	
	6	61	2	0.20	0.9°	2.69	5.91	12.14	13.05	14.10	X6736120	425	
	6	61	2	0.20	0°	11.99	12.39	12.82	13.78	14.89	X6536120	423	
	3	60	2	0.20	0°	11.99	12.39	12.82	13.78	14.89	M5756120	443	
	3	60	2	0.20	0°	11.99	12.39	12.82	13.78	14.89	D5766120	445	
	6	66	2	0.20	0.9°	2.63	5.55	15.13	16.26	17.57	X6738120	427	
	6	69	2	0.20	0.9°	2.69	5.89	18.18	19.54	21.12	X6740120	429	
	6	75	2	0.20	0.9°	2.69	5.92	22.72	24.41	26.39	X6742120	431	
	2.0	3	50	2	0.20	0°	2.30	2.37	2.45	2.63	2.84	D15751140	433
6		57	2	0.50	0°	5.99	6.18	6.38	6.83	7.36	X6532145	419	
3		50	2	0.20	0°	5.99	6.19	6.40	6.88	7.43	M5752140	435	
3		50	2	0.20	0°	5.99	6.19	6.40	6.88	7.43	D5762140	437	
6		57	2	0.20	0°	5.99	6.19	6.40	6.88	7.43	X6532140	419	
6		57	4	0.50	0°	6.37	6.63	6.91	7.55	8.33	X7200140	343	
3		50	2	0.20	0°	9.99	10.33	10.68	11.48	12.40	M5754140	439	
3		50	2	0.20	0°	9.99	10.33	10.68	11.48	12.40	D5764140	441	
6		61	2	0.50	0°	9.99	10.32	10.66	11.43	12.33	X6534145	421	
6		61	2	0.20	0°	9.99	10.33	10.68	11.48	12.40	X6534140	421	
6		66	4	0.50	0°	12.37	12.88	13.44	14.73	16.29	X7204140	363	
6		66	2	0.50	0.9°	3.07	6.28	16.16	17.34	18.72	X6736145	425	
6		66	2	0.20	0.9°	3.07	6.64	16.18	17.39	18.79	X6736140	425	
6		66	2	0.50	0°	15.99	16.52	17.08	18.33	19.79	X6536145	423	
6		66	2	0.20	0°	15.99	16.53	17.10	18.38	19.86	X6536140	423	
3		60	2	0.20	0°	15.99	16.53	17.10	18.38	19.86	M5756140	443	
3		60	2	0.20	0°	15.99	16.53	17.10	18.38	19.86	D5766140	445	
6		69	2	0.50	0.9°	3.03	6.07	20.16	21.64	23.37	X6738145	427	
6		69	2	0.20	0.9°	3.03	6.41	20.18	21.69	23.44	X6738140	427	
6		75	2	0.50	0.9°	3.08	6.36	24.22	26.01	28.09	X6740145	429	
6		75	2	0.20	0.9°	3.08	6.73	24.24	26.05	28.16	X6740140	429	
6		80	2	0.50	0.9°	3.08	6.36	30.26	32.50	35.10	X6742145	431	
6		80	2	0.20	0.9°	3.08	6.73	30.28	32.54	35.18	X6742140	431	
2.5		3	50	2	0.20	0°	2.90	2.99	3.10	3.32	3.58	D15751160	433
		6	57	2	0.50	0°	7.49	7.73	7.99	8.56	9.22	X6532165	419
	3	50	2	0.20	0°	7.49	7.74	8.01	8.60	9.29	M5752160	435	
	3	50	2	0.20	0°	7.49	7.74	8.01	8.60	9.29	D5762160	437	
	6	57	2	0.20	0°	7.49	7.74	8.01	8.60	9.29	X6532160	419	
	6	61	2	0.50	0°	12.49	12.90	13.34	14.31	15.44	X6534165	421	
	3	50	2	0.20	0°	12.49	12.91	13.36	14.35	15.51	M5754160	439	
	3	50	2	0.20	0°	12.49	12.91	13.36	14.35	15.51	D5764160	441	
	6	61	2	0.20	0°	12.49	12.91	13.36	14.35	15.51	X6534160	421	
	6	69	2	0.50	0.9°	3.45	7.06	20.20	21.69	23.42	X6736165	425	
	6	69	2	0.20	0.9°	3.45	7.41	20.22	21.73	23.49	X6736160	425	
	6	69	2	0.50	0°	19.99	20.65	21.36	22.93	24.76	X6536165	423	
	6	69	2	0.20	0°	19.99	20.66	21.38	22.98	24.83	X6536160	423	

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle - = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
2.5	3	60	2	0.20	0°	19.99	20.66	21.38	22.98	24.83	M5756160	443
	3	60	2	0.20	0°	19.99	20.66	21.38	22.98	24.83	D5766160	445
	6	75	2	0.50	0.9°	3.45	7.08	25.23	27.09	29.26	X6738165	427
	6	75	2	0.20	0.9°	3.45	7.43	25.25	27.14	29.33	X6738160	427
	6	80	2	0.50	0.9°	3.47	7.22	30.28	32.52	-	X6740165	429
	6	80	2	0.20	0.9°	3.47	7.58	30.30	32.56	-	X6740160	429
	6	87	2	0.50	0.9°	3.47	7.20	37.82	40.63	-	X6742165	431
	6	87	2	0.20	0.9°	3.47	7.56	37.84	40.67	-	X6742160	431
3.0	6	57	2	0.50	0°	8.99	9.28	9.58	10.28	11.09	X6532185	419
	6	57	2	0.20	0°	8.99	9.29	9.61	10.33	11.16	X6532180	419
	6	57	4	0.50	0°	9.37	9.76	10.17	11.14	12.31	X7200180	343
	6	57	4	0.50	0°	14.37	14.97	15.62	17.12	18.95	5250180	345
	6	66	2	0.50	0°	14.99	15.49	16.01	17.18	18.55	X6534185	421
	6	66	2	0.20	0°	14.99	15.50	16.03	17.23	18.62	X6534180	421
	6	66	4	0.50	0°	18.37	19.14	19.98	21.91	24.26	X7204180	363
	6	75	2	0.50	0.9°	3.87	8.04	24.26	26.05	28.13	X6736185	425
	6	75	2	0.20	0.9°	3.87	8.40	24.28	26.09	28.20	X6736180	425
	6	75	2	0.20	0°	23.99	24.80	25.66	27.57	-	X6536180	423
	6	75	2	0.50	0°	23.99	24.79	29.54	27.53	-	X6536185	423
	6	75	2	0.50	0.9°	3.85	7.92	30.28	32.52	-	X6738185	427
	6	75	2	0.20	0.9°	3.85	8.28	30.30	32.56	-	X6738180	427
	6	87	2	0.50	0.9°	3.87	8.08	36.34	39.03	-	X6740185	429
	6	87	2	0.20	0.9°	3.87	8.44	36.36	39.08	-	X6740180	429
	6	100	2	0.50	0.9°	3.88	8.14	45.41	-	-	X6742185	431
	6	100	2	0.20	0.9°	3.88	8.51	45.43	-	-	X6742180	431
	3	50	2	0.20	0°	3.50	-	-	-	-	D15751180	433
	3	50	2	0.20	0°	8.90	-	-	-	-	M5752180	435
	3	50	2	0.20	0°	8.90	-	-	-	-	D5762180	437
	3	50	2	0.20	0°	14.90	-	-	-	-	M5754180	439
	3	50	2	0.20	0°	14.90	-	-	-	-	D5764180	441
	3	60	2	0.20	0°	23.90	-	-	-	-	M5756180	443
	3	60	2	0.20	0°	23.90	-	-	-	-	D5766180	445
4.0	6	57	4	1.00	0°	12.61	13.11	13.65	14.91	16.45	X7200218	343
	6	57	4	0.50	0°	12.61	13.13	13.70	15.01	16.60	X7200220	343
	6	80	2	1.00	0°	12.75	13.37	14.05	15.68	17.77	31410220	375
	6	80	2	0.50	0°	12.75	13.39	14.11	15.80	17.98	31420220	373
	6	57	4	0.50	0°	16.61	17.30	18.06	19.79	-	5250220	345
	6	69	4	1.00	0°	24.61	25.62	26.73	29.27	-	X7204218	363
	6	69	4	0.50	0°	24.61	25.64	26.77	-	-	X7204220	363
5.0	6	57	4	1.00	0°	15.84	16.48	17.18	-	-	X7200258	343
	6	57	4	0.50	0°	15.84	16.50	17.22	-	-	X7200260	343
	6	80	2	1.25	0°	16.03	16.81	17.67	-	-	31410260	375
	6	80	2	0.50	0°	16.03	16.85	17.75	-	-	31420260	373
	6	57	4	0.50	0°	18.84	19.63	20.49	-	-	5250260	345
	6	75	4	1.00	0°	30.84	32.12	-	-	-	X7204258	363
	6	75	4	0.50	0°	30.84	32.14	-	-	-	X7204260	363
6.0	6	57	4	0.50	0°	19.90	-	-	-	-	X7200295	343
	6	57	4	1.00	0°	19.90	-	-	-	-	X7200293	343
	6	57	6	0.50	0°	19.90	-	-	-	-	5250297	345
	6	57	6	0.80	0°	19.90	-	-	-	-	5250300	345
	6	57	4	1.00	0°	19.90	-	-	-	-	5353300	347
	6	57	4	1.50	0°	19.90	-	-	-	-	5356300	351
	6	57	4	1.00	0°	19.90	-	-	-	-	D5367300	353
	6	57	4	1.00	0°	19.90	-	-	-	-	U5345300	355
	6	57	4	1.50	0°	19.90	-	-	-	-	U5346300	357

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°	Page
6.0	6	57	6	0.50	0°	19.90	-	-	-	-	X7200300	343
	6	57	6	1.00	0°	19.90	-	-	-	-	X7200297	343
	6	80	2	0.50	0°	20.83	-	-	-	-	31420300	373
	6	80	2	1.50	0°	20.83	-	-	-	-	31410300	375
	6	70	4	0.80	0°	32.90	-	-	-	-	5252300	359
	6	70	4	1.50	0°	32.90	-	-	-	-	5357300	361
	6	80	4	0.50	0°	42.90	-	-	-	-	X7204295	363
	6	80	4	1.00	0°	42.90	-	-	-	-	X7204293	363
	6	80	6	0.50	0°	42.90	-	-	-	-	X7204300	363
	6	80	6	1.00	0°	42.90	-	-	-	-	X7204297	363
8.0	8	63	4	0.50	0°	25.90	-	-	-	-	X7200386	343
	8	63	4	1.00	0°	25.90	-	-	-	-	X7200384	343
	8	63	6	0.50	0°	25.90	-	-	-	-	5250388	345
	8	63	6	1.00	0°	25.90	-	-	-	-	5250391	345
	8	63	4	1.00	0°	25.90	-	-	-	-	5353391	347
	8	63	4	1.50	0°	25.90	-	-	-	-	5354391	349
	8	63	4	2.00	0°	25.90	-	-	-	-	5356391	351
	8	63	4	1.00	0°	25.90	-	-	-	-	D5367391	353
	8	63	4	1.00	0°	25.90	-	-	-	-	U5345391	355
	8	63	4	2.00	0°	25.90	-	-	-	-	U5346391	357
	8	63	6	0.50	0°	25.90	-	-	-	-	X7200391	343
	8	63	6	1.00	0°	25.90	-	-	-	-	X7200388	343
	8	100	2	0.50	0°	27.02	-	-	-	-	31420391	373
	8	100	2	2.00	0°	27.87	-	-	-	-	31410391	375
	8	80	4	1.00	0°	42.90	-	-	-	-	5252391	359
	8	80	4	2.00	0°	42.90	-	-	-	-	5357391	361
	8	90	4	0.50	0°	52.90	-	-	-	-	X7204386	363
	8	90	4	1.00	0°	52.90	-	-	-	-	X7204384	363
	8	90	6	0.50	0°	52.90	-	-	-	-	X7204391	363
	8	90	6	1.00	0°	52.90	-	-	-	-	X7204388	363
10.0	10	72	4	0.50	0°	30.90	-	-	-	-	X7200440	343
	10	72	4	1.00	0°	30.90	-	-	-	-	X7200435	343
	10	72	6	0.50	0°	30.90	-	-	-	-	5250445	345
	10	72	6	1.00	0°	30.90	-	-	-	-	5250450	345
	10	72	4	1.00	0°	30.90	-	-	-	-	5353450	347
	10	72	4	1.50	0°	30.90	-	-	-	-	5354450	349
	10	72	4	2.50	0°	30.90	-	-	-	-	5356450	351
	10	72	4	1.00	0°	30.90	-	-	-	-	D5367450	353
	10	72	4	1.50	0°	30.90	-	-	-	-	U5345450	355
	10	72	4	2.50	0°	30.90	-	-	-	-	U5346450	357
	10	72	6	0.50	0°	30.90	-	-	-	-	X7200450	343
	10	72	6	1.00	0°	30.90	-	-	-	-	X7200445	343
	10	100	2	0.50	0°	32.39	-	-	-	-	31420450	373
	10	100	2	2.50	0°	32.39	-	-	-	-	31410450	375
	10	84	4	1.00	0°	42.90	-	-	-	-	5252450	359
	10	84	4	2.50	0°	42.90	-	-	-	-	5357450	361
	10	105	4	0.50	0°	63.90	-	-	-	-	X7204440	363
	10	105	4	1.00	0°	63.90	-	-	-	-	X7204435	363
	10	105	6	0.50	0°	63.90	-	-	-	-	X7204450	363
	10	105	6	1.00	0°	63.90	-	-	-	-	X7204445	363
12.0	12	83	4	0.50	0°	36.90	-	-	-	-	X7200491	343
	12	83	4	1.00	0°	36.90	-	-	-	-	X7200486	343
	12	83	6	0.50	0°	36.90	-	-	-	-	5250496	345
	12	83	6	1.50	0°	36.90	-	-	-	-	5250501	345
	12	83	4	1.00	0°	36.90	-	-	-	-	5353501	347

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
12.0	12	83	4	1.50	0°	36.90	-	-	-	-	5354501	349
	12	83	4	3.00	0°	36.90	-	-	-	-	5356501	351
	12	83	4	1.00	0°	36.90	-	-	-	-	D5367501	353
	12	83	4	1.50	0°	36.90	-	-	-	-	U5345501	355
	12	83	4	3.00	0°	36.90	-	-	-	-	U5346501	357
	12	83	6	0.50	0°	36.90	-	-	-	-	X7200501	343
	12	83	6	1.00	0°	36.90	-	-	-	-	X7200496	343
	12	120	2	0.50	0°	38.77	-	-	-	-	31420501	373
	12	120	2	3.00	0°	38.77	-	-	-	-	31410501	375
	12	97	6	1.50	0°	50.90	-	-	-	-	5252501	359
	12	97	4	3.00	0°	50.90	-	-	-	-	5357501	361
	12	120	4	0.50	0°	73.90	-	-	-	-	X7204491	363
	12	120	4	1.00	0°	73.90	-	-	-	-	X7204486	363
	12	120	6	0.50	0°	73.90	-	-	-	-	X7204501	363
	12	120	6	1.00	0°	73.90	-	-	-	-	X7204496	363
16.0	16	92	6	1.50	0°	42.90	-	-	-	-	5250610	345
	16	92	4	1.00	0°	42.90	-	-	-	-	5353610	347
	16	92	4	1.50	0°	42.90	-	-	-	-	5354610	349
	16	92	4	2.50	0°	42.90	-	-	-	-	5356605	351
	16	92	4	3.50	0°	42.90	-	-	-	-	5356610	351
	16	92	4	4.00	0°	42.90	-	-	-	-	5356615	351
	16	92	4	1.00	0°	42.90	-	-	-	-	D5367610	353
	16	92	4	2.00	0°	42.90	-	-	-	-	U5345610	355
	16	92	4	4.00	0°	42.90	-	-	-	-	U5346610	357
	16	115	6	1.50	0°	65.90	-	-	-	-	5252610	359
	16	115	4	3.50	0°	65.90	-	-	-	-	5357610	361

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Hardened tool steel 42 - 48 HRC  	1	2	160	0.040	0.18	0.40	0.77	60000	4800	0.35	
		2	2	160	0.065	0.35	0.80	1.52	33505	4355	1.20	
		3	2	160	0.075	0.53	1.20	2.29	22240	3335	2.10	
		4	2	160	0.090	0.70	1.60	3.04	16755	3015	3.40	
		5	2	160	0.100	0.88	2.00	3.81	13370	2675	4.70	
		6	2	160	0.110	1.26	2.40	4.89	10415	2290	6.90	
		8	2	160	0.125	1.68	3.20	6.52	7810	1955	10.50	
		10	2	160	0.145	2.10	4.00	8.15	6250	1810	15.20	
		12	2	160	0.150	2.52	4.80	9.78	5210	1565	18.95	
		Hardened tool steel 48 - 52 HRC  	1	2	130	0.035	0.18	0.40	0.77	53740	3760	0.25
			2	2	130	0.060	0.35	0.80	1.52	27225	3265	0.90
			3	2	130	0.070	0.53	1.20	2.29	18070	2530	1.60
4	2		130	0.085	0.70	1.60	3.04	13610	2315	2.60		
5	2		130	0.090	0.88	2.00	3.81	10860	1955	3.45		
6	2		130	0.100	1.26	2.40	4.89	8460	1690	5.10		
8	2		130	0.115	1.68	3.20	6.52	6345	1460	7.85		
10	2		130	0.135	2.10	4.00	8.15	5075	1370	11.50		
12	2		130	0.140	2.52	4.80	9.78	4230	1185	14.35		
Hardened tool steel 52 - 56 HRC  	1		2	110	0.035	0.18	0.40	0.77	45475	3185	0.25	
	2		2	110	0.055	0.35	0.80	1.52	23035	2535	0.70	
	3		2	110	0.065	0.53	1.20	2.29	15290	1990	1.25	
	4	2	110	0.075	0.70	1.60	3.04	11520	1730	1.95		
	5	2	110	0.085	0.88	2.00	3.81	9190	1560	2.75		
	6	2	110	0.095	1.26	2.40	4.89	7160	1360	4.10		
	8	2	110	0.105	1.68	3.20	6.52	5370	1130	6.05		
	10	2	110	0.125	2.10	4.00	8.15	4295	1075	9.05		
	12	2	110	0.130	2.52	4.80	9.78	3580	930	11.25		
	Hardened tool steel 56 - 60 HRC  	1	2	50	0.015	0.14	0.30	0.69	23065	690	0.05	
		2	2	50	0.025	0.27	0.60	1.37	11615	580	0.10	
		3	2	50	0.030	0.41	0.90	2.06	7725	465	0.15	
4		2	50	0.035	0.42	0.96	2.45	6495	455	0.20		
5		2	50	0.040	0.53	0.90	3.08	5170	415	0.20		
6		2	50	0.045	0.76	0.72	3.99	3990	360	0.20		
8		2	50	0.050	1.01	0.96	5.31	2995	300	0.30		
10		2	50	0.060	1.26	1.20	6.64	2395	285	0.45		
12		2	50	0.060	1.51	1.44	7.96	2000	240	0.50		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β	
	Hardened tool steel 42 - 48 HRC  	1	2	200	0.055	0.12	0.12	1.00	60000	6600	45	
		2	2	200	0.095	0.24	0.24	1.99	31990	6080	45	
		3	2	200	0.105	0.36	0.36	2.99	21290	4470	45	
		4	2	200	0.125	0.48	0.48	3.99	15955	3990	45	
		5	2	200	0.140	0.60	0.60	4.98	12785	3580	45	
		6	2	200	0.155	0.72	0.72	5.98	10645	3300	45	
		8	2	200	0.170	0.96	0.96	7.98	7980	2715	45	
		10	2	200	0.200	1.20	1.20	9.97	6385	2555	45	
		12	2	200	0.210	1.44	1.44	11.96	5325	2235	45	
		Hardened tool steel 48 - 52 HRC  	1	2	160	0.050	0.12	0.12	1.00	50930	5095	45
			2	2	160	0.085	0.24	0.24	1.99	25595	4350	45
			3	2	160	0.095	0.36	0.36	2.99	17035	3235	45
4	2		160	0.115	0.48	0.48	3.99	12765	2935	45		
5	2		160	0.130	0.60	0.60	4.98	10225	2660	45		
6	2		160	0.145	0.72	0.72	5.98	8515	2470	45		
8	2		160	0.155	0.96	0.96	7.98	6380	1980	45		
10	2		160	0.185	1.20	1.20	9.97	5110	1890	45		
12	2		160	0.195	1.44	1.44	11.96	4260	1660	45		
Hardened tool steel 52 - 56 HRC  	1		2	120	0.045	0.12	0.12	1.00	38200	3440	45	
	2		2	120	0.080	0.24	0.24	1.99	19195	3070	45	
	3		2	120	0.090	0.36	0.36	2.99	12775	2300	45	
	4	2	120	0.105	0.48	0.48	3.99	9575	2010	45		
	5	2	120	0.120	0.60	0.60	4.98	7670	1840	45		
	6	2	120	0.130	0.72	0.72	5.98	6390	1660	45		
	8	2	120	0.145	0.96	0.96	7.98	4785	1390	45		
	10	2	120	0.170	1.20	1.20	9.97	3830	1300	45		
	12	2	120	0.180	1.44	1.44	11.96	3195	1150	45		
	Hardened tool steel 56 - 60 HRC  	1	2	90	0.040	0.07	0.07	0.97	29535	2365	45	
		2	2	90	0.070	0.14	0.14	1.94	14765	2065	45	
		3	2	90	0.080	0.22	0.22	2.92	9810	1570	45	
4		2	90	0.095	0.29	0.29	3.89	7365	1400	45		
5		2	90	0.105	0.36	0.36	4.85	5905	1240	45		
6		2	90	0.115	0.43	0.43	5.82	4920	1130	45		
8		2	90	0.130	0.58	0.58	7.77	3685	960	45		
10		2	90	0.150	0.72	0.72	9.71	2950	885	45		
12		2	90	0.160	0.86	0.86	11.65	2460	785	45		



# Ball nose end mills Sphero-XR

Tolerance r  $\pm 0.005$



HM  
XT

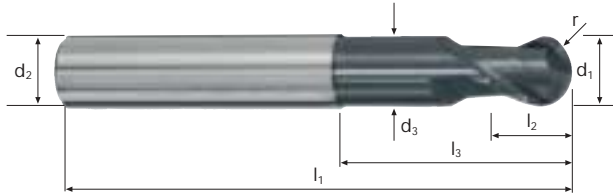
$\lambda$  30°  
 $\gamma$ -10°

h5

d1

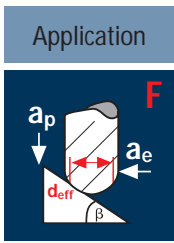
r

R



Rm 850-1100   Rm 1100-1300   Rm 1300-1500   HRC 48-56   HRC 56-60   HRC > 60

Example: Order-N°.										X-AI	
		Coating	Article-N°.		α-Code						
		X	7420		.100						
										X7420	
Ø Code	d1 *	d2 h5	d3	l1	l2	l3	r ±0.005	α	Z		
.100	1	6	0.95	57	1.5	3	0.5	9.9°	2	●	
.140	2	6	1.80	57	3.0	6	1.0	7.7°	2	●	
.180	3	6	2.80	57	4.0	9	1.5	5.7°	2	●	
.220	4	6	3.70	57	5.0	12	2.0	3.7°	2	●	
.260	5	6	4.60	57	6.0	15	2.5	1.9°	2	●	
.300	6	6	5.50	57	7.0	20	3.0	0.0°	2	●	
.391	8	8	7.40	63	9.0	26	4.0	0.0°	2	●	
.450	10	10	9.20	72	11.0	31	5.0	0.0°	2	●	
.501	12	12	11.00	83	12.0	37	6.0	0.0°	2	●	
* Tolerance of the cutting diameter											
d1 Tolerance											
< 6 0/-0.010											
≥ 6 0/-0.015											



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	300	0.030	0.05	0.05	0.94	60000	3600	45
2	2	300	0.035	0.07	0.07	1.84	51900	3635	45
3	2	300	0.040	0.10	0.10	2.74	34850	2790	45
4	2	300	0.070	0.12	0.12	3.62	26380	3695	45
5	2	300	0.080	0.15	0.15	4.53	21080	3375	45
6	2	300	0.085	0.15	0.15	5.36	17815	3030	45
8	2	300	0.095	0.17	0.17	7.05	13545	2575	45
10	2	300	0.100	0.20	0.20	8.77	10890	2180	45
12	2	300	0.105	0.25	0.25	10.56	9045	1900	45

Hardened tool steel  
48 - 52 HRC

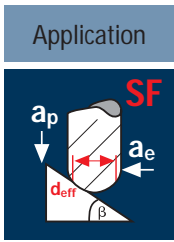
1	2	250	0.030	0.05	0.05	0.94	60000	3600	45
2	2	250	0.035	0.07	0.07	1.84	43250	3030	45
3	2	250	0.040	0.10	0.10	2.74	29045	2325	45
4	2	250	0.065	0.12	0.12	3.62	21985	2860	45
5	2	250	0.075	0.15	0.15	4.53	17565	2635	45
6	2	250	0.080	0.15	0.15	5.36	14845	2375	45
8	2	250	0.090	0.17	0.17	7.05	11290	2030	45
10	2	250	0.095	0.20	0.20	8.77	9075	1725	45
12	2	250	0.100	0.25	0.25	10.56	7535	1505	45

Hardened tool steel  
52 - 56 HRC

1	2	200	0.025	0.05	0.05	0.94	60000	3000	45
2	2	200	0.030	0.07	0.07	1.84	34600	2075	45
3	2	200	0.035	0.10	0.10	2.74	23235	1625	45
4	2	200	0.065	0.12	0.12	3.62	17585	2285	45
5	2	200	0.070	0.15	0.15	4.53	14055	1970	45
6	2	200	0.075	0.15	0.15	5.36	11880	1780	45
8	2	200	0.085	0.17	0.17	7.05	9030	1535	45
10	2	200	0.090	0.20	0.20	8.77	7260	1305	45
12	2	200	0.095	0.25	0.25	10.56	6030	1145	45

Hardened tool steel  
56 - 60 HRC

1	2	150	0.025	0.05	0.05	0.94	50795	2540	45
2	2	150	0.030	0.07	0.07	1.84	25950	1555	45
3	2	150	0.035	0.10	0.10	2.74	17425	1220	45
4	2	150	0.060	0.12	0.12	3.62	13190	1585	45
5	2	150	0.070	0.15	0.15	4.53	10540	1475	45
6	2	150	0.070	0.15	0.15	5.36	8910	1245	45
8	2	150	0.080	0.17	0.17	7.05	6775	1085	45
10	2	150	0.085	0.20	0.20	8.77	5445	925	45
12	2	150	0.090	0.25	0.25	10.56	4520	815	45



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	400	0.025	0.02	0.02	0.88	60000	3000	45
2	2	400	0.030	0.02	0.02	1.67	60000	3600	45
3	2	400	0.035	0.03	0.03	2.50	50930	3565	45
4	2	400	0.050	0.03	0.03	3.27	38940	3895	45
5	2	400	0.055	0.03	0.03	4.04	31515	3465	45
6	2	400	0.060	0.03	0.03	4.80	26525	3185	45
8	2	400	0.065	0.03	0.03	6.31	20180	2625	45
10	2	400	0.070	0.04	0.04	7.91	16095	2255	45
12	2	400	0.075	0.04	0.04	9.41	13530	2030	45

Hardened tool steel  
48 - 52 HRC

1	2	350	0.025	0.02	0.02	0.88	60000	3000	45
2	2	350	0.030	0.02	0.02	1.67	60000	3600	45
3	2	350	0.035	0.03	0.03	2.50	44565	3120	45
4	2	350	0.050	0.03	0.03	3.27	34070	3405	45
5	2	350	0.050	0.03	0.03	4.04	27575	2760	45
6	2	350	0.055	0.03	0.03	4.80	23210	2555	45
8	2	350	0.060	0.03	0.03	6.31	17655	2120	45
10	2	350	0.065	0.04	0.04	7.91	14085	1830	45
12	2	350	0.070	0.04	0.04	9.41	11840	1660	45

Hardened tool steel  
52 - 56 HRC

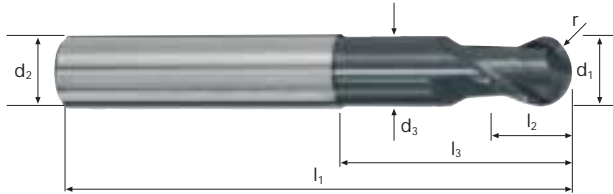
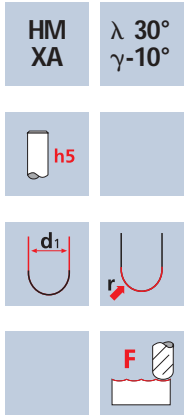
1	2	280	0.025	0.02	0.02	0.88	60000	3000	45
2	2	280	0.025	0.02	0.02	1.67	53370	2670	45
3	2	280	0.030	0.03	0.03	2.50	35650	2140	45
4	2	280	0.045	0.03	0.03	3.27	27255	2455	45
5	2	280	0.050	0.03	0.03	4.04	22060	2205	45
6	2	280	0.055	0.03	0.03	4.80	18570	2045	45
8	2	280	0.060	0.03	0.03	6.31	14125	1695	45
10	2	280	0.065	0.04	0.04	7.91	11270	1465	45
12	2	280	0.070	0.04	0.04	9.41	9470	1325	45

Hardened tool steel  
56 - 60 HRC

1	2	180	0.020	0.02	0.02	0.88	60000	2400	45
2	2	180	0.025	0.02	0.02	1.67	34310	1715	45
3	2	180	0.030	0.03	0.03	2.50	22920	1375	45
4	2	180	0.045	0.03	0.03	3.27	17520	1575	45
5	2	180	0.045	0.03	0.03	4.04	14185	1275	45
6	2	180	0.050	0.03	0.03	4.80	11935	1195	45
8	2	180	0.055	0.03	0.03	6.31	9080	1000	45
10	2	180	0.060	0.04	0.04	7.91	7245	870	45
12	2	180	0.065	0.04	0.04	9.41	6090	790	45

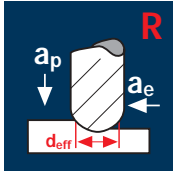










# Ball nose end mills Sphero-XF

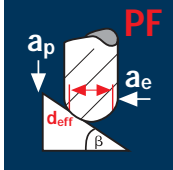










Tolerance  $r \pm 0.005$



Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	Copper
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Example: Order-N°.										X-AI	
										X7400	
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	α	Z		
.100	1	6	0.95	57	1.5	3	0.5	9.9°	2	●	
.140	2	6	1.80	57	3.0	6	1.0	7.7°	2	●	
.180	3	6	2.80	57	4.0	9	1.5	5.7°	2	●	
.220	4	6	3.70	57	5.0	12	2.0	3.7°	2	●	
.260	5	6	4.60	57	6.0	15	2.5	1.9°	2	●	
.300	6	6	5.50	57	7.0	20	3.0	0.0°	2	●	
.391	8	8	7.40	63	9.0	26	4.0	0.0°	2	●	
.450	10	10	9.20	72	11.0	31	5.0	0.0°	2	●	
.501	12	12	11.00	83	12.0	37	6.0	0.0°	2	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Hardened tool steel 42 - 48 HRC     	1	2	160	0.040	0.13	0.30	0.67	60000	4800	0.20	
		2	2	160	0.065	0.26	0.60	1.35	37725	4905	0.75	
		3	2	160	0.075	0.39	0.90	2.02	25215	3780	1.35	
		4	2	160	0.090	0.52	1.20	2.69	18935	3410	2.15	
		5	2	160	0.100	0.65	1.50	3.36	15160	3030	2.95	
		6	2	160	0.110	1.02	1.80	4.51	11295	2485	4.55	
		8	2	160	0.125	1.36	2.40	6.01	8475	2120	6.90	
		10	2	160	0.145	1.70	3.00	7.51	6780	1965	10.00	
		12	2	160	0.150	2.04	3.60	9.02	5645	1695	12.45	
		Hardened tool steel 48 - 52 HRC   	1	2	130	0.035	0.13	0.30	0.67	60000	4200	0.15
			2	2	130	0.060	0.26	0.60	1.35	30655	3680	0.55
			3	2	130	0.070	0.39	0.90	2.02	20485	2870	1.00
4	2		130	0.085	0.52	1.20	2.69	15385	2615	1.65		
5	2		130	0.090	0.65	1.50	3.36	12315	2215	2.15		
6	2		130	0.100	1.02	1.80	4.51	9175	1835	3.35		
8	2		130	0.115	1.36	2.40	6.01	6885	1585	5.15		
10	2		130	0.135	1.70	3.00	7.51	5510	1490	7.60		
12	2		130	0.140	2.04	3.60	9.02	4590	1285	9.45		
Hardened tool steel 52 - 56 HRC   	1		2	110	0.035	0.13	0.30	0.67	52260	3660	0.15	
	2		2	110	0.055	0.26	0.60	1.35	25935	2855	0.45	
	3		2	110	0.065	0.39	0.90	2.02	17335	2255	0.80	
	4	2	110	0.075	0.52	1.20	2.69	13015	1950	1.20		
	5	2	110	0.085	0.65	1.50	3.36	10420	1770	1.75		
	6	2	110	0.095	1.02	1.80	4.51	7765	1475	2.70		
	8	2	110	0.105	1.36	2.40	6.01	5825	1225	4.00		
	10	2	110	0.125	1.70	3.00	7.51	4660	1165	5.95		
	12	2	110	0.130	2.04	3.60	9.02	3880	1010	7.40		
	Hardened tool steel 56 - 60 HRC   	1	2	50	0.015	0.10	0.23	0.60	26525	795	0.00	
		2	2	50	0.025	0.20	0.45	1.20	13265	665	0.05	
		3	2	50	0.030	0.30	0.68	1.80	8840	530	0.10	
4		2	50	0.035	0.31	0.72	2.14	7435	520	0.10		
5		2	50	0.040	0.39	0.67	2.68	5940	475	0.10		
6		2	50	0.045	0.61	0.54	3.63	4385	395	0.15		
8		2	50	0.050	0.82	0.72	4.85	3280	330	0.20		
10		2	50	0.060	1.02	0.90	6.05	2630	315	0.30		
12		2	50	0.060	1.22	1.08	7.25	2195	265	0.35		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β	
	Hardened tool steel 42 - 48 HRC     	1	2	200	0.055	0.10	0.10	0.99	60000	6600	45	
		2	2	200	0.095	0.20	0.20	1.98	32155	6110	45	
		3	2	200	0.105	0.30	0.30	2.97	21435	4500	45	
		4	2	200	0.125	0.40	0.40	3.96	16075	4020	45	
		5	2	200	0.140	0.50	0.50	4.95	12860	3600	45	
		6	2	200	0.155	0.60	0.60	5.94	10720	3325	45	
		8	2	200	0.170	0.80	0.80	7.92	8040	2735	45	
		10	2	200	0.200	1.00	1.00	9.90	6430	2570	45	
		12	2	200	0.210	1.20	1.20	11.88	5360	2250	45	
		Hardened tool steel 48 - 52 HRC   	1	2	160	0.050	0.10	0.10	0.99	51445	5145	45
			2	2	160	0.085	0.20	0.20	1.98	25725	4375	45
			3	2	160	0.095	0.30	0.30	2.97	17150	3260	45
4	2		160	0.115	0.40	0.40	3.96	12860	2960	45		
5	2		160	0.130	0.50	0.50	4.95	10290	2675	45		
6	2		160	0.145	0.60	0.60	5.94	8575	2485	45		
8	2		160	0.155	0.80	0.80	7.92	6430	1995	45		
10	2		160	0.185	1.00	1.00	9.90	5145	1905	45		
12	2		160	0.195	1.20	1.20	11.88	4285	1670	45		
Hardened tool steel 52 - 56 HRC   	1		2	120	0.045	0.10	0.10	0.99	38585	3475	45	
	2		2	120	0.080	0.20	0.20	1.98	19290	3085	45	
	3		2	120	0.090	0.30	0.30	2.97	12860	2315	45	
	4	2	120	0.105	0.40	0.40	3.96	9645	2025	45		
	5	2	120	0.120	0.50	0.50	4.95	7715	1850	45		
	6	2	120	0.130	0.60	0.60	5.94	6430	1670	45		
	8	2	120	0.145	0.80	0.80	7.92	4825	1400	45		
	10	2	120	0.170	1.00	1.00	9.90	3860	1310	45		
	12	2	120	0.180	1.20	1.20	11.88	3215	1155	45		
	Hardened tool steel 56 - 60 HRC   	1	2	90	0.040	0.06	0.06	0.96	29840	2385	45	
		2	2	90	0.070	0.12	0.12	1.92	14920	2090	45	
		3	2	90	0.080	0.18	0.18	2.87	9980	1595	45	
4		2	90	0.095	0.24	0.24	3.83	7480	1420	45		
5		2	90	0.105	0.30	0.30	4.79	5980	1255	45		
6		2	90	0.115	0.36	0.36	5.75	4980	1145	45		
8		2	90	0.130	0.48	0.48	7.66	3740	970	45		
10		2	90	0.150	0.60	0.60	9.58	2990	895	45		
12		2	90	0.160	0.72	0.72	11.50	2490	795	45		

# Ball nose end mills Sphero-XR

Tolerance r ±0.005

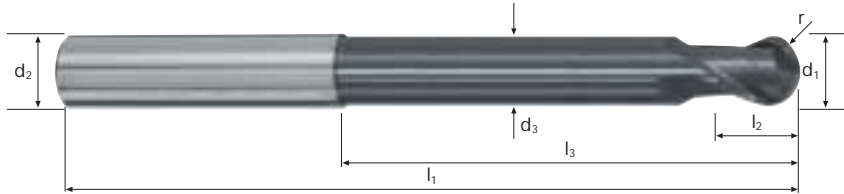


**HM XT**     $\lambda$  30°  
 $\gamma$ -10°

**h5**

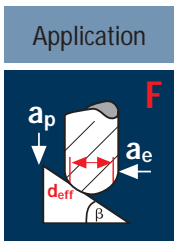
**d1**    **r**

**R**



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60			
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Example: Order-N°.										X-AI	
										X7424	
∅ Code	d1 *	d2 h5	d3	l1	l2	l3	r ±0.005	α	Z		
.100	1	6	0.95	66	1.5	6	0.5	8.2°	2	●	
.140	2	6	1.80	66	3.0	12	1.0	5.5°	2	●	
.180	3	6	2.80	66	4.0	18	1.5	3.6°	2	●	
.220	4	6	3.70	69	5.0	24	2.0	2.1°	2	●	
.260	5	6	4.60	75	6.0	30	2.5	1.0°	2	●	
.300	6	6	5.50	80	7.0	43	3.0	0.0°	2	●	
.391	8	8	7.40	90	9.0	53	4.0	0.0°	2	●	
.450	10	10	9.20	105	11.0	64	5.0	0.0°	2	●	
.501	12	12	11.00	120	12.0	74	6.0	0.0°	2	●	
* Tolerance of the cutting diameter											
d1 Tolerance											
< 6 0/-0.010											
≥ 6 0/-0.015											



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	300	0.030	0.05	0.05	0.94	60000	3600	45
2	2	300	0.035	0.07	0.07	1.84	51900	3635	45
3	2	300	0.040	0.10	0.10	2.74	34850	2790	45
4	2	300	0.070	0.12	0.12	3.62	26380	3695	45
5	2	300	0.080	0.15	0.15	4.53	21080	3375	45
6	2	300	0.085	0.15	0.15	5.36	17815	3030	45
8	2	300	0.095	0.17	0.17	7.05	13545	2575	45
10	2	300	0.100	0.20	0.20	8.77	10890	2180	45
12	2	300	0.105	0.25	0.25	10.56	9045	1900	45

Hardened tool steel  
48 - 52 HRC

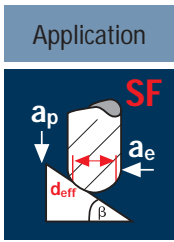
1	2	250	0.030	0.05	0.05	0.94	60000	3600	45
2	2	250	0.035	0.07	0.07	1.84	43250	3030	45
3	2	250	0.040	0.10	0.10	2.74	29045	2325	45
4	2	250	0.065	0.12	0.12	3.62	21985	2860	45
5	2	250	0.075	0.15	0.15	4.53	17565	2635	45
6	2	250	0.080	0.15	0.15	5.36	14845	2375	45
8	2	250	0.090	0.17	0.17	7.05	11290	2030	45
10	2	250	0.095	0.20	0.20	8.77	9075	1725	45
12	2	250	0.100	0.25	0.25	10.56	7535	1505	45

Hardened tool steel  
52 - 56 HRC

1	2	200	0.025	0.05	0.05	0.94	60000	3000	45
2	2	200	0.030	0.07	0.07	1.84	34600	2075	45
3	2	200	0.035	0.10	0.10	2.74	23235	1625	45
4	2	200	0.065	0.12	0.12	3.62	17585	2285	45
5	2	200	0.070	0.15	0.15	4.53	14055	1970	45
6	2	200	0.075	0.15	0.15	5.36	11880	1780	45
8	2	200	0.085	0.17	0.17	7.05	9030	1535	45
10	2	200	0.090	0.20	0.20	8.77	7260	1305	45
12	2	200	0.095	0.25	0.25	10.56	6030	1145	45

Hardened tool steel  
56 - 60 HRC

1	2	150	0.025	0.05	0.05	0.94	50795	2540	45
2	2	150	0.030	0.07	0.07	1.84	25950	1555	45
3	2	150	0.035	0.10	0.10	2.74	17425	1220	45
4	2	150	0.060	0.12	0.12	3.62	13190	1585	45
5	2	150	0.070	0.15	0.15	4.53	10540	1475	45
6	2	150	0.070	0.15	0.15	5.36	8910	1245	45
8	2	150	0.080	0.17	0.17	7.05	6775	1085	45
10	2	150	0.085	0.20	0.20	8.77	5445	925	45
12	2	150	0.090	0.25	0.25	10.56	4520	815	45



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	400	0.025	0.02	0.02	0.88	60000	3000	45
2	2	400	0.030	0.02	0.02	1.67	60000	3600	45
3	2	400	0.035	0.03	0.03	2.50	50930	3565	45
4	2	400	0.050	0.03	0.03	3.27	38940	3895	45
5	2	400	0.055	0.03	0.03	4.04	31515	3465	45
6	2	400	0.060	0.03	0.03	4.80	26525	3185	45
8	2	400	0.065	0.03	0.03	6.31	20180	2625	45
10	2	400	0.070	0.04	0.04	7.91	16095	2255	45
12	2	400	0.075	0.04	0.04	9.41	13530	2030	45

Hardened tool steel  
48 - 52 HRC

1	2	350	0.025	0.02	0.02	0.88	60000	3000	45
2	2	350	0.030	0.02	0.02	1.67	60000	3600	45
3	2	350	0.035	0.03	0.03	2.50	44565	3120	45
4	2	350	0.050	0.03	0.03	3.27	34070	3405	45
5	2	350	0.050	0.03	0.03	4.04	27575	2760	45
6	2	350	0.055	0.03	0.03	4.80	23210	2555	45
8	2	350	0.060	0.03	0.03	6.31	17655	2120	45
10	2	350	0.065	0.04	0.04	7.91	14085	1830	45
12	2	350	0.070	0.04	0.04	9.41	11840	1660	45

Hardened tool steel  
52 - 56 HRC

1	2	280	0.025	0.02	0.02	0.88	60000	3000	45
2	2	280	0.025	0.02	0.02	1.67	53370	2670	45
3	2	280	0.030	0.03	0.03	2.50	35650	2140	45
4	2	280	0.045	0.03	0.03	3.27	27255	2455	45
5	2	280	0.050	0.03	0.03	4.04	22060	2205	45
6	2	280	0.055	0.03	0.03	4.80	18570	2045	45
8	2	280	0.060	0.03	0.03	6.31	14125	1695	45
10	2	280	0.065	0.04	0.04	7.91	11270	1465	45
12	2	280	0.070	0.04	0.04	9.41	9470	1325	45

Hardened tool steel  
56 - 60 HRC

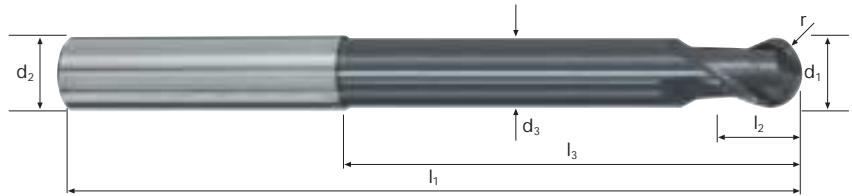
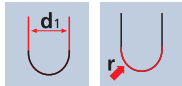
1	2	180	0.020	0.02	0.02	0.88	60000	2400	45
2	2	180	0.025	0.02	0.02	1.67	34310	1715	45
3	2	180	0.030	0.03	0.03	2.50	22920	1375	45
4	2	180	0.045	0.03	0.03	3.27	17520	1575	45
5	2	180	0.045	0.03	0.03	4.04	14185	1275	45
6	2	180	0.050	0.03	0.03	4.80	11935	1195	45
8	2	180	0.055	0.03	0.03	6.31	9080	1000	45
10	2	180	0.060	0.04	0.04	7.91	7245	870	45
12	2	180	0.065	0.04	0.04	9.41	6090	790	45

# Ball nose end mills Sphero-XF

Tolerance  $r \pm 0.005$



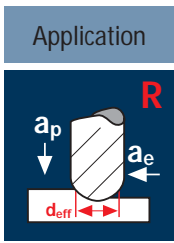
HM  
XA  $\lambda 30^\circ$   
 $\gamma - 10^\circ$



II

Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	Copper
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Example: Order-N°.										X-AI	
										X7404	
$\emptyset$ Code	$d_1$ 0/-0.01	$d_2$ h5	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.005$	$\alpha$	Z		
.100	1	6	0.95	66	1.5	6	0.5	$8.2^\circ$	2	●	
.140	2	6	1.80	66	3.0	12	1.0	$5.5^\circ$	2	●	
.180	3	6	2.80	66	4.0	18	1.5	$3.6^\circ$	2	●	
.220	4	6	3.70	69	5.0	24	2.0	$2.1^\circ$	2	●	
.260	5	6	4.60	75	6.0	30	2.5	$1.0^\circ$	2	●	
.300	6	6	5.50	80	7.0	43	3.0	$0.0^\circ$	2	●	
.391	8	8	7.40	90	9.0	53	4.0	$0.0^\circ$	2	●	
.450	10	10	9.20	105	11.0	64	5.0	$0.0^\circ$	2	●	
.501	12	12	11.00	120	12.0	74	6.0	$0.0^\circ$	2	●	



### Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	Q [cm <sup>3</sup> /min]
1	2	140	0.035	0.10	0.20	0.60	60000	4200	0.10
2	2	140	0.055	0.20	0.40	1.20	37135	4085	0.35
3	2	140	0.065	0.30	0.60	1.80	24760	3220	0.60
4	2	140	0.080	0.40	0.80	2.40	18570	2970	0.95
5	2	140	0.090	0.50	1.00	3.00	14855	2675	1.35
6	2	140	0.100	0.84	1.20	4.16	10715	2145	2.15
8	2	140	0.115	1.12	1.60	5.55	8030	1845	3.30
10	2	140	0.135	1.40	2.00	6.94	6420	1735	4.85
12	2	140	0.140	1.68	2.40	8.33	5350	1500	6.05

Hardened tool steel  
48 - 52 HRC

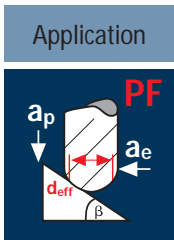
1	2	110	0.030	0.10	0.20	0.60	58360	3500	0.05
2	2	110	0.050	0.20	0.40	1.20	29180	2920	0.25
3	2	110	0.060	0.30	0.60	1.80	19455	2335	0.40
4	2	110	0.075	0.40	0.80	2.40	14590	2190	0.70
5	2	110	0.085	0.50	1.00	3.00	11670	1985	1.00
6	2	110	0.090	0.84	1.20	4.16	8415	1515	1.55
8	2	110	0.105	1.12	1.60	5.55	6310	1325	2.35
10	2	110	0.125	1.40	2.00	6.94	5045	1260	3.55
12	2	110	0.130	1.68	2.40	8.33	4205	1095	4.40

Hardened tool steel  
52 - 56 HRC

1	2	90	0.030	0.10	0.20	0.60	47750	2865	0.05
2	2	90	0.045	0.20	0.40	1.20	23875	2150	0.15
3	2	90	0.055	0.30	0.60	1.80	15915	1750	0.30
4	2	90	0.070	0.40	0.80	2.40	11935	1670	0.55
5	2	90	0.075	0.50	1.00	3.00	9550	1435	0.70
6	2	90	0.085	0.84	1.20	4.16	6885	1170	1.20
8	2	90	0.100	1.12	1.60	5.55	5160	1030	1.85
10	2	90	0.115	1.40	2.00	6.94	4130	950	2.65
12	2	90	0.120	1.68	2.40	8.33	3440	825	3.35

Hardened tool steel  
56 - 60 HRC

1	2	40	0.015	0.08	0.15	0.54	23580	705	0.00
2	2	40	0.020	0.16	0.30	1.09	11680	465	0.00
3	2	40	0.025	0.23	0.45	1.60	7960	400	0.05
4	2	40	0.030	0.24	0.48	1.90	6700	400	0.05
5	2	40	0.035	0.30	0.45	2.37	5370	375	0.05
6	2	40	0.040	0.50	0.36	3.32	3835	305	0.05
8	2	40	0.045	0.67	0.48	4.43	2875	260	0.10
10	2	40	0.055	0.84	0.60	5.55	2295	250	0.15
12	2	40	0.055	1.01	0.72	6.66	1910	210	0.15



### Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	160	0.050	0.08	0.08	0.98	51970	5195	45
2	2	160	0.080	0.16	0.16	1.96	25985	4160	45
3	2	160	0.090	0.24	0.24	2.93	17385	3130	45
4	2	160	0.105	0.32	0.32	3.91	13025	2735	45
5	2	160	0.120	0.40	0.40	4.89	10415	2500	45
6	2	160	0.130	0.48	0.48	5.87	8675	2255	45
8	2	160	0.150	0.64	0.64	7.82	6515	1955	45
10	2	160	0.170	0.80	0.80	9.78	5210	1770	45
12	2	160	0.180	0.96	0.96	11.73	4340	1560	45

Hardened tool steel  
48 - 52 HRC

1	2	120	0.045	0.08	0.08	0.98	38980	3510	45
2	2	120	0.075	0.16	0.16	1.96	19490	2925	45
3	2	120	0.085	0.24	0.24	2.93	13035	2215	45
4	2	120	0.095	0.32	0.32	3.91	9770	1855	45
5	2	120	0.110	0.40	0.40	4.89	7810	1720	45
6	2	120	0.120	0.48	0.48	5.87	6505	1560	45
8	2	120	0.140	0.64	0.64	7.82	4885	1370	45
10	2	120	0.155	0.80	0.80	9.78	3905	1210	45
12	2	120	0.165	0.96	0.96	11.73	3255	1075	45

Hardened tool steel  
52 - 56 HRC

1	2	100	0.045	0.08	0.08	0.98	32480	2925	45
2	2	100	0.070	0.16	0.16	1.96	16240	2275	45
3	2	100	0.075	0.24	0.24	2.93	10865	1630	45
4	2	100	0.090	0.32	0.32	3.91	8140	1465	45
5	2	100	0.100	0.40	0.40	4.89	6510	1300	45
6	2	100	0.110	0.48	0.48	5.87	5425	1195	45
8	2	100	0.130	0.64	0.64	7.82	4070	1060	45
10	2	100	0.145	0.80	0.80	9.78	3255	945	45
12	2	100	0.155	0.96	0.96	11.73	2715	840	45

Hardened tool steel  
56 - 60 HRC

1	2	60	0.040	0.05	0.05	0.94	20320	1625	45
2	2	60	0.060	0.10	0.10	1.89	10105	1215	45
3	2	60	0.070	0.14	0.14	2.82	6775	950	45
4	2	60	0.080	0.19	0.19	3.76	5080	815	45
5	2	60	0.090	0.24	0.24	4.71	4055	730	45
6	2	60	0.100	0.29	0.29	5.65	3380	675	45
8	2	60	0.115	0.38	0.38	7.53	2535	585	45
10	2	60	0.130	0.48	0.48	9.42	2030	530	45
12	2	60	0.135	0.58	0.58	11.30	1690	455	45

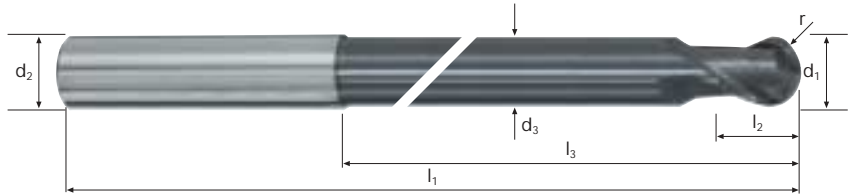
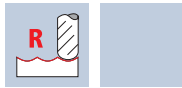
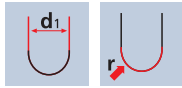


# Ball nose end mills Sphero-XR

Tolerance r ±0.005

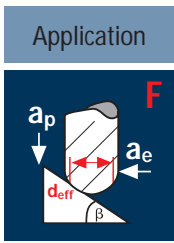


HM  
XT λ 30°  
γ-10°



Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60			
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Example: Order-N°.										X-AI	
		Coating <b>X</b>	Article-N°. <b>7428</b>	α-Code <b>.100</b>						<b>X7428</b>	
∅ Code	d1 *	d2 h5	d3	l1	l2	l3	r ±0.005	α	Z		
.100	1	6	0.95	69	1.5	9	0.5	7.0°	2	●	
.140	2	6	1.80	69	3.0	18	1.0	4.3°	2	●	
.180	3	6	2.80	75	4.0	27	1.5	2.6°	2	●	
.220	4	6	3.70	80	5.0	36	2.0	1.5°	2	●	
.260	5	6	4.60	87	6.0	45	2.5	0.7°	2	●	
.300	6	6	5.50	100	7.0	63	3.0	0.0°	2	●	
.391	8	8	7.40	120	9.0	83	4.0	0.0°	2	●	
.450	10	10	9.20	135	11.0	94	5.0	0.0°	2	●	
.501	12	12	11.00	160	12.0	114	6.0	0.0°	2	●	
* Tolerance of the cutting diameter											
d1 Tolerance											
< 6 0/-0.010											
≥ 6 0/-0.015											



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	220	0.025	0.05	0.05	0.94	60000	3000	45
2	2	220	0.030	0.07	0.07	1.84	38060	2285	45
3	2	220	0.035	0.10	0.10	2.74	25560	1790	45
4	2	220	0.060	0.12	0.12	3.62	19345	2320	45
5	2	220	0.065	0.15	0.15	4.53	15460	2010	45
6	2	220	0.070	0.15	0.15	5.36	13065	1830	45
8	2	220	0.080	0.17	0.17	7.05	9935	1590	45
10	2	220	0.085	0.20	0.20	8.77	7985	1355	45
12	2	220	0.090	0.25	0.25	10.56	6630	1195	45

Hardened tool steel  
48 - 52 HRC

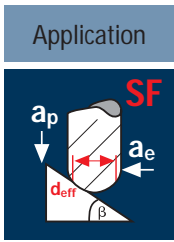
1	2	180	0.025	0.05	0.05	0.94	60000	3000	45
2	2	180	0.030	0.07	0.07	1.84	31140	1870	45
3	2	180	0.035	0.10	0.10	2.74	20910	1465	45
4	2	180	0.055	0.12	0.12	3.62	15830	1740	45
5	2	180	0.060	0.15	0.15	4.53	12650	1520	45
6	2	180	0.065	0.15	0.15	5.36	10690	1390	45
8	2	180	0.075	0.17	0.17	7.05	8125	1220	45
10	2	180	0.080	0.20	0.20	8.77	6535	1045	45
12	2	180	0.085	0.25	0.25	10.56	5425	920	45

Hardened tool steel  
52 - 56 HRC

1	2	140	0.025	0.05	0.05	0.94	47410	2370	45
2	2	140	0.025	0.07	0.07	1.84	24220	1210	45
3	2	140	0.030	0.10	0.10	2.74	16265	975	45
4	2	140	0.055	0.12	0.12	3.62	12310	1355	45
5	2	140	0.060	0.15	0.15	4.53	9840	1180	45
6	2	140	0.065	0.15	0.15	5.36	8315	1080	45
8	2	140	0.070	0.17	0.17	7.05	6320	885	45
10	2	140	0.075	0.20	0.20	8.77	5080	760	45
12	2	140	0.080	0.25	0.25	10.56	4220	675	45

Hardened tool steel  
56 - 60 HRC

1	2	100	0.020	0.05	0.05	0.94	33865	1355	45
2	2	100	0.025	0.07	0.07	1.84	17300	865	45
3	2	100	0.030	0.10	0.10	2.74	11615	695	45
4	2	100	0.050	0.12	0.12	3.62	8795	880	45
5	2	100	0.055	0.15	0.15	4.53	7025	775	45
6	2	100	0.060	0.15	0.15	5.36	5940	715	45
8	2	100	0.070	0.17	0.17	7.05	4515	630	45
10	2	100	0.070	0.20	0.20	8.77	3630	510	45
12	2	100	0.075	0.25	0.25	10.56	3015	450	45



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	300	0.020	0.02	0.02	0.88	60000	2400	45
2	2	300	0.025	0.02	0.02	1.67	57185	2860	45
3	2	300	0.025	0.03	0.03	2.50	38200	1910	45
4	2	300	0.040	0.03	0.03	3.27	29205	2335	45
5	2	300	0.045	0.03	0.03	4.04	23640	2130	45
6	2	300	0.050	0.03	0.03	4.80	19895	1990	45
8	2	300	0.055	0.03	0.03	6.31	15135	1665	45
10	2	300	0.055	0.04	0.04	7.91	12075	1330	45
12	2	300	0.060	0.04	0.04	9.41	10150	1220	45

Hardened tool steel  
48 - 52 HRC

1	2	260	0.020	0.02	0.02	0.88	60000	2400	45
2	2	260	0.025	0.02	0.02	1.67	49560	2480	45
3	2	260	0.025	0.03	0.03	2.50	33105	1655	45
4	2	260	0.040	0.03	0.03	3.27	25310	2025	45
5	2	260	0.045	0.03	0.03	4.04	20485	1845	45
6	2	260	0.050	0.03	0.03	4.80	17240	1725	45
8	2	260	0.050	0.03	0.03	6.31	13115	1310	45
10	2	260	0.050	0.04	0.04	7.91	10465	1045	45
12	2	260	0.055	0.04	0.04	9.41	8795	965	45

Hardened tool steel  
52 - 56 HRC

1	2	200	0.020	0.02	0.02	0.88	60000	2400	45
2	2	200	0.025	0.02	0.02	1.67	38120	1905	45
3	2	200	0.025	0.03	0.03	2.50	25465	1275	45
4	2	200	0.035	0.03	0.03	3.27	19470	1365	45
5	2	200	0.040	0.03	0.03	4.04	15760	1260	45
6	2	200	0.045	0.03	0.03	4.80	13265	1195	45
8	2	200	0.050	0.03	0.03	6.31	10090	1010	45
10	2	200	0.050	0.04	0.04	7.91	8050	805	45
12	2	200	0.055	0.04	0.04	9.41	6765	745	45

Hardened tool steel  
56 - 60 HRC

1	2	120	0.015	0.02	0.02	0.88	43405	1300	45
2	2	120	0.020	0.02	0.02	1.67	22875	915	45
3	2	120	0.020	0.03	0.03	2.50	15280	610	45
4	2	120	0.035	0.03	0.03	3.27	11680	820	45
5	2	120	0.040	0.03	0.03	4.04	9455	755	45
6	2	120	0.045	0.03	0.03	4.80	7960	715	45
8	2	120	0.045	0.03	0.03	6.31	6055	545	45
10	2	120	0.045	0.04	0.04	7.91	4830	435	45
12	2	120	0.050	0.04	0.04	9.41	4060	405	45

# Ball nose end mills Sphero-XF

Tolerance r ±0.005



HM  
XA

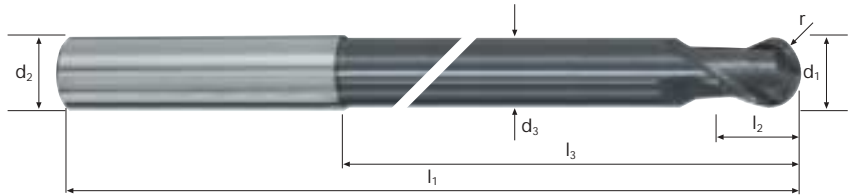
λ 30°  
γ-10°

h5

d1

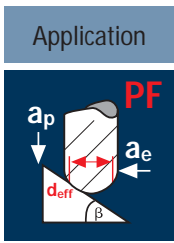
r

F



	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60		Ti Titanium	Copper
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Example: Order-N°.										X-AI	
										X7408	
∅ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	α	Z		
.100	1	6	0.95	69	1.5	9	0.5	7.0°	2	●	
.140	2	6	1.80	69	3.0	18	1.0	4.3°	2	●	
.180	3	6	2.80	75	4.0	27	1.5	2.6°	2	●	
.220	4	6	3.70	80	5.0	36	2.0	1.5°	2	●	
.260	5	6	4.60	87	6.0	45	2.5	0.7°	2	●	
.300	6	6	5.50	100	7.0	63	3.0	0.0°	2	●	
.391	8	8	7.40	120	9.0	83	4.0	0.0°	2	●	
.450	10	10	9.20	135	11.0	94	5.0	0.0°	2	●	
.501	12	12	11.00	160	12.0	114	6.0	0.0°	2	●	



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1	2	180	0.040	0.10	0.10	0.99	57875	4630	45
2	2	180	0.065	0.20	0.20	1.98	28940	3760	45
3	2	180	0.075	0.30	0.30	2.97	19290	2895	45
4	2	180	0.090	0.40	0.40	3.96	14470	2605	45
6	2	180	0.110	0.60	0.60	5.94	9645	2120	45
8	2	180	0.125	0.80	0.80	7.92	7235	1810	45
10	2	180	0.145	1.00	1.00	9.90	5790	1680	45
12	2	180	0.150	1.20	1.20	11.88	4825	1450	45

Hardened tool steel  
48 - 52 HRC

**D**

1	2	150	0.035	0.10	0.10	0.99	48230	3375	45
2	2	150	0.060	0.20	0.20	1.98	24115	2895	45
3	2	150	0.070	0.30	0.30	2.97	16075	2250	45
4	2	150	0.085	0.40	0.40	3.96	12060	2050	45
6	2	150	0.100	0.60	0.60	5.94	8040	1610	45
8	2	150	0.115	0.80	0.80	7.92	6030	1385	45
10	2	150	0.135	1.00	1.00	9.90	4825	1305	45
12	2	150	0.140	1.20	1.20	11.88	4020	1125	45

Hardened tool steel  
52 - 56 HRC

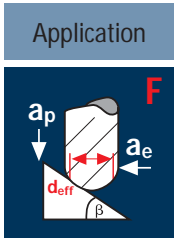
**D**

1	2	110	0.035	0.10	0.10	0.99	35370	2475	45
2	2	110	0.055	0.20	0.20	1.98	17685	1945	45
3	2	110	0.065	0.30	0.30	2.97	11790	1535	45
4	2	110	0.075	0.40	0.40	3.96	8840	1325	45
6	2	110	0.095	0.60	0.60	5.94	5895	1120	45
8	2	110	0.105	0.80	0.80	7.92	4420	930	45
10	2	110	0.125	1.00	1.00	9.90	3535	885	45
12	2	110	0.130	1.20	1.20	11.88	2945	765	45

Hardened tool steel  
56 - 60 HRC

**D**

1	2	80	0.030	0.06	0.06	0.96	26525	1590	45
2	2	80	0.050	0.12	0.12	1.92	13265	1325	45
3	2	80	0.055	0.18	0.18	2.87	8875	975	45
4	2	80	0.070	0.24	0.24	3.83	6650	930	45
6	2	80	0.085	0.36	0.36	5.75	4430	755	45
8	2	80	0.095	0.48	0.48	7.66	3325	630	45
10	2	80	0.110	0.60	0.60	9.58	2660	585	45
12	2	80	0.115	0.72	0.72	11.50	2215	510	45



Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1	2	280	0.025	0.05	0.05	0.94	60000	3000	45
2	2	280	0.030	0.07	0.07	1.84	48440	2905	45
3	2	280	0.035	0.10	0.10	2.74	32530	2275	45
4	2	280	0.055	0.12	0.12	3.62	24620	2710	45
6	2	280	0.065	0.15	0.15	5.36	16630	2160	45
8	2	280	0.075	0.17	0.17	7.05	12640	1895	45
10	2	280	0.080	0.20	0.20	8.77	10165	1625	45
12	2	280	0.085	0.25	0.25	10.56	8440	1435	45

Hardened tool steel  
48 - 52 HRC

**D**

1	2	220	0.025	0.05	0.05	0.94	60000	3000	45
2	2	220	0.030	0.07	0.07	1.84	38060	2285	45
3	2	220	0.035	0.10	0.10	2.74	25560	1790	45
4	2	220	0.050	0.12	0.12	3.62	19345	1935	45
6	2	220	0.060	0.15	0.15	5.36	13065	1570	45
8	2	220	0.070	0.17	0.17	7.05	9935	1390	45
10	2	220	0.075	0.20	0.20	8.77	7985	1200	45
12	2	220	0.080	0.25	0.25	10.56	6630	1060	45

Hardened tool steel  
52 - 56 HRC

**D**

1	2	180	0.025	0.05	0.05	0.94	60000	3000	45
2	2	180	0.025	0.07	0.07	1.84	31140	1555	45
3	2	180	0.030	0.10	0.10	2.74	20910	1255	45
4	2	180	0.050	0.12	0.12	3.62	15830	1585	45
6	2	180	0.060	0.15	0.15	5.36	10690	1285	45
8	2	180	0.070	0.17	0.17	7.05	8125	1140	45
10	2	180	0.070	0.20	0.20	8.77	6535	915	45
12	2	180	0.075	0.25	0.25	10.56	5425	815	45

Hardened tool steel  
56 - 60 HRC

**D**

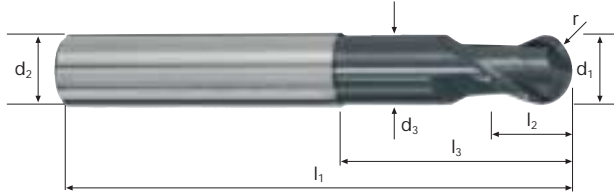
1	2	120	0.020	0.05	0.05	0.94	40635	1625	45
2	2	120	0.025	0.07	0.07	1.84	20760	1040	45
3	2	120	0.030	0.10	0.10	2.74	13940	835	45
4	2	120	0.045	0.12	0.12	3.62	10550	950	45
6	2	120	0.055	0.15	0.15	5.36	7125	785	45
8	2	120	0.065	0.17	0.17	7.05	5420	705	45
10	2	120	0.070	0.20	0.20	8.77	4355	610	45
12	2	120	0.070	0.25	0.25	10.56	3615	505	45

# Ball nose end mills HX-S

Tolerance r js8 (±)



HM XA	$\lambda$ 30° $\gamma$ -10°

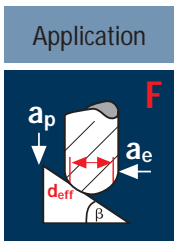


		Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60			GG(G)
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Example: Order-N°.										DURO-S	
		Coating <b>D</b>	Article-N°. <b>5100</b>	α-Code <b>.100</b>						<b>D5100</b>	
Ø Code	d1 ±	d2 h6	d3	l1	l2	l3	r js8	α	Z		
.100	1.0	6	0.95	57	1.5	3.0	0.50	10.0°	2	●	
.120	1.5	6	1.40	57	2.0	4.5	0.75	9.0°	2	●	
.140	2.0	6	1.80	57	3.0	6.0	1.00	8.0°	2	●	
.160	2.5	6	2.30	57	3.5	7.5	1.25	7.0°	2	●	
.180	3.0	6	2.80	57	4.0	9.0	1.50	6.0°	2	●	
.220	4.0	6	3.70	57	5.0	12.0	2.00	4.0°	2	●	
.260	5.0	6	4.60	57	6.0	15.0	2.50	2.0°	2	●	
.300	6.0	6	5.50	57	7.0	20.0	3.00	0.0°	2	●	
.391	8.0	8	7.40	63	9.0	26.0	4.00	0.0°	2	●	
.450	10.0	10	9.20	72	11.0	31.0	5.00	0.0°	2	●	
.501	12.0	12	11.00	83	12.0	37.0	6.00	0.0°	2	●	

CNC Radius R					CNC Radius R				
Radius js8					Radius js8				
d1	r	Minimum	Maximum	R	d1	r	Minimum	Maximum	R
1.0	0.50	0.493	0.507	0.500	6.0	3.00	2.993	3.007	3.000
1.5	0.75	0.743	0.757	0.750	8.0	4.00	3.991	4.009	4.000
2.0	1.00	0.993	1.007	1.000	10.0	5.00	4.991	5.009	5.000
2.5	1.25	1.243	1.257	1.250	12.0	6.00	5.991	6.009	6.000
3.0	1.50	1.493	1.507	1.500					
4.0	2.00	1.993	2.007	2.000					
5.0	2.50	2.493	2.507	2.500					



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
6	4	250	0.070	0.15	0.15	5.36	14845	4155	45
8	4	250	0.080	0.17	0.17	7.05	11290	3615	45
10	4	250	0.085	0.20	0.20	8.77	9075	3085	45
12	4	250	0.090	0.25	0.25	10.56	7535	2715	45

Material

Hardened tool steel  
48 - 52 HRC

6	4	200	0.065	0.15	0.15	5.36	11880	3090	45
8	4	200	0.075	0.17	0.17	7.05	9030	2710	45
10	4	200	0.080	0.20	0.20	8.77	7260	2325	45
12	4	200	0.085	0.25	0.25	10.56	6030	2050	45

Material

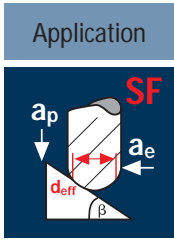
Hardened tool steel  
52 - 56 HRC

6	4	160	0.065	0.15	0.15	5.36	9500	2470	45
8	4	160	0.070	0.17	0.17	7.05	7225	2025	45
10	4	160	0.075	0.20	0.20	8.77	5805	1740	45
12	4	160	0.080	0.25	0.25	10.56	4825	1545	45

Material

Hardened tool steel  
56 - 60 HRC

6	4	100	0.060	0.15	0.15	5.36	5940	1425	45
8	4	100	0.070	0.17	0.17	7.05	4515	1265	45
10	4	100	0.070	0.20	0.20	8.77	3630	1015	45
12	4	100	0.075	0.25	0.25	10.56	3015	905	45



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
6	4	350	0.050	0.03	0.03	4.80	23210	4640	45
8	4	350	0.055	0.03	0.03	6.31	17655	3885	45
10	4	350	0.055	0.04	0.04	7.91	14085	3100	45
12	4	350	0.060	0.04	0.04	9.41	11840	2840	45

Material

Hardened tool steel  
48 - 52 HRC

6	4	300	0.050	0.03	0.03	4.80	19895	3980	45
8	4	300	0.050	0.03	0.03	6.31	15135	3025	45
10	4	300	0.050	0.04	0.04	7.91	12075	2415	45
12	4	300	0.055	0.04	0.04	9.41	10150	2235	45

Material

Hardened tool steel  
52 - 56 HRC

6	4	250	0.045	0.03	0.03	4.80	16580	2985	45
8	4	250	0.050	0.03	0.03	6.31	12610	2520	45
10	4	250	0.050	0.04	0.04	7.91	10060	2010	45
12	4	250	0.055	0.04	0.04	9.41	8455	1860	45

Material

Hardened tool steel  
56 - 60 HRC

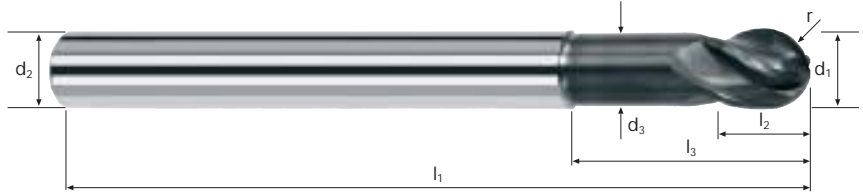
6	4	150	0.045	0.03	0.03	4.80	9945	1790	45
8	4	150	0.045	0.03	0.03	6.31	7565	1360	45
10	4	150	0.045	0.04	0.04	7.91	6035	1085	45
12	4	150	0.050	0.04	0.04	9.41	5075	1015	45

# Ball nose end mills HX-S4

Tolerance r js8 (±)



HM XA	$\lambda$ 30° $\gamma$ -10°



		Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60		GG(G)
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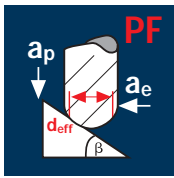


Example: Order-N°.									DURO-S	
Coating Article-N° α-Code										
D 5140 .300										
DURO-S										
D5140										
Ø Code	d1 ±	d2 h6	d3	l1	l2	l3	r js8	Z		
.300	6	6	5.5	80	7	25	3.0	4	●	
.391	8	8	7.4	90	9	31	4.0	4	●	
.450	10	10	9.2	100	11	36	5.0	4	●	
.501	12	12	11.0	120	12	42	6.0	4	●	

CNC Radius R						
d1	r	Tolerance js8		Radius		R
		Minimum	Maximum	Minimum	Maximum	
6	3.0	-0.007	+0.007	2.993	3.007	3.000
8	4.0	-0.009	+0.009	3.991	4.009	4.000
10	5.0			4.991	5.009	5.000
12	6.0			5.991	6.009	6.000

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

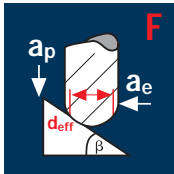
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	180	0.040	0.10	0.10	0.99	57875	4630	45
2	2	180	0.065	0.20	0.20	1.98	28940	3760	45
3	2	180	0.075	0.30	0.30	2.97	19290	2895	45
4	2	180	0.090	0.40	0.40	3.96	14470	2605	45
6	2	180	0.110	0.60	0.60	5.94	9645	2120	45
8	2	180	0.125	0.80	0.80	7.92	7235	1810	45
10	2	180	0.145	1.00	1.00	9.90	5790	1680	45
12	2	180	0.150	1.20	1.20	11.88	4825	1450	45
16	2	180	0.180	1.60	1.60	15.84	3615	1300	45

1	2	160	0.035	0.10	0.10	0.99	51445	3600	45
2	2	160	0.060	0.20	0.20	1.98	25725	3085	45
3	2	160	0.070	0.30	0.30	2.97	17150	2400	45
4	2	160	0.085	0.40	0.40	3.96	12860	2185	45
6	2	160	0.100	0.60	0.60	5.94	8575	1715	45
8	2	160	0.115	0.80	0.80	7.92	6430	1480	45
10	2	160	0.135	1.00	1.00	9.90	5145	1390	45
12	2	160	0.140	1.20	1.20	11.88	4285	1200	45
16	2	160	0.165	1.60	1.60	15.84	3215	1060	45

1	2	140	0.035	0.10	0.10	0.99	45015	3150	45
2	2	140	0.055	0.20	0.20	1.98	22505	2475	45
3	2	140	0.065	0.30	0.30	2.97	15005	1950	45
4	2	140	0.075	0.40	0.40	3.96	11255	1690	45
6	2	140	0.095	0.60	0.60	5.94	7500	1425	45
8	2	140	0.105	0.80	0.80	7.92	5625	1180	45
10	2	140	0.125	1.00	1.00	9.90	4500	1125	45
12	2	140	0.130	1.20	1.20	11.88	3750	975	45
16	2	140	0.155	1.60	1.60	15.84	2815	875	45

1	2	100	0.030	0.10	0.10	0.99	32155	1930	45
2	2	100	0.050	0.20	0.20	1.98	16075	1610	45
3	2	100	0.060	0.30	0.30	2.97	10720	1285	45
4	2	100	0.070	0.40	0.40	3.96	8040	1125	45
6	2	100	0.090	0.60	0.60	5.94	5360	965	45
8	2	100	0.100	0.80	0.80	7.92	4020	805	45
10	2	100	0.115	1.00	1.00	9.90	3215	740	45
12	2	100	0.120	1.20	1.20	11.88	2680	645	45
16	2	100	0.145	1.60	1.60	15.84	2010	585	45

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	280	0.025	0.05	0.05	0.94	60000	3000	45
2	2	280	0.030	0.07	0.07	1.84	48440	2905	45
3	2	280	0.035	0.10	0.10	2.74	32530	2275	45
4	2	280	0.055	0.12	0.12	3.62	24620	2710	45
6	2	280	0.065	0.15	0.15	5.36	16630	2160	45
8	2	280	0.075	0.17	0.17	7.05	12640	1895	45
10	2	280	0.080	0.20	0.20	8.77	10165	1625	45
12	2	280	0.085	0.25	0.25	10.56	8440	1435	45
16	2	280	0.100	0.28	0.28	13.88	6420	1285	45

1	2	250	0.025	0.05	0.05	0.94	60000	3000	45
2	2	250	0.030	0.07	0.07	1.84	43250	2595	45
3	2	250	0.035	0.10	0.10	2.74	29045	2035	45
4	2	250	0.050	0.12	0.12	3.62	21985	2200	45
6	2	250	0.060	0.15	0.15	5.36	14845	1780	45
8	2	250	0.070	0.17	0.17	7.05	11290	1580	45
10	2	250	0.075	0.20	0.20	8.77	9075	1360	45
12	2	250	0.080	0.25	0.25	10.56	7535	1205	45
16	2	250	0.095	0.28	0.28	13.88	5735	1090	45

1	2	200	0.025	0.05	0.05	0.94	60000	3000	45
2	2	200	0.025	0.07	0.07	1.84	34600	1730	45
3	2	200	0.030	0.10	0.10	2.74	23235	1395	45
4	2	200	0.050	0.12	0.12	3.62	17585	1760	45
6	2	200	0.060	0.15	0.15	5.36	11880	1425	45
8	2	200	0.070	0.17	0.17	7.05	9030	1265	45
10	2	200	0.070	0.20	0.20	8.77	7260	1015	45
12	2	200	0.075	0.25	0.25	10.56	6030	905	45
16	2	200	0.090	0.28	0.28	13.88	4585	825	45

1	2	150	0.020	0.05	0.05	0.94	50795	2030	45
2	2	150	0.025	0.07	0.07	1.84	25950	1300	45
3	2	150	0.030	0.10	0.10	2.74	17425	1045	45
4	2	150	0.045	0.12	0.12	3.62	13190	1185	45
6	2	150	0.055	0.15	0.15	5.36	8910	980	45
8	2	150	0.065	0.17	0.17	7.05	6775	880	45
10	2	150	0.070	0.20	0.20	8.77	5445	760	45
12	2	150	0.070	0.25	0.25	10.56	4520	635	45
16	2	150	0.085	0.28	0.28	13.88	3440	585	45

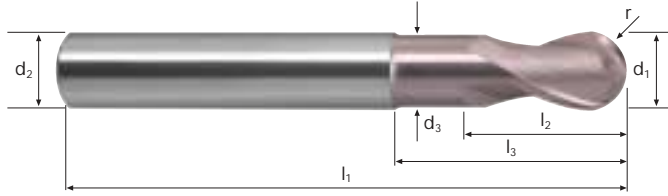


# Ball nose end mills Sphericut

Tolerance r f8 (-/-)



<b>HM Plus</b>	$\lambda$ 30° $\gamma$ -10°

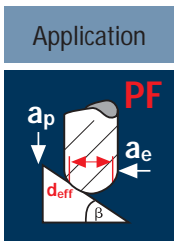


		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60					<b>GG(G)</b>
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Example: Order-N°.										UNICUT-4X	POLYCHROM
Coating: <b>U</b> Article-N°: <b>5286</b> $\alpha$ -Code: <b>.100</b>										<b>U5286</b>	<b>P5286</b>
$\emptyset$ Code	d1 -/-	d2 h6	d3	l1	l2	l3	r f8	$\alpha$	Z		
.100	1.0	3	-	40	1.0	-	0.50	9.5°	2	●	●
.120	1.5	3	-	40	2.0	-	0.75	8.0°	2	●	●
.138	2.0	3	-	40	2.5	-	1.00	6.0°	2	●	●
.140	2.0	6	1.8	57	3.0	6	1.00	8.0°	2	●	●
.178	3.0	3	-	40	4.0	-	1.50	0.0°	2	●	●
.180	3.0	6	2.8	57	4.0	9	1.50	6.0°	2	●	●
.220	4.0	6	3.7	57	5.0	12	2.00	4.0°	2	●	●
.260	5.0	6	4.6	57	6.0	15	2.50	2.0°	2	●	●
.300	6.0	6	5.5	57	7.0	20	3.00	0.0°	2	●	●
.391	8.0	8	7.4	63	9.0	26	4.00	0.0°	2	●	●
.450	10.0	10	9.2	72	11.0	31	5.00	0.0°	2	●	●
.501	12.0	12	11.0	83	12.0	37	6.00	0.0°	2	●	●
.610	16.0	16	15.0	92	16.0	43	8.00	0.0°	2	●	●

CNC Radius R					CNC Radius R				
Radius f8					Radius f8				
d1	r	Minimum	Maximum	R	d1	r	Minimum	Maximum	R
1.0	0.50	0.480	0.494	0.487	6.0	3.00	2.980	2.994	2.987
1.5	0.75	0.730	0.744	0.737	8.0	4.00	3.972	3.990	3.981
2.0	1.00	0.980	0.994	0.987	10.0	5.00	4.972	4.990	4.981
3.0	1.50	1.480	1.494	1.487	12.0	6.00	5.972	5.990	5.981
4.0	2.00	1.980	1.994	1.987	16.0	8.00	7.965	7.987	7.976
5.0	2.50	2.480	2.494	2.487					



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
2	2	650	0.065	0.30	0.30	2.00	60000	7800	45
3	2	650	0.075	0.45	0.45	3.00	60000	9000	45
4	2	650	0.090	0.60	0.60	4.00	51725	9310	45
5	2	650	0.090	0.75	0.75	5.00	41380	7450	45
6	2	650	0.090	0.90	0.90	6.00	34485	6205	45
8	2	650	0.115	1.20	1.20	8.00	25865	5950	45
10	2	650	0.125	1.50	1.50	10.00	20690	5175	45
12	2	650	0.135	1.80	1.80	12.00	17240	4655	45
16	2	650	0.160	2.40	2.40	16.00	12930	4140	45

Unalloyed copper

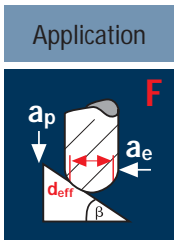
2	2	500	0.060	0.30	0.30	2.00	60000	7200	45
3	2	500	0.070	0.45	0.45	3.00	53055	7430	45
4	2	500	0.080	0.60	0.60	4.00	39790	6365	45
5	2	500	0.080	0.75	0.75	5.00	31830	5095	45
6	2	500	0.080	0.90	0.90	6.00	26525	4245	45
8	2	500	0.105	1.20	1.20	8.00	19895	4180	45
10	2	500	0.115	1.50	1.50	10.00	15915	3660	45
12	2	500	0.120	1.80	1.80	12.00	13265	3185	45
16	2	500	0.145	2.40	2.40	16.00	9945	2885	45

Thermoplastics

2	2	1000	0.065	0.30	0.30	2.00	60000	7800	45
3	2	1000	0.075	0.45	0.45	3.00	60000	9000	45
4	2	1000	0.090	0.60	0.60	4.00	60000	10800	45
5	2	1000	0.090	0.75	0.75	5.00	60000	10800	45
6	2	1000	0.090	0.90	0.90	6.00	53055	9550	45
8	2	1000	0.115	1.20	1.20	8.00	39790	9150	45
10	2	1000	0.125	1.50	1.50	10.00	31830	7960	45
12	2	1000	0.135	1.80	1.80	12.00	26525	7160	45
16	2	1000	0.160	2.40	2.40	16.00	19895	6365	45

Cast aluminium Si 6%-15%

2	2	450	0.045	0.30	0.30	2.00	60000	5400	45
3	2	450	0.055	0.45	0.45	3.00	47750	5255	45
4	2	450	0.065	0.60	0.60	4.00	35810	4655	45
5	2	450	0.065	0.75	0.75	5.00	28650	3725	45
6	2	450	0.065	0.90	0.90	6.00	23875	3105	45
8	2	450	0.080	1.20	1.20	8.00	17905	2865	45
10	2	450	0.090	1.50	1.50	10.00	14325	2580	45
12	2	450	0.095	1.80	1.80	12.00	11935	2270	45
16	2	450	0.110	2.40	2.40	16.00	8955	1970	45



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
2	2	900	0.035	0.12	0.12	1.92	60000	4200	45
3	2	900	0.040	0.15	0.15	2.83	60000	4800	45
4	2	900	0.055	0.17	0.17	3.73	60000	6600	45
5	2	900	0.055	0.20	0.20	4.64	60000	6600	45
6	2	900	0.055	0.22	0.22	5.53	51805	5700	45
8	2	900	0.065	0.24	0.24	7.25	39515	5135	45
10	2	900	0.070	0.27	0.27	8.98	31905	4465	45
12	2	900	0.075	0.30	0.30	10.71	26750	4015	45
16	2	900	0.090	0.34	0.34	14.10	20320	3660	45

Unalloyed copper

2	2	650	0.030	0.12	0.12	1.92	60000	3600	45
3	2	650	0.035	0.15	0.15	2.83	60000	4200	45
4	2	650	0.050	0.17	0.17	3.73	55470	5545	45
5	2	650	0.050	0.20	0.20	4.64	44590	4460	45
6	2	650	0.050	0.22	0.22	5.53	37415	3740	45
8	2	650	0.060	0.24	0.24	7.25	28540	3425	45
10	2	650	0.065	0.27	0.27	8.98	23040	2995	45
12	2	650	0.070	0.30	0.30	10.71	19320	2705	45
16	2	650	0.080	0.34	0.34	14.10	14675	2350	45

Thermoplastics

2	2	1200	0.035	0.12	0.12	1.92	60000	4200	45
3	2	1200	0.040	0.15	0.15	2.83	60000	4800	45
4	2	1200	0.055	0.17	0.17	3.73	60000	6600	45
5	2	1200	0.055	0.20	0.20	4.64	60000	6600	45
6	2	1200	0.055	0.22	0.22	5.53	60000	6600	45
8	2	1200	0.065	0.24	0.24	7.25	52685	6850	45
10	2	1200	0.070	0.27	0.27	8.98	42535	5955	45
12	2	1200	0.075	0.30	0.30	10.71	35665	5350	45
16	2	1200	0.090	0.34	0.34	14.10	27090	4875	45

Cast aluminium Si 6%-15%

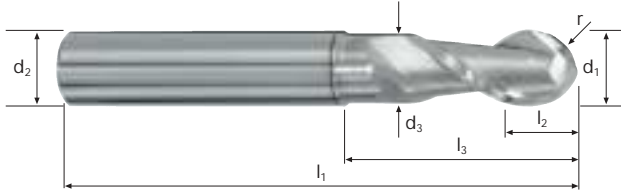
2	2	550	0.025	0.12	0.12	1.92	60000	3000	45
3	2	550	0.030	0.15	0.15	2.83	60000	3600	45
4	2	550	0.040	0.17	0.17	3.73	46935	3755	45
5	2	550	0.040	0.20	0.20	4.64	37730	3020	45
6	2	550	0.040	0.22	0.22	5.53	31660	2535	45
8	2	550	0.045	0.24	0.24	7.25	24150	2175	45
10	2	550	0.050	0.27	0.27	8.98	19495	1950	45
12	2	550	0.055	0.30	0.30	10.71	16345	1800	45
16	2	550	0.065	0.34	0.34	14.10	12415	1615	45

# Ball nose end mills Sphericut-Alu

Tolerance r f8 (-/-)



<b>HM</b>	$\lambda$ 40°
<b>MG10</b>	$\gamma$ 20°

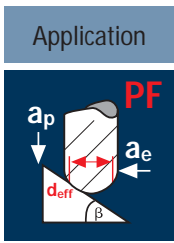


<b>Rm</b> < 850		<b>Al</b> Aluminium > 99%	<b>Al</b> Aluminium Alloy	<b>Al</b> Aluminium Cast		<b>Cu</b> Copper	<b>Plastic</b> Thermoplast	
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Example: Order-N°.										CELERO	
Coating Article-N° α-Code										5290	C5290
C 5290 .140											
Ø Code	d1 -/-	d2 h6	d3	l1	l2	l3	r f8	α	Z		
.140	2	6	1.8	57	4	6	1.0	8.0°	2	●	●
.180	3	6	2.8	57	6	9	1.5	6.0°	2	●	●
.220	4	6	3.7	57	8	12	2.0	4.0°	2	●	●
.260	5	6	4.6	57	10	15	2.5	2.0°	2	●	●
.300	6	6	5.5	57	12	20	3.0	0.0°	2	●	●
.391	8	8	7.4	63	16	26	4.0	0.0°	2	●	●
.450	10	10	9.2	72	20	31	5.0	0.0°	2	●	●
.501	12	12	11.0	83	24	37	6.0	0.0°	2	●	●
.610	16	16	15.0	92	32	43	8.0	0.0°	2	●	●
.682	20	20	19.0	104	40	53	10.0	0.0°	2	●	●

CNC Radius R						
d1	r	Tolerance f8		Radius		R
		Minimum	Maximum	Minimum	Maximum	
2	1.0	-0.006	-0.020	0.980	0.994	0.987
3	1.5			1.480	1.494	1.487
4	2.0			1.980	1.994	1.987
5	2.5			2.480	2.494	2.487
6	3.0			2.980	2.994	2.987
8	4.0	-0.010	-0.028	3.972	3.990	3.981
10	5.0			4.972	4.990	4.981
12	6.0			5.972	5.990	5.981
16	8.0	-0.013	-0.035	7.965	7.987	7.976
20	10.0			9.965	9.987	9.976



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
4	2	220	0.090	0.40	0.40	3.96	17685	3185	45
5	2	220	0.100	0.50	0.50	4.95	14150	2830	45
6	2	220	0.110	0.60	0.60	5.94	11790	2595	45
8	2	220	0.125	0.80	0.80	7.92	8840	2210	45
10	2	220	0.145	1.00	1.00	9.90	7075	2050	45
12	2	220	0.150	1.20	1.20	11.88	5895	1770	45
16	2	220	0.180	1.60	1.60	15.84	4420	1590	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

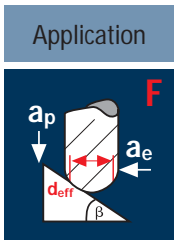
4	2	180	0.085	0.40	0.40	3.96	14470	2460	45
5	2	180	0.090	0.50	0.50	4.95	11575	2085	45
6	2	180	0.100	0.60	0.60	5.94	9645	1930	45
8	2	180	0.115	0.80	0.80	7.92	7235	1665	45
10	2	180	0.135	1.00	1.00	9.90	5790	1565	45
12	2	180	0.140	1.20	1.20	11.88	4825	1350	45
16	2	180	0.165	1.60	1.60	15.84	3615	1195	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

4	2	160	0.075	0.40	0.40	3.96	12860	1930	45
5	2	160	0.085	0.50	0.50	4.95	10290	1750	45
6	2	160	0.095	0.60	0.60	5.94	8575	1630	45
8	2	160	0.105	0.80	0.80	7.92	6430	1350	45
10	2	160	0.125	1.00	1.00	9.90	5145	1285	45
12	2	160	0.130	1.20	1.20	11.88	4285	1115	45
16	2	160	0.155	1.60	1.60	15.84	3215	995	45

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

4	2	100	0.070	0.32	0.32	3.91	8140	1140	45
5	2	100	0.080	0.40	0.40	4.89	6510	1040	45
6	2	100	0.090	0.48	0.48	5.87	5425	975	45
8	2	100	0.100	0.64	0.64	7.82	4070	815	45
10	2	100	0.115	0.80	0.80	9.78	3255	750	45
12	2	100	0.120	0.96	0.96	11.73	2715	650	45
16	2	100	0.145	1.28	1.28	15.64	2035	590	45



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
4	2	320	0.055	0.12	0.12	3.62	28140	3095	45
5	2	320	0.060	0.13	0.13	4.48	22735	2730	45
6	2	320	0.065	0.15	0.15	5.36	19005	2470	45
8	2	320	0.075	0.17	0.17	7.05	14450	2170	45
10	2	320	0.080	0.20	0.20	8.77	11615	1860	45
12	2	320	0.085	0.25	0.25	10.56	9645	1640	45
16	2	320	0.100	0.28	0.28	13.88	7340	1470	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

4	2	280	0.050	0.12	0.12	3.62	24620	2460	45
5	2	280	0.055	0.13	0.13	4.48	19895	2190	45
6	2	280	0.060	0.15	0.15	5.36	16630	1995	45
8	2	280	0.070	0.17	0.17	7.05	12640	1770	45
10	2	280	0.075	0.20	0.20	8.77	10165	1525	45
12	2	280	0.080	0.25	0.25	10.56	8440	1350	45
16	2	280	0.095	0.28	0.28	13.88	6420	1220	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

4	2	250	0.050	0.12	0.12	3.62	21985	2200	45
5	2	250	0.055	0.13	0.13	4.48	17765	1955	45
6	2	250	0.060	0.15	0.15	5.36	14845	1780	45
8	2	250	0.070	0.17	0.17	7.05	11290	1580	45
10	2	250	0.070	0.20	0.20	8.77	9075	1270	45
12	2	250	0.075	0.25	0.25	10.56	7535	1130	45
16	2	250	0.090	0.28	0.28	13.88	5735	1030	45

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

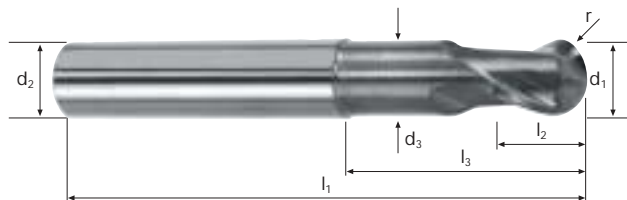
4	2	120	0.045	0.10	0.10	3.57	10700	965	45
5	2	120	0.050	0.11	0.11	4.42	8640	865	45
6	2	120	0.055	0.13	0.13	5.29	7220	795	45
8	2	120	0.065	0.15	0.15	6.98	5475	710	45
10	2	120	0.070	0.18	0.18	8.70	4390	615	45
12	2	120	0.070	0.22	0.22	10.45	3655	510	45
16	2	120	0.085	0.25	0.25	13.77	2775	470	45

# Ball nose end mills

Tolerance r f8 (-/-)

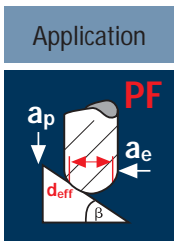


HM  
MG10    λ 30°  
              γ 5°



Rm < 850    Rm 850-1100    Rm 1100-1300    Rm 1300-1500    Inox Stainless    GG(G)

Example: Order-N°.										POLYCHROM		
		Coating	Article-N°.		α-Code							
		P	5220		.220						P5220	
∅ Code	d1 -/-	d2 h6	d3	l1	l2	l3	r f8	α	z			
.220	4	6	3.7	57	5	12	2.0	4.0°	2	●		
.260	5	6	4.6	57	6	15	2.5	2.0°	2	●		
.300	6	6	5.5	57	7	20	3.0	0.0°	2	●		
.391	8	8	7.4	63	9	26	4.0	0.0°	2	●		
.450	10	10	9.2	72	11	31	5.0	0.0°	2	●		
.501	12	12	11.0	83	12	37	6.0	0.0°	2	●		
.610	16	16	15.0	92	16	43	8.0	0.0°	2	●		
<b>CNC Radius R</b>												
		Tolerance f8		Radius		R						
d1	r			Minimum	Maximum							
4	2.0	-0.006	-0.020	1.980	1.994	1.987						
5	2.5			2.480	2.494	2.487						
6	3.0			2.980	2.994	2.987						
8	4.0	-0.010	-0.028	3.972	3.990	3.981						
10	5.0			4.972	4.990	4.981						
12	6.0			5.972	5.990	5.981						
16	8.0	-0.013	-0.035	7.965	7.987	7.976						



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	200	0.070	0.24	0.24	2.93	21730	3040	45
4	2	200	0.080	0.32	0.32	3.91	16280	2605	45
5	2	200	0.090	0.40	0.40	4.89	13020	2345	45
6	2	200	0.100	0.48	0.48	5.87	10845	2170	45
8	2	200	0.110	0.64	0.64	7.82	8140	1790	45
10	2	200	0.130	0.80	0.80	9.78	6510	1695	45
12	2	200	0.135	0.96	0.96	11.73	5425	1465	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

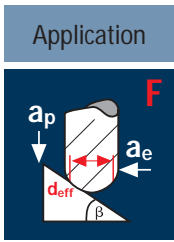
3	2	160	0.065	0.24	0.24	2.93	17385	2260	45
4	2	160	0.075	0.32	0.32	3.91	13025	1955	45
5	2	160	0.085	0.40	0.40	4.89	10415	1770	45
6	2	160	0.090	0.48	0.48	5.87	8675	1560	45
8	2	160	0.100	0.64	0.64	7.82	6515	1305	45
10	2	160	0.120	0.80	0.80	9.78	5210	1250	45
12	2	160	0.125	0.96	0.96	11.73	4340	1085	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

3	2	140	0.060	0.24	0.24	2.93	15210	1825	45
4	2	140	0.070	0.32	0.32	3.91	11400	1595	45
5	2	140	0.075	0.40	0.40	4.89	9115	1365	45
6	2	140	0.085	0.48	0.48	5.87	7590	1290	45
8	2	140	0.095	0.64	0.64	7.82	5700	1085	45
10	2	140	0.110	0.80	0.80	9.78	4555	1000	45
12	2	140	0.115	0.96	0.96	11.73	3800	875	45

Steel  
1500 - 1800 N/mm<sup>2</sup>

3	2	80	0.055	0.19	0.19	2.89	8810	970	45
4	2	80	0.065	0.26	0.26	3.86	6595	855	45
5	2	80	0.070	0.32	0.32	4.81	5295	740	45
6	2	80	0.080	0.38	0.38	5.77	4415	705	45
8	2	80	0.090	0.51	0.51	7.70	3305	595	45
10	2	80	0.105	0.64	0.64	9.63	2645	555	45
12	2	80	0.110	0.77	0.77	11.55	2205	485	45



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	300	0.025	0.10	0.10	2.74	34850	1745	45
4	2	300	0.050	0.12	0.12	3.62	26380	2640	45
5	2	300	0.055	0.13	0.13	4.48	21315	2345	45
6	2	300	0.060	0.15	0.15	5.36	17815	2140	45
8	2	300	0.065	0.17	0.17	7.05	13545	1760	45
10	2	300	0.070	0.20	0.20	8.77	10890	1525	45
12	2	300	0.075	0.25	0.25	10.56	9045	1355	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

3	2	260	0.025	0.10	0.10	2.74	30205	1510	45
4	2	260	0.050	0.12	0.12	3.62	22865	2285	45
5	2	260	0.050	0.13	0.13	4.48	18475	1850	45
6	2	260	0.055	0.15	0.15	5.36	15440	1700	45
8	2	260	0.060	0.17	0.17	7.05	11740	1410	45
10	2	260	0.065	0.20	0.20	8.77	9435	1225	45
12	2	260	0.070	0.25	0.25	10.56	7835	1095	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

3	2	200	0.025	0.10	0.10	2.74	23235	1160	45
4	2	200	0.045	0.12	0.12	3.62	17585	1585	45
5	2	200	0.050	0.13	0.13	4.48	14210	1420	45
6	2	200	0.055	0.15	0.15	5.36	11880	1305	45
8	2	200	0.060	0.17	0.17	7.05	9030	1085	45
10	2	200	0.065	0.20	0.20	8.77	7260	945	45
12	2	200	0.070	0.25	0.25	10.56	6030	845	45

Steel  
1500 - 1800 N/mm<sup>2</sup>

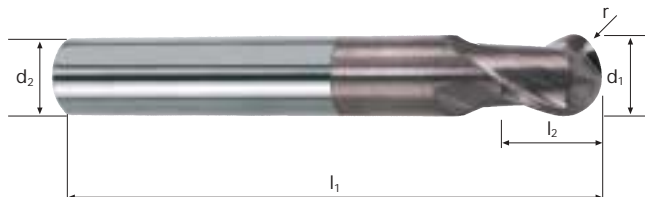
3	2	100	0.020	0.08	0.08	2.69	11835	475	45
4	2	100	0.045	0.10	0.10	3.57	8915	800	45
5	2	100	0.045	0.11	0.11	4.42	7200	650	45
6	2	100	0.050	0.13	0.13	5.29	6015	600	45
8	2	100	0.055	0.15	0.15	6.98	4560	500	45
10	2	100	0.060	0.18	0.18	8.70	3660	440	45
12	2	100	0.065	0.22	0.22	10.45	3045	395	45

# Ball nose end mills

Tolerance r f8 (-/-)



HM λ 30°  
γ-10°



Rm < 850 Rm 850-1100 Rm 1100-1300 Rm 1300-1500 GG(G)

Example:  
Order-N°.

Coating Article-N° α-Code  
**U 45298 .180**

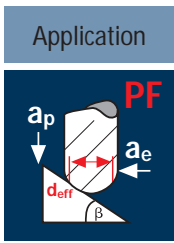
UNICUT-4X

**U45298**

Ø Code	d1 e8	d2 h6	l1	l2	r f8	α	Z
.180	3	6	57	4	1.5	8.0°	2
.220	4	6	57	5	2.0	6.0°	2
.260	5	6	57	6	2.5	4.0°	2
.300	6	6	57	7	3.0	0.0°	2
.391	8	8	63	9	4.0	0.0°	2
.450	10	10	72	11	5.0	0.0°	2
.501	12	12	83	12	6.0	0.0°	2

### CNC Radius R

d1	r	Tolerance f8		Radius		R
				Minimum	Maximum	
3	1.5	-0.006	-0.020	1.480	1.494	1.487
4	2.0			1.980	1.994	1.987
5	2.5			2.480	2.494	2.487
6	3.0			2.980	2.994	2.987
8	4.0	-0.010	-0.028	3.972	3.990	3.981
10	5.0			4.972	4.990	4.981
12	6.0			5.972	5.990	5.981



Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	180	0.035	0.08	0.08	0.98	58465	4095	45
2	2	180	0.060	0.16	0.16	1.96	29235	3510	45
3	2	180	0.070	0.24	0.24	2.93	19555	2740	45
4	2	180	0.080	0.32	0.32	3.91	14655	2345	45
6	2	180	0.100	0.48	0.48	5.87	9760	1950	45
8	2	180	0.110	0.64	0.64	7.82	7325	1610	45
10	2	180	0.130	0.80	0.80	9.78	5860	1525	45
12	2	180	0.135	0.96	0.96	11.73	4885	1320	45
16	2	180	0.160	1.28	1.28	15.64	3665	1175	45

Hardened tool steel  
42 - 48 HRC

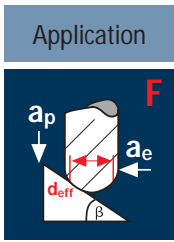
1	2	160	0.030	0.08	0.08	0.98	51970	3120	45
2	2	160	0.055	0.16	0.16	1.96	25985	2860	45
3	2	160	0.065	0.24	0.24	2.93	17385	2260	45
4	2	160	0.075	0.32	0.32	3.91	13025	1955	45
6	2	160	0.090	0.48	0.48	5.87	8675	1560	45
8	2	160	0.100	0.64	0.64	7.82	6515	1305	45
10	2	160	0.120	0.80	0.80	9.78	5210	1250	45
12	2	160	0.125	0.96	0.96	11.73	4340	1085	45
16	2	160	0.145	1.28	1.28	15.64	3255	945	45

Hardened tool steel  
48 - 52 HRC

1	2	140	0.030	0.08	0.08	0.98	45475	2730	45
2	2	140	0.050	0.16	0.16	1.96	22735	2275	45
3	2	140	0.060	0.24	0.24	2.93	15210	1825	45
4	2	140	0.070	0.32	0.32	3.91	11400	1595	45
6	2	140	0.085	0.48	0.48	5.87	7590	1290	45
8	2	140	0.095	0.64	0.64	7.82	5700	1085	45
10	2	140	0.110	0.80	0.80	9.78	4555	1000	45
12	2	140	0.115	0.96	0.96	11.73	3800	875	45
16	2	140	0.135	1.28	1.28	15.64	2850	770	45

Hardened tool steel  
52 - 56 HRC

1	2	100	0.030	0.08	0.08	0.98	32480	1950	45
2	2	100	0.050	0.16	0.16	1.96	16240	1625	45
3	2	100	0.055	0.24	0.24	2.93	10865	1195	45
4	2	100	0.065	0.32	0.32	3.91	8140	1060	45
6	2	100	0.080	0.48	0.48	5.87	5425	870	45
8	2	100	0.090	0.64	0.64	7.82	4070	735	45
10	2	100	0.105	0.80	0.80	9.78	3255	685	45
12	2	100	0.110	0.96	0.96	11.73	2715	595	45
16	2	100	0.130	1.28	1.28	15.64	2035	530	45



Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1	2	280	0.025	0.04	0.04	0.93	60000	3000	45
2	2	280	0.030	0.06	0.06	1.81	49245	2955	45
3	2	280	0.030	0.09	0.09	2.72	32770	1965	45
4	2	280	0.050	0.11	0.11	3.60	24760	2475	45
6	2	280	0.060	0.13	0.13	5.29	16850	2020	45
8	2	280	0.065	0.15	0.15	6.98	12770	1660	45
10	2	280	0.070	0.18	0.18	8.70	10245	1435	45
12	2	280	0.075	0.22	0.22	10.45	8530	1280	45
16	2	280	0.090	0.25	0.25	13.77	6475	1165	45

Hardened tool steel  
42 - 48 HRC

1	2	250	0.025	0.04	0.04	0.93	60000	3000	45
2	2	250	0.030	0.06	0.06	1.81	43965	2640	45
3	2	250	0.030	0.09	0.09	2.72	29255	1755	45
4	2	250	0.050	0.11	0.11	3.60	22105	2210	45
6	2	250	0.055	0.13	0.13	5.29	15045	1655	45
8	2	250	0.060	0.15	0.15	6.98	11400	1370	45
10	2	250	0.065	0.18	0.18	8.70	9145	1190	45
12	2	250	0.070	0.22	0.22	10.45	7615	1065	45
16	2	250	0.085	0.25	0.25	13.77	5780	985	45

Hardened tool steel  
48 - 52 HRC

1	2	200	0.025	0.04	0.04	0.93	60000	3000	45
2	2	200	0.025	0.06	0.06	1.81	35175	1760	45
3	2	200	0.025	0.09	0.09	2.72	23405	1170	45
4	2	200	0.045	0.11	0.11	3.60	17685	1590	45
6	2	200	0.055	0.13	0.13	5.29	12035	1325	45
8	2	200	0.060	0.15	0.15	6.98	9120	1095	45
10	2	200	0.065	0.18	0.18	8.70	7320	950	45
12	2	200	0.070	0.22	0.22	10.45	6090	855	45
16	2	200	0.080	0.25	0.25	13.77	4625	740	45

Hardened tool steel  
52 - 56 HRC

1	2	150	0.020	0.04	0.04	0.93	51340	2055	45
2	2	150	0.025	0.06	0.06	1.81	26380	1320	45
3	2	150	0.025	0.09	0.09	2.72	17555	880	45
4	2	150	0.045	0.11	0.11	3.60	13265	1195	45
6	2	150	0.050	0.13	0.13	5.29	9025	905	45
8	2	150	0.055	0.15	0.15	6.98	6840	750	45
10	2	150	0.060	0.18	0.18	8.70	5490	660	45
12	2	150	0.065	0.22	0.22	10.45	4570	595	45
16	2	150	0.075	0.25	0.25	13.77	3470	520	45

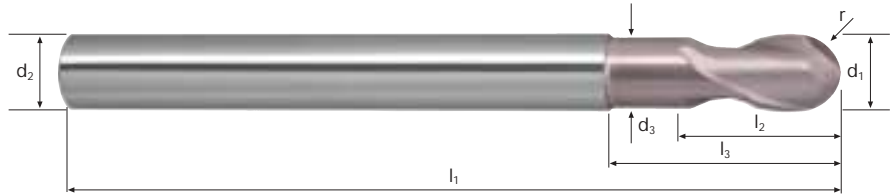


# Ball nose end mills Sphericut

Tolerance r f8 (-/-)



<b>HM Plus</b>	$\lambda$ 30° $\gamma$ -10°

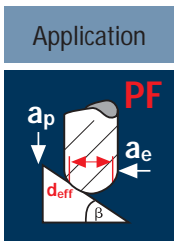


		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60					<b>GG(G)</b>
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Example: Order-N°.										UNICUT-4X	
		Coating <b>U</b>		Article-N°. <b>5288</b>		α-Code <b>.100</b>				<b>U5288</b>	
Ø Code	d1 -/-	d2 h6	d3	l1	l2	l3	r f8	α	Z		
.100	1	3	-	60	1.0	-	0.5	9.5°	2	●	
.138	2	3	-	60	2.5	-	1.0	6.0°	2	●	
.140	2	6	1.8	75	3.0	6	1.0	8.0°	2	●	
.178	3	3	-	60	4.0	-	1.5	0.0°	2	●	
.180	3	6	2.8	75	4.0	9	1.5	6.0°	2	●	
.220	4	6	3.7	75	5.0	12	2.0	4.0°	2	●	
.260	5	6	4.6	80	6.0	15	2.5	2.0°	2	●	
.300	6	6	5.5	80	7.0	20	3.0	0.0°	2	●	
.391	8	8	7.4	90	9.0	26	4.0	0.0°	2	●	
.450	10	10	9.2	100	11.0	31	5.0	0.0°	2	●	
.501	12	12	11.0	120	12.0	37	6.0	0.0°	2	●	
.610	16	16	15.0	140	16.0	43	8.0	0.0°	2	●	

CNC Radius R					CNC Radius R				
Radius f8					Radius f8				
d1	r	Minimum	Maximum	R	d1	r	Minimum	Maximum	R
1	0.5	0.480	0.494	0.487	8	4.0	3.972	3.990	3.981
2	1.0	0.980	0.994	0.987	10	5.0	4.972	4.990	4.981
3	1.5	1.480	1.494	1.487	12	6.0	5.972	5.990	5.981
4	2.0	1.980	1.994	1.987	16	8.0	7.965	7.987	7.976
5	2.5	2.480	2.494	2.487					
6	3.0	2.980	2.994	2.987					



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	500	0.090	0.36	0.36	2.99	53230	9580	45
4	2	500	0.090	0.48	0.48	3.99	39890	7180	45
5	2	500	0.100	0.60	0.60	4.98	31960	6390	45
6	2	500	0.100	0.72	0.72	5.98	26615	5325	45
8	2	500	0.110	0.96	0.96	7.98	19945	4390	45
10	2	500	0.130	1.20	1.20	9.97	15965	4150	45
12	2	500	0.135	1.44	1.44	11.96	13310	3595	45
16	2	500	0.160	1.92	1.92	15.95	9980	3195	45

Unalloyed copper

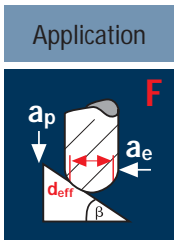
3	2	350	0.080	0.36	0.36	2.99	37260	5960	45
4	2	350	0.080	0.48	0.48	3.99	27925	4470	45
5	2	350	0.090	0.60	0.60	4.98	22370	4025	45
6	2	350	0.090	0.72	0.72	5.98	18630	3355	45
8	2	350	0.100	0.96	0.96	7.98	13960	2790	45
10	2	350	0.115	1.20	1.20	9.97	11175	2570	45
12	2	350	0.120	1.44	1.44	11.96	9315	2235	45
16	2	350	0.145	1.92	1.92	15.95	6985	2025	45

Thermoplastics

3	2	800	0.090	0.36	0.36	2.99	60000	10800	45
4	2	800	0.090	0.48	0.48	3.99	60000	10800	45
5	2	800	0.100	0.60	0.60	4.98	51135	10225	45
6	2	800	0.100	0.72	0.72	5.98	42585	8515	45
8	2	800	0.110	0.96	0.96	7.98	31910	7020	45
10	2	800	0.130	1.20	1.20	9.97	25540	6640	45
12	2	800	0.135	1.44	1.44	11.96	21290	5750	45
16	2	800	0.160	1.92	1.92	15.95	15965	5110	45

Cast aluminium Si 6%-15%

3	2	300	0.065	0.36	0.36	2.99	31940	4150	45
4	2	300	0.065	0.48	0.48	3.99	23935	3110	45
5	2	300	0.070	0.60	0.60	4.98	19175	2685	45
6	2	300	0.070	0.72	0.72	5.98	15970	2235	45
8	2	300	0.075	0.96	0.96	7.98	11965	1795	45
10	2	300	0.090	1.20	1.20	9.97	9580	1725	45
12	2	300	0.095	1.44	1.44	11.96	7985	1515	45
16	2	300	0.110	1.92	1.92	15.95	5985	1315	45



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	700	0.050	0.12	0.12	2.78	60000	6000	45
4	2	700	0.045	0.15	0.15	3.69	60000	5400	45
5	2	700	0.070	0.17	0.17	4.58	48650	6810	45
6	2	700	0.065	0.20	0.20	5.48	40660	5285	45
8	2	700	0.075	0.22	0.22	7.20	30950	4645	45
10	2	700	0.080	0.24	0.24	8.90	25035	4005	45
12	2	700	0.085	0.27	0.27	10.62	20980	3565	45
16	2	700	0.100	0.30	0.30	13.96	15960	3190	45

Unalloyed copper

3	2	500	0.045	0.12	0.12	2.78	57250	5155	45
4	2	500	0.040	0.15	0.15	3.69	43135	3450	45
5	2	500	0.065	0.17	0.17	4.58	34750	4520	45
6	2	500	0.060	0.20	0.20	5.48	29045	3485	45
8	2	500	0.070	0.22	0.22	7.20	22105	3095	45
10	2	500	0.070	0.24	0.24	8.90	17885	2505	45
12	2	500	0.075	0.27	0.27	10.62	14985	2250	45
16	2	500	0.090	0.30	0.30	13.96	11400	2050	45

Thermoplastics

3	2	900	0.050	0.12	0.12	2.78	60000	6000	45
4	2	900	0.045	0.15	0.15	3.69	60000	5400	45
5	2	900	0.070	0.17	0.17	4.58	60000	8400	45
6	2	900	0.065	0.20	0.20	5.48	52280	6795	45
8	2	900	0.075	0.22	0.22	7.20	39790	5970	45
10	2	900	0.080	0.24	0.24	8.90	32190	5150	45
12	2	900	0.085	0.27	0.27	10.62	26975	4585	45
16	2	900	0.100	0.30	0.30	13.96	20520	4105	45

Cast aluminium Si 6%-15%

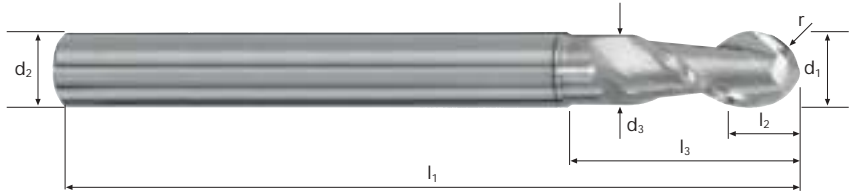
3	2	400	0.035	0.12	0.12	2.78	45800	3205	45
4	2	400	0.030	0.15	0.15	3.69	34505	2070	45
5	2	400	0.050	0.17	0.17	4.58	27800	2780	45
6	2	400	0.045	0.20	0.20	5.48	23235	2090	45
8	2	400	0.055	0.22	0.22	7.20	17685	1945	45
10	2	400	0.055	0.24	0.24	8.90	14305	1575	45
12	2	400	0.060	0.27	0.27	10.62	11990	1440	45
16	2	400	0.070	0.30	0.30	13.96	9120	1275	45

# Ball nose end mills Sphericut-Alu

Tolerance r f8 (-/-)

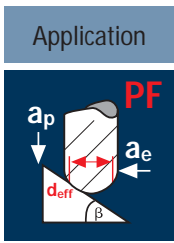


HM  
MG10    λ 40°  
                  γ 20°



Rm < 850    Al Aluminium > 99%    Al Aluminium Alloy    Al Aluminium Cast    Cu Copper    Plastic Thermoplast

Example: Order-N°.										CELERO		
		Coating	Article-N°.	α-Code								
		<b>C</b>	<b>5292</b>	<b>.180</b>								
Ø Code	d1 -/-	d2 h6	d3	l1	l2	l3	r f8	α	Z			
.180	3	6	2.8	75	6	9	1.5	6.0°	2	●		
.220	4	6	3.7	75	8	12	2.0	4.0°	2	●		
.260	5	6	4.6	80	10	15	2.5	2.0°	2	●		
.300	6	6	5.5	80	12	20	3.0	0.0°	2	●		
.391	8	8	7.4	90	16	26	4.0	0.0°	2	●		
.450	10	10	9.2	100	20	31	5.0	0.0°	2	●		
.501	12	12	11.0	120	24	37	6.0	0.0°	2	●		
.610	16	16	15.0	140	32	43	8.0	0.0°	2	●		
<b>CNC Radius R</b>												
		Tolerance f8		Radius		<b>R</b>						
d1	r			Minimum	Maximum							
3	1.5	-0.006	-0.020	1.480	1.494	1.487						
4	2.0			1.980	1.994	1.987						
5	2.5			2.480	2.494	2.487						
6	3.0			2.980	2.994	2.987						
8	4.0	-0.010	-0.028	3.972	3.990	3.981						
10	5.0			4.972	4.990	4.981						
12	6.0			5.972	5.990	5.981						
16	8.0	-0.013	-0.035	7.965	7.987	7.976						



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
4	2	220	0.080	0.32	0.32	3.91	17910	2865	45
5	2	220	0.090	0.40	0.40	4.89	14320	2580	45
6	2	220	0.100	0.48	0.48	5.87	11930	2385	45
8	2	220	0.110	0.64	0.64	7.82	8955	1970	45
10	2	220	0.130	0.80	0.80	9.78	7160	1860	45
12	2	220	0.135	0.96	0.96	11.73	5970	1610	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

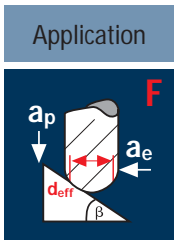
4	2	180	0.075	0.32	0.32	3.91	14655	2200	45
5	2	180	0.085	0.40	0.40	4.89	11715	1990	45
6	2	180	0.090	0.48	0.48	5.87	9760	1755	45
8	2	180	0.100	0.64	0.64	7.82	7325	1465	45
10	2	180	0.120	0.80	0.80	9.78	5860	1405	45
12	2	180	0.125	0.96	0.96	11.73	4885	1220	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

4	2	160	0.070	0.32	0.32	3.91	13025	1825	45
5	2	160	0.075	0.40	0.40	4.89	10415	1560	45
6	2	160	0.085	0.48	0.48	5.87	8675	1475	45
8	2	160	0.095	0.64	0.64	7.82	6515	1240	45
10	2	160	0.110	0.80	0.80	9.78	5210	1145	45
12	2	160	0.115	0.96	0.96	11.73	4340	1000	45

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

4	2	100	0.065	0.26	0.26	3.86	8245	1070	45
5	2	100	0.070	0.32	0.32	4.81	6620	925	45
6	2	100	0.080	0.38	0.38	5.77	5515	880	45
8	2	100	0.090	0.51	0.51	7.70	4135	745	45
10	2	100	0.105	0.64	0.64	9.63	3305	695	45
12	2	100	0.110	0.77	0.77	11.55	2755	605	45



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
4	2	320	0.050	0.10	0.10	3.57	28535	2855	45
5	2	320	0.055	0.11	0.11	4.42	23045	2535	45
6	2	320	0.060	0.13	0.13	5.29	19255	2310	45
8	2	320	0.065	0.15	0.15	6.98	14595	1895	45
10	2	320	0.070	0.18	0.18	8.70	11710	1640	45
12	2	320	0.075	0.22	0.22	10.45	9750	1465	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

4	2	280	0.050	0.10	0.10	3.57	24965	2495	45
5	2	280	0.050	0.11	0.11	4.42	20165	2015	45
6	2	280	0.055	0.13	0.13	5.29	16850	1855	45
8	2	280	0.060	0.15	0.15	6.98	12770	1530	45
10	2	280	0.065	0.18	0.18	8.70	10245	1330	45
12	2	280	0.070	0.22	0.22	10.45	8530	1195	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

4	2	250	0.045	0.10	0.10	3.57	22290	2005	45
5	2	250	0.050	0.11	0.11	4.42	18005	1800	45
6	2	250	0.055	0.13	0.13	5.29	15045	1655	45
8	2	250	0.060	0.15	0.15	6.98	11400	1370	45
10	2	250	0.065	0.18	0.18	8.70	9145	1190	45
12	2	250	0.070	0.22	0.22	10.45	7615	1065	45

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

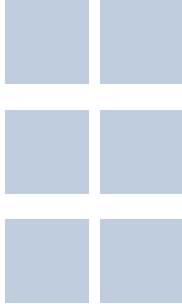
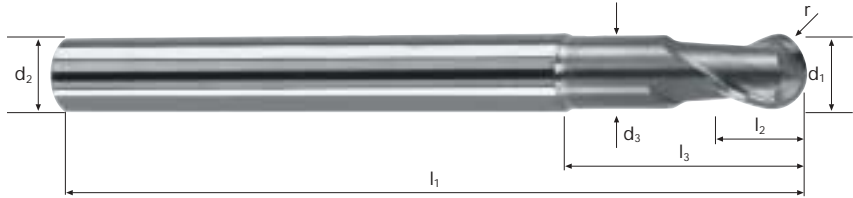
4	2	120	0.045	0.10	0.10	3.57	10700	965	45
5	2	120	0.045	0.11	0.11	4.42	8640	780	45
6	2	120	0.050	0.13	0.13	5.29	7220	720	45
8	2	120	0.055	0.15	0.15	6.98	5475	600	45
10	2	120	0.060	0.18	0.18	8.70	4390	525	45
12	2	120	0.065	0.22	0.22	10.45	3655	475	45

# Ball nose end mills

Tolerance r f8 (-/-)

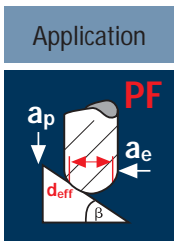


HM  
MG10    λ 30°  
          γ 5°



Rm < 850    Rm 850-1100    Rm 1100-1300    Rm 1300-1500    Inox Stainless    GG(G)

Example: Order-N°.										POLYCHROM	
		Coating	Article-N°.		α-Code						
		P	5222		.220					P5222	
∅ Code	d1 -/-	d2 h6	d3	l1	l2	l3	r f8	α	z		
.220	4	6	3.7	75	5	12	2.0	4.0°	2	●	
.260	5	6	4.6	80	6	15	2.5	2.0°	2	●	
.300	6	6	5.5	80	7	20	3.0	0.0°	2	●	
.391	8	8	7.4	90	9	26	4.0	0.0°	2	●	
.450	10	10	9.2	100	11	31	5.0	0.0°	2	●	
.501	12	12	11.0	120	12	37	6.0	0.0°	2	●	
<b>CNC Radius R</b>											
		Tolerance f8		Radius		R					
d1	r			Minimum	Maximum						
4	2.0	-0.006	-0.020	1.980	1.994	1.987					
5	2.5			2.480	2.494	2.487					
6	3.0			2.980	2.994	2.987					
8	4.0	-0.010	-0.028	3.972	3.990	3.981					
10	5.0			4.972	4.990	4.981					
12	6.0			5.972	5.990	5.981					



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	200	0.070	0.21	0.21	2.91	21880	3065	45
4	2	200	0.080	0.28	0.28	3.88	16410	2625	45
5	2	200	0.090	0.35	0.35	4.84	13155	2370	45
6	2	200	0.100	0.42	0.42	5.81	10960	2190	45
8	2	200	0.110	0.56	0.56	7.75	8215	1805	45
10	2	200	0.130	0.70	0.70	9.69	6570	1710	45
12	2	200	0.135	0.84	0.84	11.63	5475	1480	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

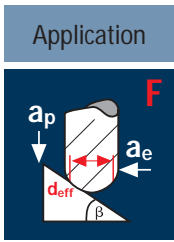
3	2	160	0.065	0.21	0.21	2.91	17500	2275	45
4	2	160	0.075	0.28	0.28	3.88	13125	1970	45
5	2	160	0.085	0.35	0.35	4.84	10525	1790	45
6	2	160	0.090	0.42	0.42	5.81	8765	1580	45
8	2	160	0.100	0.56	0.56	7.75	6570	1315	45
10	2	160	0.120	0.70	0.70	9.69	5255	1260	45
12	2	160	0.125	0.84	0.84	11.63	4380	1095	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

3	2	140	0.060	0.21	0.21	2.91	15315	1840	45
4	2	140	0.070	0.28	0.28	3.88	11485	1610	45
5	2	140	0.075	0.35	0.35	4.84	9210	1380	45
6	2	140	0.085	0.42	0.42	5.81	7670	1305	45
8	2	140	0.095	0.56	0.56	7.75	5750	1095	45
10	2	140	0.110	0.70	0.70	9.69	4600	1010	45
12	2	140	0.115	0.84	0.84	11.63	3830	880	45

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

3	2	80	0.055	0.17	0.17	2.86	8905	980	45
4	2	80	0.065	0.22	0.22	3.81	6685	870	45
5	2	80	0.070	0.28	0.28	4.77	5340	750	45
6	2	80	0.080	0.34	0.34	5.72	4450	710	45
8	2	80	0.090	0.45	0.45	7.63	3340	600	45
10	2	80	0.105	0.56	0.56	9.53	2670	560	45
12	2	80	0.110	0.67	0.67	11.43	2230	490	45



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	280	0.025	0.08	0.08	2.69	33135	1655	45
4	2	280	0.050	0.10	0.10	3.57	24965	2495	45
5	2	280	0.055	0.11	0.11	4.42	20165	2220	45
6	2	280	0.060	0.13	0.13	5.29	16850	2020	45
8	2	280	0.065	0.15	0.15	6.98	12770	1660	45
10	2	280	0.070	0.18	0.18	8.70	10245	1435	45
12	2	280	0.075	0.22	0.22	10.45	8530	1280	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

3	2	240	0.025	0.08	0.08	2.69	28400	1420	45
4	2	240	0.050	0.10	0.10	3.57	21400	2140	45
5	2	240	0.050	0.11	0.11	4.42	17285	1730	45
6	2	240	0.055	0.13	0.13	5.29	14440	1590	45
8	2	240	0.060	0.15	0.15	6.98	10945	1315	45
10	2	240	0.065	0.18	0.18	8.70	8780	1140	45
12	2	240	0.070	0.22	0.22	10.45	7310	1025	45

Steel  
1300 - 1500 N/mm<sup>2</sup>

3	2	200	0.025	0.08	0.08	2.69	23665	1185	45
4	2	200	0.045	0.10	0.10	3.57	17835	1605	45
5	2	200	0.050	0.11	0.11	4.42	14405	1440	45
6	2	200	0.055	0.13	0.13	5.29	12035	1325	45
8	2	200	0.060	0.15	0.15	6.98	9120	1095	45
10	2	200	0.065	0.18	0.18	8.70	7320	950	45
12	2	200	0.070	0.22	0.22	10.45	6090	855	45

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

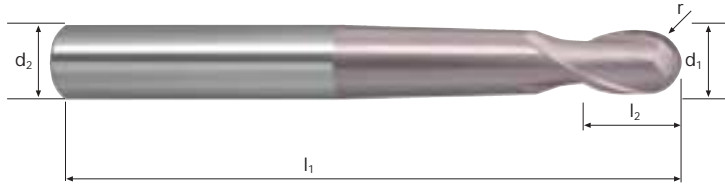
3	2	100	0.020	0.08	0.08	2.69	11835	475	45
4	2	100	0.045	0.10	0.10	3.57	8915	800	45
5	2	100	0.045	0.11	0.11	4.42	7200	650	45
6	2	100	0.050	0.13	0.13	5.29	6015	600	45
8	2	100	0.055	0.15	0.15	6.98	4560	500	45
10	2	100	0.060	0.18	0.18	8.70	3660	440	45
12	2	100	0.065	0.22	0.22	10.45	3045	395	45

# Ball nose end mills

Tolerance r f8 (-/-)



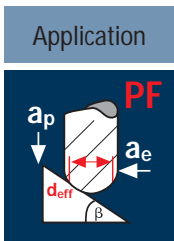
**HM**  
**MG10**    λ **30°**  
                  γ **5°**



II

Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500			Inox Stainless	GG(G)
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Example: Order-N°.								UNICUT-4X	
								U5223	
	Coating <b>U</b>			Article-N°. <b>5223</b>		α-Code <b>.180</b>			
∅ Code	d1 -/-	d2 h6	l1	l2	r f8	α	Z		
.180	3	6	65	6	1.5	2.0°	2	●	
.220	4	6	70	7	2.0	1.0°	2	●	
.260	5	8	75	8	2.5	1.0°	2	●	
.300	6	8	80	9	3.0	2.0°	2	●	
.391	8	10	90	12	4.0	2.0°	2	●	
.450	10	12	100	14	5.0	1.0°	2	●	
.501	12	16	120	16	6.0	2.0°	2	●	
<b>CNC Radius R</b>									
	d1	r	Tolerance f8		Radius				
					Minimum	Maximum	<b>R</b>		
	3	1.5	-0.006	-0.020	1.480	1.494	1.487		
	4	2.0			1.980	1.994	1.987		
	5	2.5			2.480	2.494	2.487		
	6	3.0			2.980	2.994	2.987		
	8	4.0	-0.010	-0.028	3.972	3.990	3.981		
	10	5.0			4.972	4.990	4.981		
	12	6.0			5.972	5.990	5.981		



Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
3	2	160	0.060	0.18	0.18	2.87	17745	2130	45
4	2	160	0.070	0.24	0.24	3.83	13300	1860	45
5	2	160	0.080	0.30	0.30	4.79	10635	1700	45
6	2	160	0.085	0.36	0.36	5.75	8860	1505	45
8	2	160	0.100	0.48	0.48	7.66	6650	1330	45
10	2	160	0.115	0.60	0.60	9.58	5315	1220	45
12	2	160	0.120	0.72	0.72	11.50	4430	1065	45

Hardened tool steel  
42 - 48 HRC

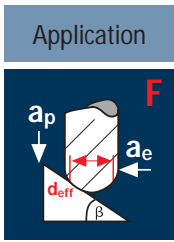
3	2	140	0.055	0.18	0.18	2.87	15530	1710	45
4	2	140	0.065	0.24	0.24	3.83	11635	1515	45
5	2	140	0.075	0.30	0.30	4.79	9305	1395	45
6	2	140	0.080	0.36	0.36	5.75	7750	1240	45
8	2	140	0.090	0.48	0.48	7.66	5820	1050	45
10	2	140	0.105	0.60	0.60	9.58	4650	975	45
12	2	140	0.110	0.72	0.72	11.50	3875	855	45

Hardened tool steel  
48 - 52 HRC

3	2	120	0.050	0.18	0.18	2.87	13310	1330	45
4	2	120	0.060	0.24	0.24	3.83	9975	1195	45
5	2	120	0.070	0.30	0.30	4.79	7975	1115	45
6	2	120	0.070	0.36	0.36	5.75	6645	930	45
8	2	120	0.085	0.48	0.48	7.66	4985	845	45
10	2	120	0.100	0.60	0.60	9.58	3985	795	45
12	2	120	0.100	0.72	0.72	11.50	3320	665	45

Hardened tool steel  
52 - 56 HRC

3	2	80	0.050	0.18	0.18	2.87	8875	890	45
4	2	80	0.055	0.24	0.24	3.83	6650	730	45
5	2	80	0.065	0.30	0.30	4.79	5315	690	45
6	2	80	0.070	0.36	0.36	5.75	4430	620	45
8	2	80	0.080	0.48	0.48	7.66	3325	530	45
10	2	80	0.090	0.60	0.60	9.58	2660	480	45
12	2	80	0.095	0.72	0.72	11.50	2215	420	45



Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
3	2	250	0.025	0.04	0.04	2.55	31210	1560	45
4	2	250	0.045	0.06	0.06	3.43	23200	2090	45
5	2	250	0.045	0.09	0.09	4.35	18295	1645	45
6	2	250	0.045	0.11	0.11	5.23	15215	1370	45
8	2	250	0.050	0.13	0.13	6.90	11535	1155	45
10	2	250	0.055	0.15	0.15	8.58	9275	1020	45
12	2	250	0.060	0.18	0.18	10.29	7735	930	45

Hardened tool steel  
42 - 48 HRC

3	2	220	0.025	0.04	0.04	2.55	27465	1375	45
4	2	220	0.045	0.06	0.06	3.43	20415	1835	45
5	2	220	0.045	0.09	0.09	4.35	16100	1450	45
6	2	220	0.045	0.11	0.11	5.23	13390	1205	45
8	2	220	0.050	0.13	0.13	6.90	10150	1015	45
10	2	220	0.050	0.15	0.15	8.58	8160	815	45
12	2	220	0.055	0.18	0.18	10.29	6805	750	45

Hardened tool steel  
48 - 52 HRC

3	2	180	0.025	0.04	0.04	2.55	22470	1125	45
4	2	180	0.040	0.06	0.06	3.43	16705	1335	45
5	2	180	0.040	0.09	0.09	4.35	13170	1055	45
6	2	180	0.040	0.11	0.11	5.23	10955	875	45
8	2	180	0.045	0.13	0.13	6.90	8305	745	45
10	2	180	0.050	0.15	0.15	8.58	6680	670	45
12	2	180	0.055	0.18	0.18	10.29	5570	615	45

Hardened tool steel  
52 - 56 HRC

3	2	120	0.020	0.04	0.04	2.55	14980	600	45
4	2	120	0.040	0.06	0.06	3.43	11135	890	45
5	2	120	0.040	0.09	0.09	4.35	8780	700	45
6	2	120	0.040	0.11	0.11	5.23	7305	585	45
8	2	120	0.045	0.13	0.13	6.90	5535	500	45
10	2	120	0.045	0.15	0.15	8.58	4450	400	45
12	2	120	0.050	0.18	0.18	10.29	3710	370	45

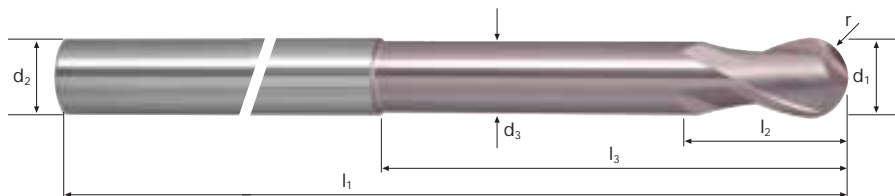


# Ball nose end mills Sphericut

Tolerance r f8 (-/-)



**HM Plus** λ 30°  
γ-10°

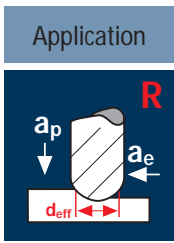


		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60				<b>GG(G)</b>
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Example: Order-N°.										UNICUT-4X	
										U5289	
∅ Code	d1 -/-	d2 h6	d3	l1	l2	l3	r f8	α	z		
.180	3	6	2.8	90	4	24	1.5	3.0°	2	●	
.220	4	6	3.7	90	5	27	2.0	2.0°	2	●	
.260	5	6	4.6	110	6	45	2.5	1.0°	2	●	
.300	6	6	5.5	110	7	50	3.0	0.0°	2	●	
.391	8	8	7.4	110	9	46	4.0	0.0°	2	●	
.450	10	10	9.2	130	11	61	5.0	0.0°	2	●	
.501	12	12	11.0	140	12	57	6.0	0.0°	2	●	

CNC Radius R						
d1	r	Tolerance f8		Radius		R
				Minimum	Maximum	
3	1.5	-0.006	-0.020	1.480	1.494	1.487
4	2.0			1.980	1.994	1.987
5	2.5			2.480	2.494	2.487
6	3.0			2.980	2.994	2.987
8	4.0	-0.010	-0.028	3.972	3.990	3.981
10	5.0			4.972	4.990	4.981
12	6.0			5.972	5.990	5.981



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
1	2	55	0.025	0.12	0.05	0.65	26935	1345	0.01
2	2	55	0.045	0.24	0.10	1.30	13465	1210	0.03
3	2	55	0.060	0.36	0.15	1.95	8980	1080	0.06
4	2	55	0.075	0.48	0.20	2.60	6735	1010	0.10
6	2	55	0.090	0.72	0.30	3.90	4490	810	0.15
8	2	55	0.115	0.96	0.40	5.20	3365	775	0.30
10	2	55	0.125	1.20	0.50	6.50	2695	675	0.40
12	2	55	0.120	1.44	0.60	7.80	2245	540	0.45

Steel  
850 - 1100 N/mm<sup>2</sup>

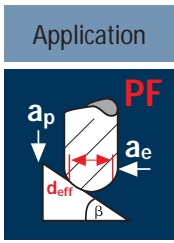
1	2	42	0.020	0.12	0.05	0.65	20570	825	0.00
2	2	42	0.040	0.24	0.10	1.30	10285	825	0.02
3	2	42	0.050	0.36	0.15	1.95	6855	685	0.04
4	2	42	0.065	0.48	0.20	2.60	5140	670	0.05
6	2	42	0.075	0.72	0.30	3.90	3430	515	0.10
8	2	42	0.100	0.96	0.40	5.20	2570	515	0.20
10	2	42	0.105	1.20	0.50	6.50	2055	430	0.25
12	2	42	0.100	1.44	0.60	7.80	1715	345	0.30

Steel  
1100 - 1300 N/mm<sup>2</sup>

1	2	34	0.020	0.12	0.05	0.65	16650	665	0.00
2	2	34	0.030	0.24	0.10	1.30	8325	500	0.01
3	2	34	0.040	0.36	0.15	1.95	5550	445	0.02
4	2	34	0.055	0.48	0.20	2.60	4165	460	0.05
6	2	34	0.065	0.72	0.30	3.90	2775	360	0.10
8	2	34	0.080	0.96	0.40	5.20	2080	335	0.15
10	2	34	0.090	1.20	0.50	6.50	1665	300	0.20
12	2	34	0.085	1.44	0.60	7.80	1390	235	0.20

Stainless steel  
[Cr-Ni/1.4301]

1	2	25	0.010	0.09	0.08	0.57	13960	280	0.00
2	2	25	0.020	0.19	0.15	1.17	6800	270	0.01
3	2	25	0.025	0.28	0.23	1.75	4545	225	0.01
4	2	25	0.030	0.29	0.24	2.07	3845	230	0.00
6	2	25	0.035	0.43	0.27	3.10	2565	180	0.00
8	2	25	0.045	0.58	0.24	4.15	1920	175	0.00
10	2	25	0.050	0.72	0.30	5.17	1540	155	0.05
12	2	25	0.050	0.86	0.36	6.19	1285	130	0.05



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1	2	60	0.030	0.05	0.05	0.94	20320	1220	45
2	2	60	0.045	0.10	0.10	1.89	10105	910	45
3	2	60	0.055	0.15	0.15	2.83	6750	745	45
4	2	60	0.060	0.20	0.20	3.78	5055	605	45
6	2	60	0.085	0.30	0.30	5.67	3370	575	45
8	2	60	0.100	0.40	0.40	7.56	2525	505	45
10	2	60	0.110	0.50	0.50	9.45	2020	445	45
12	2	60	0.120	0.60	0.60	11.34	1685	405	45

Steel  
850 - 1100 N/mm<sup>2</sup>

1	2	48	0.025	0.05	0.05	0.94	16255	815	45
2	2	48	0.040	0.10	0.10	1.89	8085	645	45
3	2	48	0.045	0.15	0.15	2.83	5400	485	45
4	2	48	0.050	0.20	0.20	3.78	4040	405	45
6	2	48	0.070	0.30	0.30	5.67	2695	375	45
8	2	48	0.085	0.40	0.40	7.56	2020	345	45
10	2	48	0.095	0.50	0.50	9.45	1615	305	45
12	2	48	0.100	0.60	0.60	11.34	1345	270	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

1	2	38	0.025	0.05	0.05	0.94	12870	645	45
2	2	38	0.035	0.10	0.10	1.89	6400	450	45
3	2	38	0.040	0.15	0.15	2.83	4275	340	45
4	2	38	0.045	0.20	0.20	3.78	3200	290	45
6	2	38	0.065	0.30	0.30	5.67	2135	280	45
8	2	38	0.075	0.40	0.40	7.56	1600	240	45
10	2	38	0.085	0.50	0.50	9.45	1280	220	45
12	2	38	0.090	0.60	0.60	11.34	1065	190	45

Stainless steel  
[Cr-Ni/1.4301]

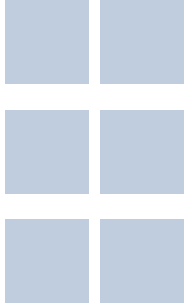
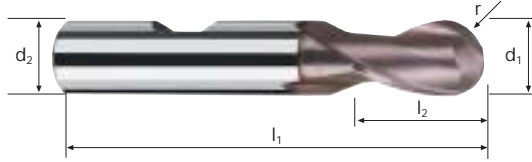
1	2	30	0.015	0.03	0.03	0.91	10495	315	45
2	2	30	0.025	0.06	0.06	1.81	5275	265	45
3	2	30	0.030	0.09	0.09	2.72	3510	210	45
4	2	30	0.030	0.12	0.12	3.62	2640	160	45
6	2	30	0.045	0.18	0.18	5.44	1755	160	45
8	2	30	0.050	0.24	0.24	7.25	1315	130	45
10	2	30	0.055	0.30	0.30	9.06	1055	115	45
12	2	30	0.060	0.36	0.36	10.87	880	105	45

# Ball nose end mills

Tolerance r h9 (0/-)

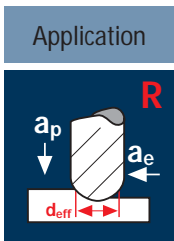


HSS-E  
Co8  
 $\lambda$  35°  
 $\gamma$  15°





Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless		
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Example: Order-N°.										UNICUT-4X	
										U0830	
$\emptyset$ Code	d1 h8	d2 h6	l1	l2	r h9	$\alpha$	Z				
.100	1.0	6	47	3	0.50	14.5°	2				
.120	1.5	6	47	3	0.75	14.0°	2				
.140	2.0	6	48	4	1.00	12.5°	2				
.180	3.0	6	49	5	1.50	8.0°	2				
.220	4.0	6	51	7	2.00	5.0°	2				
.260	5.0	6	52	8	2.50	2.5°	2				
.300	6.0	6	52	8	3.00	0.0°	2				
.391	8.0	8	55	11	4.00	0.0°	2				
.450	10.0	10	63	13	5.00	0.0°	2				
.501	12.0	12	73	16	6.00	0.0°	2				





### Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	55	0.060	0.30	0.12	1.80	9725	1750	0.06
4	3	55	0.075	0.40	0.16	2.40	7295	1640	0.10
6	4	55	0.090	0.60	0.24	3.60	4865	1750	0.25
8	4	55	0.115	0.80	0.32	4.80	3645	1675	0.45
10	4	55	0.125	1.00	0.40	6.00	2920	1460	0.60
12	4	55	0.120	1.20	0.48	7.20	2430	1165	0.65
16	4	55	0.135	1.60	0.64	9.60	1825	985	1.00
20	4	55	0.145	2.00	0.80	12.00	1460	845	1.35

Steel  
850 - 1100 N/mm<sup>2</sup>



3	3	42	0.050	0.30	0.12	1.80	7425	1115	0.04
4	3	42	0.065	0.40	0.16	2.40	5570	1085	0.07
6	4	42	0.075	0.60	0.24	3.60	3715	1115	0.16
8	4	42	0.100	0.80	0.32	4.80	2785	1115	0.30
10	4	42	0.105	1.00	0.40	6.00	2230	935	0.35
12	4	42	0.100	1.20	0.48	7.20	1855	740	0.45
16	4	42	0.115	1.60	0.64	9.60	1395	640	0.65
20	4	42	0.125	2.00	0.80	12.00	1115	560	0.90

Steel  
1100 - 1300 N/mm<sup>2</sup>

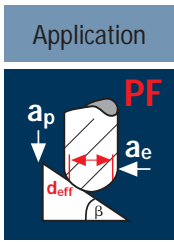



3	3	34	0.040	0.30	0.12	1.80	6015	720	0.03
4	3	34	0.055	0.40	0.16	2.40	4510	745	0.05
6	4	34	0.065	0.60	0.24	3.60	3005	780	0.11
8	4	34	0.080	0.80	0.32	4.80	2255	720	0.20
10	4	34	0.090	1.00	0.40	6.00	1805	650	0.25
12	4	34	0.085	1.20	0.48	7.20	1505	510	0.30
16	4	34	0.095	1.60	0.64	9.60	1125	430	0.45
20	4	34	0.100	2.00	0.80	12.00	900	360	0.60

Stainless steel  
[Cr-Ni/1.4301]






3	3	25	0.025	0.23	0.18	1.60	4975	375	0.02
4	3	25	0.030	0.31	0.24	2.14	3720	335	0.02
6	4	25	0.035	0.47	0.36	3.22	2470	345	0.06
8	4	25	0.045	0.48	0.38	3.80	2095	375	0.05
10	4	25	0.050	0.60	0.36	4.75	1675	335	0.05
12	4	25	0.050	0.72	0.29	5.70	1395	280	0.05
16	4	25	0.055	0.96	0.38	7.60	1045	230	0.10
20	4	25	0.060	1.20	0.48	9.50	840	200	0.10





### Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	3	60	0.055	0.11	0.11	2.76	6920	1140	45
4	3	60	0.060	0.14	0.14	3.67	5205	935	45
6	4	60	0.085	0.21	0.21	5.51	3465	1180	45
8	4	60	0.100	0.28	0.28	7.34	2600	1040	45
10	4	60	0.110	0.35	0.35	9.18	2080	915	45
12	4	60	0.120	0.42	0.42	11.01	1735	835	45
16	4	60	0.140	0.56	0.56	14.68	1300	730	45
20	4	60	0.155	0.70	0.70	18.35	1040	645	45

Steel  
850 - 1100 N/mm<sup>2</sup>



3	3	48	0.045	0.11	0.11	2.76	5535	745	45
4	3	48	0.050	0.14	0.14	3.67	4165	625	45
6	4	48	0.070	0.21	0.21	5.51	2775	775	45
8	4	48	0.085	0.28	0.28	7.34	2080	705	45
10	4	48	0.095	0.35	0.35	9.18	1665	635	45
12	4	48	0.100	0.42	0.42	11.01	1390	555	45
16	4	48	0.120	0.56	0.56	14.68	1040	500	45
20	4	48	0.130	0.70	0.70	18.35	835	435	45

Steel  
1100 - 1300 N/mm<sup>2</sup>




3	3	38	0.040	0.11	0.11	2.76	4385	525	45
4	3	38	0.045	0.14	0.14	3.67	3295	445	45
6	4	38	0.065	0.21	0.21	5.51	2195	570	45
8	4	38	0.075	0.28	0.28	7.34	1650	495	45
10	4	38	0.085	0.35	0.35	9.18	1320	450	45
12	4	38	0.090	0.42	0.42	11.01	1100	395	45
16	4	38	0.105	0.56	0.56	14.68	825	345	45
20	4	38	0.115	0.70	0.70	18.35	660	305	45

Stainless steel  
[Cr-Ni/1.4301]

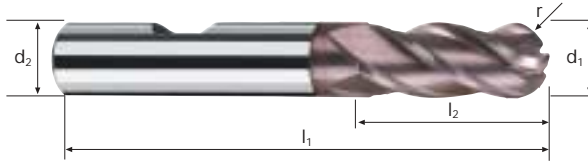
3	3	30	0.030	0.07	0.07	2.66	3590	325	45
4	3	30	0.030	0.08	0.08	3.51	2720	245	45
6	4	30	0.045	0.13	0.13	5.29	1805	325	45
8	4	30	0.050	0.17	0.17	7.05	1355	270	45
10	4	30	0.055	0.21	0.21	8.80	1085	240	45
12	4	30	0.060	0.25	0.25	10.56	905	215	45
16	4	30	0.070	0.34	0.34	14.10	675	190	45
20	4	30	0.080	0.42	0.42	17.60	545	175	45

# Ball nose end mills

Tolerance r k8 (0/+)



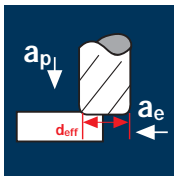
HSS-E Co8	$\lambda$ 35° $\gamma$ 15°



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless		
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Example: Order-N°.									UNICUT-4X	
									U0800	
$\emptyset$ Code	d1 k8	d2 h6		l1	l2	r k8	$\alpha$	Z		
.180	3	6		52	8	1.5	2.0°	3	●	
.220	4	6		55	11	2.0	1.5°	3	●	
.260	5	6		57	13	2.5	1.0°	3	●	
.300	6	6		57	13	3.0	0.0°	4	●	
.331	7	8		60	16	3.5	1.0°	4	●	
.391	8	8		63	19	4.0	0.0°	4	●	
.450	10	10		72	22	5.0	0.0°	4	●	
.501	12	12		83	26	6.0	0.0°	4	●	
.610	16	16		92	32	8.0	0.0°	4	●	
.682	20	20		104	38	10.0	0.0°	4	●	

## Application



## Material

Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



Hardened tool steel  
> 60 HRC



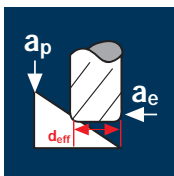
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
2	4	150	0.030	0.12	0.70	1.65	28940	3475	r=0.5
3	4	150	0.045	0.15	1.05	2.71	17620	3170	r=0.5
4	4	150	0.050	0.17	1.40	3.75	12735	2545	r=0.5
5	4	150	0.055	0.19	1.75	4.78	9990	2200	r=0.5
6	6	150	0.060	0.20	2.10	5.80	8230	2965	r=0.5
8	6	150	0.075	0.22	2.80	7.83	6100	2745	r=0.5
10	6	150	0.095	0.24	3.50	9.85	4850	2765	r=0.5
12	6	150	0.115	0.25	4.20	11.87	4025	2775	r=0.5

2	4	120	0.025	0.12	0.70	1.65	23150	2315	r=0.5
3	4	120	0.040	0.15	1.05	2.71	14095	2255	r=0.5
4	4	120	0.045	0.17	1.40	3.75	10185	1835	r=0.5
5	4	120	0.050	0.19	1.75	4.78	7990	1600	r=0.5
6	6	120	0.055	0.20	2.10	5.80	6585	2175	r=0.5
8	6	120	0.070	0.22	2.80	7.83	4880	2050	r=0.5
10	6	120	0.085	0.24	3.50	9.85	3880	1980	r=0.5
12	6	120	0.105	0.25	4.20	11.87	3220	2030	r=0.5

2	4	80	0.025	0.12	0.70	1.65	15435	1545	r=0.5
3	4	80	0.035	0.15	1.05	2.71	9395	1315	r=0.5
4	4	80	0.040	0.17	1.40	3.75	6790	1085	r=0.5
5	4	80	0.045	0.19	1.75	4.78	5330	960	r=0.5
6	6	80	0.050	0.20	2.10	5.80	4390	1315	r=0.5
8	6	80	0.060	0.22	2.80	7.83	3250	1170	r=0.5
10	6	80	0.080	0.24	3.50	9.85	2585	1240	r=0.5
12	6	80	0.095	0.25	4.20	11.87	2145	1225	r=0.5

2	4	40	0.015	0.12	0.70	1.65	7715	465	r=0.5
3	4	40	0.025	0.15	1.05	2.71	4700	470	r=0.5
4	4	40	0.030	0.17	1.40	3.75	3395	405	r=0.5
5	4	40	0.030	0.19	1.75	4.78	2665	320	r=0.5
6	6	40	0.035	0.20	2.10	5.80	2195	460	r=0.5
8	6	40	0.045	0.22	2.80	7.83	1625	440	r=0.5
10	6	40	0.055	0.24	3.50	9.85	1295	425	r=0.5
12	6	40	0.065	0.25	4.20	11.87	1075	420	r=0.5

## Application



## Material

Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



Hardened tool steel  
> 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
2	4	360	0.045	0.10	0.10	1.99	57585	10365	45
3	4	360	0.065	0.12	0.12	3.00	38200	9930	45
4	4	360	0.085	0.12	0.12	4.00	28650	9740	45
5	4	360	0.100	0.16	0.16	5.00	22920	9170	45
6	6	360	0.120	0.18	0.18	6.00	19100	13750	45
8	6	360	0.150	0.20	0.20	7.99	14340	12905	45
10	6	360	0.185	0.24	0.24	9.97	11495	12760	45
12	6	360	0.225	0.26	0.26	11.96	9580	12935	45

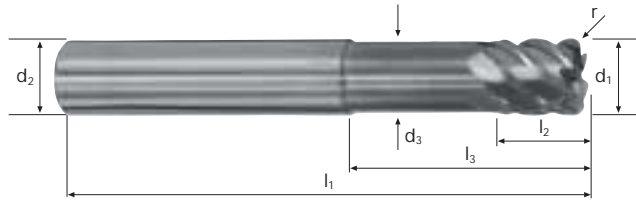
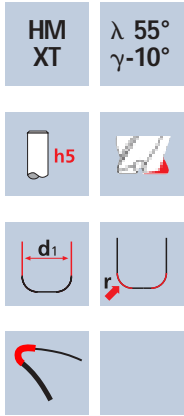
2	4	250	0.045	0.10	0.10	1.99	39990	7200	45
3	4	250	0.060	0.12	0.12	3.00	26525	6365	45
4	4	250	0.080	0.12	0.12	4.00	19895	6365	45
5	4	250	0.095	0.16	0.16	5.00	15915	6050	45
6	6	250	0.115	0.18	0.18	6.00	13265	9155	45
8	6	250	0.145	0.20	0.20	7.99	9960	8665	45
10	6	250	0.175	0.24	0.24	9.97	7980	8380	45
12	6	250	0.215	0.26	0.26	11.96	6655	8585	45

2	4	180	0.040	0.10	0.10	1.99	28795	4605	45
3	4	180	0.055	0.12	0.12	3.00	19100	4200	45
4	4	180	0.075	0.12	0.12	4.00	14325	4300	45
5	4	180	0.085	0.16	0.16	5.00	11460	3895	45
6	6	180	0.105	0.18	0.18	6.00	9550	6015	45
8	6	180	0.130	0.20	0.20	7.99	7170	5595	45
10	6	180	0.160	0.24	0.24	9.97	5745	5515	45
12	6	180	0.195	0.26	0.26	11.96	4790	5605	45

2	4	100	0.025	0.10	0.10	1.99	15995	1600	45
3	4	100	0.035	0.12	0.12	3.00	10610	1485	45
4	4	100	0.045	0.12	0.12	4.00	7960	1435	45
5	4	100	0.050	0.16	0.16	5.00	6365	1275	45
6	6	100	0.060	0.18	0.18	6.00	5305	1910	45
8	6	100	0.075	0.20	0.20	7.99	3985	1795	45
10	6	100	0.095	0.24	0.24	9.97	3195	1820	45
12	6	100	0.115	0.26	0.26	11.96	2660	1835	45

# Corner radius end mills XSpeed

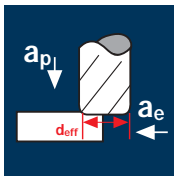
Normal version



Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	HSS
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Example: Order-N°.										X-AI	
										X7200	
Ø Code	d1 0/-0,01	d2 h5	d3	l1	l2	l3	r 0/+0,015	α	Z		
.140	2	6	1.8	57	3	6	0.5	7.4°	4	●	
.180	3	6	2.8	57	4	9	0.5	5.4°	4	●	
.220	4	6	3.7	57	5	12	0.5	3.4°	4	●	
.260	5	6	4.6	57	6	15	0.5	1.7°	4	●	
.295	6	6	5.5	57	7	20	0.5	0.0°	4	●	
.300	6	6	5.5	57	7	20	0.5	0.0°	6	●	
.386	8	8	7.4	63	9	26	0.5	0.0°	4	●	
.391	8	8	7.4	63	9	26	0.5	0.0°	6	●	
.440	10	10	9.2	72	11	31	0.5	0.0°	4	●	
.450	10	10	9.2	72	11	31	0.5	0.0°	6	●	
.491	12	12	11.0	83	13	37	0.5	0.0°	4	●	
.501	12	12	11.0	83	13	37	0.5	0.0°	6	●	
.218	4	6	3.7	57	5	12	1.0	3.5°	4	●	
.258	5	6	4.6	57	6	15	1.0	1.7°	4	●	
.293	6	6	5.5	57	7	20	1.0	0.0°	4	●	
.297	6	6	5.5	57	7	20	1.0	0.0°	6	●	
.384	8	8	7.4	63	9	26	1.0	0.0°	4	●	
.388	8	8	7.4	63	9	26	1.0	0.0°	6	●	
.435	10	10	9.2	72	11	31	1.0	0.0°	4	●	
.445	10	10	9.2	72	11	31	1.0	0.0°	6	●	
.486	12	12	11.0	83	13	37	1.0	0.0°	4	●	
.496	12	12	11.0	83	13	37	1.0	0.0°	6	●	

## Application







## Material





Steel  
< 850 N/mm<sup>2</sup>





Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

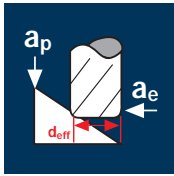
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
3	4	200	0.040	0.15	0.90	2.71	23490	3760	r=0.5
4	4	200	0.050	0.18	1.20	3.77	16885	3375	r=0.5
5	4	200	0.055	0.20	1.50	4.80	13265	2920	r=0.5
6	6	200	0.060	0.22	1.80	5.83	10920	3930	r=0.5
8	6	200	0.075	0.25	2.40	7.87	8090	3640	r=0.5
10	6	200	0.090	0.28	3.00	9.90	6430	3470	r=0.5
12	6	200	0.110	0.30	3.60	11.92	5340	3525	r=0.5
16	6	200	0.120	0.65	4.80	15.47	4115	2965	r=1.5

3	4	180	0.040	0.15	0.90	2.71	21145	3385	r=0.5
4	4	180	0.050	0.18	1.20	3.77	15200	3040	r=0.5
5	4	180	0.050	0.20	1.50	4.80	11935	2385	r=0.5
6	6	180	0.055	0.22	1.80	5.83	9830	3245	r=0.5
8	6	180	0.070	0.25	2.40	7.87	7280	3060	r=0.5
10	6	180	0.085	0.28	3.00	9.90	5790	2955	r=0.5
12	6	180	0.105	0.30	3.60	11.92	4805	3025	r=0.5
16	6	180	0.115	0.65	4.80	15.47	3705	2555	r=1.5

3	4	150	0.035	0.15	0.90	2.71	17620	2465	r=0.5
4	4	150	0.045	0.18	1.20	3.77	12665	2280	r=0.5
5	4	150	0.050	0.20	1.50	4.80	9945	1990	r=0.5
6	6	150	0.055	0.22	1.80	5.83	8190	2705	r=0.5
8	6	150	0.065	0.25	2.40	7.87	6065	2365	r=0.5
10	6	150	0.080	0.28	3.00	9.90	4825	2315	r=0.5
12	6	150	0.095	0.30	3.60	11.92	4005	2285	r=0.5
16	6	150	0.105	0.65	4.80	15.47	3085	1945	r=1.5




3	4	120	0.030	0.15	0.90	2.71	14095	1690	r=0.5
4	4	120	0.040	0.18	1.20	3.77	10130	1620	r=0.5
5	4	120	0.045	0.20	1.50	4.80	7960	1435	r=0.5
6	6	120	0.050	0.22	1.80	5.83	6550	1965	r=0.5
8	6	120	0.060	0.25	2.40	7.87	4855	1750	r=0.5
10	6	120	0.070	0.28	3.00	9.90	3860	1620	r=0.5
12	6	120	0.090	0.30	3.60	11.92	3205	1730	r=0.5
16	6	120	0.095	0.65	4.80	15.47	2470	1410	r=1.5

## Application







## Material

Steel  
< 850 N/mm<sup>2</sup>





Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	4	420	0.065	0.12	0.12	3.00	44565	11585	45
4	4	420	0.085	0.12	0.12	4.00	33425	11365	45
5	4	420	0.100	0.16	0.16	5.00	26740	10695	45
6	6	420	0.120	0.18	0.18	6.00	22280	16040	45
8	6	420	0.150	0.20	0.20	7.99	16735	15060	45
10	6	420	0.185	0.24	0.24	9.97	13410	14885	45
12	6	420	0.190	0.28	0.28	11.95	11190	12755	45
16	6	420	0.230	0.30	0.30	15.97	8370	11550	45

3	4	360	0.060	0.12	0.12	3.00	38200	9170	45
4	4	360	0.080	0.12	0.12	4.00	28650	9170	45
5	4	360	0.095	0.16	0.16	5.00	22920	8710	45
6	6	360	0.115	0.18	0.18	6.00	19100	13180	45
8	6	360	0.145	0.20	0.20	7.99	14340	12475	45
10	6	360	0.175	0.24	0.24	9.97	11495	12070	45
12	6	360	0.180	0.28	0.28	11.95	9590	10355	45
16	6	360	0.220	0.30	0.30	15.97	7175	9470	45

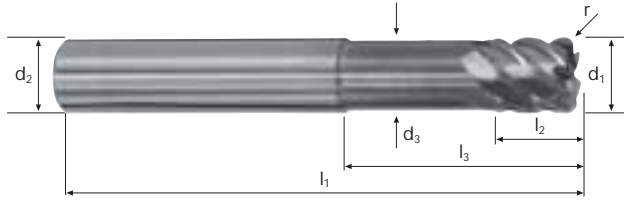
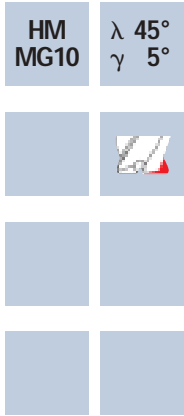
3	4	320	0.055	0.12	0.12	3.00	33955	7470	45
4	4	320	0.075	0.12	0.12	4.00	25465	7640	45
5	4	320	0.090	0.16	0.16	5.00	20370	7335	45
6	6	320	0.105	0.18	0.18	6.00	16975	10695	45
8	6	320	0.130	0.20	0.20	7.99	12750	9945	45
10	6	320	0.165	0.24	0.24	9.97	10215	10115	45
12	6	320	0.165	0.28	0.28	11.95	8525	8440	45
16	6	320	0.200	0.30	0.30	15.97	6380	7655	45

3	4	280	0.050	0.12	0.12	3.00	29710	5940	45
4	4	280	0.070	0.12	0.12	4.00	22280	6240	45
5	4	280	0.080	0.16	0.16	5.00	17825	5705	45
6	6	280	0.095	0.18	0.18	6.00	14855	8465	45
8	6	280	0.120	0.20	0.20	7.99	11155	8030	45
10	6	280	0.150	0.24	0.24	9.97	8940	8045	45
12	6	280	0.150	0.28	0.28	11.95	7460	6715	45
16	6	280	0.185	0.30	0.30	15.97	5580	6195	45



# Corner radius end mills Multispeed

Normal version

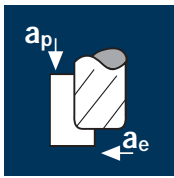


Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G)
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										UNICUT-4X	DURO-S
Example: Order-N°. Coating: U Article-N°. 5250 α-Code: .180										U5250	D5250
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	α	Z		
.180	3	6	2.8	57	4	14	0.5	5.0°	4	●	●
.220	4	6	3.7	57	5	16	0.5	3.0°	4	●	●
.260	5	6	4.6	57	6	18	0.5	2.0°	4	●	●
.297	6	6	5.5	57	7	20	0.5	0.0°	6	●	●
.388	8	8	7.4	63	9	26	0.5	0.0°	6	●	●
.445	10	10	9.2	72	11	31	0.5	0.0°	6	●	●
.496	12	12	11.0	83	13	37	0.5	0.0°	6	●	●
.300	6	6	5.5	57	7	20	0.8	0.0°	6	●	●
.391	8	8	7.4	63	9	26	1.0	0.0°	6	●	●
.450	10	10	9.2	72	11	31	1.0	0.0°	6	●	●
.501	12	12	11.0	83	13	37	1.5	0.0°	6	●	●
.610	16	16	15.0	92	17	43	1.5	0.0°	6	●	●

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>



Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



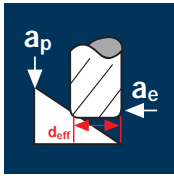
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	150	0.050	6	3.6	7960	1590	34.5
8	4	150	0.065	8	4.8	5970	1550	59.5
10	4	150	0.085	10	6.0	4775	1625	97.5
12	4	150	0.100	12	7.2	3980	1590	137.5
16	4	150	0.135	16	6.4	2985	1610	165.0

6	4	120	0.035	6	3.6	6365	890	19.0
8	4	120	0.045	8	4.8	4775	860	33.0
10	4	120	0.055	10	6.0	3820	840	50.5
12	4	120	0.065	12	7.2	3185	830	71.5
16	4	120	0.090	16	6.4	2385	860	88.0

6	4	80	0.025	6	3.6	4245	425	9.0
8	4	80	0.035	8	4.8	3185	445	17.0
10	4	80	0.045	10	6.0	2545	460	27.5
12	4	80	0.055	12	7.2	2120	465	40.0
16	4	80	0.075	16	6.4	1590	475	48.5

6	4	60	0.020	6	3.6	3185	255	5.5
8	4	60	0.025	8	4.8	2385	239	9.0
10	4	60	0.035	10	6.0	1910	267	16.0
12	4	60	0.040	12	7.2	1590	254	22.0
16	4	60	0.055	16	6.4	1195	263	27.0

## Application

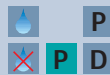


## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>



Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	4	280	0.060	0.90	0.90	5.55	16060	3855	45
8	4	280	0.075	1.20	1.20	7.10	12555	3765	45
10	4	280	0.095	1.50	1.50	8.52	10460	3975	45
12	4	280	0.120	1.80	1.80	9.72	9170	4400	45
16	4	280	0.145	2.00	2.00	12.59	7080	4105	45

6	4	200	0.050	0.90	0.90	5.55	11470	2295	45
8	4	200	0.065	1.20	1.20	7.10	8965	2330	45
10	4	200	0.080	1.50	1.50	8.52	7470	2390	45
12	4	200	0.100	1.80	1.80	9.72	6550	2620	45
16	4	200	0.125	2.00	2.00	12.59	5055	2530	45

6	4	140	0.035	0.90	0.90	5.55	8030	1125	45
8	4	140	0.045	1.20	1.20	7.10	6275	1130	45
10	4	140	0.055	1.50	1.50	8.52	5230	1150	45
12	4	140	0.070	1.80	1.80	9.72	4585	1285	45
16	4	140	0.085	2.00	2.00	12.59	3540	1205	45

6	4	100	0.030	0.90	0.90	5.55	5735	690	45
8	4	100	0.040	1.20	1.20	7.10	4485	720	45
10	4	100	0.050	1.50	1.50	8.52	3735	745	45
12	4	100	0.060	1.80	1.80	9.72	3275	785	45
16	4	100	0.075	2.00	2.00	12.59	2530	760	45

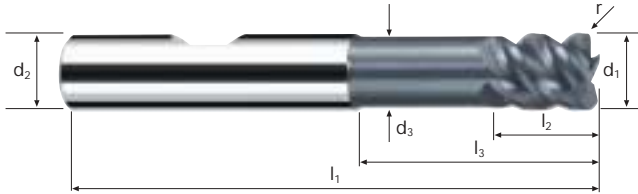
# Corner radius end mills HX-R

Normal version



**HM**  
**MG10**

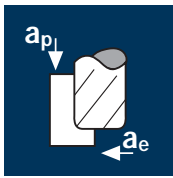
$\lambda$  55°  
 $\gamma$ -10°



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60		<b>Ti</b> Titanium	<b>GG(G)</b>
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Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	z	POLYCHROM		DURO-S	
									P5353	P5253	D5353	D5253
.300	6	6	5.5	57	7	20	1.0	4	●	●	●	●
.391	8	8	7.4	63	9	26	1.0	4	●	●	●	●
.450	10	10	9.2	72	11	31	1.0	4	●	●	●	●
.501	12	12	11.0	83	13	37	1.0	4	●	●	●	●
.610	16	16	15.0	92	17	43	1.0	4	●	●	●	●

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>



Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



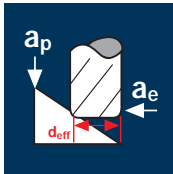
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
8	4	150	0.065	8	4.8	5970	1550	59.5
10	4	150	0.085	10	6.0	4775	1625	97.5
12	4	150	0.100	12	7.2	3980	1590	137.5
16	4	150	0.135	16	6.4	2985	1610	165.0

8	4	120	0.045	8	4.8	4775	860	33.0
10	4	120	0.055	10	6.0	3820	840	50.5
12	4	120	0.065	12	7.2	3185	830	71.5
16	4	120	0.090	16	6.4	2385	860	88.0

8	4	80	0.035	8	4.8	3185	445	17.0
10	4	80	0.045	10	6.0	2545	460	27.5
12	4	80	0.055	12	7.2	2120	465	40.0
16	4	80	0.075	16	6.4	1590	475	48.5

8	4	60	0.025	8	4.8	2385	239	9.0
10	4	60	0.035	10	6.0	1910	267	16.0
12	4	60	0.040	12	7.2	1590	254	22.0
16	4	60	0.055	16	6.4	1195	263	27.0

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>



Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
8	4	280	0.075	1.50	1.50	7.12	12520	3755	45
10	4	280	0.085	1.80	1.80	8.65	10305	3505	45
12	4	280	0.110	2.00	2.00	10.29	8660	3810	45
16	4	280	0.150	2.40	2.40	13.42	6640	3985	45

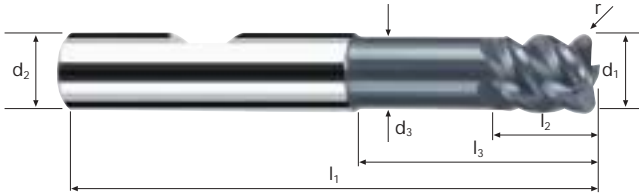
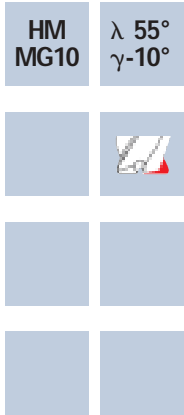
8	4	200	0.065	1.50	1.50	7.12	8940	2325	45
10	4	200	0.070	1.80	1.80	8.65	7360	2060	45
12	4	200	0.095	2.00	2.00	10.29	6185	2350	45
16	4	200	0.130	2.40	2.40	13.42	4745	2465	45

8	4	140	0.045	1.50	1.50	7.12	6260	1125	45
10	4	140	0.050	1.80	1.80	8.65	5150	1030	45
12	4	140	0.065	2.00	2.00	10.29	4330	1125	45
16	4	140	0.090	2.40	2.40	13.42	3320	1195	45

8	4	100	0.040	1.50	1.50	7.12	4470	715	45
10	4	100	0.045	1.80	1.80	8.65	3680	660	45
12	4	100	0.055	2.00	2.00	10.29	3095	680	45
16	4	100	0.075	2.40	2.40	13.42	2370	710	45

# Corner radius end mills HX-R

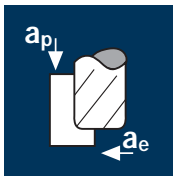
Normal version



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°. <span style="margin-left: 40px;">Coating <b>D</b> Article-N° <b>5354</b> α-Code <b>.391</b></span> <span style="margin-left: 40px;"> </span>									<b>DURO-S</b>
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	Z	
<b>.391</b>	8	8	7.4	63	9	26	1.5	4	●
<b>.450</b>	10	10	9.2	72	11	31	1.5	4	●
<b>.501</b>	12	12	11.0	83	13	37	1.5	4	●
<b>.610</b>	16	16	15.0	92	17	43	1.5	4	●

## Application




## Material


Steel  
1100 - 1300 N/mm<sup>2</sup>

 **D**  
 **D**


Hardened tool steel  
42 - 48 HRC

 **D**

Hardened tool steel  
48 - 52 HRC

 **D**

Hardened tool steel  
52 - 56 HRC

 **D**

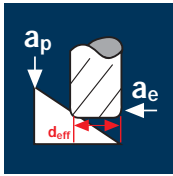
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	150	0.050	6	3.6	7960	1590	34.5
8	4	150	0.065	8	4.8	5970	1550	59.5
10	4	150	0.085	10	6.0	4775	1625	97.5
12	4	150	0.100	12	7.2	3980	1590	137.5
16	4	150	0.135	16	6.4	2985	1610	165.0

6	4	120	0.035	6	3.6	6365	890	19.0
8	4	120	0.045	8	4.8	4775	860	33.0
10	4	120	0.055	10	6.0	3820	840	50.5
12	4	120	0.065	12	7.2	3185	830	71.5
16	4	120	0.090	16	6.4	2385	860	88.0

6	4	80	0.025	6	3.6	4245	425	9.0
8	4	80	0.035	8	4.8	3185	445	17.0
10	4	80	0.045	10	6.0	2545	460	27.5
12	4	80	0.055	12	7.2	2120	465	40.0
16	4	80	0.075	16	6.4	1590	475	48.5



6	4	60	0.020	6	3.6	3185	255	5.5
8	4	60	0.025	8	4.8	2385	239	9.0
10	4	60	0.035	10	6.0	1910	267	16.0
12	4	60	0.040	12	7.2	1590	254	22.0
16	4	60	0.055	16	6.4	1195	263	27.0

## Application




## Material


Steel  
1100 - 1300 N/mm<sup>2</sup>

 **D**  
 **D**


Hardened tool steel  
42 - 48 HRC

 **D**

Hardened tool steel  
48 - 52 HRC

 **D**

Hardened tool steel  
52 - 56 HRC

 **D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	4	280	0.055	1.20	1.20	5.50	16205	3565	45
8	4	280	0.065	1.80	1.80	7.10	12555	3265	45
10	4	280	0.085	2.00	2.00	9.17	9720	3305	45
12	4	280	0.100	2.40	2.40	11.01	8095	3240	45
16	4	280	0.125	2.80	2.80	14.84	6005	3005	45

6	4	200	0.045	1.20	1.20	5.50	11575	2085	45
8	4	200	0.055	1.50	1.50	7.45	8545	1880	45
10	4	200	0.070	1.80	1.80	9.38	6785	1900	45
12	4	200	0.085	2.00	2.00	11.41	5580	1895	45
16	4	200	0.105	2.40	2.40	15.25	4175	1755	45

6	4	140	0.035	1.20	1.20	5.50	8105	1135	45
8	4	140	0.040	1.50	1.50	7.45	5980	955	45
10	4	140	0.050	1.80	1.80	9.38	4750	950	45
12	4	140	0.060	2.00	2.00	11.41	3905	935	45
16	4	140	0.075	2.40	2.40	15.25	2920	875	45

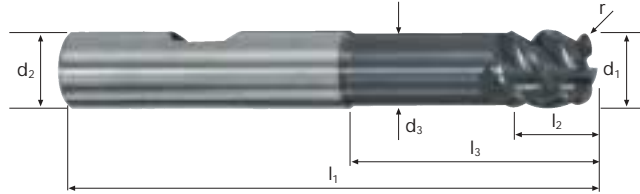
6	4	100	0.030	1.20	1.20	5.50	5790	695	45
8	4	100	0.035	1.50	1.50	7.45	4275	600	45
10	4	100	0.045	1.80	1.80	9.38	3395	610	45
12	4	100	0.050	2.00	2.00	11.41	2790	560	45
16	4	100	0.065	2.40	2.40	15.25	2085	540	45

# Corner radius end mills HX-R

Normal version



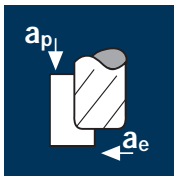
<b>HM MG10</b>	$\lambda$ <b>55°</b> $\gamma$ <b>-10°</b>



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.									DURO-S	
Coating Article-N° α-Code									D5356	
D 5356 .300									D5256	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	z		
.300	6	6	5.5	57	7	20	1.5	4	●	
.391	8	8	7.4	63	9	26	2.0	4	●	
.450	10	10	9.2	72	11	31	2.5	4	●	
.501	12	12	11.0	83	13	37	3.0	4	●	
.605	16	16	15.0	92	17	43	2.5	4	●	
.610	16	16	15.0	92	17	43	3.5	4	●	
.615	16	16	15.0	92	17	43	4.0	4	●	

## Application




## Material

Hardened tool steel  
42 - 48 HRC

 **D**


d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	90	0.040	6	2.4	4775	765	11.0
8	4	90	0.050	8	3.2	3580	715	18.5
10	4	90	0.065	10	4.0	2865	745	30.0
12	4	90	0.075	12	4.8	2385	715	41.0
16	4	90	0.100	16	4.0	1790	715	46.0

Hardened tool steel  
48 - 52 HRC

 **D**


6	4	70	0.035	6	2.4	3715	520	7.5
8	4	70	0.045	8	3.2	2785	500	13.0
10	4	70	0.055	10	4.0	2230	490	19.5
12	4	70	0.065	12	4.8	1855	480	27.5
16	4	70	0.090	16	4.0	1395	500	32.0

Hardened tool steel  
52 - 56 HRC

 **D**

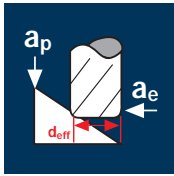
6	4	35	0.025	6	2.4	1855	185	2.5
8	4	35	0.035	8	3.2	1395	195	5.0
10	4	35	0.045	10	4.0	1115	200	8.0
12	4	35	0.055	12	4.8	930	205	12.0
16	4	35	0.075	16	4.0	695	210	13.5

Hardened tool steel  
56 - 60 HRC

 **D**


6	4	25	0.015	6	2.4	1325	80	1.0
8	4	25	0.025	8	3.2	995	100	2.5
10	4	25	0.030	10	4.0	795	95	4.0
12	4	25	0.035	12	4.8	665	93	5.5
16	4	25	0.045	16	4.0	495	89	5.5

## Application




## Material

Hardened tool steel  
42 - 48 HRC

 **D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	4	250	0.050	0.30	0.30	6.00	13265	2655	45
8	4	250	0.060	0.35	0.35	7.99	9960	2390	45
10	4	250	0.070	0.40	0.40	9.98	7975	2235	45
12	4	250	0.080	0.45	0.45	11.96	6655	2130	45
16	4	250	0.100	0.50	0.50	15.93	4995	2000	45

Hardened tool steel  
48 - 52 HRC

 **D**


6	4	180	0.045	0.30	0.30	6.00	9550	1720	45
8	4	180	0.050	0.35	0.35	7.99	7170	1435	45
10	4	180	0.060	0.40	0.40	9.98	5740	1380	45
12	4	180	0.070	0.45	0.45	11.96	4790	1340	45
16	4	180	0.085	0.50	0.50	15.93	3595	1220	45

Hardened tool steel  
52 - 56 HRC

 **D**

6	4	140	0.030	0.30	0.30	6.00	7425	890	45
8	4	140	0.035	0.35	0.35	7.99	5580	780	45
10	4	140	0.040	0.40	0.40	9.98	4465	715	45
12	4	140	0.050	0.45	0.45	11.96	3725	745	45
16	4	140	0.060	0.50	0.50	15.93	2800	670	45

Hardened tool steel  
56 - 60 HRC

 **D**

6	4	100	0.025	0.30	0.30	6.00	5305	530	45
8	4	100	0.030	0.35	0.35	7.99	3985	480	45
10	4	100	0.035	0.40	0.40	9.98	3190	445	45
12	4	100	0.040	0.45	0.45	11.96	2660	425	45
16	4	100	0.050	0.50	0.50	15.93	2000	400	45

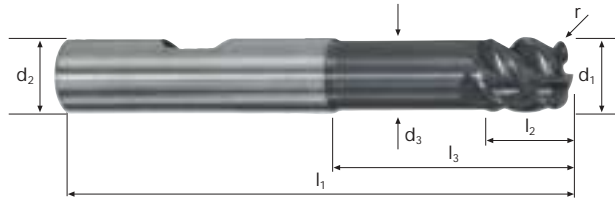


# Corner radius end mills HX-RH

Normal version



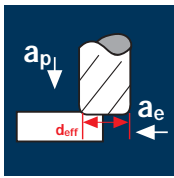
**HM XT**  $\lambda$  55°  $\gamma$ -10°



**Rm** 1300-1500 **HRC** 48-56 **HRC** 56-60 **HRC** > 60 **HSS**

Example: Order-N°.										DURO-S	
										D5367	
										D5267	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	α	Z		
.300	6	6	5.5	57	7	20	1.0	0.0°	4	●	
.391	8	8	7.4	63	9	26	1.0	0.0°	4	●	
.450	10	10	9.2	72	11	31	1.0	0.0°	4	●	
.501	12	12	11.0	83	13	37	1.0	0.0°	4	●	
.610	16	16	15.0	92	17	43	1.0	0.0°	4	●	

## Application



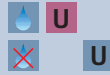
## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
6	4	200	0.055	0.35	1.20	5.52	11535	2540	r=1.0
8	4	200	0.065	0.45	1.60	7.67	8300	2160	r=1.0
10	4	200	0.075	0.85	2.00	9.70	6565	1970	r=1.5
12	4	200	0.085	1.00	2.40	11.83	5380	1830	r=1.5
16	4	200	0.105	1.25	3.20	15.71	4050	1700	r=2.0

Steel  
850 - 1100 N/mm<sup>2</sup>



6	4	180	0.050	0.35	1.20	5.52	10380	2075	r=1.0
8	4	180	0.060	0.45	1.60	7.67	7470	1795	r=1.0
10	4	180	0.070	0.85	2.00	9.70	5905	1655	r=1.5
12	4	180	0.075	1.00	2.40	11.83	4845	1455	r=1.5
16	4	180	0.095	1.25	3.20	15.71	3645	1385	r=2.0

Stainless steel  
[Cr-Ni/1.4301]



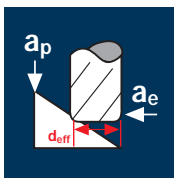
6	4	80	0.040	0.35	1.20	5.52	4615	740	r=1.0
8	4	80	0.045	0.45	1.60	7.67	3320	600	r=1.0
10	4	80	0.055	0.85	2.00	9.70	2625	580	r=1.5
12	4	80	0.060	1.00	2.40	11.83	2155	515	r=1.5
16	4	80	0.075	1.25	3.20	15.71	1620	485	r=2.0

Titanium alloys  
>300 HB  
[Ti6Al4V]



6	4	70	0.035	0.35	1.20	5.52	4035	565	r=1.0
8	4	70	0.040	0.45	1.60	7.67	2905	465	r=1.0
10	4	70	0.045	0.85	2.00	9.70	2295	415	r=1.5
12	4	70	0.050	1.00	2.40	11.83	1885	375	r=1.5
16	4	70	0.065	1.25	3.20	15.71	1420	370	r=2.0

## Application



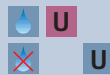
## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	4	380	0.130	0.18	0.18	5.97	20260	10535	45
8	4	380	0.175	0.20	0.20	7.98	15160	10610	45
10	4	380	0.200	0.24	0.24	9.93	12180	9745	45
12	4	380	0.240	0.28	0.28	11.96	10115	9710	45
16	4	380	0.295	0.30	0.30	15.89	7610	8980	45

Steel  
850 - 1100 N/mm<sup>2</sup>



6	4	300	0.125	0.18	0.18	5.97	15995	8000	45
8	4	300	0.165	0.20	0.20	7.98	11965	7895	45
10	4	300	0.190	0.24	0.24	9.93	9615	7305	45
12	4	300	0.230	0.28	0.28	11.96	7985	7345	45
16	4	300	0.280	0.30	0.30	15.89	6010	6730	45

Stainless steel  
[Cr-Ni/1.4301]



6	4	140	0.090	0.18	0.18	5.97	7465	2685	45
8	4	140	0.125	0.20	0.20	7.98	5585	2795	45
10	4	140	0.140	0.24	0.24	9.93	4490	2515	45
12	4	140	0.170	0.28	0.28	11.96	3725	2535	45
16	4	140	0.205	0.30	0.30	15.89	2805	2300	45

Titanium alloys  
>300 HB  
[Ti6Al4V]



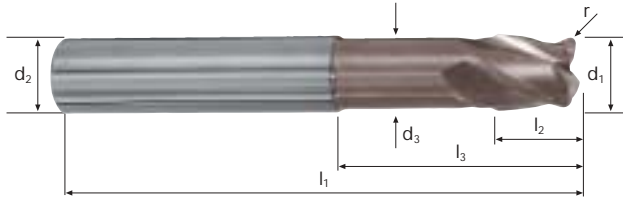
6	4	120	0.065	0.18	0.18	5.97	6400	1665	45
8	4	120	0.090	0.20	0.20	7.98	4785	1725	45
10	4	120	0.100	0.24	0.24	9.93	3845	1540	45
12	4	120	0.120	0.28	0.28	11.96	3195	1535	45
16	4	120	0.150	0.30	0.30	15.89	2405	1445	45

# Corner radius end mills Steelspeed

Normal version



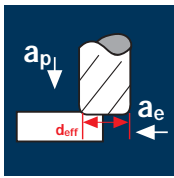
<b>HM</b> <b>MG10</b>	$\lambda$ 30° $\gamma$ 12°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°. Coating: <b>U</b> Article-N°: <b>5245</b> $\alpha$ -Code: <b>.300</b>									UNICUT-4X	
$\emptyset$ Code <b>d1</b> e8 <b>d2</b> h6 <b>d3</b> <b>l1</b> <b>l2</b> <b>l3</b> <b>r</b> 0/+0,03 <b>Z</b>									U5345 U5245	
.300	6	6	5.5	57	7	20	1.0	4	●	
.391	8	8	7.4	63	9	26	1.0	4	●	
.450	10	10	9.2	72	11	31	1.5	4	●	
.501	12	12	11.0	83	13	37	1.5	4	●	
.610	16	16	15.0	92	17	43	2.0	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
>300 HB  
[Ti6Al4V]

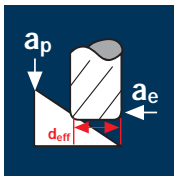
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
6	4	200	0.050	0.55	1.20	5.32	11965	2395	r=1.5
8	4	200	0.060	0.65	1.60	6.95	9160	2200	r=2.0
10	4	200	0.070	1.05	2.00	9.07	7020	1965	r=2.5
12	4	200	0.080	1.20	2.40	10.80	5895	1885	r=3.0
16	4	200	0.100	1.45	3.20	14.16	4495	1800	r=4.0

6	4	180	0.045	0.55	1.20	5.32	10770	1940	r=1.5
8	4	180	0.055	0.65	1.60	6.95	8245	1815	r=2.0
10	4	180	0.065	1.05	2.00	9.07	6315	1640	r=2.5
12	4	180	0.070	1.20	2.40	10.80	5305	1485	r=3.0
16	4	180	0.090	1.45	3.20	14.16	4045	1455	r=4.0

6	4	80	0.035	0.55	1.20	5.32	4785	670	r=1.5
8	4	80	0.040	0.65	1.60	6.95	3665	585	r=2.0
10	4	80	0.050	1.05	2.00	9.07	2810	560	r=2.5
12	4	80	0.055	1.20	2.40	10.80	2360	520	r=3.0
16	4	80	0.070	1.45	3.20	14.16	1800	505	r=4.0

6	4	70	0.030	0.55	1.20	5.32	4190	505	r=1.5
8	4	70	0.035	0.65	1.60	6.95	3205	450	r=2.0
10	4	70	0.040	1.05	2.00	9.07	2455	395	r=2.5
12	4	70	0.050	1.20	2.40	10.80	2065	415	r=3.0
16	4	70	0.060	1.45	3.20	14.16	1575	380	r=4.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
>300 HB  
[Ti6Al4V]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	4	380	0.120	0.25	0.25	5.94	20365	9775	45
8	4	380	0.160	0.30	0.30	7.89	15330	9810	45
10	4	380	0.185	0.34	0.34	9.83	12305	9105	45
12	4	380	0.220	0.38	0.38	11.77	10275	9040	45
16	4	380	0.275	0.40	0.40	15.56	7775	8555	45

6	4	300	0.115	0.25	0.25	5.94	16075	7395	45
8	4	300	0.150	0.30	0.30	7.89	12105	7265	45
10	4	300	0.175	0.34	0.34	9.83	9715	6800	45
12	4	300	0.210	0.38	0.38	11.77	8115	6815	45
16	4	300	0.260	0.40	0.40	15.56	6135	6380	45

6	4	140	0.085	0.25	0.25	5.94	7500	2550	45
8	4	140	0.110	0.30	0.30	7.89	5650	2485	45
10	4	140	0.130	0.34	0.34	9.83	4535	2360	45
12	4	140	0.155	0.38	0.38	11.77	3785	2345	45
16	4	140	0.195	0.40	0.40	15.56	2865	2235	45

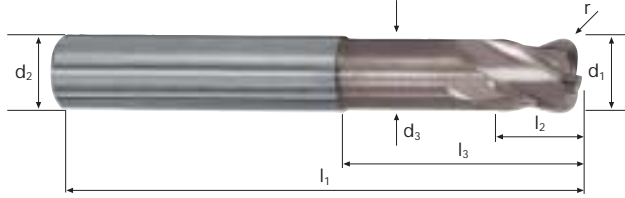
6	4	120	0.060	0.25	0.25	5.94	6430	1545	45
8	4	120	0.080	0.30	0.30	7.89	4840	1550	45
10	4	120	0.095	0.34	0.34	9.83	3885	1475	45
12	4	120	0.110	0.38	0.38	11.77	3245	1430	45
16	4	120	0.140	0.40	0.40	15.56	2455	1375	45

# Corner radius end mills Steelspeed G

Normal version



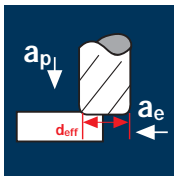
HM  
MG10     $\lambda$  30°  
              $\gamma$  5°



Rm < 850    Rm 850-1100    Rm 1100-1300    **Inox** Stainless    **Ti** Titanium    **GG(G)**

Example: Order-N°.									UNICUT-4X	
									U5346	
									U5246	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	Z		
.300	6	6	5.5	57	7	20	1.5	4	●	
.391	8	8	7.4	63	9	26	2.0	4	●	
.450	10	10	9.2	72	11	31	2.5	4	●	
.501	12	12	11.0	83	13	37	3.0	4	●	
.610	16	16	15.0	92	17	43	4.0	4	●	

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

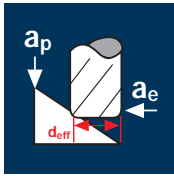
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
6	6	200	0.050	0.15	1.32	5.33	11945	3585	r=0.8
8	6	200	0.065	0.18	1.76	7.14	8915	3475	r=1.0
10	6	200	0.080	0.20	2.20	9.20	6920	3320	r=1.0
12	6	200	0.090	0.22	2.64	10.56	6030	3255	r=1.5
16	6	200	0.115	0.25	3.52	14.66	4345	3000	r=1.5

6	6	180	0.050	0.15	1.32	5.33	10750	3225	r=0.8
8	6	180	0.060	0.18	1.76	7.14	8025	2890	r=1.0
10	6	180	0.075	0.20	2.20	9.20	6230	2805	r=1.0
12	6	180	0.085	0.22	2.64	10.56	5425	2765	r=1.5
16	6	180	0.110	0.25	3.52	14.66	3910	2580	r=1.5

6	6	150	0.045	0.15	1.32	5.33	8960	2420	r=0.8
8	6	150	0.055	0.18	1.76	7.14	6685	2205	r=1.0
10	6	150	0.070	0.20	2.20	9.20	5190	2180	r=1.0
12	6	150	0.080	0.22	2.64	10.56	4520	2170	r=1.5
16	6	150	0.100	0.25	3.52	14.66	3255	1955	r=1.5

6	6	120	0.040	0.15	1.32	5.33	7165	1720	r=0.8
8	6	120	0.050	0.18	1.76	7.14	5350	1605	r=1.0
10	6	120	0.065	0.20	2.20	9.20	4150	1620	r=1.0
12	6	120	0.070	0.22	2.64	10.56	3615	1520	r=1.5
16	6	120	0.090	0.25	3.52	14.66	2605	1405	r=1.5

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Steel  
1300 - 1500 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	6	420	0.110	0.16	0.16	5.98	22355	14755	45
8	6	420	0.140	0.18	0.18	7.97	16775	14090	45
10	6	420	0.165	0.20	0.20	9.98	13395	13260	45
12	6	420	0.175	0.24	0.24	11.93	11205	11765	45
16	6	420	0.215	0.28	0.28	15.96	8375	10805	45

6	6	360	0.105	0.16	0.16	5.98	19165	12075	45
8	6	360	0.135	0.18	0.18	7.97	14380	11650	45
10	6	360	0.155	0.20	0.20	9.98	11480	10675	45
12	6	360	0.165	0.24	0.24	11.93	9605	9510	45
16	6	360	0.205	0.28	0.28	15.96	7180	8830	45

6	6	320	0.095	0.16	0.16	5.98	17035	9710	45
8	6	320	0.125	0.18	0.18	7.97	12780	9585	45
10	6	320	0.145	0.20	0.20	9.98	10205	8880	45
12	6	320	0.155	0.24	0.24	11.93	8540	7940	45
16	6	320	0.190	0.28	0.28	15.96	6380	7275	45

6	6	280	0.090	0.16	0.16	5.98	14905	8050	45
8	6	280	0.110	0.18	0.18	7.97	11185	7380	45
10	6	280	0.130	0.20	0.20	9.98	8930	6965	45
12	6	280	0.140	0.24	0.24	11.93	7470	6275	45
16	6	280	0.170	0.28	0.28	15.96	5585	5695	45

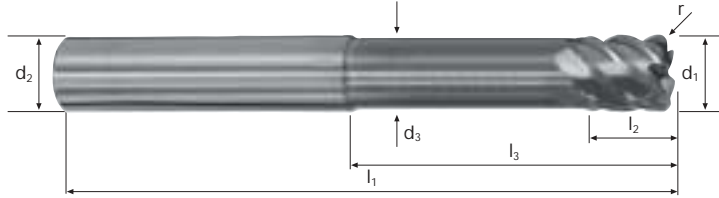
# Corner radius end mills Multispeed

Medium length version



**HM**  
**MG10**

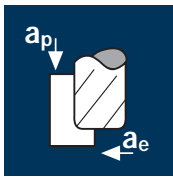
$\lambda$  45°  
 $\gamma$  5°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500		Inox Stainless	Ti Titanium	GG(G)
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									UNICUT-4X	DURO-S									
Example: Order-N°. <table style="display: inline-table; border: none;"> <tr> <td style="text-align: center; padding: 0 5px;">Coating <b>U</b></td> <td style="text-align: center; padding: 0 5px;">Article-N°. <b>5252</b></td> <td style="text-align: center; padding: 0 5px;">α-Code <b>.300</b></td> <td colspan="6"></td> </tr> </table>									Coating <b>U</b>	Article-N°. <b>5252</b>	α-Code <b>.300</b>								
Coating <b>U</b>	Article-N°. <b>5252</b>	α-Code <b>.300</b>																	
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	z											
.300	6	6	5.5	70	7	33	0.8	4	●	●									
.391	8	8	7.4	80	9	43	1.0	4	●	●									
.450	10	10	9.2	84	11	43	1.0	4	●	●									
.501	12	12	11.0	97	13	51	1.5	6	●	●									
.610	16	16	15.0	115	17	66	1.5	6	●	●									

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	4	120	0.050	6	2.4	6365	1275	18.5
8	4	120	0.065	8	3.2	4775	1240	31.5
10	4	120	0.085	10	4.0	3820	1300	52.0
12	4	120	0.100	12	4.8	3185	1275	73.5
16	4	120	0.135	16	3.2	2385	1290	66.0

Hardened tool steel  
42 - 48 HRC



6	4	80	0.035	6	2.4	4245	595	8.5
8	4	80	0.045	8	3.2	3185	575	14.5
10	4	80	0.055	10	4.0	2545	560	22.5
12	4	80	0.065	12	4.8	2120	550	31.5
16	4	80	0.090	16	3.2	1590	570	29.0

Hardened tool steel  
48 - 52 HRC



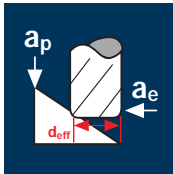
6	4	60	0.025	6	2.4	3185	320	4.5
8	4	60	0.035	8	3.2	2385	335	8.5
10	4	60	0.045	10	4.0	1910	345	14.0
12	4	60	0.055	12	4.8	1590	350	20.0
16	4	60	0.075	16	3.2	1195	360	18.5

Hardened tool steel  
52 - 56 HRC



6	4	30	0.020	6	2.4	1590	127	2.0
8	4	30	0.025	8	3.2	1195	120	3.0
10	4	30	0.035	10	4.0	955	134	5.5
12	4	30	0.040	12	4.8	795	127	7.5
16	4	30	0.055	16	3.2	595	131	6.5

## Application



## Material

Steel  
1100 - 1300 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	4	250	0.055	0.90	0.90	5.79	13745	3025	45
8	4	250	0.065	1.50	1.50	7.45	10680	2775	45
10	4	250	0.085	1.70	1.70	9.48	8395	2855	45
12	4	250	0.100	2.00	2.00	11.41	6975	2790	45
16	4	250	0.125	2.40	2.40	15.25	5220	2610	45

Hardened tool steel  
42 - 48 HRC



6	4	180	0.045	1.20	1.20	5.50	10420	1875	45
8	4	180	0.055	1.50	1.50	7.45	7690	1690	45
10	4	180	0.070	1.80	1.80	9.38	6110	1710	45
12	4	180	0.085	2.00	2.00	11.41	5020	1705	45
16	4	180	0.105	2.40	2.40	15.25	3755	1575	45

Hardened tool steel  
48 - 52 HRC



6	4	120	0.035	1.20	1.20	5.50	6945	970	45
8	4	120	0.040	1.50	1.50	7.45	5125	820	45
10	4	120	0.050	1.80	1.80	9.38	4070	815	45
12	4	120	0.060	2.00	2.00	11.41	3350	805	45
16	4	120	0.075	2.40	2.40	15.25	2505	750	45

Hardened tool steel  
52 - 56 HRC



6	4	80	0.030	1.20	1.20	5.50	4630	555	45
8	4	80	0.035	1.50	1.50	7.45	3420	480	45
10	4	80	0.045	1.80	1.80	9.38	2715	490	45
12	4	80	0.050	2.00	2.00	11.41	2230	445	45
16	4	80	0.065	2.40	2.40	15.25	1670	435	45

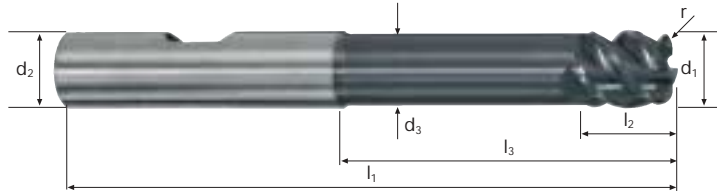


# Corner radius end mills HX-R

Medium length version



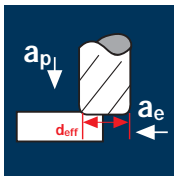
**HM**     $\lambda$  55°  
**MG10**     $\gamma$ -10°



		<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60		<b>Ti</b> Titanium	<b>GG(G)</b>
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Example: Order-N°.									<b>POLYCHROM</b>	<b>DURO-S</b>
		Coating <b>P</b>	Article-N°. <b>5357</b>	α-Code <b>.300</b>					<b>P5357</b>	<b>D5357</b>
									<b>P5257</b>	<b>D5257</b>
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	Z		
<b>.300</b>	6	6	5.5	70	7	33	1.5	4	●	●
<b>.391</b>	8	8	7.4	80	9	43	2.0	4	●	●
<b>.450</b>	10	10	9.2	84	11	43	2.5	4	●	●
<b>.501</b>	12	12	11.0	97	13	51	3.0	4	●	●
<b>.610</b>	16	16	15.0	115	17	66	3.5	4	●	●

## Application



## Material

Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



Hardened tool steel  
> 60 HRC



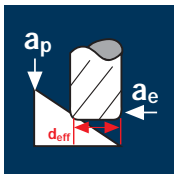
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
2	4	150	0.025	0.10	0.44	1.60	29840	2985	r=0.5
3	4	150	0.040	0.12	0.66	2.65	18020	2885	r=0.5
4	4	150	0.045	0.15	0.88	3.71	12870	2315	r=0.5
5	4	150	0.050	0.16	1.10	4.73	10095	2020	r=0.5
6	6	150	0.055	0.17	1.32	5.75	8305	2740	r=0.5
8	6	150	0.065	0.19	1.76	7.78	6135	2395	r=0.5
10	6	150	0.085	0.20	2.20	9.80	4870	2485	r=0.5
12	6	150	0.105	0.22	2.64	11.83	4035	2540	r=0.5

2	4	120	0.025	0.10	0.44	1.60	23875	2390	r=0.5
3	4	120	0.035	0.12	0.66	2.65	14415	2020	r=0.5
4	4	120	0.040	0.15	0.88	3.71	10295	1645	r=0.5
5	4	120	0.045	0.16	1.10	4.73	8075	1455	r=0.5
6	6	120	0.050	0.17	1.32	5.75	6645	1995	r=0.5
8	6	120	0.060	0.19	1.76	7.78	4910	1770	r=0.5
10	6	120	0.075	0.20	2.20	9.80	3900	1755	r=0.5
12	6	120	0.095	0.22	2.64	11.83	3230	1840	r=0.5

2	4	80	0.020	0.10	0.44	1.60	15915	1275	r=0.5
3	4	80	0.035	0.12	0.66	2.65	9610	1345	r=0.5
4	4	80	0.035	0.15	0.88	3.71	6865	960	r=0.5
5	4	80	0.040	0.16	1.10	4.73	5385	860	r=0.5
6	6	80	0.045	0.17	1.32	5.75	4430	1195	r=0.5
8	6	80	0.055	0.19	1.76	7.78	3275	1080	r=0.5
10	6	80	0.070	0.20	2.20	9.80	2600	1090	r=0.5
12	6	80	0.085	0.22	2.64	11.83	2155	1100	r=0.5

2	4	40	0.015	0.10	0.44	1.60	7960	480	r=0.5
3	4	40	0.025	0.12	0.66	2.65	4805	480	r=0.5
4	4	40	0.025	0.15	0.88	3.71	3430	345	r=0.5
5	4	40	0.030	0.16	1.10	4.73	2690	325	r=0.5
6	6	40	0.030	0.17	1.32	5.75	2215	400	r=0.5
8	6	40	0.040	0.19	1.76	7.78	1635	390	r=0.5
10	6	40	0.050	0.20	2.20	9.80	1300	390	r=0.5
12	6	40	0.060	0.22	2.64	11.83	1075	385	r=0.5

## Application



## Material

Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



Hardened tool steel  
> 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
2	4	360	0.040	0.08	0.08	1.98	57875	9260	45
3	4	360	0.060	0.10	0.10	2.99	38325	9200	45
4	4	360	0.080	0.10	0.10	3.99	28720	9190	45
5	4	360	0.090	0.12	0.12	5.00	22920	8250	45
6	6	360	0.110	0.15	0.15	6.00	19100	12605	45
8	6	360	0.135	0.18	0.18	8.00	14325	11605	45
10	6	360	0.170	0.20	0.20	9.99	11470	11700	45
12	6	360	0.205	0.22	0.22	11.98	9565	11765	45

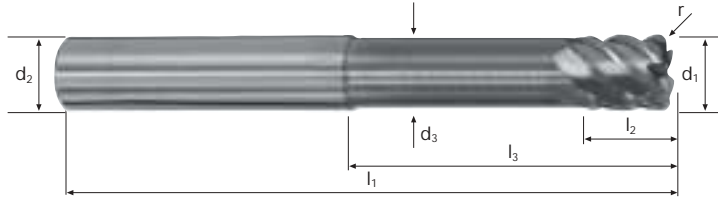
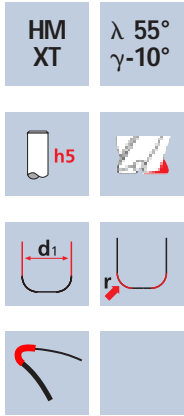
2	4	250	0.040	0.08	0.08	1.98	40190	6430	45
3	4	250	0.055	0.10	0.10	2.99	26615	5855	45
4	4	250	0.075	0.10	0.10	3.99	19945	5985	45
5	4	250	0.085	0.12	0.12	5.00	15915	5410	45
6	6	250	0.105	0.15	0.15	6.00	13265	8355	45
8	6	250	0.130	0.18	0.18	8.00	9945	7755	45
10	6	250	0.160	0.20	0.20	9.99	7965	7645	45
12	6	250	0.195	0.22	0.22	11.98	6645	7775	45

2	4	180	0.035	0.08	0.08	1.98	28940	4050	45
3	4	180	0.050	0.10	0.10	2.99	19165	3835	45
4	4	180	0.070	0.10	0.10	3.99	14360	4020	45
5	4	180	0.075	0.12	0.12	5.00	11460	3440	45
6	6	180	0.095	0.15	0.15	6.00	9550	5445	45
8	6	180	0.115	0.18	0.18	8.00	7160	4940	45
10	6	180	0.145	0.20	0.20	9.99	5735	4990	45
12	6	180	0.175	0.22	0.22	11.98	4785	5025	45

2	4	100	0.020	0.08	0.08	1.98	16075	1285	45
3	4	100	0.030	0.10	0.10	2.99	10645	1275	45
4	4	100	0.040	0.10	0.10	3.99	7980	1275	45
5	4	100	0.045	0.12	0.12	5.00	6365	1145	45
6	6	100	0.055	0.15	0.15	6.00	5305	1750	45
8	6	100	0.070	0.18	0.18	8.00	3980	1670	45
10	6	100	0.085	0.20	0.20	9.99	3185	1625	45
12	6	100	0.105	0.22	0.22	11.98	2655	1675	45

# Corner radius end mills XSpeed

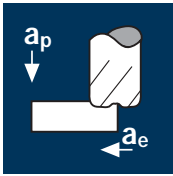
Long version



Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	HSS
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Example: Order-N°.										X-Al		
		Coating <b>X</b>	Article-N°. <b>7204</b>	α-Code <b>.140</b>							<b>X7204</b>	
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r 0/+0,015	α	Z			
.140	2	6	1.8	66	3	12	0.5	5.4°	4	●		
.180	3	6	2.8	66	4	18	0.5	3.5°	4	●		
.220	4	6	3.7	69	5	24	0.5	2.0°	4	●		
.260	5	6	4.6	75	6	30	0.5	0.9°	4	●		
.295	6	6	5.5	80	7	43	0.5	0.0°	4	●		
.300	6	6	5.5	80	7	43	0.5	0.0°	6	●		
.386	8	8	7.4	90	9	53	0.5	0.0°	4	●		
.391	8	8	7.4	90	9	53	0.5	0.0°	6	●		
.440	10	10	9.2	105	11	64	0.5	0.0°	4	●		
.450	10	10	9.2	105	11	64	0.5	0.0°	6	●		
.491	12	12	11.0	120	13	74	0.5	0.0°	4	●		
.501	12	12	11.0	120	13	74	0.5	0.0°	6	●		
.218	4	6	3.7	69	5	24	1.0	2.1°	4	●		
.258	5	6	4.6	75	6	30	1.0	0.9°	4	●		
.293	6	6	5.5	80	7	43	1.0	0.0°	4	●		
.297	6	6	5.5	80	7	43	1.0	0.0°	6	●		
.384	8	8	7.4	90	9	53	1.0	0.0°	4	●		
.388	8	8	7.4	90	9	53	1.0	0.0°	6	●		
.435	10	10	9.2	105	11	64	1.0	0.0°	4	●		
.445	10	10	9.2	105	11	64	1.0	0.0°	6	●		
.486	12	12	11.0	120	13	74	1.0	0.0°	4	●		
.496	12	12	11.0	120	13	74	1.0	0.0°	6	●		

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	250	0.200	0.08	1.80	26525	21220	3.05
4	4	250	0.265	0.12	2.40	19895	21090	6.05
5	4	250	0.335	0.16	3.00	15915	21325	10.25
6	4	250	0.400	0.20	3.60	13265	21225	15.30
8	4	250	0.535	0.25	4.80	9945	21280	25.55
10	4	250	0.665	0.32	6.00	7960	21175	40.65
12	4	250	0.800	0.40	7.20	6630	21215	61.10
16	4	250	1.065	0.48	9.60	4975	21195	97.65

Steel  
1100 - 1300 N/mm<sup>2</sup>



3	4	220	0.170	0.08	1.80	23345	15875	2.30
4	4	220	0.225	0.12	2.40	17510	15760	4.55
5	4	220	0.285	0.16	3.00	14005	15965	7.65
6	4	220	0.340	0.20	3.60	11670	15870	11.45
8	4	220	0.455	0.25	4.80	8755	15935	19.10
10	4	220	0.565	0.32	6.00	7005	15830	30.40
12	4	220	0.680	0.40	7.20	5835	15870	45.70
16	4	220	0.905	0.48	9.60	4375	15840	73.00

Steel  
1300 - 1500 N/mm<sup>2</sup>



3	4	200	0.155	0.07	1.80	21220	13155	1.65
4	4	200	0.205	0.11	2.40	15915	13050	3.45
5	4	200	0.260	0.14	3.00	12735	13245	5.55
6	4	200	0.310	0.18	3.60	10610	13155	8.50
8	4	200	0.415	0.23	4.80	7960	13215	14.60
10	4	200	0.520	0.29	6.00	6365	13240	23.05
12	4	200	0.625	0.36	7.20	5305	13265	34.40
16	4	200	0.830	0.43	9.60	3980	13215	54.55

Hardened tool steel  
48 - 52 HRC



3	4	180	0.120	0.06	1.80	19100	9170	1.00
4	4	180	0.160	0.10	2.40	14325	9170	2.20
5	4	180	0.200	0.13	3.00	11460	9170	3.60
6	4	180	0.240	0.16	3.60	9550	9170	5.30
8	4	180	0.320	0.20	4.80	7160	9165	8.80
10	4	180	0.400	0.26	6.00	5730	9170	14.30
12	4	180	0.480	0.32	7.20	4775	9170	21.15
16	4	180	0.640	0.38	9.60	3580	9165	33.45

## Material

Hardened tool steel  
52 - 56 HRC



3	4	160	0.090	0.06	1.80	16975	6110	0.65
4	4	160	0.120	0.08	2.40	12735	6115	1.15
5	4	160	0.150	0.11	3.00	10185	6110	2.00
6	4	160	0.180	0.14	3.60	8490	6115	3.10
8	4	160	0.240	0.18	4.80	6365	6110	5.30
10	4	160	0.300	0.22	6.00	5095	6115	8.05
12	4	160	0.360	0.28	7.20	4245	6115	12.35
16	4	160	0.480	0.34	9.60	3185	6115	19.95

Hardened tool steel  
56 - 60 HRC



3	4	140	0.055	0.05	1.80	14855	3270	0.30
4	4	140	0.075	0.08	2.40	11140	3340	0.65
5	4	140	0.095	0.10	3.00	8915	3390	1.00
6	4	140	0.110	0.13	3.60	7425	3265	1.55
8	4	140	0.150	0.16	4.80	5570	3340	2.55
10	4	140	0.185	0.21	6.00	4455	3295	4.15
12	4	140	0.225	0.26	7.20	3715	3345	6.25
16	4	140	0.300	0.31	9.60	2785	3340	9.95

Hardened tool steel  
> 60 HRC



3	4	80	0.045	0.05	1.80	8490	1530	0.15
4	4	80	0.060	0.07	2.40	6365	1530	0.25
5	4	80	0.075	0.10	3.00	5095	1530	0.45
6	4	80	0.090	0.12	3.60	4245	1530	0.65
8	4	80	0.120	0.15	4.80	3185	1530	1.10
10	4	80	0.145	0.19	6.00	2545	1475	1.70
12	4	80	0.175	0.24	7.20	2120	1485	2.55
16	4	80	0.235	0.29	9.60	1590	1495	4.15

Cast iron  
(lamellar / spheroidal)



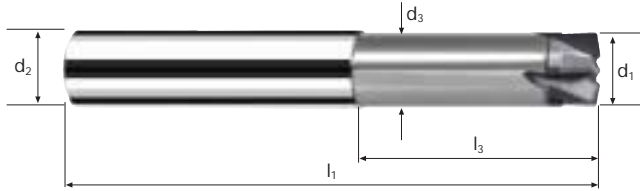
3	4	250	0.200	0.08	1.80	26525	21220	3.05
4	4	250	0.265	0.12	2.40	19895	21090	6.05
5	4	250	0.335	0.16	3.00	15915	21325	10.25
6	4	250	0.400	0.20	3.60	13265	21225	15.30
8	4	250	0.535	0.25	4.80	9945	21280	25.55
10	4	250	0.665	0.32	6.00	7960	21175	40.65
12	4	250	0.800	0.40	7.20	6630	21215	61.10
16	4	250	1.065	0.48	9.60	4975	21195	97.65

# High feed end mills XFeed

Normal version



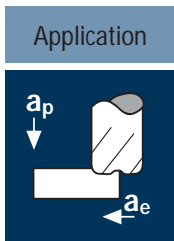
<b>HM</b> <b>XT</b>	$\lambda$ 0° $\gamma$ 0°



II

<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Ti</b> Titanium	<b>HSS</b> GG(G)
--------------------	-----------------------	------------------------	------------------------	---------------------	---------------------	--------------------	-----------------------	---------------------

Ø Code	d1 0/-0.02	d2 h5	d3	l1	l3	ap <sub>max.</sub>	R <sub>theo.</sub>	α	z	X-AI	
										X7600	
.180	3	6	2.8	57	9	0.12	0.27	5.5°	4	●	
.220	4	6	3.7	57	12	0.16	0.36	3.5°	4	●	
.260	5	6	4.6	57	15	0.20	0.45	2.0°	4	●	
.300	6	6	5.5	57	20	0.25	0.54	0.0°	4	●	
.391	8	8	7.4	63	26	0.33	0.72	0.0°	4	●	
.450	10	10	9.2	72	31	0.41	0.90	0.0°	4	●	
.501	12	12	11.0	83	37	0.50	1.08	0.0°	4	●	
.610	16	16	15.0	92	43	0.69	1.44	0.0°	4	●	



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	250	0.165	0.08	1.20	26525	17505	1.70
4	4	250	0.220	0.12	1.60	19895	17510	3.35
5	4	250	0.280	0.16	2.00	15915	17825	5.70
6	4	250	0.335	0.20	2.40	13265	17775	8.55
8	4	250	0.445	0.25	3.20	9945	17700	14.15
10	4	250	0.555	0.32	4.00	7960	17670	22.60
12	4	250	0.665	0.40	4.80	6630	17635	33.85
16	4	250	0.890	0.48	6.40	4975	17710	54.40

Steel  
1100 - 1300 N/mm<sup>2</sup>

3	4	220	0.140	0.08	1.20	23345	13075	1.25
4	4	220	0.185	0.12	1.60	17510	12955	2.50
5	4	220	0.240	0.16	2.00	14005	13445	4.30
6	4	220	0.285	0.20	2.40	11670	13305	6.40
8	4	220	0.380	0.25	3.20	8755	13310	10.65
10	4	220	0.470	0.32	4.00	7005	13170	16.85
12	4	220	0.565	0.40	4.80	5835	13185	25.30
16	4	220	0.755	0.48	6.40	4375	13215	40.60

Steel  
1300 - 1500 N/mm<sup>2</sup>

3	4	200	0.130	0.07	1.20	21220	11035	0.95
4	4	200	0.170	0.11	1.60	15915	10820	1.90
5	4	200	0.220	0.14	2.00	12735	11205	3.15
6	4	200	0.260	0.18	2.40	10610	11035	4.75
8	4	200	0.345	0.23	3.20	7960	10985	8.10
10	4	200	0.435	0.29	4.00	6365	11075	12.85
12	4	200	0.520	0.36	4.80	5305	11035	19.05
16	4	200	0.695	0.43	6.40	3980	11065	30.45

Hardened tool steel  
48 - 52 HRC

3	4	180	0.100	0.06	1.20	19100	7640	0.55
4	4	180	0.130	0.10	1.60	14325	7450	1.20
5	4	180	0.170	0.13	2.00	11460	7795	2.05
6	4	180	0.200	0.16	2.40	9550	7640	2.95
8	4	180	0.265	0.20	3.20	7160	7590	4.85
10	4	180	0.335	0.26	4.00	5730	7680	8.00
12	4	180	0.400	0.32	4.80	4775	7640	11.75
16	4	180	0.535	0.38	6.40	3580	7660	18.65

Material

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	160	0.075	0.06	1.20	16975	5095	0.35
4	4	160	0.100	0.08	1.60	12735	5095	0.65
5	4	160	0.125	0.11	2.00	10185	5095	1.10
6	4	160	0.150	0.14	2.40	8490	5095	1.70
8	4	160	0.200	0.18	3.20	6365	5090	2.95
10	4	160	0.250	0.22	4.00	5095	5095	4.50
12	4	160	0.300	0.28	4.80	4245	5095	6.85
16	4	160	0.400	0.34	6.40	3185	5095	11.10

Hardened tool steel  
56 - 60 HRC

3	4	140	0.045	0.05	1.20	14855	2675	0.15
4	4	140	0.060	0.08	1.60	11140	2675	0.35
5	4	140	0.080	0.10	2.00	8915	2855	0.55
6	4	140	0.095	0.13	2.40	7425	2820	0.90
8	4	140	0.125	0.16	3.20	5570	2785	1.45
10	4	140	0.155	0.21	4.00	4455	2760	2.30
12	4	140	0.185	0.26	4.80	3715	2750	3.45
16	4	140	0.250	0.31	6.40	2785	2785	5.55

Hardened tool steel  
> 60 HRC

3	4	80	0.035	0.05	1.20	8490	1190	0.05
4	4	80	0.050	0.07	1.60	6365	1275	0.15
5	4	80	0.060	0.10	2.00	5095	1225	0.25
6	4	80	0.075	0.12	2.40	4245	1275	0.35
8	4	80	0.100	0.15	3.20	3185	1275	0.60
10	4	80	0.120	0.19	4.00	2545	1220	0.95
12	4	80	0.145	0.24	4.80	2120	1230	1.40
16	4	80	0.195	0.29	6.40	1590	1240	2.30

Material

Cast iron  
(lamellar / spheroidal)

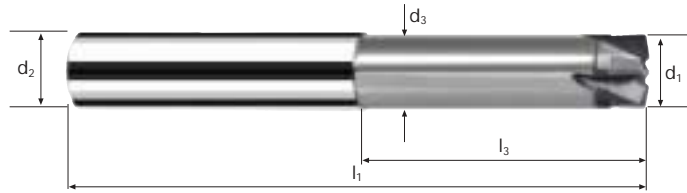
3	4	250	0.165	0.08	1.20	26525	17505	1.70
4	4	250	0.220	0.12	1.60	19895	17510	3.35
5	4	250	0.280	0.16	2.00	15915	17825	5.70
6	4	250	0.335	0.20	2.40	13265	17775	8.55
8	4	250	0.445	0.25	3.20	9945	17700	14.15
10	4	250	0.555	0.32	4.00	7960	17670	22.60
12	4	250	0.665	0.40	4.80	6630	17635	33.85
16	4	250	0.890	0.48	6.40	4975	17710	54.40

# High feed end mills XFeed

Long version



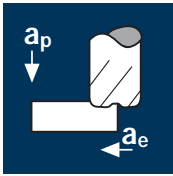
HM XT	$\lambda$ 0° $\gamma$ 0°
	HFC



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	HSS GG(G)
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Example: Order-N°.											X-AI		
			Coating <b>X</b>	Article-N°. <b>7604</b>	α-Code <b>.180</b>						<input type="text"/>	<b>X7604</b>	
Ø Code	d1 0/-0.02	d2 h5	d3	l1	l3	ap <sub>max.</sub>	R <sub>theo.</sub>	α	z				
.180	3	6	2.8	66	18	0.12	0.27	3.5°	4	●			
.220	4	6	3.7	69	24	0.16	0.36	2.0°	4	●			
.260	5	6	4.6	75	30	0.20	0.45	1.0°	4	●			
.300	6	6	5.5	80	43	0.25	0.54	0.0°	4	●			
.391	8	8	7.4	90	53	0.33	0.72	0.0°	4	●			
.450	10	10	9.2	105	64	0.41	0.90	0.0°	4	●			
.501	12	12	11.0	120	74	0.50	1.08	0.0°	4	●			
.610	16	16	15.0	135	86	0.69	1.44	0.0°	4	●			

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	4	150	0.135	0.05	0.90	15915	8595	0.40
4	4	150	0.180	0.08	1.20	11935	8595	0.85
5	4	150	0.225	0.10	1.50	9550	8595	1.30
6	4	150	0.275	0.13	1.80	7960	8755	2.05
8	4	150	0.365	0.16	2.40	5970	8715	3.35
10	4	150	0.455	0.21	3.00	4775	8690	5.45
12	4	150	0.545	0.27	3.60	3980	8675	8.45
16	4	150	0.725	0.32	4.80	2985	8655	13.30

Steel  
1100 - 1300 N/mm<sup>2</sup>



3	4	140	0.115	0.05	0.90	14855	6835	0.30
4	4	140	0.155	0.08	1.20	11140	6905	0.65
5	4	140	0.190	0.10	1.50	8915	6775	1.00
6	4	140	0.235	0.13	1.80	7425	6980	1.65
8	4	140	0.310	0.16	2.40	5570	6905	2.65
10	4	140	0.385	0.21	3.00	4455	6860	4.30
12	4	140	0.465	0.27	3.60	3715	6910	6.70
16	4	140	0.615	0.32	4.80	2785	6850	10.50

Steel  
1300 - 1500 N/mm<sup>2</sup>



3	4	120	0.105	0.05	0.90	12735	5350	0.25
4	4	120	0.140	0.07	1.20	9550	5350	0.45
5	4	120	0.175	0.09	1.50	7640	5350	0.70
6	4	120	0.215	0.12	1.80	6365	5475	1.20
8	4	120	0.285	0.14	2.40	4775	5445	1.85
10	4	120	0.355	0.19	3.00	3820	5425	3.10
12	4	120	0.425	0.24	3.60	3185	5415	4.70
16	4	120	0.565	0.29	4.80	2385	5390	7.50

Hardened tool steel  
48 - 52 HRC



3	4	90	0.080	0.04	0.90	9550	3055	0.10
4	4	90	0.110	0.06	1.20	7160	3150	0.25
5	4	90	0.135	0.08	1.50	5730	3095	0.35
6	4	90	0.165	0.10	1.80	4775	3150	0.55
8	4	90	0.220	0.13	2.40	3580	3150	1.00
10	4	90	0.275	0.17	3.00	2865	3150	1.60
12	4	90	0.325	0.22	3.60	2385	3100	2.45
16	4	90	0.435	0.26	4.80	1790	3115	3.90

## Material

Hardened tool steel  
52 - 56 HRC



3	4	80	0.060	0.04	0.90	8490	2040	0.05
4	4	80	0.080	0.06	1.20	6365	2035	0.15
5	4	80	0.100	0.07	1.50	5095	2040	0.20
6	4	80	0.125	0.09	1.80	4245	2125	0.35
8	4	80	0.165	0.11	2.40	3185	2100	0.55
10	4	80	0.205	0.15	3.00	2545	2085	0.95
12	4	80	0.245	0.19	3.60	2120	2080	1.40
16	4	80	0.325	0.22	4.80	1590	2065	2.20

Hardened tool steel  
56 - 60 HRC



3	4	60	0.040	0.03	0.90	6365	1020	0.05
4	4	60	0.050	0.05	1.20	4775	955	0.05
5	4	60	0.065	0.07	1.50	3820	995	0.10
6	4	60	0.075	0.08	1.80	3185	955	0.15
8	4	60	0.100	0.10	2.40	2385	955	0.25
10	4	60	0.125	0.14	3.00	1910	955	0.40
12	4	60	0.155	0.18	3.60	1590	985	0.65
16	4	60	0.205	0.21	4.80	1195	980	1.00

Hardened tool steel  
> 60 HRC



3	4	50	0.030	0.03	0.90	5305	635	0.00
4	4	50	0.040	0.05	1.20	3980	635	0.05
5	4	50	0.050	0.06	1.50	3185	635	0.05
6	4	50	0.060	0.08	1.80	2655	635	0.10
8	4	50	0.080	0.10	2.40	1990	635	0.15
10	4	50	0.100	0.13	3.00	1590	635	0.25
12	4	50	0.120	0.16	3.60	1325	635	0.35
16	4	50	0.160	0.19	4.80	995	635	0.60

Cast iron  
(lamellar / spheroidal)



3	4	150	0.135	0.05	0.90	15915	8595	0.40
4	4	150	0.180	0.08	1.20	11935	8595	0.85
5	4	150	0.225	0.10	1.50	9550	8595	1.30
6	4	150	0.275	0.13	1.80	7960	8755	2.05
8	4	150	0.365	0.16	2.40	5970	8715	3.35
10	4	150	0.455	0.21	3.00	4775	8690	5.45
12	4	150	0.545	0.27	3.60	3980	8675	8.45
16	4	150	0.725	0.32	4.80	2985	8655	13.30

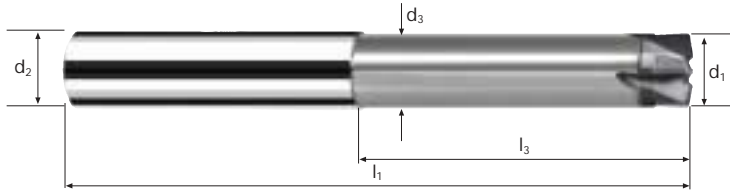
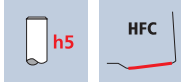


# High feed end mills XFeed

Extra-long version

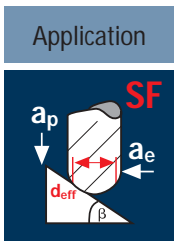


HM	$\lambda$ 0°
XT	$\gamma$ 0°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	HSS GG(G)
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Example: Order-N°. <span style="margin-left: 50px;">Coating: X</span> <span style="margin-left: 50px;">Article-N°: 7608</span> <span style="margin-left: 50px;">α-Code: .180</span>										X-AI	
∅ Code	d1 0/-0.02	d2 h5	d3	l1	l3	ap <sub>max.</sub>	R <sub>theo.</sub>	α	z	X7608	
.180	3	6	2.8	75	27	0.12	0.27	2.5°	4	●	
.220	4	6	3.7	80	36	0.16	0.36	1.5°	4	●	
.260	5	6	4.6	87	45	0.20	0.45	1.0°	4	●	
.300	6	6	5.5	100	63	0.25	0.54	0.0°	4	●	
.391	8	8	7.4	120	83	0.33	0.72	0.0°	4	●	
.450	10	10	9.2	135	94	0.41	0.90	0.0°	4	●	
.501	12	12	11.0	160	114	0.50	1.08	0.0°	4	●	
.610	16	16	15.0	180	131	0.69	1.44	0.0°	4	●	



Material

Hardened tool steel  
52 - 56 HRC

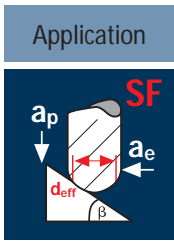
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
4	2	700	0.020	0.014	0.022	2.40	60000	2400	30
5	2	700	0.025	0.016	0.024	2.97	60000	3000	30
6	2	700	0.030	0.018	0.026	3.55	60000	3600	30
8	2	700	0.040	0.020	0.030	4.67	47715	3815	30
10	2	700	0.040	0.022	0.034	5.79	38485	3080	30
12	2	700	0.050	0.026	0.038	6.94	32105	3210	30

Hardened tool steel  
56 - 60 HRC

4	2	650	0.020	0.014	0.022	2.40	60000	2400	30
5	2	650	0.025	0.016	0.024	2.97	60000	3000	30
6	2	650	0.025	0.018	0.026	3.55	58285	2915	30
8	2	650	0.035	0.020	0.030	4.67	44305	3100	30
10	2	650	0.035	0.022	0.034	5.79	35735	2500	30
12	2	650	0.045	0.026	0.038	6.94	29815	2685	30

Hardened tool steel  
> 60 HRC

4	2	600	0.015	0.014	0.022	2.40	60000	1800	30
5	2	600	0.020	0.016	0.024	2.97	60000	2400	30
6	2	600	0.025	0.018	0.026	3.55	53800	2690	30
8	2	600	0.030	0.020	0.030	4.67	40900	2455	30
10	2	600	0.030	0.022	0.034	5.79	32985	1980	30
12	2	600	0.040	0.026	0.038	6.94	27520	2200	30



Material

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
4	2	700	0.020	0.022	0.014	3.72	59900	2395	60
5	2	700	0.025	0.024	0.016	4.63	48125	2405	60
6	2	700	0.030	0.026	0.018	5.55	40150	2410	60
8	2	700	0.040	0.030	0.020	7.37	30235	2420	60
10	2	700	0.040	0.034	0.022	9.18	24275	1940	60
12	2	700	0.050	0.038	0.026	11.00	20255	2025	60

Hardened tool steel  
56 - 60 HRC

4	2	650	0.020	0.022	0.014	3.72	55620	2225	60
5	2	650	0.025	0.024	0.016	4.63	44690	2235	60
6	2	650	0.025	0.026	0.018	5.55	37280	1865	60
8	2	650	0.035	0.030	0.020	7.37	28075	1965	60
10	2	650	0.035	0.034	0.022	9.18	22540	1580	60
12	2	650	0.045	0.038	0.026	11.00	18810	1695	60

Hardened tool steel  
> 60 HRC

4	2	600	0.015	0.022	0.014	3.72	51340	1540	60
5	2	600	0.020	0.024	0.016	4.63	41250	1650	60
6	2	600	0.025	0.026	0.018	5.55	34415	1720	60
8	2	600	0.030	0.030	0.020	7.37	25915	1555	60
10	2	600	0.030	0.034	0.022	9.18	20805	1250	60
12	2	600	0.040	0.038	0.026	11.00	17365	1390	60

# Ball nose end mills Sphero-CBN

Long version



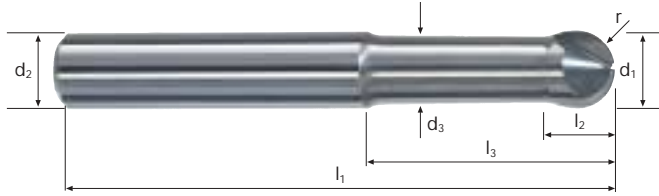
**CBN**     $\lambda$   $0^\circ$   
 $\gamma$   $0^\circ$

**h5**

**d1**

**r**

**F**



HRC 48-56    HRC 56-60    HRC > 60    HSS

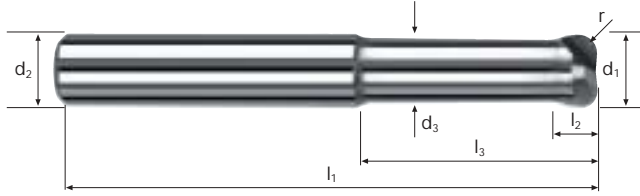
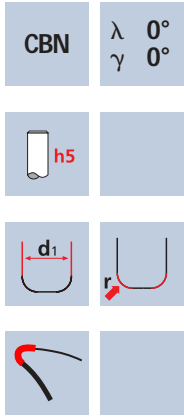
Example: Order-N°.											
		Coating		Article-N°.		α-Code					
				<b>31700</b>		<b>.220</b>					
∅ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	α	Z	<b>31700</b>	
<b>.220</b>	4	6	3.7	80	3.2	12	2.0	3.5°	2	●	
<b>.260</b>	5	6	4.6	80	4.0	15	2.5	1.8°	2	●	
<b>.300</b>	6	6	5.5	80	4.8	20	3.0	0.0°	2	●	
<b>.391</b>	8	8	7.4	100	6.4	26	4.0	0.0°	2	●	
<b>.450</b>	10	10	9.2	100	8.0	31	5.0	0.0°	2	●	
<b>.501</b>	12	12	11.0	120	9.6	37	6.0	0.0°	2	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
	Hardened tool steel 52 - 56 HRC	4	2	650	0.020	0.020	0.040	3.28	60000	2400	r=0.5
		5	2	650	0.025	0.026	0.050	4.32	47895	2395	r=0.5
		6	2	650	0.030	0.030	0.060	5.34	38745	2325	r=0.5
		8	2	650	0.040	0.040	0.080	7.39	28000	2240	r=0.5
		10	2	650	0.050	0.030	0.100	9.34	22155	2215	r=0.5
		12	2	650	0.060	0.036	0.120	11.37	18200	2185	r=0.5
	Hardened tool steel 56 - 60 HRC	4	2	620	0.020	0.020	0.040	3.28	60000	2400	r=0.5
		5	2	620	0.025	0.026	0.050	4.32	45685	2285	r=0.5
		6	2	620	0.030	0.030	0.060	5.34	36960	2220	r=0.5
		8	2	620	0.040	0.040	0.080	7.39	26705	2135	r=0.5
		10	2	620	0.050	0.030	0.100	9.34	21130	2115	r=0.5
		12	2	620	0.060	0.036	0.120	11.37	17360	2085	r=0.5
	Hardened tool steel > 60 HRC	4	2	580	0.020	0.020	0.040	3.28	56290	2250	r=0.5
		5	2	580	0.025	0.026	0.050	4.32	42735	2135	r=0.5
		6	2	580	0.030	0.030	0.060	5.34	34575	2075	r=0.5
		8	2	580	0.040	0.040	0.080	7.39	24985	2000	r=0.5
		10	2	580	0.050	0.030	0.100	9.34	19765	1975	r=0.5
		12	2	580	0.060	0.036	0.120	11.37	16240	1950	r=0.5

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
	Hardened tool steel 52 - 56 HRC	4	2	700	0.020	0.016	0.016	3.86	57725	2310	45
		5	2	700	0.025	0.020	0.020	4.88	45660	2285	45
		6	2	700	0.030	0.022	0.022	5.88	37895	2275	45
		8	2	700	0.040	0.024	0.024	7.89	28240	2260	45
		10	2	700	0.050	0.026	0.026	9.90	22505	2250	45
		12	2	700	0.060	0.032	0.032	11.91	18710	2245	45
	Hardened tool steel 56 - 60 HRC	4	2	650	0.020	0.016	0.016	3.86	53605	2145	45
		5	2	650	0.025	0.020	0.020	4.88	42400	2120	45
		6	2	650	0.030	0.022	0.022	5.88	35190	2110	45
		8	2	650	0.040	0.024	0.024	7.89	26225	2100	45
		10	2	650	0.050	0.026	0.026	9.90	20900	2090	45
		12	2	650	0.060	0.032	0.032	11.91	17375	2085	45
	Hardened tool steel > 60 HRC	4	2	600	0.020	0.016	0.016	3.86	49480	1980	45
		5	2	600	0.025	0.020	0.020	4.88	39140	1955	45
		6	2	600	0.030	0.022	0.022	5.88	32480	1950	45
		8	2	600	0.040	0.024	0.024	7.89	24205	1935	45
		10	2	600	0.050	0.026	0.026	9.90	19290	1930	45
		12	2	600	0.060	0.032	0.032	11.91	16035	1925	45

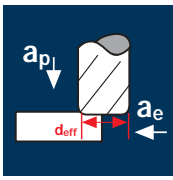
# Corner radius end mills XSpeed-CBN

Long version



Example: Order-N°.										31420		
		Coating	Article-N°.			α-Code					31420	
			31420			.220						
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r 0/+0,015	α	z			
.220	4	6	3.7	80	1.9	12	0.5	3.2°	2	●		
.260	5	6	4.6	80	2.5	15	0.5	1.6°	2	●		
.300	6	6	5.5	80	3.0	20	0.5	0.0°	2	●		
.391	8	8	7.4	100	4.0	26	0.5	0.0°	2	●		
.450	10	10	9.2	100	5.0	31	0.5	0.0°	2	●		
.501	12	12	11.0	120	6.0	37	0.5	0.0°	2	●		

### Application



### Material

Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
4	2	650	0.020	0.020	0.040	2.40	60000	2400	r=1.00
5	2	650	0.025	0.026	0.050	3.01	60000	3000	r=1.25
6	2	650	0.030	0.030	0.060	3.60	57475	3450	r=1.50
8	2	650	0.040	0.040	0.080	4.80	43105	3450	r=2.00
10	2	650	0.050	0.030	0.100	5.77	35860	3585	r=2.50
12	2	650	0.060	0.036	0.120	6.93	29855	3585	r=3.00

Hardened tool steel  
56 - 60 HRC



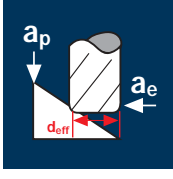
4	2	620	0.020	0.020	0.040	2.40	60000	2400	r=1.00
5	2	620	0.025	0.026	0.050	3.01	60000	3000	r=1.25
6	2	620	0.030	0.030	0.060	3.60	54820	3290	r=1.50
8	2	620	0.040	0.040	0.080	4.80	41115	3290	r=2.00
10	2	620	0.050	0.030	0.100	5.77	34205	3420	r=2.50
12	2	620	0.060	0.036	0.120	6.93	28480	3420	r=3.00

Hardened tool steel  
> 60 HRC



4	2	580	0.020	0.020	0.040	2.40	60000	2400	r=1.00
5	2	580	0.025	0.026	0.050	3.01	60000	3000	r=1.25
6	2	580	0.030	0.030	0.060	3.60	51285	3075	r=1.50
8	2	580	0.040	0.040	0.080	4.80	38465	3075	r=2.00
10	2	580	0.050	0.030	0.100	5.77	31995	3200	r=2.50
12	2	580	0.060	0.036	0.120	6.93	26640	3195	r=3.00

### Application



### Material

Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
4	2	700	0.020	0.016	0.016	3.64	60000	2400	45
5	2	700	0.025	0.020	0.020	4.55	48970	2450	45
6	2	700	0.030	0.022	0.022	5.45	40885	2455	45
8	2	700	0.040	0.024	0.024	7.23	30820	2465	45
10	2	700	0.050	0.026	0.026	9.01	24730	2475	45
12	2	700	0.060	0.032	0.032	10.82	20595	2470	45

Hardened tool steel  
56 - 60 HRC



4	2	650	0.020	0.016	0.016	3.64	56845	2275	45
5	2	650	0.025	0.020	0.020	4.55	45475	2275	45
6	2	650	0.030	0.022	0.022	5.45	37965	2280	45
8	2	650	0.040	0.024	0.024	7.23	28620	2290	45
10	2	650	0.050	0.026	0.026	9.01	22965	2295	45
12	2	650	0.060	0.032	0.032	10.82	19125	2295	45

Hardened tool steel  
> 60 HRC



4	2	600	0.020	0.016	0.016	3.64	52470	2100	45
5	2	600	0.025	0.020	0.020	4.55	41975	2100	45
6	2	600	0.030	0.022	0.022	5.45	35045	2105	45
8	2	600	0.040	0.024	0.024	7.23	26415	2115	45
10	2	600	0.050	0.026	0.026	9.01	21200	2120	45
12	2	600	0.060	0.032	0.032	10.82	17650	2120	45

# Corner radius end mills XSpeed-CBN

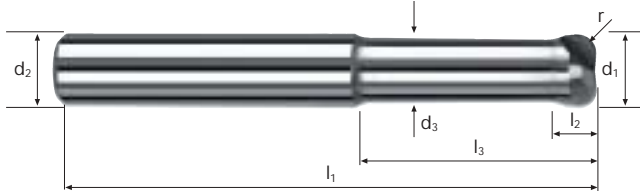
Long version



**CBN**     $\lambda$  0°  
                $\gamma$  0°

h5

d1    r



HRC 48-56    HRC 56-60    HRC > 60    HSS

Example: Order-N°.											
										31410	
$\emptyset$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r 0/+0,015	$\alpha$	z		
.220	4	6	3.7	80	1.9	12	1.00	3.3°	2	●	
.260	5	6	4.6	80	2.5	15	1.25	1.7°	2	●	
.300	6	6	5.5	80	3.0	20	1.50	0.0°	2	●	
.391	8	8	7.4	100	4.0	26	2.00	0.0°	2	●	
.450	10	10	9.2	100	5.0	31	2.50	0.0°	2	●	
.501	12	12	11.0	120	6.0	37	3.00	0.0°	2	●	

**Application**

**Material**

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.016	0.03	0.10	0.24	60000	1920	6.0
0.8	2	140	0.026	0.05	0.16	0.39	60000	3120	25.0
1.0	2	140	0.034	0.06	0.20	0.47	60000	4080	49.0
1.2	2	140	0.040	0.07	0.24	0.56	60000	4800	80.5
1.5	2	140	0.050	0.09	0.30	0.71	60000	6000	162.0
2.0	2	140	0.066	0.12	0.40	0.95	46910	6190	297.0
2.5	2	140	0.084	0.15	0.50	1.19	37450	6290	472.0
2.8	2	140	0.094	0.17	0.56	1.34	33255	6250	595.0
3.0	2	140	0.100	0.18	0.60	1.42	31385	6275	677.5

Hardened tool steel  
48 - 52 HRC

0.5	2	120	0.016	0.03	0.10	0.24	60000	1920	6.0
0.8	2	120	0.024	0.05	0.16	0.39	60000	2880	23.0
1.0	2	120	0.032	0.06	0.20	0.47	60000	3840	46.0
1.2	2	120	0.038	0.07	0.24	0.56	60000	4560	76.5
1.5	2	120	0.048	0.09	0.30	0.71	53800	5165	139.5
2.0	2	120	0.062	0.12	0.40	0.95	40210	4985	239.5
2.5	2	120	0.080	0.15	0.50	1.19	32100	5135	385.0
2.8	2	120	0.090	0.17	0.56	1.34	28505	5130	488.5
3.0	2	120	0.096	0.18	0.60	1.42	26900	5165	558.0

Hardened tool steel  
52 - 56 HRC

0.5	2	100	0.014	0.03	0.10	0.24	60000	1680	5.0
0.8	2	100	0.022	0.05	0.16	0.39	60000	2640	21.0
1.0	2	100	0.030	0.06	0.20	0.47	60000	3600	43.0
1.2	2	100	0.036	0.07	0.24	0.56	56845	4095	69.0
1.5	2	100	0.044	0.09	0.30	0.71	44835	3945	106.5
2.0	2	100	0.058	0.12	0.40	0.95	33505	3885	186.5
2.5	2	100	0.074	0.15	0.50	1.19	26750	3960	297.0
2.8	2	100	0.082	0.17	0.56	1.34	23755	3895	371.0
3.0	2	100	0.088	0.18	0.60	1.42	22415	3945	426.0

Hardened tool steel  
56 - 60 HRC

0.5	2	60	0.012	0.03	0.10	0.24	60000	1440	4.5
0.8	2	60	0.020	0.05	0.16	0.39	48970	1960	15.5
1.0	2	60	0.028	0.06	0.20	0.47	40635	2275	27.5
1.2	2	60	0.032	0.07	0.24	0.56	34105	2185	36.5
1.5	2	60	0.040	0.09	0.30	0.71	26900	2150	58.0
2.0	2	60	0.052	0.12	0.40	0.95	20105	2090	100.5
2.5	2	60	0.068	0.15	0.50	1.19	16050	2185	164.0
2.8	2	60	0.076	0.17	0.56	1.34	14255	2165	206.0
3.0	2	60	0.080	0.18	0.60	1.42	13450	2150	232.0

**Application**

**Material**

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
0.5	2	300	0.020	0.022	0.022	0.47	60000	2400	45
0.8	2	300	0.022	0.034	0.034	0.75	60000	2640	45
1.0	2	300	0.028	0.042	0.042	0.93	60000	3360	45
1.2	2	300	0.030	0.050	0.050	1.12	60000	3600	45
1.5	2	300	0.034	0.064	0.064	1.40	60000	4080	45
2.0	2	300	0.038	0.084	0.084	1.86	51340	3900	45
2.5	2	300	0.040	0.106	0.106	2.33	40985	3280	45
2.8	2	300	0.044	0.118	0.118	2.61	36590	3220	45
3.0	2	300	0.046	0.126	0.126	2.79	34230	3150	45

Hardened tool steel  
48 - 52 HRC

0.5	2	250	0.020	0.022	0.022	0.47	60000	2400	45
0.8	2	250	0.020	0.034	0.034	0.75	60000	2400	45
1.0	2	250	0.026	0.042	0.042	0.93	60000	3120	45
1.2	2	250	0.028	0.050	0.050	1.12	60000	3360	45
1.5	2	250	0.032	0.064	0.064	1.40	56845	3640	45
2.0	2	250	0.036	0.084	0.084	1.86	42785	3080	45
2.5	2	250	0.038	0.106	0.106	2.33	34155	2595	45
2.8	2	250	0.042	0.118	0.118	2.61	30490	2560	45
3.0	2	250	0.044	0.126	0.126	2.79	28525	2510	45

Hardened tool steel  
52 - 56 HRC

0.5	2	200	0.018	0.022	0.022	0.47	60000	2160	45
0.8	2	200	0.020	0.034	0.034	0.75	60000	2400	45
1.0	2	200	0.026	0.042	0.042	0.93	60000	3120	45
1.2	2	200	0.028	0.050	0.050	1.12	56845	3185	45
1.5	2	200	0.030	0.064	0.064	1.40	45475	2730	45
2.0	2	200	0.034	0.084	0.084	1.86	34230	2330	45
2.5	2	200	0.036	0.106	0.106	2.33	27325	1965	45
2.8	2	200	0.040	0.118	0.118	2.61	24390	1950	45
3.0	2	200	0.042	0.126	0.126	2.79	22820	1915	45

Hardened tool steel  
56 - 60 HRC

0.5	2	150	0.016	0.022	0.022	0.47	60000	1920	45
0.8	2	150	0.018	0.034	0.034	0.75	60000	2160	45
1.0	2	150	0.022	0.042	0.042	0.93	51340	2260	45
1.2	2	150	0.024	0.050	0.050	1.12	42630	2045	45
1.5	2	150	0.028	0.064	0.064	1.40	34105	1910	45
2.0	2	150	0.030	0.084	0.084	1.86	25670	1540	45
2.5	2	150	0.032	0.106	0.106	2.33	20495	1310	45
2.8	2	150	0.036	0.118	0.118	2.61	18295	1315	45
3.0	2	150	0.036	0.126	0.126	2.79	17115	1230	45

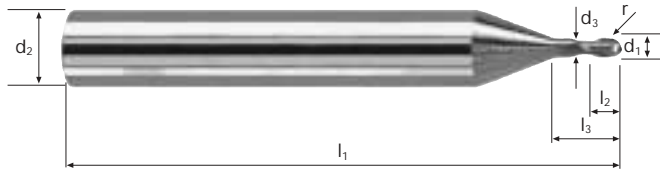
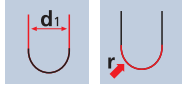


# Ball nose end mills MicroX

Shank  $\varnothing$  6mm, cylindrical neck, 3xd



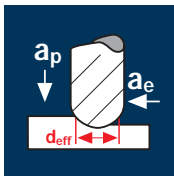
HM  
XA  $\lambda$  30°  
 $\gamma$ -10°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper
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Example: Order-N°.										X-Al	
										X6562	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	Z		
.020	0.2	6	0.18	57	0.2	0.6	0.10	9.7°	2	●	
.030	0.3	6	0.25	57	0.3	0.9	0.15	9.5°	2	●	
.040	0.4	6	0.35	57	0.5	1.2	0.20	9.4°	2	●	
.050	0.5	6	0.45	57	0.6	1.5	0.25	13.3°	2	●	
.060	0.6	6	0.55	57	0.7	1.8	0.30	13.0°	2	●	
.080	0.8	6	0.75	57	0.9	2.4	0.40	12.4°	2	●	
.100	1.0	6	0.95	57	1.2	3.0	0.50	11.8°	2	●	
.108	1.2	6	1.15	57	1.4	3.6	0.60	11.3°	2	●	
.120	1.5	6	1.45	57	1.8	4.5	0.75	10.4°	2	●	
.140	2.0	6	1.95	57	2.4	6.0	1.00	9.0°	2	●	
.152	2.3	6	2.25	57	2.8	6.9	1.15	8.3°	2	●	
.160	2.5	6	2.45	57	3.0	7.5	1.25	7.7°	2	●	
.172	2.8	6	2.75	57	3.4	8.4	1.40	7.0°	2	●	
.180	3.0	6	2.95	57	3.6	9.0	1.50	6.5°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

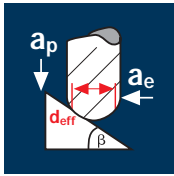
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.016	0.03	0.10	0.24	60000	1920	6.0
0.8	2	140	0.026	0.04	0.16	0.35	60000	3120	20.0
1.0	2	140	0.034	0.05	0.20	0.44	60000	4080	41.0
1.2	2	140	0.040	0.06	0.24	0.52	60000	4800	69.0
1.5	2	140	0.050	0.08	0.30	0.67	60000	6000	144.0
2.0	2	140	0.066	0.10	0.40	0.87	51225	6760	270.5
2.5	2	140	0.084	0.13	0.50	1.11	40150	6745	438.5
2.8	2	140	0.094	0.14	0.56	1.22	36530	6870	538.5
3.0	2	140	0.100	0.15	0.60	1.31	34020	6805	612.5

0.5	2	120	0.016	0.03	0.10	0.24	60000	1920	6.0
0.8	2	120	0.024	0.04	0.16	0.35	60000	2880	18.5
1.0	2	120	0.032	0.05	0.20	0.44	60000	3840	38.5
1.2	2	120	0.038	0.06	0.24	0.52	60000	4560	65.5
1.5	2	120	0.048	0.08	0.30	0.67	57010	5475	131.5
2.0	2	120	0.062	0.10	0.40	0.87	43905	5445	218.0
2.5	2	120	0.080	0.13	0.50	1.11	34415	5505	358.0
2.8	2	120	0.090	0.14	0.56	1.22	31310	5635	442.0
3.0	2	120	0.096	0.15	0.60	1.31	29160	5600	504.0

0.5	2	100	0.014	0.03	0.10	0.24	60000	1680	5.0
0.8	2	100	0.022	0.04	0.16	0.35	60000	2640	17.0
1.0	2	100	0.030	0.05	0.20	0.44	60000	3600	36.0
1.2	2	100	0.036	0.06	0.24	0.52	60000	4320	62.0
1.5	2	100	0.044	0.08	0.30	0.67	47510	4180	100.5
2.0	2	100	0.058	0.10	0.40	0.87	36590	4245	170.0
2.5	2	100	0.074	0.13	0.50	1.11	28675	4245	276.0
2.8	2	100	0.082	0.14	0.56	1.22	26090	4280	335.5
3.0	2	100	0.088	0.15	0.60	1.31	24300	4275	385.0

0.5	2	60	0.012	0.03	0.10	0.24	60000	1440	4.5
0.8	2	60	0.020	0.04	0.16	0.35	54570	2185	14.0
1.0	2	60	0.028	0.05	0.20	0.44	43405	2430	24.5
1.2	2	60	0.032	0.06	0.24	0.52	36730	2350	34.0
1.5	2	60	0.040	0.08	0.30	0.67	28505	2280	54.5
2.0	2	60	0.052	0.10	0.40	0.87	21955	2285	91.5
2.5	2	60	0.068	0.13	0.50	1.11	17205	2340	152.0
2.8	2	60	0.076	0.14	0.56	1.22	15655	2380	186.5
3.0	2	60	0.080	0.15	0.60	1.31	14580	2335	210.0

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
0.5	2	300	0.020	0.020	0.020	0.46	60000	2400	45
0.8	2	300	0.022	0.032	0.032	0.74	60000	2640	45
1.0	2	300	0.028	0.042	0.042	0.93	60000	3360	45
1.2	2	300	0.030	0.050	0.050	1.12	60000	3600	45
1.5	2	300	0.034	0.062	0.062	1.40	60000	4080	45
2.0	2	300	0.038	0.082	0.082	1.86	51340	3900	45
2.5	2	300	0.040	0.102	0.102	2.32	41160	3295	45
2.8	2	300	0.044	0.114	0.114	2.60	36730	3230	45
3.0	2	300	0.046	0.122	0.122	2.79	34230	3150	45

0.5	2	250	0.020	0.020	0.020	0.46	60000	2400	45
0.8	2	250	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	250	0.026	0.042	0.042	0.93	60000	3120	45
1.2	2	250	0.028	0.050	0.050	1.12	60000	3360	45
1.5	2	250	0.032	0.062	0.062	1.40	56845	3640	45
2.0	2	250	0.036	0.082	0.082	1.86	42785	3080	45
2.5	2	250	0.038	0.102	0.102	2.32	34300	2605	45
2.8	2	250	0.042	0.114	0.114	2.60	30610	2570	45
3.0	2	250	0.044	0.122	0.122	2.79	28525	2510	45

0.5	2	200	0.018	0.020	0.020	0.46	60000	2160	45
0.8	2	200	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	200	0.026	0.042	0.042	0.93	60000	3120	45
1.2	2	200	0.028	0.050	0.050	1.12	56845	3185	45
1.5	2	200	0.030	0.062	0.062	1.40	45475	2730	45
2.0	2	200	0.034	0.082	0.082	1.86	34230	2330	45
2.5	2	200	0.036	0.102	0.102	2.32	27440	1975	45
2.8	2	200	0.040	0.114	0.114	2.60	24485	1960	45
3.0	2	200	0.042	0.122	0.122	2.79	22820	1915	45

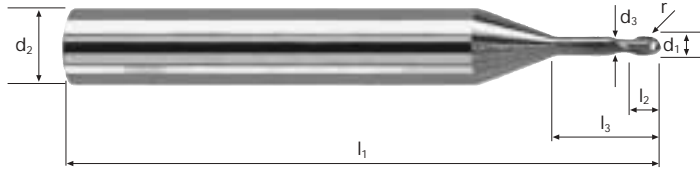
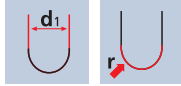
0.5	2	150	0.016	0.020	0.020	0.46	60000	1920	45
0.8	2	150	0.018	0.032	0.032	0.74	60000	2160	45
1.0	2	150	0.022	0.042	0.042	0.93	51340	2260	45
1.2	2	150	0.024	0.050	0.050	1.12	42630	2045	45
1.5	2	150	0.028	0.062	0.062	1.40	34105	1910	45
2.0	2	150	0.030	0.082	0.082	1.86	25670	1540	45
2.5	2	150	0.032	0.102	0.102	2.32	20580	1315	45
2.8	2	150	0.036	0.114	0.114	2.60	18365	1320	45
3.0	2	150	0.036	0.122	0.122	2.79	17115	1230	45

# Ball nose end mills MicroX

Shank  $\varnothing$  6mm, cylindrical neck, 5xd



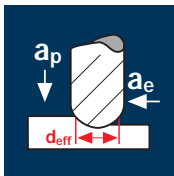
HM  
XA  $\lambda$  30°  
 $\gamma$ -10°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper
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Example: Order-N°.										X-AI	
										X6564	
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	$\alpha$	z		
.050	0.5	6	0.45	57	0.6	2.5	0.25	12.3°	2	●	
.060	0.6	6	0.55	57	0.7	3.0	0.30	11.9°	2	●	
.080	0.8	6	0.75	57	0.9	4.0	0.40	11.0°	2	●	
.100	1.0	6	0.95	57	1.2	5.0	0.50	10.2°	2	●	
.108	1.2	6	1.15	57	1.4	6.0	0.60	9.4°	2	●	
.120	1.5	6	1.45	61	1.8	7.5	0.75	8.4°	2	●	
.140	2.0	6	1.95	61	2.4	10.0	1.00	6.9°	2	●	
.152	2.3	6	2.25	61	2.8	11.5	1.15	6.1°	2	●	
.160	2.5	6	2.45	61	3.0	12.5	1.25	5.6°	2	●	
.172	2.8	6	2.75	61	3.4	14.0	1.40	4.9°	2	●	
.180	3.0	6	2.95	66	3.6	15.0	1.50	4.5°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

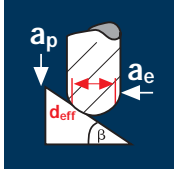
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.016	0.02	0.09	0.20	60000	1920	3.5
0.6	2	140	0.020	0.02	0.11	0.22	60000	2400	5.5
0.8	2	140	0.026	0.03	0.14	0.30	60000	3120	13.0
1.0	2	140	0.034	0.04	0.18	0.39	60000	4080	29.5
1.2	2	140	0.040	0.05	0.22	0.48	60000	4800	53.0
1.5	2	140	0.050	0.06	0.27	0.59	60000	6000	97.0
2.0	2	140	0.066	0.08	0.36	0.78	57135	7540	217.0
2.5	2	140	0.084	0.10	0.45	0.98	45475	7640	344.0
3.0	2	140	0.100	0.12	0.54	1.18	37765	7550	489.5

0.5	2	120	0.016	0.02	0.09	0.20	60000	1920	3.5
0.6	2	120	0.020	0.02	0.11	0.22	60000	2400	5.5
0.8	2	120	0.024	0.03	0.14	0.30	60000	2880	12.0
1.0	2	120	0.032	0.04	0.18	0.39	60000	3840	27.5
1.2	2	120	0.038	0.05	0.22	0.48	60000	4560	50.0
1.5	2	120	0.048	0.06	0.27	0.59	60000	5760	93.5
2.0	2	120	0.062	0.08	0.36	0.78	48970	6070	175.0
2.5	2	120	0.080	0.10	0.45	0.98	38980	6235	280.5
3.0	2	120	0.096	0.12	0.54	1.18	32370	6215	402.5

0.5	2	100	0.014	0.02	0.09	0.20	60000	1680	3.0
0.6	2	100	0.018	0.02	0.11	0.22	60000	2160	5.0
0.8	2	100	0.022	0.03	0.14	0.30	60000	2640	11.0
1.0	2	100	0.030	0.04	0.18	0.39	60000	3600	26.0
1.2	2	100	0.036	0.05	0.22	0.48	60000	4320	47.5
1.5	2	100	0.044	0.06	0.27	0.59	53950	4750	77.0
2.0	2	100	0.058	0.08	0.36	0.78	40810	4735	136.5
2.5	2	100	0.074	0.10	0.45	0.98	32480	4805	216.0
3.0	2	100	0.088	0.12	0.54	1.18	26975	4750	308.0

0.5	2	60	0.012	0.02	0.09	0.20	60000	1440	2.5
0.6	2	60	0.016	0.02	0.11	0.22	60000	1920	4.0
0.8	2	60	0.020	0.03	0.14	0.30	60000	2400	10.0
1.0	2	60	0.028	0.04	0.18	0.39	48970	2740	19.5
1.2	2	60	0.032	0.05	0.22	0.48	39790	2545	28.0
1.5	2	60	0.040	0.06	0.27	0.59	32370	2590	42.0
2.0	2	60	0.052	0.08	0.36	0.78	24485	2545	73.5
2.5	2	60	0.068	0.10	0.45	0.98	19490	2650	119.5
3.0	2	60	0.080	0.12	0.54	1.18	16185	2590	168.0

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
0.5	2	300	0.020	0.020	0.020	0.46	60000	2400	45
0.6	2	300	0.022	0.024	0.024	0.56	60000	2640	45
0.8	2	300	0.024	0.032	0.032	0.74	60000	2880	45
1.0	2	300	0.028	0.040	0.040	0.93	60000	3360	45
1.2	2	300	0.030	0.048	0.048	1.11	60000	3600	45
1.5	2	300	0.034	0.060	0.060	1.39	60000	4080	45
2.0	2	300	0.038	0.080	0.080	1.86	51340	3900	45
2.5	2	300	0.040	0.100	0.100	2.32	41160	3295	45
3.0	2	300	0.046	0.120	0.120	2.78	34350	3160	45

0.5	2	250	0.020	0.020	0.020	0.46	60000	2400	45
0.6	2	250	0.020	0.024	0.024	0.56	60000	2400	45
0.8	2	250	0.022	0.032	0.032	0.74	60000	2640	45
1.0	2	250	0.026	0.040	0.040	0.93	60000	3120	45
1.2	2	250	0.028	0.048	0.048	1.11	60000	3360	45
1.5	2	250	0.032	0.060	0.060	1.39	57250	3665	45
2.0	2	250	0.036	0.080	0.080	1.86	42785	3080	45
2.5	2	250	0.038	0.100	0.100	2.32	34300	2605	45
3.0	2	250	0.044	0.120	0.120	2.78	28625	2520	45

0.5	2	200	0.018	0.020	0.020	0.46	60000	2160	45
0.6	2	200	0.020	0.024	0.024	0.56	60000	2400	45
0.8	2	200	0.022	0.032	0.032	0.74	60000	2640	45
1.0	2	200	0.026	0.040	0.040	0.93	60000	3120	45
1.2	2	200	0.028	0.048	0.048	1.11	57355	3210	45
1.5	2	200	0.030	0.060	0.060	1.39	45800	2750	45
2.0	2	200	0.034	0.080	0.080	1.86	34230	2330	45
2.5	2	200	0.036	0.100	0.100	2.32	27440	1975	45
3.0	2	200	0.042	0.120	0.120	2.78	22900	1925	45

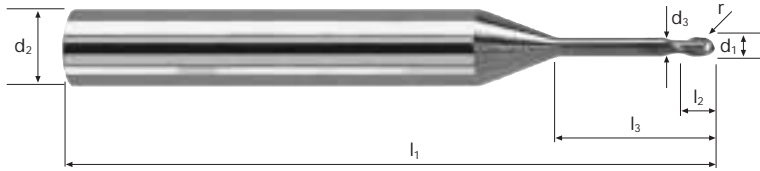
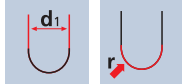
0.5	2	150	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	150	0.018	0.024	0.024	0.56	60000	2160	45
0.8	2	150	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	150	0.022	0.040	0.040	0.93	51340	2260	45
1.2	2	150	0.024	0.048	0.048	1.11	43015	2065	45
1.5	2	150	0.028	0.060	0.060	1.39	34350	1925	45
2.0	2	150	0.030	0.080	0.080	1.86	25670	1540	45
2.5	2	150	0.032	0.100	0.100	2.32	20580	1315	45
3.0	2	150	0.036	0.120	0.120	2.78	17175	1235	45

# Ball nose end mills MicroX

Shank Ø 6mm, cylindrical neck, 8xd



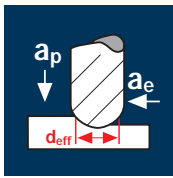
**HM**  $\lambda$  30°  
**XA**  $\gamma$ -10°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome</b> <b>Copper</b>
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Example: Order-N°.										X-AI	
										X6566	
$\emptyset$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	z		
.050	0.5	6	0.45	57	0.6	4.0	0.25	11.1°	2	●	
.060	0.6	6	0.55	57	0.7	4.8	0.30	10.5°	2	●	
.080	0.8	6	0.75	57	0.9	6.4	0.40	9.4°	2	●	
.100	1.0	6	0.95	61	1.2	8.0	0.50	8.4°	2	●	
.108	1.2	6	1.15	61	1.4	9.6	0.60	7.6°	2	●	
.120	1.5	6	1.45	61	1.8	12.0	0.75	6.5°	2	●	
.140	2.0	6	1.95	66	2.4	16.0	1.00	5.1°	2	●	
.160	2.5	6	2.45	69	3.0	20.0	1.25	4.0°	2	●	
.180	3.0	6	2.95	75	3.6	24.0	1.50	3.1°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



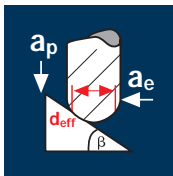
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.016	0.02	0.08	0.20	60000	1920	3.0
0.6	2	140	0.020	0.02	0.10	0.22	60000	2400	5.0
0.8	2	140	0.026	0.03	0.13	0.30	60000	3120	12.0
1.0	2	140	0.034	0.04	0.16	0.39	60000	4080	26.0
1.2	2	140	0.040	0.05	0.19	0.48	60000	4800	45.5
1.5	2	140	0.050	0.06	0.24	0.59	60000	6000	86.5
2.0	2	140	0.066	0.08	0.32	0.78	57135	7540	193.0
2.5	2	140	0.084	0.10	0.40	0.98	45475	7640	305.5
3.0	2	140	0.100	0.12	0.48	1.18	37765	7555	435.0

0.5	2	120	0.016	0.02	0.08	0.20	60000	1920	3.0
0.6	2	120	0.020	0.02	0.10	0.22	60000	2400	5.0
0.8	2	120	0.024	0.03	0.13	0.30	60000	2880	11.0
1.0	2	120	0.032	0.04	0.16	0.39	60000	3840	24.5
1.2	2	120	0.038	0.05	0.19	0.48	60000	4560	43.5
1.5	2	120	0.048	0.06	0.24	0.59	60000	5760	83.0
2.0	2	120	0.062	0.08	0.32	0.78	48970	6070	155.5
2.5	2	120	0.080	0.10	0.40	0.98	38980	6235	249.5
3.0	2	120	0.096	0.12	0.48	1.18	32370	6215	358.0

0.5	2	100	0.014	0.02	0.08	0.20	60000	1680	2.5
0.6	2	100	0.018	0.02	0.10	0.22	60000	2160	4.5
0.8	2	100	0.022	0.03	0.13	0.30	60000	2640	10.5
1.0	2	100	0.030	0.04	0.16	0.39	60000	3600	23.0
1.2	2	100	0.036	0.05	0.19	0.48	60000	4320	41.0
1.5	2	100	0.044	0.06	0.24	0.59	53950	4750	68.5
2.0	2	100	0.058	0.08	0.32	0.78	40810	4735	121.0
2.5	2	100	0.074	0.10	0.40	0.98	32480	4805	192.0
3.0	2	100	0.088	0.12	0.48	1.18	26975	4750	273.5

0.5	2	60	0.012	0.02	0.08	0.20	60000	1440	2.5
0.6	2	60	0.016	0.02	0.10	0.22	60000	1920	4.0
0.8	2	60	0.020	0.03	0.13	0.30	60000	2400	9.5
1.0	2	60	0.028	0.04	0.16	0.39	48970	2740	17.5
1.2	2	60	0.032	0.05	0.19	0.48	39790	2545	24.0
1.5	2	60	0.040	0.06	0.24	0.59	32370	2590	37.5
2.0	2	60	0.052	0.08	0.32	0.78	24485	2545	65.0
2.5	2	60	0.068	0.10	0.40	0.98	19490	2650	106.0
3.0	2	60	0.080	0.12	0.48	1.18	16185	2590	149.0

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.018	0.018	0.018	0.46	60000	2160	45
0.6	2	300	0.020	0.022	0.022	0.55	60000	2400	45
0.8	2	300	0.022	0.028	0.028	0.73	60000	2640	45
1.0	2	300	0.026	0.036	0.036	0.92	60000	3120	45
1.2	2	300	0.028	0.042	0.042	1.10	60000	3360	45
1.5	2	300	0.030	0.052	0.052	1.38	60000	3600	45
2.0	2	300	0.034	0.070	0.070	1.84	51900	3530	45
2.5	2	300	0.036	0.088	0.088	2.29	41700	3000	45
3.0	2	300	0.042	0.106	0.106	2.75	34725	2915	45

0.5	2	250	0.018	0.018	0.018	0.46	60000	2160	45
0.6	2	250	0.020	0.022	0.022	0.55	60000	2400	45
0.8	2	250	0.020	0.028	0.028	0.73	60000	2400	45
1.0	2	250	0.024	0.036	0.036	0.92	60000	2880	45
1.2	2	250	0.026	0.042	0.042	1.10	60000	3120	45
1.5	2	250	0.028	0.052	0.052	1.38	57665	3230	45
2.0	2	250	0.032	0.070	0.070	1.84	43250	2770	45
2.5	2	250	0.034	0.088	0.088	2.29	34750	2365	45
3.0	2	250	0.040	0.106	0.106	2.75	28940	2315	45

0.5	2	200	0.016	0.018	0.018	0.46	60000	1920	45
0.6	2	200	0.018	0.022	0.022	0.55	60000	2160	45
0.8	2	200	0.020	0.028	0.028	0.73	60000	2400	45
1.0	2	200	0.024	0.036	0.036	0.92	60000	2880	45
1.2	2	200	0.026	0.042	0.042	1.10	57875	3010	45
1.5	2	200	0.028	0.052	0.052	1.38	46135	2585	45
2.0	2	200	0.030	0.070	0.070	1.84	34600	2075	45
2.5	2	200	0.032	0.088	0.088	2.29	27800	1780	45
3.0	2	200	0.038	0.106	0.106	2.75	23150	1760	45

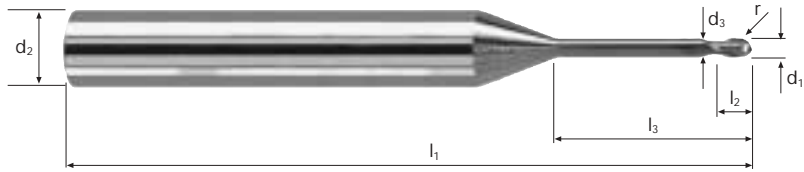
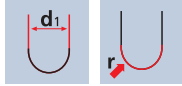
0.5	2	150	0.014	0.018	0.018	0.46	60000	1680	45
0.6	2	150	0.016	0.022	0.022	0.55	60000	1920	45
0.8	2	150	0.018	0.028	0.028	0.73	60000	2160	45
1.0	2	150	0.020	0.036	0.036	0.92	51900	2075	45
1.2	2	150	0.022	0.042	0.042	1.10	43405	1910	45
1.5	2	150	0.024	0.052	0.052	1.38	34600	1660	45
2.0	2	150	0.028	0.070	0.070	1.84	25950	1455	45
2.5	2	150	0.028	0.088	0.088	2.29	20850	1170	45
3.0	2	150	0.034	0.106	0.106	2.75	17365	1180	45

# Ball nose end mills MicroX

Shank Ø 6mm, cylindrical neck, 10xd



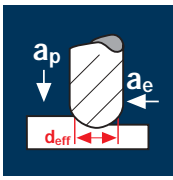
**HM** λ 30°  
**XA** γ-10°



**Rm** < 850   **Rm** 850-1100   **Rm** 1100-1300   **Rm** 1300-1500   **HRC** 48-56   **HRC** 56-60   **HRC** > 60   **Inox** Stainless   **Ti** Titanium   **Cobalt-Chrome** Copper

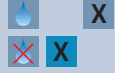
Example: Order-N°.											X-AI	
											X6568	
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	α	z			
.050	0.5	6	0.45	57	0.6	5.0	0.25	10.3°	2	●		
.060	0.6	6	0.55	57	0.7	6.0	0.30	9.7°	2	●		
.080	0.8	6	0.75	61	0.9	8.0	0.40	8.5°	2	●		
.100	1.0	6	0.95	61	1.2	10.0	0.50	7.6°	2	●		
.108	1.2	6	1.15	66	1.4	12.0	0.60	6.7°	2	●		
.120	1.5	6	1.45	66	1.8	15.0	0.75	5.7°	2	●		
.140	2.0	6	1.95	69	2.4	20.0	1.00	4.3°	2	●		
.160	2.5	6	2.45	75	3.0	25.0	1.25	3.3°	2	●		
.180	3.0	6	2.95	80	3.6	30.0	1.50	3.0°	2	●		

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



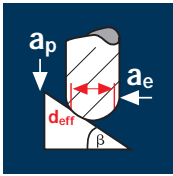
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.020	0.02	0.09	0.20	60000	2400	4.5
0.6	2	140	0.024	0.02	0.11	0.22	60000	2880	6.5
0.8	2	140	0.032	0.03	0.14	0.30	60000	3840	16.0
1.0	2	140	0.040	0.04	0.18	0.39	60000	4800	34.5
1.2	2	140	0.048	0.05	0.22	0.48	60000	5760	63.5
1.5	2	140	0.060	0.06	0.27	0.59	60000	7200	116.5
2.0	2	140	0.080	0.08	0.36	0.78	57135	9140	263.0
2.5	2	140	0.100	0.10	0.45	0.98	45475	9095	409.5
3.0	2	140	0.120	0.12	0.54	1.18	37765	9065	587.5

0.5	2	120	0.020	0.02	0.09	0.20	60000	2400	4.5
0.6	2	120	0.022	0.02	0.11	0.22	60000	2640	6.0
0.8	2	120	0.030	0.03	0.14	0.30	60000	3600	15.0
1.0	2	120	0.038	0.04	0.18	0.39	60000	4560	33.0
1.2	2	120	0.046	0.05	0.22	0.48	60000	5520	60.5
1.5	2	120	0.058	0.06	0.27	0.59	60000	6960	113.0
2.0	2	120	0.076	0.08	0.36	0.78	48970	7445	214.5
2.5	2	120	0.096	0.10	0.45	0.98	38980	7485	337.0
3.0	2	120	0.114	0.12	0.54	1.18	32370	7380	478.0

0.5	2	100	0.018	0.02	0.09	0.20	60000	2160	4.0
0.6	2	100	0.022	0.02	0.11	0.22	60000	2640	6.0
0.8	2	100	0.028	0.03	0.14	0.30	60000	3360	14.0
1.0	2	100	0.036	0.04	0.18	0.39	60000	4320	31.0
1.2	2	100	0.042	0.05	0.22	0.48	60000	5040	55.5
1.5	2	100	0.052	0.06	0.27	0.59	53950	5610	91.0
2.0	2	100	0.070	0.08	0.36	0.78	40810	5715	164.5
2.5	2	100	0.088	0.10	0.45	0.98	32480	5715	257.0
3.0	2	100	0.106	0.12	0.54	1.18	26975	5720	370.5

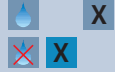
0.5	2	60	0.016	0.02	0.09	0.20	60000	1920	3.5
0.6	2	60	0.020	0.02	0.11	0.22	60000	2400	5.5
0.8	2	60	0.026	0.03	0.14	0.30	60000	3120	13.0
1.0	2	60	0.032	0.04	0.18	0.39	48970	3135	22.5
1.2	2	60	0.038	0.05	0.22	0.48	39790	3025	33.5
1.5	2	60	0.048	0.06	0.27	0.59	32370	3110	50.5
2.0	2	60	0.064	0.08	0.36	0.78	24485	3135	90.5
2.5	2	60	0.080	0.10	0.45	0.98	19490	3120	140.5
3.0	2	60	0.096	0.12	0.54	1.18	16185	3110	201.5

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
0.5	2	300	0.024	0.020	0.020	0.46	60000	2880	45
0.6	2	300	0.026	0.024	0.024	0.56	60000	3120	45
0.8	2	300	0.030	0.032	0.032	0.74	60000	3600	45
1.0	2	300	0.034	0.040	0.040	0.93	60000	4080	45
1.2	2	300	0.036	0.048	0.048	1.11	60000	4320	45
1.5	2	300	0.040	0.060	0.060	1.39	60000	4800	45
2.0	2	300	0.046	0.080	0.080	1.86	51340	4725	45
2.5	2	300	0.048	0.100	0.100	2.32	41160	3950	45
3.0	2	300	0.056	0.120	0.120	2.78	34350	3845	45

0.5	2	250	0.022	0.020	0.020	0.46	60000	2640	45
0.6	2	250	0.024	0.024	0.024	0.56	60000	2880	45
0.8	2	250	0.028	0.032	0.032	0.74	60000	3360	45
1.0	2	250	0.032	0.040	0.040	0.93	60000	3840	45
1.2	2	250	0.034	0.048	0.048	1.11	60000	4080	45
1.5	2	250	0.038	0.060	0.060	1.39	57250	4350	45
2.0	2	250	0.044	0.080	0.080	1.86	42785	3765	45
2.5	2	250	0.046	0.100	0.100	2.32	34300	3155	45
3.0	2	250	0.054	0.120	0.120	2.78	28625	3090	45

0.5	2	200	0.022	0.020	0.020	0.46	60000	2640	45
0.6	2	200	0.024	0.024	0.024	0.56	60000	2880	45
0.8	2	200	0.028	0.032	0.032	0.74	60000	3360	45
1.0	2	200	0.030	0.040	0.040	0.93	60000	3600	45
1.2	2	200	0.032	0.048	0.048	1.11	57355	3670	45
1.5	2	200	0.036	0.060	0.060	1.39	45800	3300	45
2.0	2	200	0.042	0.080	0.080	1.86	34230	2875	45
2.5	2	200	0.044	0.100	0.100	2.32	27440	2415	45
3.0	2	200	0.050	0.120	0.120	2.78	22900	2290	45

0.5	2	150	0.020	0.020	0.020	0.46	60000	2400	45
0.6	2	150	0.020	0.024	0.024	0.56	60000	2400	45
0.8	2	150	0.024	0.032	0.032	0.74	60000	2880	45
1.0	2	150	0.028	0.040	0.040	0.93	51340	2875	45
1.2	2	150	0.028	0.048	0.048	1.11	43015	2410	45
1.5	2	150	0.032	0.060	0.060	1.39	34350	2200	45
2.0	2	150	0.036	0.080	0.080	1.86	25670	1850	45
2.5	2	150	0.038	0.100	0.100	2.32	20580	1565	45
3.0	2	150	0.044	0.120	0.120	2.78	17175	1510	45

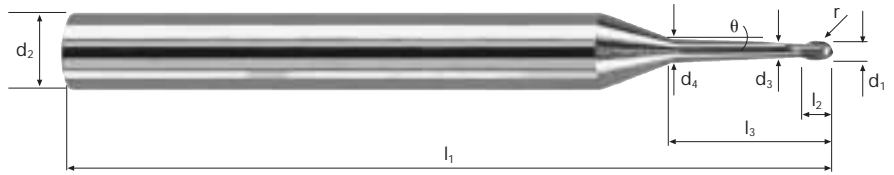


# Ball nose end mills MicroX

Shank  $\varnothing$  6mm, conical neck 0.9°, 8xd



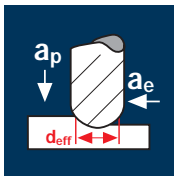
**HM XA**  $\lambda$  30°  
 $\gamma$ -10°



**Rm < 850** **Rm 850-1100** **Rm 1100-1300** **Rm 1300-1500** **HRC 48-56** **HRC 56-60** **HRC > 60** **Inox Stainless** **Ti Titanium** **Cobalt-Chrome Copper**

Example: Order-N°.												X-Al			
				Coating <b>X</b>	Article-N°. <b>6766</b>										
$\varnothing$ Code	$d_1$ 0/-0.01	$d_2$ h5	$d_3$	$d_4$	$l_1$	$l_2$	$l_3$	$\theta$	$r$ $\pm 0.005$	$\alpha$	$z$				
.050	0.5	6	0.45	0.56	57	0.40	4.0	0.9°	0.25	11.2°	2	●			
.060	0.6	6	0.55	0.68	57	0.50	4.8	0.9°	0.30	10.6°	2	●			
.080	0.8	6	0.75	0.93	57	0.65	6.4	0.9°	0.40	9.6°	2	●			
.100	1.0	6	0.95	1.18	61	0.80	8.0	0.9°	0.50	8.6°	2	●			
.108	1.2	6	1.15	1.42	61	1.00	9.6	0.9°	0.60	7.8°	2	●			
.120	1.5	6	1.45	1.79	61	1.20	12.0	0.9°	0.75	6.7°	2	●			
.140	2.0	6	1.95	2.41	66	1.60	16.0	0.9°	1.00	5.3°	2	●			
.160	2.5	6	2.45	3.03	69	2.00	20.0	0.9°	1.25	4.2°	2	●			
.180	3.0	6	2.95	3.64	75	2.40	24.0	0.9°	1.50	3.2°	2	●			

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

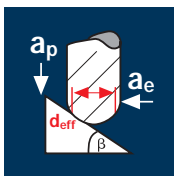
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d_eff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.020	0.02	0.08	0.20	60000	2400	4.0
0.6	2	140	0.024	0.02	0.10	0.22	60000	2880	6.0
0.8	2	140	0.032	0.03	0.13	0.30	60000	3840	15.0
1.0	2	140	0.040	0.04	0.16	0.39	60000	4800	30.5
1.2	2	140	0.048	0.05	0.19	0.48	60000	5760	54.5
1.5	2	140	0.060	0.06	0.24	0.59	60000	7200	103.5
2.0	2	140	0.080	0.08	0.32	0.78	57135	9140	234.0
2.5	2	140	0.100	0.10	0.40	0.98	45475	9095	364.0
3.0	2	140	0.120	0.12	0.48	1.18	37765	9065	522.0

0.5	2	120	0.020	0.02	0.08	0.20	60000	2400	4.0
0.6	2	120	0.022	0.02	0.10	0.22	60000	2640	5.5
0.8	2	120	0.030	0.03	0.13	0.30	60000	3600	14.0
1.0	2	120	0.038	0.04	0.16	0.39	60000	4560	29.0
1.2	2	120	0.046	0.05	0.19	0.48	60000	5520	52.5
1.5	2	120	0.058	0.06	0.24	0.59	60000	6960	100.0
2.0	2	120	0.076	0.08	0.32	0.78	48970	7445	190.5
2.5	2	120	0.096	0.10	0.40	0.98	38980	7485	299.5
3.0	2	120	0.114	0.12	0.48	1.18	32370	7380	425.0

0.5	2	100	0.018	0.02	0.08	0.20	60000	2160	3.5
0.6	2	100	0.022	0.02	0.10	0.22	60000	2640	5.5
0.8	2	100	0.028	0.03	0.13	0.30	60000	3360	13.0
1.0	2	100	0.036	0.04	0.16	0.39	60000	4320	27.5
1.2	2	100	0.042	0.05	0.19	0.48	60000	5040	48.0
1.5	2	100	0.052	0.06	0.24	0.59	53950	5610	81.0
2.0	2	100	0.070	0.08	0.32	0.78	40810	5715	146.5
2.5	2	100	0.088	0.10	0.40	0.98	32480	5715	228.5
3.0	2	100	0.106	0.12	0.48	1.18	26975	5720	329.5

0.5	2	60	0.016	0.02	0.08	0.20	60000	1920	3.0
0.6	2	60	0.020	0.02	0.10	0.22	60000	2400	5.0
0.8	2	60	0.026	0.03	0.13	0.30	60000	3120	12.0
1.0	2	60	0.032	0.04	0.16	0.39	48970	3135	20.0
1.2	2	60	0.038	0.05	0.19	0.48	39790	3025	28.5
1.5	2	60	0.048	0.06	0.24	0.59	32370	3110	45.0
2.0	2	60	0.064	0.08	0.32	0.78	24485	3135	80.5
2.5	2	60	0.080	0.10	0.40	0.98	19490	3120	125.0
3.0	2	60	0.096	0.12	0.48	1.18	16185	3110	179.0

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d_eff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
0.5	2	300	0.022	0.018	0.018	0.46	60000	2640	45
0.6	2	300	0.024	0.022	0.022	0.55	60000	2880	45
0.8	2	300	0.026	0.028	0.028	0.73	60000	3120	45
1.0	2	300	0.032	0.036	0.036	0.92	60000	3840	45
1.2	2	300	0.034	0.042	0.042	1.10	60000	4080	45
1.5	2	300	0.038	0.052	0.052	1.38	60000	4560	45
2.0	2	300	0.042	0.070	0.070	1.84	51900	4360	45
2.5	2	300	0.044	0.088	0.088	2.29	41700	3670	45
3.0	2	300	0.050	0.106	0.106	2.75	34725	3475	45

0.5	2	250	0.020	0.018	0.018	0.46	60000	2400	45
0.6	2	250	0.022	0.022	0.022	0.55	60000	2640	45
0.8	2	250	0.024	0.028	0.028	0.73	60000	2880	45
1.0	2	250	0.030	0.036	0.036	0.92	60000	3600	45
1.2	2	250	0.032	0.042	0.042	1.10	60000	3840	45
1.5	2	250	0.036	0.052	0.052	1.38	57665	4150	45
2.0	2	250	0.040	0.070	0.070	1.84	43250	3460	45
2.5	2	250	0.042	0.088	0.088	2.29	34750	2920	45
3.0	2	250	0.048	0.106	0.106	2.75	28940	2780	45

0.5	2	200	0.020	0.018	0.018	0.46	60000	2400	45
0.6	2	200	0.022	0.022	0.022	0.55	60000	2640	45
0.8	2	200	0.024	0.028	0.028	0.73	60000	2880	45
1.0	2	200	0.028	0.036	0.036	0.92	60000	3360	45
1.2	2	200	0.030	0.042	0.042	1.10	57875	3475	45
1.5	2	200	0.034	0.052	0.052	1.38	46135	3135	45
2.0	2	200	0.038	0.070	0.070	1.84	34600	2630	45
2.5	2	200	0.040	0.088	0.088	2.29	27800	2225	45
3.0	2	200	0.046	0.106	0.106	2.75	23150	2130	45

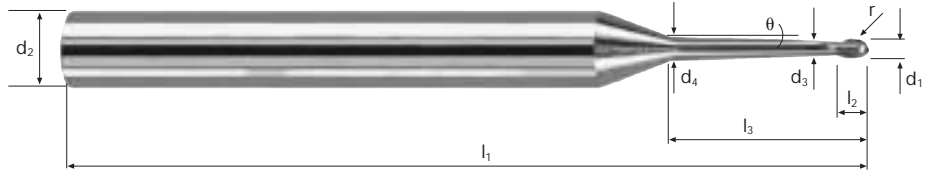
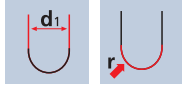
0.5	2	150	0.018	0.018	0.018	0.46	60000	2160	45
0.6	2	150	0.020	0.022	0.022	0.55	60000	2400	45
0.8	2	150	0.020	0.028	0.028	0.73	60000	2400	45
1.0	2	150	0.026	0.036	0.036	0.92	51900	2700	45
1.2	2	150	0.028	0.042	0.042	1.10	43405	2430	45
1.5	2	150	0.030	0.052	0.052	1.38	34600	2075	45
2.0	2	150	0.034	0.070	0.070	1.84	25950	1765	45
2.5	2	150	0.036	0.088	0.088	2.29	20850	1500	45
3.0	2	150	0.040	0.106	0.106	2.75	17365	1390	45

# Ball nose end mills MicroX

Shank  $\varnothing$  6mm, conical neck 0.9°, 10xd



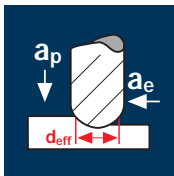
**HM**  $\lambda$  30°  
**XA**  $\gamma$ -10°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome</b> <b>Copper</b>
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Example: Order-N°.												X-Al	
												X6768	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	d4	l1	l2	l3	$\theta$	r $\pm 0.005$	$\alpha$	Z		
.050	0.5	6	0.45	0.60	57	0.40	5.0	0.9°	0.25	10.5°	2	●	
.060	0.6	6	0.55	0.73	57	0.50	6.0	0.9°	0.30	9.9°	2	●	
.080	0.8	6	0.75	0.99	61	0.65	8.0	0.9°	0.40	8.8°	2	●	
.100	1.0	6	0.95	1.25	61	0.80	10.0	0.9°	0.50	7.8°	2	●	
.108	1.2	6	1.15	1.51	66	1.00	12.0	0.9°	0.60	7.0°	2	●	
.120	1.5	6	1.45	1.90	66	1.20	15.0	0.9°	0.75	5.9°	2	●	
.140	2.0	6	1.95	2.55	69	1.60	20.0	0.9°	1.00	4.5°	2	●	
.160	2.5	6	2.45	3.19	75	2.00	25.0	0.9°	1.25	3.5°	2	●	
.180	3.0	6	2.95	3.84	75	2.40	30.0	0.9°	1.50	2.7°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

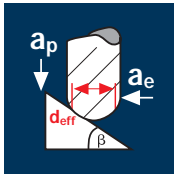
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.015	0.02	0.07	0.20	60000	1800	2.5
0.8	2	140	0.025	0.02	0.11	0.25	60000	3000	6.5
1.0	2	140	0.030	0.03	0.14	0.34	60000	3600	15.0
1.2	2	140	0.035	0.04	0.17	0.43	60000	4200	28.5
1.5	2	140	0.045	0.05	0.21	0.54	60000	5400	56.5
2.0	2	140	0.055	0.06	0.28	0.68	60000	6600	111.0
2.5	2	140	0.070	0.08	0.35	0.88	50640	7090	198.5
3.0	2	140	0.085	0.09	0.42	1.02	43690	7425	280.5

0.5	2	120	0.014	0.02	0.07	0.20	60000	1680	2.5
0.8	2	120	0.024	0.02	0.11	0.25	60000	2880	6.5
1.0	2	120	0.028	0.03	0.14	0.34	60000	3360	14.0
1.2	2	120	0.034	0.04	0.17	0.43	60000	4080	27.5
1.5	2	120	0.042	0.05	0.21	0.54	60000	5040	53.0
2.0	2	120	0.052	0.06	0.28	0.68	56175	5840	98.0
2.5	2	120	0.066	0.08	0.35	0.88	43405	5730	160.5
3.0	2	120	0.080	0.09	0.42	1.02	37450	5990	226.5

0.5	2	100	0.014	0.02	0.07	0.20	60000	1680	2.5
0.8	2	100	0.022	0.02	0.11	0.25	60000	2640	6.0
1.0	2	100	0.026	0.03	0.14	0.34	60000	3120	13.0
1.2	2	100	0.030	0.04	0.17	0.43	60000	3600	24.5
1.5	2	100	0.040	0.05	0.21	0.54	58950	4715	49.5
2.0	2	100	0.048	0.06	0.28	0.68	46810	4495	75.5
2.5	2	100	0.062	0.08	0.35	0.88	36175	4485	125.5
3.0	2	100	0.074	0.09	0.42	1.02	31210	4620	174.5

0.5	2	60	0.012	0.02	0.07	0.20	60000	1440	2.0
0.8	2	60	0.020	0.02	0.11	0.25	60000	2400	5.5
1.0	2	60	0.024	0.03	0.14	0.34	56175	2695	11.5
1.2	2	60	0.028	0.04	0.17	0.43	44415	2485	17.0
1.5	2	60	0.036	0.05	0.21	0.54	35370	2545	26.5
2.0	2	60	0.044	0.06	0.28	0.68	28085	2470	41.5
2.5	2	60	0.056	0.08	0.35	0.88	21705	2430	68.0
3.0	2	60	0.068	0.09	0.42	1.02	18725	2545	96.0

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.018	0.016	0.016	0.46	60000	2160	45
0.8	2	300	0.020	0.024	0.024	0.72	60000	2400	45
1.0	2	300	0.026	0.030	0.030	0.91	60000	3120	45
1.2	2	300	0.028	0.036	0.036	1.09	60000	3360	45
1.5	2	300	0.030	0.046	0.046	1.36	60000	3600	45
2.0	2	300	0.034	0.060	0.060	1.81	52760	3590	45
2.5	2	300	0.036	0.076	0.076	2.27	42070	3030	45
3.0	2	300	0.042	0.090	0.090	2.72	35110	2950	45

0.5	2	250	0.018	0.016	0.016	0.46	60000	2160	45
0.8	2	250	0.020	0.024	0.024	0.72	60000	2400	45
1.0	2	250	0.024	0.030	0.030	0.91	60000	2880	45
1.2	2	250	0.026	0.036	0.036	1.09	60000	3120	45
1.5	2	250	0.028	0.046	0.046	1.36	58515	3275	45
2.0	2	250	0.032	0.060	0.060	1.81	43965	2815	45
2.5	2	250	0.034	0.076	0.076	2.27	35055	2385	45
3.0	2	250	0.040	0.090	0.090	2.72	29255	2340	45

0.5	2	200	0.016	0.016	0.016	0.46	60000	1920	45
0.8	2	200	0.018	0.024	0.024	0.72	60000	2160	45
1.0	2	200	0.024	0.030	0.030	0.91	60000	2880	45
1.2	2	200	0.026	0.036	0.036	1.09	58405	3035	45
1.5	2	200	0.028	0.046	0.046	1.36	46810	2620	45
2.0	2	200	0.030	0.060	0.060	1.81	35175	2110	45
2.5	2	200	0.032	0.076	0.076	2.27	28045	1795	45
3.0	2	200	0.038	0.090	0.090	2.72	23405	1780	45

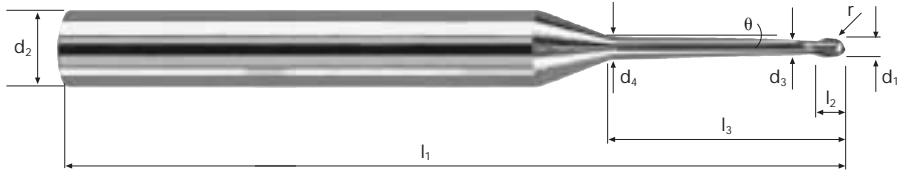
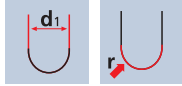
0.5	2	150	0.014	0.016	0.016	0.46	60000	1680	45
0.8	2	150	0.016	0.024	0.024	0.72	60000	1920	45
1.0	2	150	0.020	0.030	0.030	0.91	52470	2100	45
1.2	2	150	0.022	0.036	0.036	1.09	43805	1925	45
1.5	2	150	0.024	0.046	0.046	1.36	35110	1685	45
2.0	2	150	0.028	0.060	0.060	1.81	26380	1475	45
2.5	2	150	0.028	0.076	0.076	2.27	21035	1180	45
3.0	2	150	0.034	0.090	0.090	2.72	17555	1195	45

# Ball nose end mills MicroX

Shank  $\varnothing$  6mm, conical neck 0.9°, 12xd



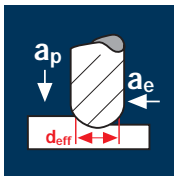
HM  
XA  $\lambda$  30°  
 $\gamma$ -10°



Rm < 850   Rm 850-1100   Rm 1100-1300   Rm 1300-1500   HRC 48-56   HRC 56-60   HRC > 60   Inox Stainless   Ti Titanium   Cobalt-Chrome Copper

Example: Order-N°. <span style="margin-left: 20px;">Coating: X</span> <span style="margin-left: 20px;">Article-N°: 6770</span> <span style="margin-left: 20px;">α-Code: .050</span>												X-Al	
∅ Code	d1 0/-0.01	d2 h5	d3	d4	l1	l2	l3	θ	r ±0.005	α	Z	X6770	
.050	0.5	6	0.45	0.62	57	0.40	6.0	0.9°	0.25	9.9°	2	●	
.080	0.8	6	0.75	1.03	61	0.65	9.6	0.9°	0.40	8.0°	2	●	
.100	1.0	6	0.95	1.30	66	0.80	12.0	0.9°	0.50	7.1°	2	●	
.108	1.2	6	1.15	1.57	66	1.00	14.4	0.9°	0.60	6.2°	2	●	
.120	1.5	6	1.45	1.98	69	1.20	18.0	0.9°	0.75	5.2°	2	●	
.140	2.0	6	1.95	2.66	75	1.60	24.0	0.9°	1.00	4.0°	2	●	
.160	2.5	6	2.45	3.34	80	2.00	30.0	0.9°	1.25	3.0°	2	●	
.180	3.0	6	2.95	4.02	87	2.40	36.0	0.9°	1.50	2.3°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

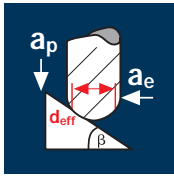
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.015	0.02	0.06	0.20	60000	1800	2.0
0.8	2	140	0.025	0.02	0.10	0.25	60000	3000	6.0
1.0	2	140	0.030	0.03	0.12	0.34	60000	3600	13.0
1.2	2	140	0.035	0.04	0.14	0.43	60000	4200	23.5
1.5	2	140	0.045	0.05	0.18	0.54	60000	5400	48.5
2.0	2	140	0.055	0.06	0.24	0.68	60000	6600	95.0
2.5	2	140	0.070	0.08	0.30	0.88	50640	7090	170.0
3.0	2	140	0.085	0.09	0.36	1.02	43690	7425	240.5

0.5	2	120	0.014	0.02	0.06	0.20	60000	1680	2.0
0.8	2	120	0.024	0.02	0.10	0.25	60000	2880	6.0
1.0	2	120	0.028	0.03	0.12	0.34	60000	3360	12.0
1.2	2	120	0.034	0.04	0.14	0.43	60000	4080	23.0
1.5	2	120	0.042	0.05	0.18	0.54	60000	5040	45.5
2.0	2	120	0.052	0.06	0.24	0.68	56175	5840	84.0
2.5	2	120	0.066	0.08	0.30	0.88	43405	5730	137.5
3.0	2	120	0.080	0.09	0.36	1.02	37450	5990	194.0

0.5	2	100	0.014	0.02	0.06	0.20	60000	1680	2.0
0.8	2	100	0.022	0.02	0.10	0.25	60000	2640	5.5
1.0	2	100	0.026	0.03	0.12	0.34	60000	3120	11.0
1.2	2	100	0.030	0.04	0.14	0.43	60000	3600	20.0
1.5	2	100	0.040	0.05	0.18	0.54	58950	4715	42.5
2.0	2	100	0.048	0.06	0.24	0.68	46810	4495	64.5
2.5	2	100	0.062	0.08	0.30	0.88	36175	4485	107.5
3.0	2	100	0.074	0.09	0.36	1.02	31210	4620	149.5

0.5	2	60	0.012	0.02	0.06	0.20	60000	1440	1.5
0.8	2	60	0.020	0.02	0.10	0.25	60000	2400	5.0
1.0	2	60	0.024	0.03	0.12	0.34	56175	2695	9.5
1.2	2	60	0.028	0.04	0.14	0.43	44415	2485	14.0
1.5	2	60	0.036	0.05	0.18	0.54	35370	2545	23.0
2.0	2	60	0.044	0.06	0.24	0.68	28085	2470	35.5
2.5	2	60	0.056	0.08	0.30	0.88	21705	2430	58.5
3.0	2	60	0.068	0.09	0.36	1.02	18725	2545	82.5

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.018	0.012	0.012	0.44	60000	2160	45
0.8	2	300	0.020	0.020	0.020	0.71	60000	2400	45
1.0	2	300	0.026	0.026	0.026	0.90	60000	3120	45
1.2	2	300	0.028	0.030	0.030	1.07	60000	3360	45
1.5	2	300	0.030	0.038	0.038	1.34	60000	3600	45
2.0	2	300	0.034	0.050	0.050	1.79	53350	3630	45
2.5	2	300	0.036	0.062	0.062	2.23	42825	3085	45
3.0	2	300	0.042	0.076	0.076	2.68	35635	2995	45

0.5	2	250	0.018	0.012	0.012	0.44	60000	2160	45
0.8	2	250	0.020	0.020	0.020	0.71	60000	2400	45
1.0	2	250	0.024	0.026	0.026	0.90	60000	2880	45
1.2	2	250	0.026	0.030	0.030	1.07	60000	3120	45
1.5	2	250	0.028	0.038	0.038	1.34	59390	3325	45
2.0	2	250	0.032	0.050	0.050	1.79	44460	2845	45
2.5	2	250	0.034	0.062	0.062	2.23	35685	2425	45
3.0	2	250	0.040	0.076	0.076	2.68	29695	2375	45

0.5	2	200	0.016	0.012	0.012	0.44	60000	1920	45
0.8	2	200	0.018	0.020	0.020	0.71	60000	2160	45
1.0	2	200	0.024	0.026	0.026	0.90	60000	2880	45
1.2	2	200	0.026	0.030	0.030	1.07	59500	3095	45
1.5	2	200	0.028	0.038	0.038	1.34	47510	2660	45
2.0	2	200	0.030	0.050	0.050	1.79	35565	2135	45
2.5	2	200	0.032	0.062	0.062	2.23	28550	1825	45
3.0	2	200	0.038	0.076	0.076	2.68	23755	1805	45

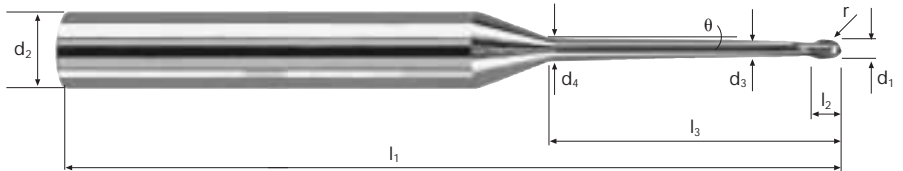
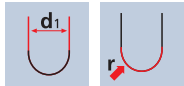
0.5	2	150	0.014	0.012	0.012	0.44	60000	1680	45
0.8	2	150	0.016	0.020	0.020	0.71	60000	1920	45
1.0	2	150	0.020	0.026	0.026	0.90	53055	2120	45
1.2	2	150	0.022	0.030	0.030	1.07	44625	1965	45
1.5	2	150	0.024	0.038	0.038	1.34	35635	1710	45
2.0	2	150	0.028	0.050	0.050	1.79	26675	1495	45
2.5	2	150	0.028	0.062	0.062	2.23	21410	1200	45
3.0	2	150	0.034	0.076	0.076	2.68	17815	1210	45

# Ball nose end mills MicroX

Shank  $\varnothing$  6mm, conical neck 0.9°, 15xd



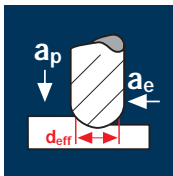
<b>HM XA</b>	$\lambda$ 30° $\gamma$ -10°
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<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome Copper</b>
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Example: Order-N°.											X-AI		
		Coating <b>X</b>	Article-N°. <b>6772</b>	α-Code <b>.050</b>							<input type="text" value=""/>	<b>X6772</b>	
Ø Code	d1 0/-0.01	d2 h5	d3	d4	l1	l2	l3	θ	r ±0.005	α	Z		
<b>.050</b>	0.5	6	0.45	0.67	61	0.40	7.5	0.9°	0.25	9.1°	2	●	
<b>.080</b>	0.8	6	0.75	1.11	66	0.65	12.0	0.9°	0.40	7.2°	2	●	
<b>.100</b>	1.0	6	0.95	1.40	66	0.80	15.0	0.9°	0.50	6.2°	2	●	
<b>.108</b>	1.2	6	1.15	1.69	69	1.00	18.0	0.9°	0.60	5.4°	2	●	
<b>.120</b>	1.5	6	1.45	2.12	75	1.20	22.5	0.9°	0.75	4.4°	2	●	
<b>.140</b>	2.0	6	1.95	2.85	80	1.60	30.0	0.9°	1.00	3.3°	2	●	
<b>.160</b>	2.5	6	2.45	3.58	87	2.00	37.5	0.9°	1.25	2.5°	2	●	
<b>.180</b>	3.0	6	2.95	4.30	100	2.40	45.0	0.9°	1.50	1.9°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	140	0.006	0.01	0.04	0.09	60000	720	0.5
0.5	2	140	0.012	0.04	0.10	0.27	60000	1440	6.0
0.8	2	140	0.020	0.06	0.16	0.42	60000	2400	23.0
1.0	2	140	0.026	0.07	0.20	0.51	60000	3120	43.5
1.2	2	140	0.030	0.08	0.24	0.60	60000	3600	69.0
1.5	2	140	0.038	0.11	0.30	0.78	57135	4340	143.0
2.0	2	140	0.050	0.14	0.40	1.02	43690	4370	244.5
2.5	2	140	0.062	0.18	0.50	1.29	34545	4285	385.5
3.0	2	140	0.076	0.21	0.60	1.53	29125	4425	557.5

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	120	0.006	0.01	0.04	0.09	60000	720	0.5
0.5	2	120	0.012	0.04	0.10	0.27	60000	1440	6.0
0.8	2	120	0.020	0.06	0.16	0.42	60000	2400	23.0
1.0	2	120	0.024	0.07	0.20	0.51	60000	2880	40.5
1.2	2	120	0.028	0.08	0.24	0.60	60000	3360	64.5
1.5	2	120	0.036	0.11	0.30	0.78	48970	3525	116.5
2.0	2	120	0.048	0.14	0.40	1.02	37450	3595	201.5
2.5	2	120	0.058	0.18	0.50	1.29	29610	3435	309.0
3.0	2	120	0.072	0.21	0.60	1.53	24965	3595	453.0

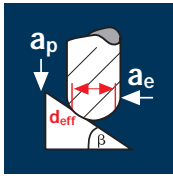
Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	100	0.006	0.01	0.04	0.09	60000	720	0.5
0.5	2	100	0.010	0.04	0.10	0.27	60000	1200	5.0
0.8	2	100	0.018	0.06	0.16	0.42	60000	2160	20.5
1.0	2	100	0.022	0.07	0.20	0.51	60000	2640	37.0
1.2	2	100	0.026	0.08	0.24	0.60	53055	2760	53.0
1.5	2	100	0.034	0.11	0.30	0.78	40810	2775	91.5
2.0	2	100	0.044	0.14	0.40	1.02	31210	2745	153.5
2.5	2	100	0.054	0.18	0.50	1.29	24675	2665	240.0
3.0	2	100	0.066	0.21	0.60	1.53	20805	2745	346.0

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	60	0.004	0.01	0.04	0.09	60000	480	0.0
0.5	2	60	0.010	0.04	0.10	0.27	60000	1200	5.0
0.8	2	60	0.016	0.06	0.16	0.42	45475	1455	14.0
1.0	2	60	0.020	0.07	0.20	0.51	37450	1500	21.0
1.2	2	60	0.024	0.08	0.24	0.60	31830	1530	29.5
1.5	2	60	0.030	0.11	0.30	0.78	24485	1470	48.5
2.0	2	60	0.040	0.14	0.40	1.02	18725	1500	84.0
2.5	2	60	0.050	0.18	0.50	1.29	14805	1480	133.0
3.0	2	60	0.060	0.21	0.60	1.53	12485	1500	189.0

## Application



## Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.2	2	300	0.008	0.008	0.008	0.19	60000	960	45
0.5	2	300	0.016	0.022	0.022	0.47	60000	1920	45
0.8	2	300	0.018	0.034	0.034	0.75	60000	2160	45
1.0	2	300	0.022	0.044	0.044	0.93	60000	2640	45
1.2	2	300	0.024	0.052	0.052	1.12	60000	2880	45
1.5	2	300	0.028	0.064	0.064	1.40	60000	3360	45
2.0	2	300	0.030	0.086	0.086	1.87	51065	3065	45
2.5	2	300	0.032	0.108	0.108	2.33	40985	2625	45
3.0	2	300	0.036	0.128	0.128	2.80	34105	2455	45

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.2	2	250	0.008	0.008	0.008	0.19	60000	960	45
0.5	2	250	0.016	0.022	0.022	0.47	60000	1920	45
0.8	2	250	0.018	0.034	0.034	0.75	60000	2160	45
1.0	2	250	0.020	0.044	0.044	0.93	60000	2400	45
1.2	2	250	0.022	0.052	0.052	1.12	60000	2640	45
1.5	2	250	0.026	0.064	0.064	1.40	56845	2955	45
2.0	2	250	0.028	0.086	0.086	1.87	42555	2385	45
2.5	2	250	0.030	0.108	0.108	2.33	34155	2050	45
3.0	2	250	0.034	0.128	0.128	2.80	28420	1935	45

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.2	2	200	0.008	0.008	0.008	0.19	60000	960	45
0.5	2	200	0.014	0.022	0.022	0.47	60000	1680	45
0.8	2	200	0.016	0.034	0.034	0.75	60000	1920	45
1.0	2	200	0.020	0.044	0.044	0.93	60000	2400	45
1.2	2	200	0.022	0.052	0.052	1.12	56845	2500	45
1.5	2	200	0.026	0.064	0.064	1.40	45475	2365	45
2.0	2	200	0.028	0.086	0.086	1.87	34045	1905	45
2.5	2	200	0.028	0.108	0.108	2.33	27325	1530	45
3.0	2	200	0.032	0.128	0.128	2.80	22735	1455	45

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.2	2	150	0.006	0.008	0.008	0.19	60000	720	45
0.5	2	150	0.012	0.022	0.022	0.47	60000	1440	45
0.8	2	150	0.014	0.034	0.034	0.75	60000	1680	45
1.0	2	150	0.018	0.044	0.044	0.93	51340	1850	45
1.2	2	150	0.020	0.052	0.052	1.12	42630	1705	45
1.5	2	150	0.022	0.064	0.064	1.40	34105	1500	45
2.0	2	150	0.024	0.086	0.086	1.87	25535	1225	45
2.5	2	150	0.026	0.108	0.108	2.33	20495	1065	45
3.0	2	150	0.028	0.128	0.128	2.80	17055	955	45

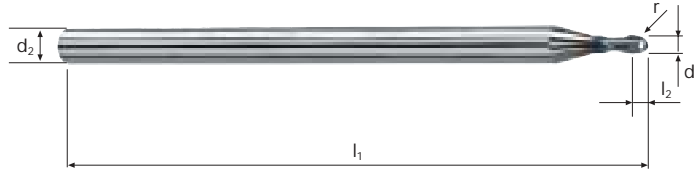
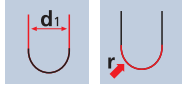


# Ball nose end mills Microcut-B1H

Shank  $\varnothing$  3mm, 1xd



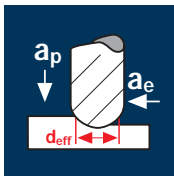
**HM**  
**XA**     $\lambda$  30°  
               $\gamma$ -10°



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	
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Example: Order-N°.									DURO-S	
		Coating <b>D</b>	Article-N°. <b>15781</b>		α-Code <b>.020</b>				<b>D15781</b>	
∅ Code	d1 0/-0.01	d2 h5	l1	l2	r ±0.005	α	Z			
.020	0.2	3	40	0.24	0.10	14.7°	2	●		
.030	0.3	3	40	0.36	0.15	14.3°	2	●		
.040	0.4	3	40	0.48	0.20	14.1°	2	●		
.050	0.5	3	40	0.60	0.25	14.0°	2	●		
.060	0.6	3	40	0.72	0.30	13.8°	2	●		
.080	0.8	3	40	0.96	0.40	13.1°	2	●		
.100	1.0	3	50	1.20	0.50	12.6°	2	●		
.108	1.2	3	50	1.40	0.60	12.1°	2	●		
.120	1.5	3	50	1.80	0.75	10.9°	2	●		
.140	2.0	3	50	2.40	1.00	8.6°	2	●		
.160	2.5	3	50	3.00	1.25	5.3°	2	●		
.180	3.0	3	50	3.60	1.50	0.0°	2	●		

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

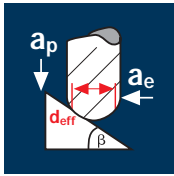
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.2	2	180	0.008	0.02	0.04	0.12	60000	960	1.0
0.5	2	180	0.018	0.04	0.10	0.27	60000	2160	8.5
0.8	2	180	0.028	0.06	0.16	0.42	60000	3360	32.5
1.0	2	180	0.036	0.08	0.20	0.54	60000	4320	69.0
1.2	2	180	0.042	0.10	0.24	0.66	60000	5040	121.0
1.5	2	180	0.054	0.12	0.30	0.81	60000	6480	233.5
2.0	2	180	0.072	0.16	0.40	1.09	52565	7570	484.5
2.5	2	180	0.090	0.20	0.50	1.36	42130	7585	758.5
3.0	2	180	0.108	0.24	0.60	1.63	35150	7590	1093.0

0.2	2	160	0.008	0.02	0.04	0.12	60000	960	1.0
0.5	2	160	0.016	0.04	0.10	0.27	60000	1920	7.5
0.8	2	160	0.026	0.06	0.16	0.42	60000	3120	30.0
1.0	2	160	0.032	0.08	0.20	0.54	60000	3840	61.5
1.2	2	160	0.038	0.10	0.24	0.66	60000	4560	109.5
1.5	2	160	0.048	0.12	0.30	0.81	60000	5760	207.5
2.0	2	160	0.064	0.16	0.40	1.09	46725	5980	382.5
2.5	2	160	0.082	0.20	0.50	1.36	37450	6140	614.0
3.0	2	160	0.098	0.24	0.60	1.63	31245	6125	882.0

0.2	2	80	0.008	0.02	0.04	0.12	60000	960	1.0
0.5	2	80	0.016	0.04	0.10	0.27	60000	1920	7.5
0.8	2	80	0.026	0.06	0.16	0.42	60000	3120	30.0
1.0	2	80	0.032	0.08	0.20	0.54	47160	3020	48.5
1.2	2	80	0.038	0.10	0.24	0.66	38585	2930	70.5
1.5	2	80	0.048	0.12	0.30	0.81	31440	3020	108.5
2.0	2	80	0.064	0.16	0.40	1.09	23365	2990	191.5
2.5	2	80	0.082	0.20	0.50	1.36	18725	3070	307.0
3.0	2	80	0.098	0.24	0.60	1.63	15625	3065	441.5

0.2	2	60	0.006	0.02	0.04	0.12	60000	720	0.5
0.5	2	60	0.012	0.04	0.10	0.27	60000	1440	6.0
0.8	2	60	0.020	0.06	0.16	0.42	45475	1820	17.5
1.0	2	60	0.026	0.08	0.20	0.54	35370	1840	29.5
1.2	2	60	0.030	0.10	0.24	0.66	28940	1735	41.5
1.5	2	60	0.038	0.12	0.30	0.81	23580	1790	64.5
2.0	2	60	0.050	0.16	0.40	1.09	17520	1750	112.0
2.5	2	60	0.064	0.20	0.50	1.36	14045	1800	180.0
3.0	2	60	0.076	0.24	0.60	1.63	11715	1780	256.5

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.2	2	300	0.010	0.008	0.008	0.19	60000	1200	45
0.5	2	300	0.020	0.022	0.022	0.47	60000	2400	45
0.8	2	300	0.022	0.034	0.034	0.75	60000	2640	45
1.0	2	300	0.028	0.042	0.042	0.93	60000	3360	45
1.2	2	300	0.030	0.050	0.050	1.12	60000	3600	45
1.5	2	300	0.034	0.064	0.064	1.40	60000	4080	45
2.0	2	300	0.038	0.084	0.084	1.86	51340	3900	45
2.5	2	300	0.040	0.106	0.106	2.33	40985	3280	45
3.0	2	300	0.046	0.126	0.126	2.79	34230	3150	45

0.2	2	250	0.010	0.008	0.008	0.19	60000	1200	45
0.5	2	250	0.018	0.022	0.022	0.47	60000	2160	45
0.8	2	250	0.020	0.034	0.034	0.75	60000	2400	45
1.0	2	250	0.026	0.042	0.042	0.93	60000	3120	45
1.2	2	250	0.028	0.050	0.050	1.12	60000	3360	45
1.5	2	250	0.030	0.064	0.064	1.40	56845	3410	45
2.0	2	250	0.034	0.084	0.084	1.86	42785	2910	45
2.5	2	250	0.036	0.106	0.106	2.33	34155	2460	45
3.0	2	250	0.042	0.126	0.126	2.79	28525	2395	45

0.2	2	120	0.008	0.008	0.008	0.19	60000	960	45
0.5	2	120	0.016	0.022	0.022	0.47	60000	1920	45
0.8	2	120	0.018	0.034	0.034	0.75	50930	1835	45
1.0	2	120	0.022	0.042	0.042	0.93	41075	1805	45
1.2	2	120	0.024	0.050	0.050	1.12	34105	1635	45
1.5	2	120	0.028	0.064	0.064	1.40	27285	1530	45
2.0	2	120	0.030	0.084	0.084	1.86	20535	1230	45
2.5	2	120	0.032	0.106	0.106	2.33	16395	1050	45
3.0	2	120	0.036	0.126	0.126	2.79	13690	985	45

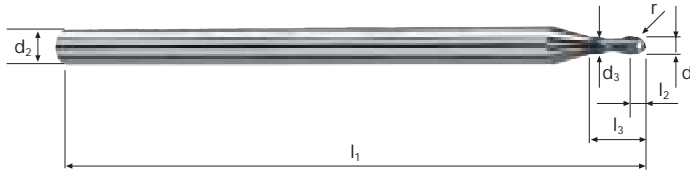
0.2	2	100	0.008	0.008	0.008	0.19	60000	960	45
0.5	2	100	0.014	0.022	0.022	0.47	60000	1680	45
0.8	2	100	0.016	0.034	0.034	0.75	42445	1360	45
1.0	2	100	0.020	0.042	0.042	0.93	34230	1370	45
1.2	2	100	0.022	0.050	0.050	1.12	28420	1250	45
1.5	2	100	0.024	0.064	0.064	1.40	22735	1090	45
2.0	2	100	0.026	0.084	0.084	1.86	17115	890	45
2.5	2	100	0.028	0.106	0.106	2.33	13660	765	45
3.0	2	100	0.032	0.126	0.126	2.79	11410	730	45

# Ball nose end mills Microcut-B3

Shank  $\varnothing$  3mm, cylindrical neck, 3xd



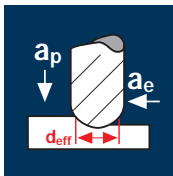
**HM**  $\lambda$  30°  
**Micro**  $\gamma$  5°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **Cobalt-Chrome** Gold / Platinum Copper

Example: Order-N°.										MICRO	
										M5782	
$\varnothing$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r ±0.01	$\alpha$	z		
.020	0.2	3	0.18	40	0.2	0.6	0.10	10.0°	2	●	
.030	0.3	3	0.25	40	0.3	0.9	0.15	10.0°	2	●	
.040	0.4	3	0.35	40	0.5	1.2	0.20	9.0°	2	●	
.050	0.5	3	0.45	40	0.6	1.5	0.25	12.0°	2	●	
.060	0.6	3	0.55	40	0.7	1.8	0.30	12.0°	2	●	
.080	0.8	3	0.75	40	0.9	2.4	0.40	11.0°	2	●	
.100	1.0	3	0.95	50	1.2	3.0	0.50	10.0°	2	●	
.108	1.2	3	1.15	50	1.4	3.6	0.60	9.0°	2	●	
.120	1.5	3	1.45	50	1.8	4.5	0.75	7.0°	2	●	
.140	2.0	3	1.95	50	2.4	6.0	1.00	5.0°	2	●	
.160	2.5	3	2.45	50	3.0	7.5	1.25	2.0°	2	●	
.180	3.0	3	2.95	50	3.6	9.0	1.50	0.0°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	$v_c$ [m/min]	$f_z$ [mm]	$a_p$ [mm]	$a_e$ [mm]	$d_{eff}$ [mm]	n [min <sup>-1</sup> ]	$v_f$ [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.012	0.03	0.10	0.24	60000	1440	4.5
0.6	2	140	0.016	0.04	0.12	0.30	60000	1920	9.0
0.8	2	140	0.020	0.05	0.16	0.39	60000	2400	19.0
1.0	2	140	0.026	0.06	0.20	0.47	60000	3120	37.5
1.2	2	140	0.030	0.07	0.24	0.56	60000	3600	60.5
1.5	2	140	0.038	0.09	0.30	0.71	60000	4560	123.0
2.0	2	140	0.050	0.12	0.40	0.95	46910	4690	225.0
2.5	2	140	0.062	0.15	0.50	1.19	37450	4645	348.5
3.0	2	140	0.076	0.18	0.60	1.42	31385	4770	515.0

Hardened tool steel  
48 - 52 HRC

0.5	2	120	0.012	0.03	0.10	0.24	60000	1440	4.5
0.6	2	120	0.016	0.04	0.12	0.30	60000	1920	9.0
0.8	2	120	0.020	0.05	0.16	0.39	60000	2400	19.0
1.0	2	120	0.024	0.06	0.20	0.47	60000	2880	34.5
1.2	2	120	0.028	0.07	0.24	0.56	60000	3360	56.5
1.5	2	120	0.036	0.09	0.30	0.71	53800	3875	104.5
2.0	2	120	0.048	0.12	0.40	0.95	40210	3860	185.5
2.5	2	120	0.058	0.15	0.50	1.19	32100	3725	279.5
3.0	2	120	0.072	0.18	0.60	1.42	26900	3875	418.5

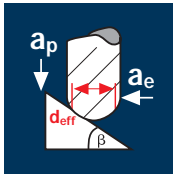
Hardened tool steel  
52 - 56 HRC

0.5	2	100	0.010	0.03	0.10	0.24	60000	1200	3.5
0.6	2	100	0.014	0.04	0.12	0.30	60000	1680	8.0
0.8	2	100	0.018	0.05	0.16	0.39	60000	2160	17.5
1.0	2	100	0.022	0.06	0.20	0.47	60000	2640	31.5
1.2	2	100	0.026	0.07	0.24	0.56	56845	2955	49.5
1.5	2	100	0.034	0.09	0.30	0.71	44835	3050	82.5
2.0	2	100	0.044	0.12	0.40	0.95	33505	2950	141.5
2.5	2	100	0.054	0.15	0.50	1.19	26750	2890	217.0
3.0	2	100	0.066	0.18	0.60	1.42	22415	2960	319.5

Hardened tool steel  
56 - 60 HRC

0.5	2	60	0.010	0.03	0.10	0.24	60000	1200	3.5
0.6	2	60	0.012	0.04	0.12	0.30	60000	1440	7.0
0.8	2	60	0.016	0.05	0.16	0.39	48970	1565	12.5
1.0	2	60	0.020	0.06	0.20	0.47	40635	1625	19.5
1.2	2	60	0.024	0.07	0.24	0.56	34105	1635	27.5
1.5	2	60	0.030	0.09	0.30	0.71	26900	1615	43.5
2.0	2	60	0.040	0.12	0.40	0.95	20105	1610	77.5
2.5	2	60	0.050	0.15	0.50	1.19	16050	1605	120.5
3.0	2	60	0.060	0.18	0.60	1.42	13450	1615	174.5

## Application



## Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	$v_c$ [m/min]	$f_z$ [mm]	$a_p$ [mm]	$a_e$ [mm]	$d_{eff}$ [mm]	n [min <sup>-1</sup> ]	$v_f$ [mm/min]	$\beta$
0.5	2	300	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	300	0.018	0.024	0.024	0.56	60000	2160	45
0.8	2	300	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	300	0.022	0.042	0.042	0.93	60000	2640	45
1.2	2	300	0.024	0.050	0.050	1.12	60000	2880	45
1.5	2	300	0.028	0.062	0.062	1.40	60000	3360	45
2.0	2	300	0.030	0.082	0.082	1.86	51340	3080	45
2.5	2	300	0.032	0.102	0.102	2.32	41160	2635	45
3.0	2	300	0.036	0.122	0.122	2.79	34230	2465	45

Hardened tool steel  
48 - 52 HRC

0.5	2	250	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	250	0.018	0.024	0.024	0.56	60000	2160	45
0.8	2	250	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	250	0.020	0.042	0.042	0.93	60000	2400	45
1.2	2	250	0.022	0.050	0.050	1.12	60000	2640	45
1.5	2	250	0.026	0.062	0.062	1.40	56845	2955	45
2.0	2	250	0.028	0.082	0.082	1.86	42785	2395	45
2.5	2	250	0.030	0.102	0.102	2.32	34300	2060	45
3.0	2	250	0.034	0.122	0.122	2.79	28525	1940	45

Hardened tool steel  
52 - 56 HRC

0.5	2	200	0.014	0.020	0.020	0.46	60000	1680	45
0.6	2	200	0.016	0.024	0.024	0.56	60000	1920	45
0.8	2	200	0.018	0.032	0.032	0.74	60000	2160	45
1.0	2	200	0.020	0.042	0.042	0.93	60000	2400	45
1.2	2	200	0.022	0.050	0.050	1.12	56845	2500	45
1.5	2	200	0.026	0.062	0.062	1.40	45475	2365	45
2.0	2	200	0.028	0.082	0.082	1.86	34230	1915	45
2.5	2	200	0.028	0.102	0.102	2.32	27440	1535	45
3.0	2	200	0.032	0.122	0.122	2.79	22820	1460	45

Hardened tool steel  
56 - 60 HRC

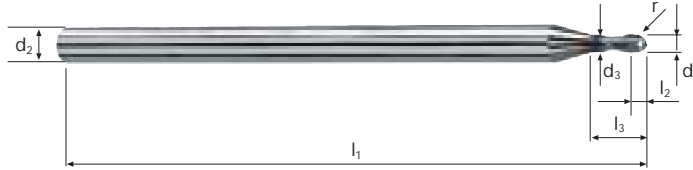
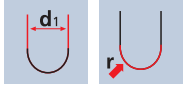
0.5	2	150	0.012	0.020	0.020	0.46	60000	1440	45
0.6	2	150	0.014	0.024	0.024	0.56	60000	1680	45
0.8	2	150	0.016	0.032	0.032	0.74	60000	1920	45
1.0	2	150	0.018	0.042	0.042	0.93	51340	1850	45
1.2	2	150	0.020	0.050	0.050	1.12	42630	1705	45
1.5	2	150	0.022	0.062	0.062	1.40	34105	1500	45
2.0	2	150	0.024	0.082	0.082	1.86	25670	1230	45
2.5	2	150	0.026	0.102	0.102	2.32	20580	1070	45
3.0	2	150	0.028	0.122	0.122	2.79	17115	960	45

# Ball nose end mills Microcut-B3H

Shank  $\varnothing$  3mm, cylindrical neck, 3xd



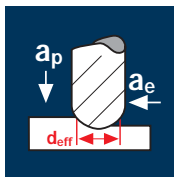
<b>HM</b> <b>XA</b>	$\lambda$ <b>30°</b> $\gamma$ - <b>10°</b>
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<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium
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Example: Order-N°.											DURO-S	
											<b>D5792</b>	
Coating <b>D</b>			Article-N°. <b>5792</b>			α-Code <b>.050</b>						
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	α	z			
.050	0.5	3	0.45	40	0.6	1.5	0.25	11.7°	2	●		
.060	0.6	3	0.55	40	0.7	1.8	0.30	11.2°	2	●		
.080	0.8	3	0.75	40	1.0	2.4	0.40	10.1°	2	●		
.100	1.0	3	0.95	50	1.2	3.0	0.50	9.0°	2	●		
.108	1.2	3	1.15	50	1.4	3.6	0.60	7.9°	2	●		
.120	1.5	3	1.45	50	1.8	4.5	0.75	6.4°	2	●		
.140	2.0	3	1.95	50	2.4	6.0	1.00	4.1°	2	●		
.160	2.5	3	2.45	50	3.0	7.5	1.25	2.0°	2	●		
.180	3.0	3	2.95	50	3.6	9.0	1.50	0.0°	2	●		

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	120	0.014	0.03	0.10	0.24	60000	1680	5.0
0.6	2	120	0.018	0.04	0.12	0.30	60000	2160	10.5
0.8	2	120	0.022	0.05	0.16	0.39	60000	2640	21.0
1.0	2	120	0.028	0.06	0.20	0.47	60000	3360	40.5
1.2	2	120	0.034	0.07	0.24	0.56	60000	4080	68.5
1.5	2	120	0.042	0.09	0.30	0.71	53800	4520	122.0
2.0	2	120	0.058	0.12	0.40	0.95	40210	4665	224.0
2.5	2	120	0.072	0.15	0.50	1.19	32100	4620	346.5
3.0	2	120	0.086	0.18	0.60	1.42	26900	4625	499.5

Steel  
850 - 1100 N/mm<sup>2</sup>

0.5	2	80	0.012	0.03	0.10	0.24	60000	1440	4.5
0.6	2	80	0.016	0.04	0.12	0.30	60000	1920	9.0
0.8	2	80	0.020	0.05	0.16	0.39	60000	2400	19.0
1.0	2	80	0.026	0.06	0.20	0.47	54180	2815	34.0
1.2	2	80	0.030	0.07	0.24	0.56	45475	2730	46.0
1.5	2	80	0.038	0.09	0.30	0.71	35865	2725	73.5
2.0	2	80	0.052	0.12	0.40	0.95	26805	2790	134.0
2.5	2	80	0.064	0.15	0.50	1.19	21400	2740	205.5
3.0	2	80	0.078	0.18	0.60	1.42	17935	2800	302.5

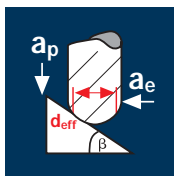
Unalloyed copper

0.5	2	230	0.016	0.03	0.10	0.24	60000	1920	6.0
0.6	2	230	0.020	0.04	0.12	0.30	60000	2400	11.5
0.8	2	230	0.024	0.05	0.16	0.39	60000	2880	23.0
1.0	2	230	0.030	0.06	0.20	0.47	60000	3600	43.0
1.2	2	230	0.038	0.07	0.24	0.56	60000	4560	76.5
1.5	2	230	0.046	0.09	0.30	0.71	60000	5520	149.0
2.0	2	230	0.064	0.12	0.40	0.95	60000	7680	368.5
2.5	2	230	0.080	0.15	0.50	1.19	60000	9600	720.0
3.0	2	230	0.094	0.18	0.60	1.42	51560	9695	1047.0

Wrought aluminium  
alloys Si < 6%

0.5	2	480	0.016	0.03	0.10	0.24	60000	1920	6.0
0.6	2	480	0.020	0.04	0.12	0.30	60000	2400	11.5
0.8	2	480	0.024	0.05	0.16	0.39	60000	2880	23.0
1.0	2	480	0.030	0.06	0.20	0.47	60000	3600	43.0
1.2	2	480	0.038	0.07	0.24	0.56	60000	4560	76.5
1.5	2	480	0.046	0.09	0.30	0.71	60000	5520	149.0
2.0	2	480	0.064	0.12	0.40	0.95	60000	7680	368.5
2.5	2	480	0.080	0.15	0.50	1.19	60000	9600	720.0
3.0	2	480	0.094	0.18	0.60	1.42	60000	11280	1218.0

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	220	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	220	0.018	0.024	0.024	0.56	60000	2160	45
0.8	2	220	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	220	0.022	0.040	0.040	0.93	60000	2640	45
1.2	2	220	0.024	0.048	0.048	1.11	60000	2880	45
1.5	2	220	0.028	0.060	0.060	1.39	50380	2820	45
2.0	2	220	0.030	0.080	0.080	1.86	37650	2260	45
2.5	2	220	0.032	0.100	0.100	2.32	30185	1930	45
3.0	2	220	0.036	0.120	0.120	2.78	25190	1815	45

Steel  
850 - 1100 N/mm<sup>2</sup>

0.5	2	150	0.014	0.020	0.020	0.46	60000	1680	45
0.6	2	150	0.016	0.024	0.024	0.56	60000	1920	45
0.8	2	150	0.018	0.032	0.032	0.74	60000	2160	45
1.0	2	150	0.020	0.040	0.040	0.93	51340	2055	45
1.2	2	150	0.022	0.048	0.048	1.11	43015	1895	45
1.5	2	150	0.026	0.060	0.060	1.39	34350	1785	45
2.0	2	150	0.028	0.080	0.080	1.86	25670	1440	45
2.5	2	150	0.028	0.100	0.100	2.32	20580	1150	45
3.0	2	150	0.032	0.120	0.120	2.78	17175	1100	45

Unalloyed copper

0.5	2	400	0.018	0.020	0.020	0.46	60000	2160	45
0.6	2	400	0.020	0.024	0.024	0.56	60000	2400	45
0.8	2	400	0.022	0.032	0.032	0.74	60000	2640	45
1.0	2	400	0.024	0.040	0.040	0.93	60000	2880	45
1.2	2	400	0.026	0.048	0.048	1.11	60000	3120	45
1.5	2	400	0.030	0.060	0.060	1.39	60000	3600	45
2.0	2	400	0.034	0.080	0.080	1.86	60000	4080	45
2.5	2	400	0.036	0.100	0.100	2.32	54885	3950	45
3.0	2	400	0.040	0.120	0.120	2.78	45800	3665	45

Wrought aluminium  
alloys Si < 6%

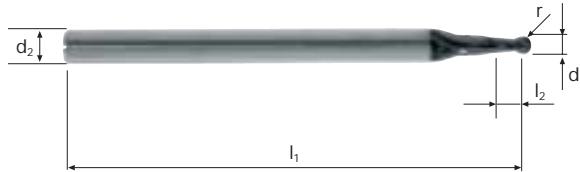
0.5	2	650	0.018	0.020	0.020	0.46	60000	2160	45
0.6	2	650	0.020	0.024	0.024	0.56	60000	2400	45
0.8	2	650	0.022	0.032	0.032	0.74	60000	2640	45
1.0	2	650	0.024	0.040	0.040	0.93	60000	2880	45
1.2	2	650	0.026	0.048	0.048	1.11	60000	3120	45
1.5	2	650	0.030	0.060	0.060	1.39	60000	3600	45
2.0	2	650	0.034	0.080	0.080	1.86	60000	4080	45
2.5	2	650	0.036	0.100	0.100	2.32	60000	4320	45
3.0	2	650	0.040	0.120	0.120	2.78	60000	4800	45

# Ball nose end mills

Shank  $\varnothing$  3mm, 3xd



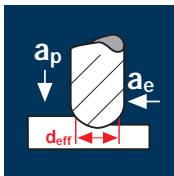
HM  $\lambda$  30°  
 $\gamma$  10°



Rm < 850    Rm 850-1100    Rm 1100-1300    **Inox** Stainless    **Ti** Titanium    **Copper Aluminium**

Example: Order-N°.										MICRO	
										5785	M45785
$\varnothing$ Code	d1 ±0.01	d2 h6	l1	l2	r ±0.01	$\alpha$	Z				
.030	0.3	3	39	1.0	0.15	9.0°	2	●	●	●	●
.040	0.4	3	39	1.0	0.20	9.0°	2	●	●	●	●
.050	0.5	3	39	1.5	0.25	9.0°	2	●	●	●	●
.060	0.6	3	39	1.5	0.30	9.0°	2	●	●	●	●
.070	0.7	3	39	2.0	0.35	8.0°	2	●	●	●	●
.080	0.8	3	39	2.0	0.40	8.0°	2	●	●	●	●
.090	0.9	3	39	2.5	0.45	8.0°	2	●	●	●	●
.100	1.0	3	39	3.0	0.50	7.0°	2	●	●	●	●
.108	1.2	3	39	4.0	0.60	6.0°	2	●	●	●	●
.120	1.5	3	39	4.0	0.75	6.0°	2	●	●	●	●
.130	1.8	3	39	5.0	0.90	6.0°	2	●	●	●	●
.140	2.0	3	39	5.0	1.00	6.0°	2	●	●	●	●
.160	2.5	3	39	7.0	1.25	3.0°	2	●	●	●	●
.180	3.0	4	44	10.0	1.50	3.0°	2	●	●	●	●

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

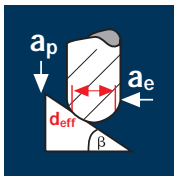
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	180	0.018	0.04	0.10	0.27	60000	2160	8.5
0.6	2	180	0.022	0.04	0.12	0.30	60000	2640	12.5
0.8	2	180	0.028	0.06	0.16	0.42	60000	3360	32.5
1.0	2	180	0.036	0.07	0.20	0.51	60000	4320	60.5
1.2	2	180	0.042	0.08	0.24	0.60	60000	5040	97.0
1.5	2	180	0.054	0.11	0.30	0.78	60000	6480	214.0
2.0	2	180	0.072	0.14	0.40	1.02	56175	8090	453.0
2.5	2	180	0.090	0.18	0.50	1.29	44415	7995	719.5
3.0	2	180	0.108	0.21	0.60	1.53	37450	8090	1019.5

0.5	2	160	0.016	0.04	0.10	0.27	60000	1920	7.5
0.6	2	160	0.020	0.04	0.12	0.30	60000	2400	11.5
0.8	2	160	0.026	0.06	0.16	0.42	60000	3120	30.0
1.0	2	160	0.032	0.07	0.20	0.51	60000	3840	54.0
1.2	2	160	0.038	0.08	0.24	0.60	60000	4560	87.5
1.5	2	160	0.048	0.11	0.30	0.78	60000	5760	190.0
2.0	2	160	0.064	0.14	0.40	1.02	49930	6390	358.0
2.5	2	160	0.082	0.18	0.50	1.29	39480	6475	583.0
3.0	2	160	0.098	0.21	0.60	1.53	33290	6525	822.0

0.5	2	80	0.016	0.04	0.10	0.27	60000	1920	7.5
0.6	2	80	0.020	0.04	0.12	0.30	60000	2400	11.5
0.8	2	80	0.026	0.06	0.16	0.42	60000	3120	30.0
1.0	2	80	0.032	0.07	0.20	0.51	49930	3195	44.5
1.2	2	80	0.038	0.08	0.24	0.60	42445	3225	62.0
1.5	2	80	0.048	0.11	0.30	0.78	32650	3135	103.5
2.0	2	80	0.064	0.14	0.40	1.02	24965	3195	179.0
2.5	2	80	0.082	0.18	0.50	1.29	19740	3235	291.0
3.0	2	80	0.098	0.21	0.60	1.53	16645	3260	411.0

0.5	2	60	0.012	0.04	0.10	0.27	60000	1440	6.0
0.6	2	60	0.016	0.04	0.12	0.30	60000	1920	9.0
0.8	2	60	0.020	0.06	0.16	0.42	45475	1820	17.5
1.0	2	60	0.026	0.07	0.20	0.51	37450	1945	27.0
1.2	2	60	0.030	0.08	0.24	0.60	31830	1910	36.5
1.5	2	60	0.038	0.11	0.30	0.78	24485	1860	61.5
2.0	2	60	0.050	0.14	0.40	1.02	18725	1875	105.0
2.5	2	60	0.064	0.18	0.50	1.29	14805	1895	170.5
3.0	2	60	0.076	0.21	0.60	1.53	12485	1900	239.5

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
0.5	2	300	0.014	0.020	0.020	0.46	60000	1680	45
0.6	2	300	0.016	0.024	0.024	0.56	60000	1920	45
0.8	2	300	0.018	0.032	0.032	0.74	60000	2160	45
1.0	2	300	0.022	0.040	0.040	0.93	60000	2640	45
1.2	2	300	0.024	0.048	0.048	1.11	60000	2880	45
1.5	2	300	0.028	0.060	0.060	1.39	60000	3360	45
2.0	2	300	0.030	0.080	0.080	1.86	51340	3080	45
2.5	2	300	0.032	0.100	0.100	2.32	41160	2635	45
3.0	2	300	0.036	0.120	0.120	2.78	34350	2475	45

0.2	2	250	0.012	0.008	0.008	0.19	60000	1440	45
0.5	2	250	0.014	0.020	0.020	0.46	60000	1680	45
0.8	2	250	0.016	0.032	0.032	0.74	60000	1920	45
1.0	2	250	0.020	0.040	0.040	0.93	60000	2400	45
1.2	2	250	0.022	0.048	0.048	1.11	60000	2640	45
1.5	2	250	0.026	0.060	0.060	1.39	57250	2975	45
2.0	2	250	0.028	0.080	0.080	1.86	42785	2395	45
2.5	2	250	0.028	0.100	0.100	2.32	34300	1920	45
3.0	2	250	0.032	0.120	0.120	2.78	28625	1830	45

0.2	2	120	0.012	0.008	0.008	0.19	60000	1440	45
0.5	2	120	0.012	0.020	0.020	0.46	60000	1440	45
0.8	2	120	0.014	0.032	0.032	0.74	51620	1445	45
1.0	2	120	0.018	0.040	0.040	0.93	41075	1480	45
1.2	2	120	0.020	0.048	0.048	1.11	34415	1375	45
1.5	2	120	0.022	0.060	0.060	1.39	27480	1210	45
2.0	2	120	0.024	0.080	0.080	1.86	20535	985	45
2.5	2	120	0.026	0.100	0.100	2.32	16465	855	45
3.0	2	120	0.028	0.120	0.120	2.78	13740	770	45

0.2	2	100	0.010	0.008	0.008	0.19	60000	1200	45
0.5	2	100	0.012	0.020	0.020	0.46	60000	1440	45
0.8	2	100	0.012	0.032	0.032	0.74	43015	1030	45
1.0	2	100	0.016	0.040	0.040	0.93	34230	1095	45
1.2	2	100	0.016	0.048	0.048	1.11	28675	920	45
1.5	2	100	0.020	0.060	0.060	1.39	22900	915	45
2.0	2	100	0.022	0.080	0.080	1.86	17115	755	45
2.5	2	100	0.022	0.100	0.100	2.32	13720	605	45
3.0	2	100	0.026	0.120	0.120	2.78	11450	595	45

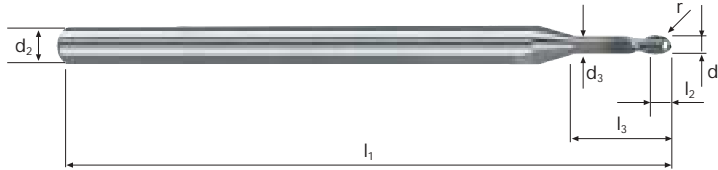


# Ball nose end mills Microcut-B5

Shank  $\varnothing$  3mm, cylindrical neck, 5xd



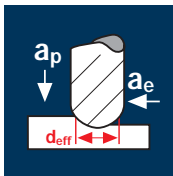
**HM**  $\lambda$  30°  
**Micro**  $\gamma$  5°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **Cobalt-Chrome**    **Gold / Platinum**    **Copper**

Example: Order-N°.										MICRO	
										M5784	
$\varnothing$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r ±0.01	$\alpha$	Z		
.050	0.5	3	0.45	40	0.6	2.5	0.25	11.0°	2	●	
.060	0.6	3	0.55	40	0.7	3.0	0.30	10.0°	2	●	
.070	0.7	3	0.65	40	0.8	3.5	0.35	9.0°	2	●	
.080	0.8	3	0.75	40	1.0	4.0	0.40	9.0°	2	●	
.090	0.9	3	0.85	40	1.1	4.5	0.45	8.0°	2	●	
.100	1.0	3	0.95	50	1.2	5.0	0.50	7.0°	2	●	
.108	1.2	3	1.15	50	1.4	6.0	0.60	6.0°	2	●	
.120	1.5	3	1.45	50	1.8	7.5	0.75	5.0°	2	●	
.132	1.8	3	1.75	50	2.2	9.0	0.90	4.0°	2	●	
.140	2.0	3	1.95	50	2.4	10.0	1.00	3.0°	2	●	
.152	2.3	3	2.25	50	2.8	11.5	1.15	2.0°	2	●	
.160	2.5	3	2.45	50	3.0	12.5	1.25	1.5°	2	●	
.172	2.8	3	2.75	50	3.4	14.0	1.40	1.0°	2	●	
.180	3.0	3	2.95	50	3.6	15.0	1.50	0.0°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.012	0.03	0.10	0.24	60000	1440	4.5
0.6	2	140	0.016	0.03	0.12	0.26	60000	1920	7.0
0.8	2	140	0.020	0.04	0.16	0.35	60000	2400	15.5
1.0	2	140	0.026	0.05	0.20	0.44	60000	3120	31.0
1.2	2	140	0.030	0.06	0.24	0.52	60000	3600	52.0
1.5	2	140	0.038	0.08	0.30	0.67	60000	4560	109.5
2.0	2	140	0.050	0.10	0.40	0.87	51225	5125	205.0
2.5	2	140	0.062	0.13	0.50	1.11	40150	4980	323.5
3.0	2	140	0.076	0.15	0.60	1.31	34020	5170	465.5

Hardened tool steel  
48 - 52 HRC



0.5	2	120	0.012	0.03	0.10	0.24	60000	1440	4.5
0.6	2	120	0.016	0.03	0.12	0.26	60000	1920	7.0
0.8	2	120	0.020	0.04	0.16	0.35	60000	2400	15.5
1.0	2	120	0.024	0.05	0.20	0.44	60000	2880	29.0
1.2	2	120	0.028	0.06	0.24	0.52	60000	3360	48.5
1.5	2	120	0.036	0.08	0.30	0.67	57010	4105	98.5
2.0	2	120	0.048	0.10	0.40	0.87	43905	4215	168.5
2.5	2	120	0.058	0.13	0.50	1.11	34415	3990	259.5
3.0	2	120	0.072	0.15	0.60	1.31	29160	4200	378.0

Hardened tool steel  
52 - 56 HRC



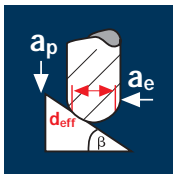
0.5	2	100	0.010	0.03	0.10	0.24	60000	1200	3.5
0.6	2	100	0.014	0.03	0.12	0.26	60000	1680	6.0
0.8	2	100	0.018	0.04	0.16	0.35	60000	2160	14.0
1.0	2	100	0.022	0.05	0.20	0.44	60000	2640	26.5
1.2	2	100	0.026	0.06	0.24	0.52	60000	3120	45.0
1.5	2	100	0.034	0.08	0.30	0.67	47510	3230	77.5
2.0	2	100	0.044	0.10	0.40	0.87	36590	3220	129.0
2.5	2	100	0.054	0.13	0.50	1.11	28675	3095	201.0
3.0	2	100	0.066	0.15	0.60	1.31	24300	3210	289.0

Hardened tool steel  
56 - 60 HRC



0.5	2	60	0.010	0.03	0.10	0.24	60000	1200	3.5
0.6	2	60	0.012	0.03	0.12	0.26	60000	1440	5.0
0.8	2	60	0.016	0.04	0.16	0.35	54570	1745	11.0
1.0	2	60	0.020	0.05	0.20	0.44	43405	1735	17.5
1.2	2	60	0.024	0.06	0.24	0.52	36730	1765	25.5
1.5	2	60	0.030	0.08	0.30	0.67	28505	1710	41.0
2.0	2	60	0.040	0.10	0.40	0.87	21955	1755	70.0
2.5	2	60	0.050	0.13	0.50	1.11	17205	1720	112.0
3.0	2	60	0.060	0.15	0.60	1.31	14580	1750	157.5

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	300	0.018	0.024	0.024	0.56	60000	2160	45
0.8	2	300	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	300	0.022	0.040	0.040	0.93	60000	2640	45
1.2	2	300	0.024	0.048	0.048	1.11	60000	2880	45
1.5	2	300	0.028	0.060	0.060	1.39	60000	3360	45
2.0	2	300	0.030	0.080	0.080	1.86	51340	3080	45
2.5	2	300	0.032	0.100	0.100	2.32	41160	2635	45
3.0	2	300	0.036	0.120	0.120	2.78	34350	2475	45

Hardened tool steel  
48 - 52 HRC



0.5	2	250	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	250	0.018	0.024	0.024	0.56	60000	2160	45
0.8	2	250	0.020	0.032	0.032	0.74	60000	2400	45
1.0	2	250	0.020	0.040	0.040	0.93	60000	2400	45
1.2	2	250	0.022	0.048	0.048	1.11	60000	2640	45
1.5	2	250	0.026	0.060	0.060	1.39	57250	2975	45
2.0	2	250	0.028	0.080	0.080	1.86	42785	2395	45
2.5	2	250	0.030	0.100	0.100	2.32	34300	2060	45
3.0	2	250	0.034	0.120	0.120	2.78	28625	1945	45

Hardened tool steel  
52 - 56 HRC



0.5	2	200	0.014	0.020	0.020	0.46	60000	1680	45
0.6	2	200	0.016	0.024	0.024	0.56	60000	1920	45
0.8	2	200	0.018	0.032	0.032	0.74	60000	2160	45
1.0	2	200	0.020	0.040	0.040	0.93	60000	2400	45
1.2	2	200	0.022	0.048	0.048	1.11	57355	2525	45
1.5	2	200	0.026	0.060	0.060	1.39	45800	2380	45
2.0	2	200	0.028	0.080	0.080	1.86	34230	1915	45
2.5	2	200	0.028	0.100	0.100	2.32	27440	1535	45
3.0	2	200	0.032	0.120	0.120	2.78	22900	1465	45

Hardened tool steel  
56 - 60 HRC



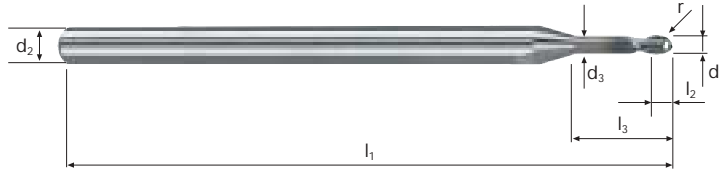
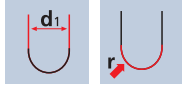
0.5	2	150	0.012	0.020	0.020	0.46	60000	1440	45
0.6	2	150	0.014	0.024	0.024	0.56	60000	1680	45
0.8	2	150	0.016	0.032	0.032	0.74	60000	1920	45
1.0	2	150	0.018	0.040	0.040	0.93	51340	1850	45
1.2	2	150	0.020	0.048	0.048	1.11	43015	1720	45
1.5	2	150	0.022	0.060	0.060	1.39	34350	1510	45
2.0	2	150	0.024	0.080	0.080	1.86	25670	1230	45
2.5	2	150	0.026	0.100	0.100	2.32	20580	1070	45
3.0	2	150	0.028	0.120	0.120	2.78	17175	960	45

# Ball nose end mills Microcut-B5H

Shank  $\varnothing$  3mm, cylindrical neck, 5xd



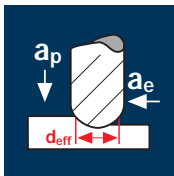
**HM**  $\lambda$  30°  
**XA**  $\gamma$ -10°



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	
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Example: Order-N°.										DURO-S	
										D5794	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	Z		
.050	0.5	3	0.45	40	0.6	2.5	0.25	10.1°	2	●	
.060	0.6	3	0.55	40	0.7	3.0	0.30	9.4°	2	●	
.070	0.7	3	0.65	40	0.8	3.5	0.35	8.7°	2	●	
.080	0.8	3	0.75	40	1.0	4.0	0.40	8.0°	2	●	
.090	0.9	3	0.85	40	1.1	4.5	0.45	7.4°	2	●	
.100	1.0	3	0.95	50	1.2	5.0	0.50	6.9°	2	●	
.108	1.2	3	1.15	50	1.4	6.0	0.60	5.8°	2	●	
.120	1.5	3	1.45	50	1.8	7.5	0.75	4.5°	2	●	
.132	1.8	3	1.75	50	2.2	9.0	0.90	3.3°	2	●	
.140	2.0	3	1.95	50	2.4	10.0	1.00	2.7°	2	●	
.152	2.3	3	2.25	50	2.8	11.5	1.15	1.7°	2	●	
.160	2.5	3	2.45	50	3.0	12.5	1.25	1.2°	2	●	
.172	2.8	3	2.75	50	3.4	14.0	1.40	0.5°	2	●	
.180	3.0	3	2.95	50	3.6	15.0	1.50	0.0°	2	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

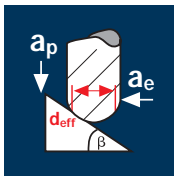
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	180	0.018	0.03	0.10	0.24	60000	2160	6.5
0.6	2	180	0.022	0.03	0.12	0.26	60000	2640	9.5
0.8	2	180	0.028	0.04	0.16	0.35	60000	3360	21.5
1.0	2	180	0.036	0.05	0.20	0.44	60000	4320	43.0
1.2	2	180	0.042	0.06	0.24	0.52	60000	5040	72.5
1.5	2	180	0.054	0.08	0.30	0.67	60000	6480	155.5
2.0	2	180	0.072	0.10	0.40	0.87	60000	8640	345.5
2.5	2	180	0.090	0.13	0.50	1.11	51620	9290	604.0
3.0	2	180	0.108	0.15	0.60	1.31	43740	9450	850.5

0.5	2	160	0.016	0.03	0.10	0.24	60000	1920	6.0
0.6	2	160	0.020	0.03	0.12	0.26	60000	2400	8.5
0.8	2	160	0.026	0.04	0.16	0.35	60000	3120	20.0
1.0	2	160	0.032	0.05	0.20	0.44	60000	3840	38.5
1.2	2	160	0.038	0.06	0.24	0.52	60000	4560	65.5
1.5	2	160	0.048	0.08	0.30	0.67	60000	5760	138.0
2.0	2	160	0.064	0.10	0.40	0.87	58540	7495	300.0
2.5	2	160	0.082	0.13	0.50	1.11	45885	7525	489.0
3.0	2	160	0.098	0.15	0.60	1.31	38880	7620	686.0

0.5	2	80	0.016	0.03	0.10	0.24	60000	1920	6.0
0.6	2	80	0.020	0.03	0.12	0.26	60000	2400	8.5
0.8	2	80	0.026	0.04	0.16	0.35	60000	3120	20.0
1.0	2	80	0.032	0.05	0.20	0.44	57875	3705	37.0
1.2	2	80	0.038	0.06	0.24	0.52	48970	3720	53.5
1.5	2	80	0.048	0.08	0.30	0.67	38010	3650	87.5
2.0	2	80	0.064	0.10	0.40	0.87	29270	3745	150.0
2.5	2	80	0.082	0.13	0.50	1.11	22940	3760	244.5
3.0	2	80	0.098	0.15	0.60	1.31	19440	3810	343.0

0.5	2	60	0.012	0.03	0.10	0.24	60000	1440	4.5
0.6	2	60	0.016	0.03	0.12	0.26	60000	1920	7.0
0.8	2	60	0.020	0.04	0.16	0.35	54570	2185	14.0
1.0	2	60	0.026	0.05	0.20	0.44	43405	2255	22.5
1.2	2	60	0.030	0.06	0.24	0.52	36730	2205	32.0
1.5	2	60	0.038	0.08	0.30	0.67	28505	2165	52.0
2.0	2	60	0.050	0.10	0.40	0.87	21955	2195	88.0
2.5	2	60	0.064	0.13	0.50	1.11	17205	2200	143.0
3.0	2	60	0.076	0.15	0.60	1.31	14580	2215	199.5

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.014	0.020	0.020	0.46	60000	1680	45
0.6	2	300	0.016	0.022	0.022	0.55	60000	1920	45
0.8	2	300	0.018	0.030	0.030	0.74	60000	2160	45
1.0	2	300	0.022	0.038	0.038	0.92	60000	2640	45
1.2	2	300	0.024	0.046	0.046	1.11	60000	2880	45
1.5	2	300	0.028	0.058	0.058	1.39	60000	3360	45
2.0	2	300	0.030	0.076	0.076	1.85	51620	3095	45
2.5	2	300	0.032	0.096	0.096	2.31	41340	2645	45
3.0	2	300	0.036	0.114	0.114	2.77	34475	2480	45

0.5	2	250	0.012	0.020	0.020	0.46	60000	1440	45
0.6	2	250	0.014	0.022	0.022	0.55	60000	1680	45
0.8	2	250	0.016	0.030	0.030	0.74	60000	1920	45
1.0	2	250	0.020	0.038	0.038	0.92	60000	2400	45
1.2	2	250	0.022	0.046	0.046	1.11	60000	2640	45
1.5	2	250	0.026	0.058	0.058	1.39	57250	2975	45
2.0	2	250	0.028	0.076	0.076	1.85	43015	2410	45
2.5	2	250	0.028	0.096	0.096	2.31	34450	1930	45
3.0	2	250	0.032	0.114	0.114	2.77	28730	1840	45

0.5	2	120	0.012	0.020	0.020	0.46	60000	1440	45
0.6	2	120	0.012	0.022	0.022	0.55	60000	1440	45
0.8	2	120	0.014	0.030	0.030	0.74	51620	1445	45
1.0	2	120	0.018	0.038	0.038	0.92	41520	1495	45
1.2	2	120	0.020	0.046	0.046	1.11	34415	1375	45
1.5	2	120	0.022	0.058	0.058	1.39	27480	1210	45
2.0	2	120	0.024	0.076	0.076	1.85	20650	990	45
2.5	2	120	0.026	0.096	0.096	2.31	16535	860	45
3.0	2	120	0.028	0.114	0.114	2.77	13790	770	45

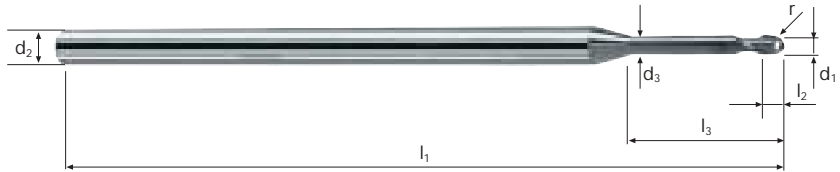
0.5	2	100	0.010	0.020	0.020	0.46	60000	1200	45
0.6	2	100	0.012	0.022	0.022	0.55	57875	1390	45
0.8	2	100	0.012	0.030	0.030	0.74	43015	1030	45
1.0	2	100	0.016	0.038	0.038	0.92	34600	1105	45
1.2	2	100	0.016	0.046	0.046	1.11	28675	920	45
1.5	2	100	0.020	0.058	0.058	1.39	22900	915	45
2.0	2	100	0.022	0.076	0.076	1.85	17205	755	45
2.5	2	100	0.022	0.096	0.096	2.31	13780	605	45
3.0	2	100	0.026	0.114	0.114	2.77	11490	595	45

# Ball nose end mills Microcut-B8

Shank  $\varnothing$  3mm, cylindrical neck, 8xd



**HM**  $\lambda$  30°  
**Micro**  $\gamma$  5°

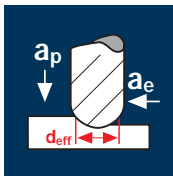


<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome</b> <b>Gold / Platinum</b> <b>Copper</b>
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Example: Order-N°.											MICRO		
		Coating <b>M</b>	Article-N°. <b>5786</b>								α-Code <b>.050</b>		
											<b>M5786</b>		
∅ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r ±0.01	α	z				
.050	0.5	3	0.45	40	0.6	4.0	0.25	9.0°	2	●			
.060	0.6	3	0.55	40	0.7	4.8	0.30	8.0°	2	●			
.080	0.8	3	0.75	40	1.0	6.4	0.40	7.0°	2	●			
.100	1.0	3	0.95	50	1.2	8.0	0.50	6.0°	2	●			
.108	1.2	3	1.15	50	1.4	9.6	0.60	5.0°	2	●			
.120	1.5	3	1.45	60	1.8	12.0	0.75	4.0°	2	●			
.140	2.0	3	1.95	60	2.4	16.0	1.00	2.0°	2	●			
.160	2.5	3	2.45	60	3.0	20.0	1.25	1.0°	2	●			
.180	3.0	3	2.95	60	3.6	24.0	1.50	0.0°	2	●			

## Application



## Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	$v_c$ [m/min]	$f_z$ [mm]	$a_p$ [mm]	$a_e$ [mm]	$d_{eff}$ [mm]	n [min <sup>-1</sup> ]	$v_f$ [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	140	0.012	0.02	0.09	0.20	60000	1440	2.5
0.6	2	140	0.016	0.02	0.11	0.22	60000	1920	4.0
0.8	2	140	0.020	0.03	0.14	0.30	60000	2400	10.0
1.0	2	140	0.026	0.04	0.18	0.39	60000	3120	22.5
1.2	2	140	0.030	0.05	0.22	0.48	60000	3600	39.5
1.5	2	140	0.038	0.06	0.27	0.59	60000	4560	74.0
2.0	2	140	0.050	0.08	0.36	0.78	57135	5715	164.5
2.5	2	140	0.062	0.10	0.45	0.98	45475	5640	254.0
3.0	2	140	0.076	0.12	0.54	1.18	37765	5740	372.0

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	120	0.012	0.02	0.09	0.20	60000	1440	2.5
0.6	2	120	0.016	0.02	0.11	0.22	60000	1920	4.0
0.8	2	120	0.020	0.03	0.14	0.30	60000	2400	10.0
1.0	2	120	0.024	0.04	0.18	0.39	60000	2880	20.5
1.2	2	120	0.028	0.05	0.22	0.48	60000	3360	37.0
1.5	2	120	0.036	0.06	0.27	0.59	60000	4320	70.0
2.0	2	120	0.048	0.08	0.36	0.78	48970	4700	135.5
2.5	2	120	0.058	0.10	0.45	0.98	38980	4520	203.5
3.0	2	120	0.072	0.12	0.54	1.18	32370	4660	302.0

Hardened tool steel  
52 - 56 HRC

**D**

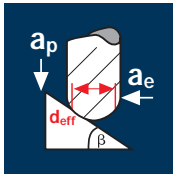
0.5	2	100	0.010	0.02	0.09	0.20	60000	1200	2.0
0.6	2	100	0.014	0.02	0.11	0.22	60000	1680	3.5
0.8	2	100	0.018	0.03	0.14	0.30	60000	2160	9.0
1.0	2	100	0.022	0.04	0.18	0.39	60000	2640	19.0
1.2	2	100	0.026	0.05	0.22	0.48	60000	3120	34.5
1.5	2	100	0.034	0.06	0.27	0.59	53950	3670	59.5
2.0	2	100	0.044	0.08	0.36	0.78	40810	3590	103.5
2.5	2	100	0.054	0.10	0.45	0.98	32480	3510	158.0
3.0	2	100	0.066	0.12	0.54	1.18	26975	3560	230.5

Hardened tool steel  
56 - 60 HRC

**D**

0.5	2	60	0.010	0.02	0.09	0.20	60000	1200	2.0
0.6	2	60	0.012	0.02	0.11	0.22	60000	1440	3.0
0.8	2	60	0.016	0.03	0.14	0.30	60000	1920	8.0
1.0	2	60	0.020	0.04	0.18	0.39	48970	1960	14.0
1.2	2	60	0.024	0.05	0.22	0.48	39790	1910	21.0
1.5	2	60	0.030	0.06	0.27	0.59	32370	1940	31.5
2.0	2	60	0.040	0.08	0.36	0.78	24485	1960	56.5
2.5	2	60	0.050	0.10	0.45	0.98	19490	1950	88.0
3.0	2	60	0.060	0.12	0.54	1.18	16185	1940	125.5

## Application



## Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	$v_c$ [m/min]	$f_z$ [mm]	$a_p$ [mm]	$a_e$ [mm]	$d_{eff}$ [mm]	n [min <sup>-1</sup> ]	$v_f$ [mm/min]	$\beta$
0.5	2	300	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	300	0.018	0.022	0.022	0.55	60000	2160	45
0.8	2	300	0.020	0.030	0.030	0.74	60000	2400	45
1.0	2	300	0.022	0.038	0.038	0.92	60000	2640	45
1.2	2	300	0.024	0.046	0.046	1.11	60000	2880	45
1.5	2	300	0.028	0.058	0.058	1.39	60000	3360	45
2.0	2	300	0.030	0.076	0.076	1.85	51620	3095	45
2.5	2	300	0.032	0.096	0.096	2.31	41340	2645	45
3.0	2	300	0.036	0.114	0.114	2.77	34475	2480	45

Hardened tool steel  
48 - 52 HRC

**D**

0.5	2	250	0.016	0.020	0.020	0.46	60000	1920	45
0.6	2	250	0.018	0.022	0.022	0.55	60000	2160	45
0.8	2	250	0.020	0.030	0.030	0.74	60000	2400	45
1.0	2	250	0.020	0.038	0.038	0.92	60000	2400	45
1.2	2	250	0.022	0.046	0.046	1.11	60000	2640	45
1.5	2	250	0.026	0.058	0.058	1.39	57250	2975	45
2.0	2	250	0.028	0.076	0.076	1.85	43015	2410	45
2.5	2	250	0.030	0.096	0.096	2.31	34450	2065	45
3.0	2	250	0.034	0.114	0.114	2.77	28730	1955	45

Hardened tool steel  
52 - 56 HRC

**D**

0.5	2	200	0.014	0.020	0.020	0.46	60000	1680	45
0.6	2	200	0.016	0.022	0.022	0.55	60000	1920	45
0.8	2	200	0.018	0.030	0.030	0.74	60000	2160	45
1.0	2	200	0.020	0.038	0.038	0.92	60000	2400	45
1.2	2	200	0.022	0.046	0.046	1.11	57355	2525	45
1.5	2	200	0.026	0.058	0.058	1.39	45800	2380	45
2.0	2	200	0.028	0.076	0.076	1.85	34415	1925	45
2.5	2	200	0.028	0.096	0.096	2.31	27560	1545	45
3.0	2	200	0.032	0.114	0.114	2.77	22985	1470	45

Hardened tool steel  
56 - 60 HRC

**D**

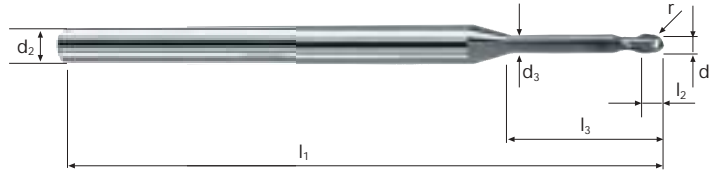
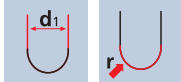
0.5	2	150	0.012	0.020	0.020	0.46	60000	1440	45
0.6	2	150	0.014	0.022	0.022	0.55	60000	1680	45
0.8	2	150	0.016	0.030	0.030	0.74	60000	1920	45
1.0	2	150	0.018	0.038	0.038	0.92	51900	1870	45
1.2	2	150	0.020	0.046	0.046	1.11	43015	1720	45
1.5	2	150	0.022	0.058	0.058	1.39	34350	1510	45
2.0	2	150	0.024	0.076	0.076	1.85	25810	1240	45
2.5	2	150	0.026	0.096	0.096	2.31	20670	1075	45
3.0	2	150	0.028	0.114	0.114	2.77	17240	965	45

# Ball nose end mills Microcut-B8H

Shank  $\varnothing$  3mm, cylindrical neck, 8xd



**HM**  
**XA**     $\lambda$  30°  
             $\gamma$ -10°

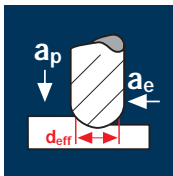


II

	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	
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										<b>DURO-S</b>	
Example: Order-N°.										<b>D5796</b>	
$\varnothing$ Code	$d_1$ 0/-0.01	$d_2$ h5	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.005$	$\alpha$	$Z$		
<b>.050</b>	0.5	3	0.45	40	0.6	4.0	0.25	8.4°	2	●	
<b>.060</b>	0.6	3	0.55	40	0.7	4.8	0.30	7.6°	2	●	
<b>.080</b>	0.8	3	0.75	40	1.0	6.4	0.40	6.2°	2	●	
<b>.100</b>	1.0	3	0.95	50	1.2	8.0	0.50	5.1°	2	●	
<b>.108</b>	1.2	3	1.15	50	1.4	9.6	0.60	4.2°	2	●	
<b>.120</b>	1.5	3	1.45	60	1.8	12.0	0.75	3.1°	2	●	
<b>.140</b>	2.0	3	1.95	60	2.4	16.0	1.00	1.7°	2	●	
<b>.160</b>	2.5	3	2.45	60	3.0	20.0	1.25	0.8°	2	●	
<b>.180</b>	3.0	3	2.95	60	3.6	24.0	1.50	0.0°	2	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

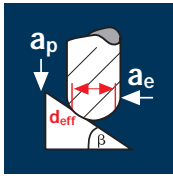
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	180	0.018	0.02	0.08	0.20	60000	2160	3.5
0.6	2	180	0.022	0.02	0.09	0.22	60000	2640	5.0
0.8	2	180	0.028	0.03	0.12	0.30	60000	3360	12.0
1.0	2	180	0.036	0.04	0.15	0.39	60000	4320	26.0
1.2	2	180	0.042	0.05	0.18	0.48	60000	5040	45.5
1.5	2	180	0.054	0.06	0.23	0.59	60000	6480	89.5
2.0	2	180	0.072	0.08	0.30	0.78	60000	8640	207.5
2.5	2	180	0.090	0.10	0.38	0.98	58465	10525	400.0
3.0	2	180	0.108	0.12	0.45	1.18	48555	10490	566.5

0.5	2	160	0.016	0.02	0.08	0.20	60000	1920	3.0
0.6	2	160	0.020	0.02	0.09	0.22	60000	2400	4.5
0.8	2	160	0.026	0.03	0.12	0.30	60000	3120	11.0
1.0	2	160	0.032	0.04	0.15	0.39	60000	3840	23.0
1.2	2	160	0.038	0.05	0.18	0.48	60000	4560	41.0
1.5	2	160	0.048	0.06	0.23	0.59	60000	5760	79.5
2.0	2	160	0.064	0.08	0.30	0.78	60000	7680	184.5
2.5	2	160	0.082	0.10	0.38	0.98	51970	8525	324.0
3.0	2	160	0.098	0.12	0.45	1.18	43160	8460	457.0

0.5	2	80	0.016	0.02	0.08	0.20	60000	1920	3.0
0.6	2	80	0.020	0.02	0.09	0.22	60000	2400	4.5
0.8	2	80	0.026	0.03	0.12	0.30	60000	3120	11.0
1.0	2	80	0.032	0.04	0.15	0.39	60000	3840	23.0
1.2	2	80	0.038	0.05	0.18	0.48	53055	4030	36.5
1.5	2	80	0.048	0.06	0.23	0.59	43160	4145	57.0
2.0	2	80	0.064	0.08	0.30	0.78	32650	4180	100.5
2.5	2	80	0.082	0.10	0.38	0.98	25985	4260	162.0
3.0	2	80	0.098	0.12	0.45	1.18	21580	4230	228.5

0.5	2	60	0.012	0.02	0.08	0.20	60000	1440	2.5
0.6	2	60	0.016	0.02	0.09	0.22	60000	1920	3.5
0.8	2	60	0.020	0.03	0.12	0.30	60000	2400	8.5
1.0	2	60	0.026	0.04	0.15	0.39	48970	2545	15.5
1.2	2	60	0.030	0.05	0.18	0.48	39790	2385	21.5
1.5	2	60	0.038	0.06	0.23	0.59	32370	2460	34.0
2.0	2	60	0.050	0.08	0.30	0.78	24485	2450	59.0
2.5	2	60	0.064	0.10	0.38	0.98	19490	2495	95.0
3.0	2	60	0.076	0.12	0.45	1.18	16185	2460	133.0

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.012	0.018	0.018	0.46	60000	1440	45
0.6	2	300	0.014	0.022	0.022	0.55	60000	1680	45
0.8	2	300	0.016	0.028	0.028	0.73	60000	1920	45
1.0	2	300	0.020	0.036	0.036	0.92	60000	2400	45
1.2	2	300	0.022	0.042	0.042	1.10	60000	2640	45
1.5	2	300	0.024	0.052	0.052	1.38	60000	2880	45
2.0	2	300	0.026	0.070	0.070	1.84	51900	2700	45
2.5	2	300	0.028	0.088	0.088	2.29	41700	2335	45
3.0	2	300	0.032	0.106	0.106	2.75	34725	2220	45

0.2	2	250	0.010	0.008	0.008	0.19	60000	1200	45
0.5	2	250	0.012	0.018	0.018	0.46	60000	1440	45
0.8	2	250	0.014	0.028	0.028	0.73	60000	1680	45
1.0	2	250	0.018	0.036	0.036	0.92	60000	2160	45
1.2	2	250	0.020	0.042	0.042	1.10	60000	2400	45
1.5	2	250	0.022	0.052	0.052	1.38	57665	2535	45
2.0	2	250	0.024	0.070	0.070	1.84	43250	2075	45
2.5	2	250	0.026	0.088	0.088	2.29	34750	1805	45
3.0	2	250	0.028	0.106	0.106	2.75	28940	1620	45

0.2	2	120	0.010	0.008	0.008	0.19	60000	1200	45
0.5	2	120	0.012	0.018	0.018	0.46	60000	1440	45
0.8	2	120	0.012	0.028	0.028	0.73	52325	1255	45
1.0	2	120	0.016	0.036	0.036	0.92	41520	1330	45
1.2	2	120	0.018	0.042	0.042	1.10	34725	1250	45
1.5	2	120	0.020	0.052	0.052	1.38	27680	1105	45
2.0	2	120	0.020	0.070	0.070	1.84	20760	830	45
2.5	2	120	0.022	0.088	0.088	2.29	16680	735	45
3.0	2	120	0.026	0.106	0.106	2.75	13890	720	45

0.2	2	100	0.008	0.008	0.008	0.19	60000	960	45
0.5	2	100	0.010	0.018	0.018	0.46	60000	1200	45
0.8	2	100	0.012	0.028	0.028	0.73	43605	1045	45
1.0	2	100	0.014	0.036	0.036	0.92	34600	970	45
1.2	2	100	0.016	0.042	0.042	1.10	28940	925	45
1.5	2	100	0.016	0.052	0.052	1.38	23065	740	45
2.0	2	100	0.018	0.070	0.070	1.84	17300	625	45
2.5	2	100	0.020	0.088	0.088	2.29	13900	555	45
3.0	2	100	0.022	0.106	0.106	2.75	11575	510	45

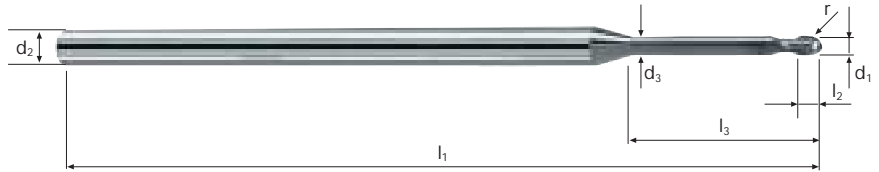
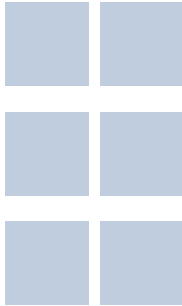


# Ball nose end mills Microcut-B10

Shank  $\varnothing$  3mm, cylindrical neck, 10xd



HM	$\lambda$ 30°
Micro	$\gamma$ 5°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	Gold / Platinum Copper
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Example: Order-N°.										MICRO	
										M5787	
$\varnothing$ Code	$d_1$ ±0.01	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ ±0.01	$\alpha$	$Z$		
.050	0.5	3	0.45	40	0.6	5.0	0.25	8.0°	2	●	
.060	0.6	3	0.55	40	0.7	6.0	0.30	7.0°	2	●	
.080	0.8	3	0.75	40	1.0	8.0	0.40	6.0°	2	●	
.100	1.0	3	0.95	50	1.2	10.0	0.50	5.0°	2	●	
.108	1.2	3	1.15	50	1.4	12.0	0.60	4.0°	2	●	
.120	1.5	3	1.45	60	1.8	15.0	0.75	3.0°	2	●	
.140	2.0	3	1.95	60	2.4	20.0	1.00	2.0°	2	●	
.160	2.5	3	2.45	60	3.0	25.0	1.25	1.0°	2	●	
.180	3.0	3	2.95	60	3.6	30.0	1.50	0.0°	2	●	

Application		Material		d1	z	$v_c$	$f_z$	$a_p$	$a_e$	$d_{eff}$	n	$v_f$	Q
				[mm]		[m/min]	[mm]	[mm]	[mm]	[mm]	[min <sup>-1</sup> ]	[mm/min]	[mm <sup>3</sup> /min]
	Steel 850 - 1100 N/mm <sup>2</sup>	M	M	1.0	2	180	0.028	0.03	0.12	0.34	60000	3360	12.0
				1.2	2	180	0.034	0.04	0.14	0.43	60000	4080	23.0
				1.5	2	180	0.042	0.05	0.18	0.54	60000	5040	45.5
				2.0	2	180	0.058	0.06	0.24	0.68	60000	6960	100.0
				2.5	2	180	0.072	0.08	0.30	0.88	60000	8640	207.5
				3.0	2	180	0.086	0.09	0.36	1.02	56175	9660	313.0
Steel 1100 - 1300 N/mm <sup>2</sup>	M	M	1.0	2	160	0.026	0.03	0.12	0.34	60000	3120	11.0	
			1.2	2	160	0.030	0.04	0.14	0.43	60000	3600	20.0	
			1.5	2	160	0.038	0.05	0.18	0.54	60000	4560	41.0	
			2.0	2	160	0.052	0.06	0.24	0.68	60000	6240	90.0	
			2.5	2	160	0.064	0.08	0.30	0.88	57875	7410	178.0	
			3.0	2	160	0.078	0.09	0.36	1.02	49930	7790	252.5	
Stainless steel [Cr-Ni/1.4301]	M		1.0	2	80	0.022	0.03	0.12	0.34	60000	2640	9.5	
			1.2	2	80	0.028	0.04	0.14	0.43	59220	3315	18.5	
			1.5	2	80	0.034	0.05	0.18	0.54	47160	3205	29.0	
			2.0	2	80	0.046	0.06	0.24	0.68	37450	3445	49.5	
			2.5	2	80	0.058	0.08	0.30	0.88	28940	3355	80.5	
			3.0	2	80	0.068	0.09	0.36	1.02	24965	3395	110.0	
Titanium alloys up to 300 HB [Ti5Al2.5Sn]	M		1.0	2	60	0.020	0.03	0.12	0.34	56175	2245	8.0	
			1.2	2	60	0.024	0.04	0.14	0.43	44415	2130	12.0	
			1.5	2	60	0.030	0.05	0.18	0.54	35370	2120	19.0	
			2.0	2	60	0.040	0.06	0.24	0.68	28085	2245	32.5	
			2.5	2	60	0.050	0.08	0.30	0.88	21705	2170	52.0	
			3.0	2	60	0.060	0.09	0.36	1.02	18725	2245	72.5	

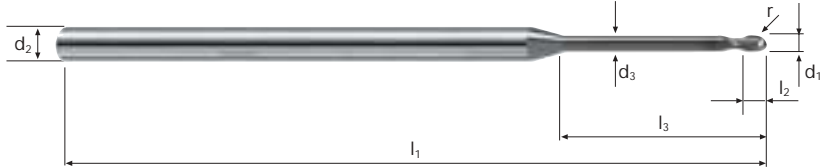
Application		Material		d1	z	$v_c$	$f_z$	$a_p$	$a_e$	$d_{eff}$	n	$v_f$	$\beta$
				[mm]		[m/min]	[mm]	[mm]	[mm]	[mm]	[min <sup>-1</sup> ]	[mm/min]	
	Steel 850 - 1100 N/mm <sup>2</sup>	M	M	1.0	2	300	0.020	0.028	0.028	0.90	60000	2400	45
				1.2	2	300	0.022	0.034	0.034	1.08	60000	2640	45
				1.5	2	300	0.024	0.042	0.042	1.35	60000	2880	45
				2.0	2	300	0.026	0.056	0.056	1.80	53055	2760	45
				2.5	2	300	0.028	0.070	0.070	2.25	42445	2375	45
				3.0	2	300	0.032	0.084	0.084	2.70	35370	2265	45
Steel 1100 - 1300 N/mm <sup>2</sup>	M	M	1.0	2	250	0.018	0.028	0.028	0.90	60000	2160	45	
			1.2	2	250	0.020	0.034	0.034	1.08	60000	2400	45	
			1.5	2	250	0.022	0.042	0.042	1.35	58950	2595	45	
			2.0	2	250	0.024	0.056	0.056	1.80	44210	2120	45	
			2.5	2	250	0.026	0.070	0.070	2.25	35370	1840	45	
			3.0	2	250	0.028	0.084	0.084	2.70	29475	1650	45	
Stainless steel [Cr-Ni/1.4301]	M		1.0	2	120	0.016	0.028	0.028	0.90	42445	1360	45	
			1.2	2	120	0.018	0.034	0.034	1.08	35370	1275	45	
			1.5	2	120	0.020	0.042	0.042	1.35	28295	1130	45	
			2.0	2	120	0.020	0.056	0.056	1.80	21220	850	45	
			2.5	2	120	0.022	0.070	0.070	2.25	16975	745	45	
			3.0	2	120	0.026	0.084	0.084	2.70	14150	735	45	
Titanium alloys up to 300 HB [Ti5Al2.5Sn]	M		1.0	2	100	0.014	0.028	0.028	0.90	35370	990	45	
			1.2	2	100	0.016	0.034	0.034	1.08	29475	945	45	
			1.5	2	100	0.016	0.042	0.042	1.35	23580	755	45	
			2.0	2	100	0.018	0.056	0.056	1.80	17685	635	45	
			2.5	2	100	0.020	0.070	0.070	2.25	14150	565	45	
			3.0	2	100	0.022	0.084	0.084	2.70	11790	520	45	

# Ball nose end mills Microcut-B12

Shank Ø 3mm, cylindrical neck, 12xd



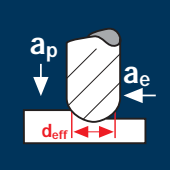
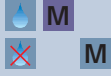
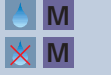


HM  
Micro    λ 30°  
                  γ 5°

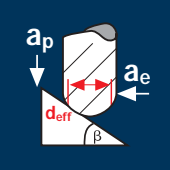
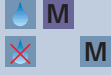
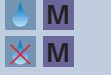
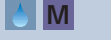
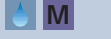


Rm < 850    Rm 850-1100    Rm 1100-1300    Rm 1300-1500    Inox Stainless    Ti Titanium    Gold / Platinum Copper



Example: Order-N°.    Coating: M    Article-N°. 5791    α-Code: .100											MICRO	
Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r ±0.01	α	z		M5791	
.100	1.0	3	0.95	50	1.2	12.0	0.50	4.0°	2	●		
.108	1.2	3	1.15	60	1.4	14.4	0.60	3.0°	2	●		
.120	1.5	3	1.45	60	1.8	18.0	0.75	3.0°	2	●		
.140	2.0	3	1.95	60	2.4	24.0	1.00	2.0°	2	●		
.160	2.5	3	2.45	70	3.0	30.0	1.25	1.0°	2	●		
.180	3.0	3	2.95	70	3.6	36.0	1.50	0.0°	2	●		

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
	Steel 850 - 1100 N/mm <sup>2</sup> 	1.0	2	150	0.028	0.03	0.10	0.34	60000	3360	10.0
		1.2	2	150	0.034	0.04	0.12	0.43	60000	4080	19.5
		1.5	2	150	0.042	0.05	0.15	0.54	60000	5040	38.0
		2.0	2	150	0.058	0.06	0.20	0.68	60000	6960	83.5
		2.5	2	150	0.072	0.08	0.25	0.88	54260	7815	156.5
		3.0	2	150	0.086	0.09	0.30	1.02	46810	8050	217.5
Steel 1100 - 1300 N/mm <sup>2</sup> 	1.0	2	120	0.026	0.03	0.10	0.34	60000	3120	9.5	
	1.2	2	120	0.030	0.04	0.12	0.43	60000	3600	17.5	
	1.5	2	120	0.038	0.05	0.15	0.54	60000	4560	34.0	
	2.0	2	120	0.052	0.06	0.20	0.68	56175	5840	70.0	
	2.5	2	120	0.064	0.08	0.25	0.88	43405	5555	111.0	
	3.0	2	120	0.078	0.09	0.30	1.02	37450	5840	157.5	
Stainless steel [Cr-Ni/1.4301] 	1.0	2	70	0.022	0.03	0.10	0.34	60000	2640	8.0	
	1.2	2	70	0.028	0.04	0.12	0.43	51820	2900	14.0	
	1.5	2	70	0.034	0.05	0.15	0.54	41265	2805	21.0	
	2.0	2	70	0.046	0.06	0.20	0.68	32770	3015	36.0	
	2.5	2	70	0.058	0.08	0.25	0.88	25320	2935	58.5	
	3.0	2	70	0.068	0.09	0.30	1.02	21845	2970	80.0	
Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	1.0	2	50	0.020	0.03	0.10	0.34	46810	1870	5.5	
	1.2	2	50	0.024	0.04	0.12	0.43	37015	1775	8.5	
	1.5	2	50	0.030	0.05	0.15	0.54	29475	1770	13.5	
	2.0	2	50	0.040	0.06	0.20	0.68	23405	1870	22.5	
	2.5	2	50	0.050	0.08	0.25	0.88	18085	1810	36.0	
	3.0	2	50	0.060	0.09	0.30	1.02	15605	1875	50.5	

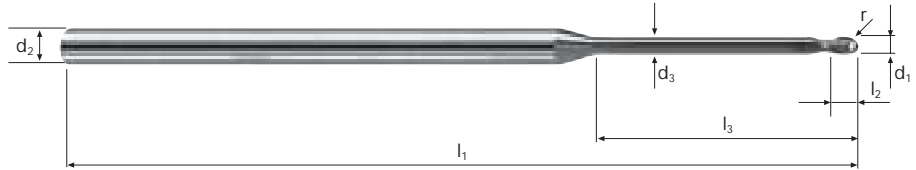
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
	Steel 850 - 1100 N/mm <sup>2</sup> 	1.0	2	250	0.020	0.026	0.026	0.90	60000	2400	45
		1.2	2	250	0.022	0.032	0.032	1.08	60000	2640	45
		1.5	2	250	0.024	0.040	0.040	1.35	58950	2830	45
		2.0	2	250	0.026	0.052	0.052	1.79	44460	2310	45
		2.5	2	250	0.028	0.066	0.066	2.24	35525	1990	45
		3.0	2	250	0.032	0.078	0.078	2.69	29585	1895	45
Steel 1100 - 1300 N/mm <sup>2</sup> 	1.0	2	200	0.018	0.026	0.026	0.90	60000	2160	45	
	1.2	2	200	0.020	0.032	0.032	1.08	58950	2360	45	
	1.5	2	200	0.022	0.040	0.040	1.35	47160	2075	45	
	2.0	2	200	0.024	0.052	0.052	1.79	35565	1705	45	
	2.5	2	200	0.026	0.066	0.066	2.24	28420	1480	45	
	3.0	2	200	0.028	0.078	0.078	2.69	23665	1325	45	
Stainless steel [Cr-Ni/1.4301] 	1.0	2	100	0.016	0.026	0.026	0.90	35370	1130	45	
	1.2	2	100	0.018	0.032	0.032	1.08	29475	1060	45	
	1.5	2	100	0.020	0.040	0.040	1.35	23580	945	45	
	2.0	2	100	0.020	0.052	0.052	1.79	17785	710	45	
	2.5	2	100	0.022	0.066	0.066	2.24	14210	625	45	
	3.0	2	100	0.026	0.078	0.078	2.69	11835	615	45	
Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	1.0	2	80	0.014	0.026	0.026	0.90	28295	790	45	
	1.2	2	80	0.016	0.032	0.032	1.08	23580	755	45	
	1.5	2	80	0.016	0.040	0.040	1.35	18865	605	45	
	2.0	2	80	0.018	0.052	0.052	1.79	14225	510	45	
	2.5	2	80	0.020	0.066	0.066	2.24	11370	455	45	
	3.0	2	80	0.022	0.078	0.078	2.69	9465	415	45	

# Ball nose end mills Microcut-B15

Shank  $\varnothing$  3mm, cylindrical neck, 15xd

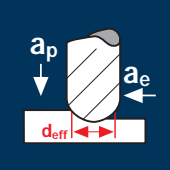
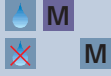





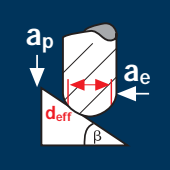
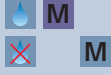



<b>HM</b>	$\lambda$ 30°
<b>Micro</b>	$\gamma$ 5°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500				<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Gold / Platinum</b> <b>Copper</b>
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Example: Order-N°.										MICRO	
										M5793	
$\varnothing$ Code	d1 $\pm 0.01$	d2 h6	d3	l1	l2	l3	r $\pm 0.01$	$\alpha$	z		
.100	1.0	3	0.95	60	1.2	15.0	0.50	4.0°	2	●	
.108	1.2	3	1.15	60	1.4	18.0	0.60	3.0°	2	●	
.120	1.5	3	1.45	70	1.8	22.5	0.75	2.0°	2	●	
.140	2.0	3	1.95	70	2.4	30.0	1.00	1.0°	2	●	
.160	2.5	3	2.45	70	3.0	37.5	1.25	1.0°	2	●	
.180	3.0	3	2.95	80	3.6	45.0	1.50	0.0°	2	●	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
	Steel 850 - 1100 N/mm <sup>2</sup> 	1.0	2	150	0.028	0.03	0.08	0.34	60000	3360	8.0
		1.2	2	150	0.034	0.04	0.10	0.43	60000	4080	16.5
		1.5	2	150	0.042	0.05	0.12	0.54	60000	5040	30.0
		2.0	2	150	0.058	0.06	0.16	0.68	60000	6960	67.0
		2.5	2	150	0.072	0.08	0.20	0.88	54260	7815	125.0
		3.0	2	150	0.086	0.09	0.24	1.02	46810	8050	174.0
Steel 1100 - 1300 N/mm <sup>2</sup> 	1.0	2	120	0.026	0.03	0.08	0.34	60000	3120	7.5	
	1.2	2	120	0.030	0.04	0.10	0.43	60000	3600	14.5	
	1.5	2	120	0.038	0.05	0.12	0.54	60000	4560	27.5	
	2.0	2	120	0.052	0.06	0.16	0.68	56175	5840	56.0	
	2.5	2	120	0.064	0.08	0.20	0.88	43405	5555	89.0	
	3.0	2	120	0.078	0.09	0.24	1.02	37450	5840	126.0	
Stainless steel [Cr-Ni/1.4301] 	1.0	2	70	0.022	0.03	0.08	0.34	60000	2640	6.5	
	1.2	2	70	0.028	0.04	0.10	0.43	51820	2900	11.5	
	1.5	2	70	0.034	0.05	0.12	0.54	41265	2805	17.0	
	2.0	2	70	0.046	0.06	0.16	0.68	32770	3015	29.0	
	2.5	2	70	0.058	0.08	0.20	0.88	25320	2935	47.0	
	3.0	2	70	0.068	0.09	0.24	1.02	21845	2970	64.0	
Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	1.0	2	50	0.020	0.03	0.08	0.34	46810	1870	4.5	
	1.2	2	50	0.024	0.04	0.10	0.43	37015	1775	7.0	
	1.5	2	50	0.030	0.05	0.12	0.54	29475	1770	10.5	
	2.0	2	50	0.040	0.06	0.16	0.68	23405	1870	18.0	
	2.5	2	50	0.050	0.08	0.20	0.88	18085	1810	29.0	
	3.0	2	50	0.060	0.09	0.24	1.02	15605	1875	40.5	

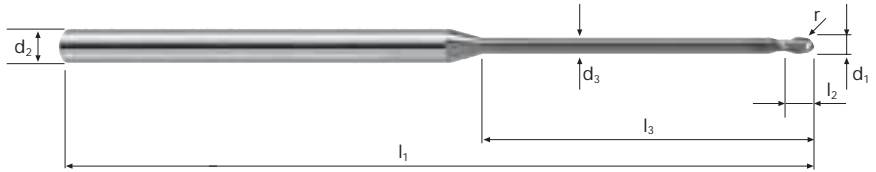
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
	Steel 850 - 1100 N/mm <sup>2</sup> 	1.0	2	250	0.020	0.022	0.022	0.88	60000	2400	45
		1.2	2	250	0.022	0.026	0.026	1.06	60000	2640	45
		1.5	2	250	0.024	0.034	0.034	1.33	59835	2870	45
		2.0	2	250	0.026	0.044	0.044	1.77	44960	2340	45
		2.5	2	250	0.028	0.056	0.056	2.21	36010	2015	45
		3.0	2	250	0.032	0.066	0.066	2.65	30030	1920	45
Steel 1100 - 1300 N/mm <sup>2</sup> 	1.0	2	200	0.018	0.022	0.022	0.88	60000	2160	45	
	1.2	2	200	0.020	0.026	0.026	1.06	60000	2400	45	
	1.5	2	200	0.022	0.034	0.034	1.33	47870	2105	45	
	2.0	2	200	0.024	0.044	0.044	1.77	35970	1725	45	
	2.5	2	200	0.026	0.056	0.056	2.21	28805	1500	45	
	3.0	2	200	0.028	0.066	0.066	2.65	24025	1345	45	
Stainless steel [Cr-Ni/1.4301] 	1.0	2	100	0.016	0.022	0.022	0.88	36175	1160	45	
	1.2	2	100	0.018	0.026	0.026	1.06	30030	1080	45	
	1.5	2	100	0.020	0.034	0.034	1.33	23935	955	45	
	2.0	2	100	0.020	0.044	0.044	1.77	17985	720	45	
	2.5	2	100	0.022	0.056	0.056	2.21	14405	635	45	
	3.0	2	100	0.026	0.066	0.066	2.65	12010	625	45	
Titanium alloys up to 300 HB [Ti5Al2.5Sn] 	1.0	2	80	0.014	0.022	0.022	0.88	28940	810	45	
	1.2	2	80	0.016	0.026	0.026	1.06	24025	770	45	
	1.5	2	80	0.016	0.034	0.034	1.33	19145	615	45	
	2.0	2	80	0.018	0.044	0.044	1.77	14385	520	45	
	2.5	2	80	0.020	0.056	0.056	2.21	11525	460	45	
	3.0	2	80	0.022	0.066	0.066	2.65	9610	425	45	

# Ball nose end mills Microcut-B20

Shank  $\varnothing$  3mm, cylindrical neck, 20xd



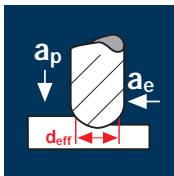
<b>HM</b>	$\lambda$ 30°
<b>Micro</b>	$\gamma$ 5°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300							<b>Gold / Platinum Copper</b>
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										MICRO	
										M15795	
$\varnothing$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r ±0.01	$\alpha$	z		
.100	1.0	3	0.95	60	1.2	20	0.50	3.0°	2	●	
.108	1.2	3	1.15	60	1.4	24	0.60	2.0°	2	●	
.120	1.5	3	1.45	70	1.8	30	0.75	2.0°	2	●	
.140	2.0	3	1.95	80	2.4	40	1.00	1.0°	2	●	
.160	2.5	3	2.45	80	3.0	50	1.25	1.0°	2	●	
.180	3.0	3	2.95	90	3.6	60	1.50	0.0°	2	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

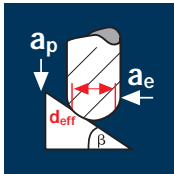
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [mm <sup>3</sup> /min]
0.5	2	180	0.018	0.04	0.10	0.27	60000	2160	8.5
0.6	2	180	0.022	0.05	0.12	0.33	60000	2640	16.0
0.7	2	180	0.026	0.06	0.14	0.39	60000	3120	26.0
0.8	2	180	0.028	0.06	0.16	0.42	60000	3360	32.5
1.0	2	180	0.036	0.08	0.20	0.54	60000	4320	69.0
1.2	2	180	0.042	0.10	0.24	0.66	60000	5040	121.0
1.5	2	180	0.054	0.12	0.30	0.81	60000	6480	233.5
2.0	2	180	0.072	0.16	0.40	1.09	52565	7570	484.5
3.0	2	180	0.108	0.24	0.60	1.63	35150	7590	1093.0

0.5	2	160	0.016	0.04	0.10	0.27	60000	1920	7.5
0.6	2	160	0.020	0.05	0.12	0.33	60000	2400	14.5
0.7	2	160	0.024	0.06	0.14	0.39	60000	2880	24.0
0.8	2	160	0.026	0.06	0.16	0.42	60000	3120	30.0
1.0	2	160	0.032	0.08	0.20	0.54	60000	3840	61.5
1.2	2	160	0.038	0.10	0.24	0.66	60000	4560	109.5
1.5	2	160	0.048	0.12	0.30	0.81	60000	5760	207.5
2.0	2	160	0.064	0.16	0.40	1.09	46725	5980	382.5
3.0	2	160	0.098	0.24	0.60	1.63	31245	6125	882.0

0.5	2	80	0.016	0.04	0.10	0.27	60000	1920	7.5
0.6	2	80	0.020	0.05	0.12	0.33	60000	2400	14.5
0.7	2	80	0.024	0.06	0.14	0.39	60000	2880	24.0
0.8	2	80	0.026	0.06	0.16	0.42	60000	3120	30.0
1.0	2	80	0.032	0.08	0.20	0.54	47160	3020	48.5
1.2	2	80	0.038	0.10	0.24	0.66	38585	2930	70.5
1.5	2	80	0.048	0.12	0.30	0.81	31440	3020	108.5
2.0	2	80	0.064	0.16	0.40	1.09	23365	2990	191.5
3.0	2	80	0.098	0.24	0.60	1.63	15625	3065	441.5

0.5	2	60	0.012	0.04	0.10	0.27	60000	1440	6.0
0.6	2	60	0.016	0.05	0.12	0.33	57875	1850	11.0
0.7	2	60	0.018	0.06	0.14	0.39	48970	1765	15.0
0.8	2	60	0.020	0.06	0.16	0.42	45475	1820	17.5
1.0	2	60	0.026	0.08	0.20	0.54	35370	1840	29.5
1.2	2	60	0.030	0.10	0.24	0.66	28940	1735	41.5
1.5	2	60	0.038	0.12	0.30	0.81	23580	1790	64.5
2.0	2	60	0.050	0.16	0.40	1.09	17520	1750	112.0
3.0	2	60	0.076	0.24	0.60	1.63	11715	1780	256.5

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.020	0.022	0.022	0.47	60000	2400	45
0.6	2	300	0.022	0.026	0.026	0.56	60000	2640	45
0.7	2	300	0.024	0.030	0.030	0.65	60000	2880	45
0.8	2	300	0.026	0.034	0.034	0.75	60000	3120	45
1.0	2	300	0.028	0.042	0.042	0.93	60000	3360	45
1.2	2	300	0.030	0.050	0.050	1.12	60000	3600	45
1.5	2	300	0.034	0.064	0.064	1.40	60000	4080	45
2.0	2	300	0.036	0.084	0.084	1.86	51340	3695	45
3.0	2	300	0.046	0.126	0.126	2.79	34230	3150	45

0.5	2	250	0.018	0.022	0.022	0.47	60000	2160	45
0.6	2	250	0.020	0.026	0.026	0.56	60000	2400	45
0.7	2	250	0.022	0.030	0.030	0.65	60000	2640	45
0.8	2	250	0.024	0.034	0.034	0.75	60000	2880	45
1.0	2	250	0.026	0.042	0.042	0.93	60000	3120	45
1.2	2	250	0.028	0.050	0.050	1.12	60000	3360	45
1.5	2	250	0.030	0.064	0.064	1.40	56845	3410	45
2.0	2	250	0.032	0.084	0.084	1.86	42785	2740	45
3.0	2	250	0.042	0.126	0.126	2.79	28525	2395	45

0.5	2	120	0.016	0.022	0.022	0.47	60000	1920	45
0.6	2	120	0.018	0.026	0.026	0.56	60000	2160	45
0.7	2	120	0.020	0.030	0.030	0.65	58765	2350	45
0.8	2	120	0.020	0.034	0.034	0.75	50930	2035	45
1.0	2	120	0.022	0.042	0.042	0.93	41075	1805	45
1.2	2	120	0.024	0.050	0.050	1.12	34105	1635	45
1.5	2	120	0.028	0.064	0.064	1.40	27285	1530	45
2.0	2	120	0.028	0.084	0.084	1.86	20535	1150	45
3.0	2	120	0.036	0.126	0.126	2.79	13690	985	45

0.5	2	100	0.014	0.022	0.022	0.47	60000	1680	45
0.6	2	100	0.016	0.026	0.026	0.56	56845	1820	45
0.7	2	100	0.016	0.030	0.030	0.65	48970	1565	45
0.8	2	100	0.018	0.034	0.034	0.75	42445	1530	45
1.0	2	100	0.020	0.042	0.042	0.93	34230	1370	45
1.2	2	100	0.022	0.050	0.050	1.12	28420	1250	45
1.5	2	100	0.024	0.064	0.064	1.40	22735	1090	45
2.0	2	100	0.026	0.084	0.084	1.86	17115	890	45
3.0	2	100	0.032	0.126	0.126	2.79	11410	730	45

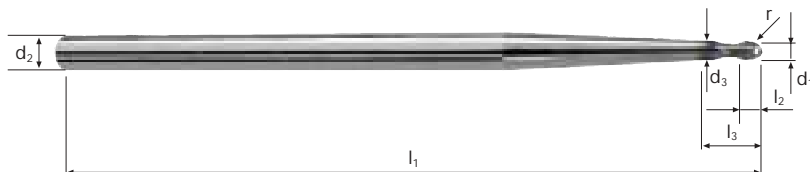


# Ball nose end mills Microcut-LB2

Shank  $\varnothing$  3mm, 2xd



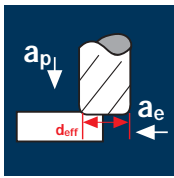
**HM**  $\lambda$  30°  
**Micro**  $\gamma$  5°



**Rm** < 850    **Rm** 850-1100    **Rm** 1100-1300    **Rm** 1300-1500    **Inox** Stainless    **Ti** Titanium    **Cobalt-Chrome**  
**Gold / Platinum**  
**Copper**

Example: Order-N°.											MICRO	
											M5788	
$\varnothing$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r ±0.01	$\alpha$	z			
.050	0.5	3	0.45	60	0.6	1.0	0.25	2.5°	2	●		
.060	0.6	3	0.55	60	0.7	1.2	0.30	2.5°	2	●		
.070	0.7	3	0.65	60	0.8	1.4	0.35	2.5°	2	●		
.080	0.8	3	0.75	60	1.0	1.6	0.40	2.5°	2	●		
.100	1.0	3	0.95	60	1.2	2.0	0.50	2.5°	2	●		
.108	1.2	3	1.15	60	1.4	2.4	0.60	2.5°	2	●		
.120	1.5	3	1.45	60	1.8	3.0	0.75	2.5°	2	●		
.140	2.0	3	1.95	60	2.4	4.0	1.00	1.5°	2	●		
.180	3.0	3	2.95	60	3.6	6.0	1.50	0.0°	2	●		

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

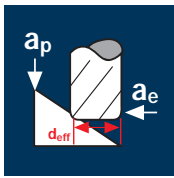
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
0.5	2	140	0.016	0.03	0.10	0.44	60000	1920	r=0.1
0.8	2	140	0.026	0.05	0.16	0.77	57875	3010	r=0.1
1.0	2	140	0.034	0.06	0.20	0.89	50075	3405	r=0.2
1.2	2	140	0.040	0.07	0.24	1.10	40515	3240	r=0.2
1.5	2	140	0.050	0.09	0.30	1.43	31165	3115	r=0.2
2.0	2	140	0.066	0.12	0.40	1.97	22620	2985	r=0.2
2.5	2	140	0.084	0.15	0.50	2.49	17895	3005	r=0.2
3.0	2	140	0.100	0.18	0.60	3.00	14855	2970	r=0.2

0.5	2	120	0.016	0.03	0.10	0.44	60000	1920	r=0.1
0.8	2	120	0.024	0.05	0.16	0.77	49610	2380	r=0.1
1.0	2	120	0.032	0.06	0.20	0.89	42920	2745	r=0.2
1.2	2	120	0.038	0.07	0.24	1.10	34725	2640	r=0.2
1.5	2	120	0.048	0.09	0.30	1.43	26710	2565	r=0.2
2.0	2	120	0.062	0.12	0.40	1.97	19390	2405	r=0.2
2.5	2	120	0.080	0.15	0.50	2.49	15340	2455	r=0.2
3.0	2	120	0.096	0.18	0.60	3.00	12735	2445	r=0.2

0.5	2	100	0.014	0.03	0.10	0.44	60000	1680	r=0.1
0.8	2	100	0.022	0.05	0.16	0.77	41340	1820	r=0.1
1.0	2	100	0.030	0.06	0.20	0.89	35765	2145	r=0.2
1.2	2	100	0.036	0.07	0.24	1.10	28940	2085	r=0.2
1.5	2	100	0.044	0.09	0.30	1.43	22260	1960	r=0.2
2.0	2	100	0.058	0.12	0.40	1.97	16160	1875	r=0.2
2.5	2	100	0.074	0.15	0.50	2.49	12785	1890	r=0.2
3.0	2	100	0.088	0.18	0.60	3.00	10610	1865	r=0.2

0.5	2	60	0.012	0.03	0.10	0.44	43405	1040	r=0.1
0.8	2	60	0.020	0.05	0.16	0.77	24805	990	r=0.1
1.0	2	60	0.028	0.06	0.20	0.89	21460	1200	r=0.2
1.2	2	60	0.032	0.07	0.24	1.10	17365	1110	r=0.2
1.5	2	60	0.040	0.09	0.30	1.43	13355	1070	r=0.2
2.0	2	60	0.052	0.12	0.40	1.97	9695	1010	r=0.2
2.5	2	60	0.068	0.15	0.50	2.49	7670	1045	r=0.2
3.0	2	60	0.080	0.18	0.60	3.00	6365	1020	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.020	0.022	0.022	0.50	60000	2400	45
0.8	2	300	0.022	0.034	0.034	0.80	60000	2640	45
1.0	2	300	0.028	0.042	0.042	1.00	60000	3360	45
1.2	2	300	0.030	0.050	0.050	1.20	60000	3600	45
1.5	2	300	0.034	0.064	0.064	1.50	60000	4080	45
2.0	2	300	0.038	0.084	0.084	1.99	47990	3645	45
2.5	2	300	0.040	0.106	0.106	2.48	38505	3080	45
3.0	2	300	0.046	0.126	0.126	2.97	32155	2960	45

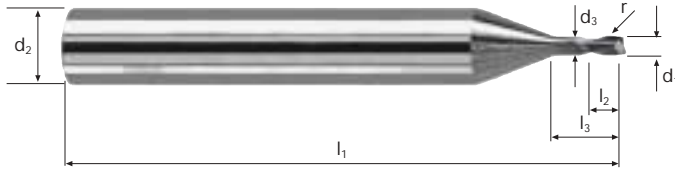
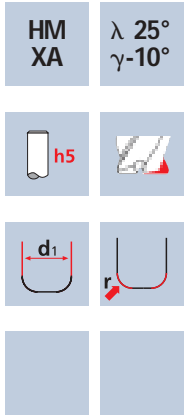
0.5	2	250	0.020	0.022	0.022	0.50	60000	2400	45
0.8	2	250	0.020	0.034	0.034	0.80	60000	2400	45
1.0	2	250	0.026	0.042	0.042	1.00	60000	3120	45
1.2	2	250	0.028	0.050	0.050	1.20	60000	3360	45
1.5	2	250	0.032	0.064	0.064	1.50	53055	3395	45
2.0	2	250	0.036	0.084	0.084	1.99	39990	2880	45
2.5	2	250	0.038	0.106	0.106	2.48	32090	2440	45
3.0	2	250	0.044	0.126	0.126	2.97	26795	2360	45

0.5	2	200	0.018	0.022	0.022	0.50	60000	2160	45
0.8	2	200	0.020	0.034	0.034	0.80	60000	2400	45
1.0	2	200	0.026	0.042	0.042	1.00	60000	3120	45
1.2	2	200	0.028	0.050	0.050	1.20	53055	2970	45
1.5	2	200	0.030	0.064	0.064	1.50	42445	2545	45
2.0	2	200	0.034	0.084	0.084	1.99	31990	2175	45
2.5	2	200	0.036	0.106	0.106	2.48	25670	1850	45
3.0	2	200	0.042	0.126	0.126	2.97	21435	1800	45

0.5	2	150	0.016	0.022	0.022	0.50	60000	1920	45
0.8	2	150	0.018	0.034	0.034	0.80	59685	2150	45
1.0	2	150	0.022	0.042	0.042	1.00	47750	2100	45
1.2	2	150	0.024	0.050	0.050	1.20	39790	1910	45
1.5	2	150	0.028	0.064	0.064	1.50	31830	1780	45
2.0	2	150	0.030	0.084	0.084	1.99	23995	1440	45
2.5	2	150	0.032	0.106	0.106	2.48	19255	1230	45
3.0	2	150	0.036	0.126	0.126	2.97	16075	1155	45

# Corner radius end mills MicroX

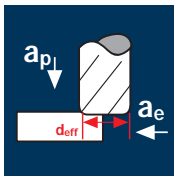
Shank  $\varnothing$  6mm, cylindrical neck, 3xd



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper
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Example: Order-N°.										X-Al	
										X6532	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r 0/+0.010	$\alpha$	z		
.050	0.5	6	0.45	57	0.6	1.5	0.10	13.2°	2	●	
.080	0.8	6	0.75	57	0.9	2.4	0.10	12.2°	2	●	
.100	1.0	6	0.95	57	1.2	3.0	0.20	11.6°	2	●	
.108	1.2	6	1.15	57	1.4	3.6	0.20	10.9°	2	●	
.120	1.5	6	1.45	57	1.8	4.5	0.20	10.0°	2	●	
.140	2.0	6	1.95	57	2.4	6.0	0.20	8.6°	2	●	
.160	2.5	6	2.45	57	3.0	7.5	0.20	7.2°	2	●	
.180	3.0	6	2.95	57	3.6	9.0	0.20	6.0°	2	●	
.145	2.0	6	1.95	57	2.4	6.0	0.50	8.7°	2	●	
.165	2.5	6	2.45	57	3.0	7.5	0.50	7.3°	2	●	
.185	3.0	6	2.95	57	3.6	9.0	0.50	6.1°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

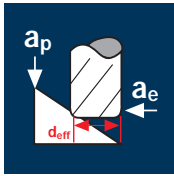
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
0.5	2	140	0.016	0.03	0.10	0.44	60000	1920	r=0.1
0.8	2	140	0.026	0.04	0.16	0.76	58640	3050	r=0.1
1.0	2	140	0.034	0.05	0.20	0.86	51820	3525	r=0.2
1.2	2	140	0.040	0.06	0.24	1.09	40885	3270	r=0.2
1.5	2	140	0.050	0.08	0.30	1.42	31385	3140	r=0.2
2.0	2	140	0.066	0.10	0.40	1.95	22855	3015	r=0.2
2.5	2	140	0.084	0.13	0.50	2.47	18040	3030	r=0.2
3.0	2	140	0.100	0.15	0.60	2.99	14905	2980	r=0.2

0.5	2	120	0.016	0.03	0.10	0.44	60000	1920	r=0.1
0.8	2	120	0.024	0.04	0.16	0.76	50260	2410	r=0.1
1.0	2	120	0.032	0.05	0.20	0.86	44415	2845	r=0.2
1.2	2	120	0.038	0.06	0.24	1.09	35045	2665	r=0.2
1.5	2	120	0.048	0.08	0.30	1.42	26900	2580	r=0.2
2.0	2	120	0.062	0.10	0.40	1.95	19590	2430	r=0.2
2.5	2	120	0.080	0.13	0.50	2.47	15465	2475	r=0.2
3.0	2	120	0.096	0.15	0.60	2.99	12775	2455	r=0.2

0.5	2	100	0.014	0.03	0.10	0.44	60000	1680	r=0.1
0.8	2	100	0.022	0.04	0.16	0.76	41885	1845	r=0.1
1.0	2	100	0.030	0.05	0.20	0.86	37015	2220	r=0.2
1.2	2	100	0.036	0.06	0.24	1.09	29205	2105	r=0.2
1.5	2	100	0.044	0.08	0.30	1.42	22415	1975	r=0.2
2.0	2	100	0.058	0.10	0.40	1.95	16325	1895	r=0.2
2.5	2	100	0.074	0.13	0.50	2.47	12885	1905	r=0.2
3.0	2	100	0.088	0.15	0.60	2.99	10645	1875	r=0.2

0.5	2	60	0.012	0.03	0.10	0.44	43405	1040	r=0.1
0.8	2	60	0.020	0.04	0.16	0.76	25130	1005	r=0.1
1.0	2	60	0.028	0.05	0.20	0.86	22210	1245	r=0.2
1.2	2	60	0.032	0.06	0.24	1.09	17520	1120	r=0.2
1.5	2	60	0.040	0.08	0.30	1.42	13450	1075	r=0.2
2.0	2	60	0.052	0.10	0.40	1.95	9795	1020	r=0.2
2.5	2	60	0.068	0.13	0.50	2.47	7730	1050	r=0.2
3.0	2	60	0.080	0.15	0.60	2.99	6390	1020	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.020	0.020	0.020	0.50	60000	2400	45
0.8	2	300	0.022	0.032	0.032	0.80	60000	2640	45
1.0	2	300	0.028	0.042	0.042	1.00	60000	3360	45
1.2	2	300	0.030	0.050	0.050	1.20	60000	3600	45
1.5	2	300	0.034	0.062	0.062	1.50	60000	4080	45
2.0	2	300	0.038	0.082	0.082	2.00	47750	3630	45
2.5	2	300	0.040	0.102	0.102	2.49	38350	3070	45
3.0	2	300	0.046	0.122	0.122	2.97	32155	2960	45

0.5	2	250	0.020	0.020	0.020	0.50	60000	2400	45
0.8	2	250	0.020	0.032	0.032	0.80	60000	2400	45
1.0	2	250	0.026	0.042	0.042	1.00	60000	3120	45
1.2	2	250	0.028	0.050	0.050	1.20	60000	3360	45
1.5	2	250	0.032	0.062	0.062	1.50	53055	3395	45
2.0	2	250	0.036	0.082	0.082	2.00	39790	2865	45
2.5	2	250	0.038	0.102	0.102	2.49	31960	2430	45
3.0	2	250	0.044	0.122	0.122	2.97	26795	2360	45

0.5	2	200	0.018	0.020	0.020	0.50	60000	2160	45
0.8	2	200	0.020	0.032	0.032	0.80	60000	2400	45
1.0	2	200	0.026	0.042	0.042	1.00	60000	3120	45
1.2	2	200	0.028	0.050	0.050	1.20	53055	2970	45
1.5	2	200	0.030	0.062	0.062	1.50	42445	2545	45
2.0	2	200	0.034	0.082	0.082	2.00	31830	2165	45
2.5	2	200	0.036	0.102	0.102	2.49	25570	1840	45
3.0	2	200	0.042	0.122	0.122	2.97	21435	1800	45

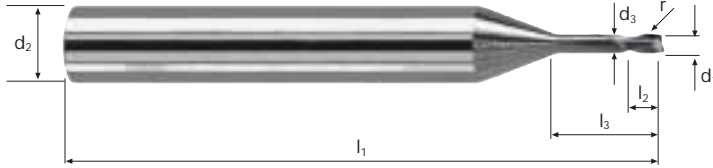
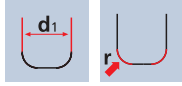
0.5	2	150	0.016	0.020	0.020	0.50	60000	1920	45
0.8	2	150	0.018	0.032	0.032	0.80	59685	2150	45
1.0	2	150	0.022	0.042	0.042	1.00	47750	2100	45
1.2	2	150	0.024	0.050	0.050	1.20	39790	1910	45
1.5	2	150	0.028	0.062	0.062	1.50	31830	1780	45
2.0	2	150	0.030	0.082	0.082	2.00	23875	1435	45
2.5	2	150	0.032	0.102	0.102	2.49	19175	1225	45
3.0	2	150	0.036	0.122	0.122	2.97	16075	1155	45

# Corner radius end mills MicroX

Shank  $\varnothing$  6mm, cylindrical neck, 5xd



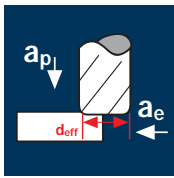
**HM**  
**XA**     $\lambda$  25°  
              $\gamma$ -10°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome</b> <b>Copper</b>
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Example: Order-N°.											X-Al	
											X6534	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r 0/+0.010	$\alpha$	z			
.050	0.5	6	0.45	57	0.6	2.5	0.10	12.2°	2	●		
.080	0.8	6	0.75	57	0.9	4.0	0.10	10.8°	2	●		
.100	1.0	6	0.95	57	1.2	5.0	0.20	10.0°	2	●		
.108	1.2	6	1.15	57	1.4	6.0	0.20	9.2°	2	●		
.120	1.5	6	1.45	61	1.8	7.5	0.20	8.1°	2	●		
.140	2.0	6	1.95	61	2.4	10.0	0.20	6.6°	2	●		
.160	2.5	6	2.45	61	3.0	12.5	0.20	5.3°	2	●		
.180	3.0	6	2.95	66	3.6	15.0	0.20	4.2°	2	●		
.145	2.0	6	1.95	61	2.4	10.0	0.50	6.7°	2	●		
.165	2.5	6	2.45	61	3.0	12.5	0.50	5.4°	2	●		
.185	3.0	6	2.95	66	3.6	15.0	0.50	4.3°	2	●		

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



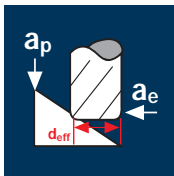
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
0.5	2	140	0.016	0.02	0.09	0.42	60000	1920	r=0.1
0.8	2	140	0.026	0.03	0.14	0.74	60000	3120	r=0.1
1.0	2	140	0.034	0.04	0.18	0.84	53055	3610	r=0.2
1.2	2	140	0.040	0.05	0.22	1.06	42040	3365	r=0.2
1.5	2	140	0.050	0.06	0.27	1.39	32060	3205	r=0.2
2.0	2	140	0.066	0.08	0.36	1.92	23210	3065	r=0.2
2.5	2	140	0.084	0.10	0.45	2.45	18190	3055	r=0.2
3.0	2	140	0.100	0.12	0.54	2.97	15005	3000	r=0.2

0.5	2	120	0.016	0.02	0.09	0.42	60000	1920	r=0.1
0.8	2	120	0.024	0.03	0.14	0.74	51620	2480	r=0.1
1.0	2	120	0.032	0.04	0.18	0.84	45475	2910	r=0.2
1.2	2	120	0.038	0.05	0.22	1.06	36035	2740	r=0.2
1.5	2	120	0.048	0.06	0.27	1.39	27480	2640	r=0.2
2.0	2	120	0.062	0.08	0.36	1.92	19895	2465	r=0.2
2.5	2	120	0.080	0.10	0.45	2.45	15590	2495	r=0.2
3.0	2	120	0.096	0.12	0.54	2.97	12860	2470	r=0.2

0.5	2	100	0.014	0.02	0.09	0.42	60000	1680	r=0.1
0.8	2	100	0.022	0.03	0.14	0.74	43015	1895	r=0.1
1.0	2	100	0.030	0.04	0.18	0.84	37895	2275	r=0.2
1.2	2	100	0.036	0.05	0.22	1.06	30030	2160	r=0.2
1.5	2	100	0.044	0.06	0.27	1.39	22900	2015	r=0.2
2.0	2	100	0.058	0.08	0.36	1.92	16580	1925	r=0.2
2.5	2	100	0.074	0.10	0.45	2.45	12995	1925	r=0.2
3.0	2	100	0.088	0.12	0.54	2.97	10720	1885	r=0.2

0.5	2	60	0.012	0.02	0.09	0.42	45475	1090	r=0.1
0.8	2	60	0.020	0.03	0.14	0.74	25810	1030	r=0.1
1.0	2	60	0.028	0.04	0.18	0.84	22735	1275	r=0.2
1.2	2	60	0.032	0.05	0.22	1.06	18020	1155	r=0.2
1.5	2	60	0.040	0.06	0.27	1.39	13740	1100	r=0.2
2.0	2	60	0.052	0.08	0.36	1.92	9945	1035	r=0.2
2.5	2	60	0.068	0.10	0.45	2.45	7795	1060	r=0.2
3.0	2	60	0.080	0.12	0.54	2.97	6430	1030	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.020	0.020	0.020	0.50	60000	2400	45
0.8	2	300	0.022	0.032	0.032	0.80	60000	2640	45
1.0	2	300	0.028	0.040	0.040	1.00	60000	3360	45
1.2	2	300	0.030	0.048	0.048	1.20	60000	3600	45
1.5	2	300	0.034	0.060	0.060	1.50	60000	4080	45
2.0	2	300	0.038	0.080	0.080	2.00	47750	3630	45
2.5	2	300	0.040	0.100	0.100	2.49	38350	3070	45
3.0	2	300	0.046	0.120	0.120	2.97	32155	2960	45

0.5	2	250	0.020	0.020	0.020	0.50	60000	2400	45
0.8	2	250	0.020	0.032	0.032	0.80	60000	2400	45
1.0	2	250	0.026	0.040	0.040	1.00	60000	3120	45
1.2	2	250	0.028	0.048	0.048	1.20	60000	3360	45
1.5	2	250	0.032	0.060	0.060	1.50	53055	3395	45
2.0	2	250	0.036	0.080	0.080	2.00	39790	2865	45
2.5	2	250	0.038	0.100	0.100	2.49	31960	2430	45
3.0	2	250	0.044	0.120	0.120	2.97	26795	2360	45

0.5	2	200	0.018	0.020	0.020	0.50	60000	2160	45
0.8	2	200	0.020	0.032	0.032	0.80	60000	2400	45
1.0	2	200	0.026	0.040	0.040	1.00	60000	3120	45
1.2	2	200	0.028	0.048	0.048	1.20	53055	2970	45
1.5	2	200	0.030	0.060	0.060	1.50	42445	2545	45
2.0	2	200	0.034	0.080	0.080	2.00	31830	2165	45
2.5	2	200	0.036	0.100	0.100	2.49	25570	1840	45
3.0	2	200	0.042	0.120	0.120	2.97	21435	1800	45

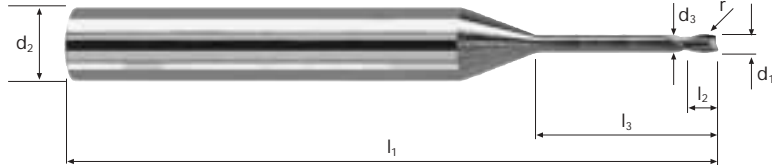
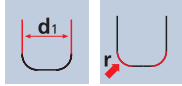
0.5	2	150	0.016	0.020	0.020	0.50	60000	1920	45
0.8	2	150	0.018	0.032	0.032	0.80	59685	2150	45
1.0	2	150	0.022	0.040	0.040	1.00	47750	2100	45
1.2	2	150	0.024	0.048	0.048	1.20	39790	1910	45
1.5	2	150	0.028	0.060	0.060	1.50	31830	1780	45
2.0	2	150	0.030	0.080	0.080	2.00	23875	1435	45
2.5	2	150	0.032	0.100	0.100	2.49	19175	1225	45
3.0	2	150	0.036	0.120	0.120	2.97	16075	1155	45

# Corner radius end mills MicroX

Shank  $\varnothing$  6mm, cylindrical neck, 8xd



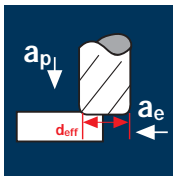
**HM**  
**XA**     $\lambda$  25°  
               $\gamma$ -10°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome</b> <b>Copper</b>
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Example: Order-N°.										X-Al	
										X6536	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r 0/+0.010	$\alpha$	z		
.050	0.5	6	0.45	57	0.6	4.0	0.10	11.1°	2	●	
.080	0.8	6	0.75	57	0.9	6.4	0.10	9.4°	2	●	
.100	1.0	6	0.95	61	1.2	8.0	0.20	8.4°	2	●	
.108	1.2	6	1.15	61	1.4	9.6	0.20	7.6°	2	●	
.120	1.5	6	1.45	61	1.8	12.0	0.20	6.5°	2	●	
.140	2.0	6	1.95	66	2.4	16.0	0.20	5.1°	2	●	
.160	2.5	6	2.45	69	3.0	20.0	0.20	4.0°	2	●	
.180	3.0	6	2.95	75	3.6	24.0	0.20	3.1°	2	●	
.145	2.0	6	1.95	66	2.4	16.0	0.50	5.1°	2	●	
.165	2.5	6	2.45	69	3.0	20.0	0.50	4.0°	2	●	
.185	3.0	6	2.95	75	3.6	24.0	0.50	3.1°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



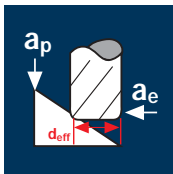
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	r [mm]
0.5	2	140	0.020	0.02	0.09	0.42	60000	2400	r=0.1
0.8	2	140	0.032	0.03	0.14	0.74	60000	3840	r=0.1
1.0	2	140	0.040	0.04	0.18	0.84	53055	4245	r=0.2
1.2	2	140	0.048	0.05	0.22	1.06	42040	4035	r=0.2
1.5	2	140	0.060	0.06	0.27	1.39	32060	3845	r=0.2
2.0	2	140	0.080	0.08	0.36	1.92	23210	3715	r=0.2
2.5	2	140	0.100	0.10	0.45	2.45	18190	3640	r=0.2
3.0	2	140	0.120	0.12	0.54	2.97	15005	3600	r=0.2

0.5	2	120	0.020	0.02	0.09	0.42	60000	2400	r=0.1
0.8	2	120	0.030	0.03	0.14	0.74	51620	3095	r=0.1
1.0	2	120	0.038	0.04	0.18	0.84	45475	3455	r=0.2
1.2	2	120	0.046	0.05	0.22	1.06	36035	3315	r=0.2
1.5	2	120	0.058	0.06	0.27	1.39	27480	3190	r=0.2
2.0	2	120	0.076	0.08	0.36	1.92	19895	3025	r=0.2
2.5	2	120	0.096	0.10	0.45	2.45	15590	2995	r=0.2
3.0	2	120	0.114	0.12	0.54	2.97	12860	2930	r=0.2

0.5	2	100	0.018	0.02	0.09	0.42	60000	2160	r=0.1
0.8	2	100	0.028	0.03	0.14	0.74	43015	2710	r=0.1
1.0	2	100	0.036	0.04	0.18	0.84	37895	2730	r=0.2
1.2	2	100	0.042	0.05	0.22	1.06	30030	2525	r=0.2
1.5	2	100	0.052	0.06	0.27	1.39	22900	2380	r=0.2
2.0	2	100	0.070	0.08	0.36	1.92	16580	2320	r=0.2
2.5	2	100	0.088	0.10	0.45	2.45	12995	2285	r=0.2
3.0	2	100	0.106	0.12	0.54	2.97	10720	2275	r=0.2

0.5	2	60	0.016	0.02	0.09	0.42	45475	1455	r=0.1
0.8	2	60	0.026	0.03	0.14	0.74	25810	1340	r=0.1
1.0	2	60	0.032	0.04	0.18	0.84	22735	1455	r=0.2
1.2	2	60	0.038	0.05	0.22	1.06	18020	1370	r=0.2
1.5	2	60	0.048	0.06	0.27	1.39	13740	1320	r=0.2
2.0	2	60	0.064	0.08	0.36	1.92	9945	1275	r=0.2
2.5	2	60	0.080	0.10	0.45	2.45	7795	1245	r=0.2
3.0	2	60	0.096	0.12	0.54	2.97	6430	1235	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
0.5	2	300	0.024	0.020	0.020	0.50	60000	2880	45
0.8	2	300	0.028	0.032	0.032	0.80	60000	3360	45
1.0	2	300	0.034	0.040	0.040	1.00	60000	4080	45
1.2	2	300	0.036	0.048	0.048	1.20	60000	4320	45
1.5	2	300	0.040	0.060	0.060	1.50	60000	4800	45
2.0	2	300	0.046	0.080	0.080	2.00	47750	4395	45
2.5	2	300	0.048	0.100	0.100	2.49	38350	3680	45
3.0	2	300	0.056	0.120	0.120	2.97	32155	3600	45

0.5	2	250	0.022	0.020	0.020	0.50	60000	2640	45
0.8	2	250	0.026	0.032	0.032	0.80	60000	3120	45
1.0	2	250	0.032	0.040	0.040	1.00	60000	3840	45
1.2	2	250	0.034	0.048	0.048	1.20	60000	4080	45
1.5	2	250	0.038	0.060	0.060	1.50	53055	4030	45
2.0	2	250	0.044	0.080	0.080	2.00	39790	3500	45
2.5	2	250	0.046	0.100	0.100	2.49	31960	2940	45
3.0	2	250	0.054	0.120	0.120	2.97	26795	2895	45

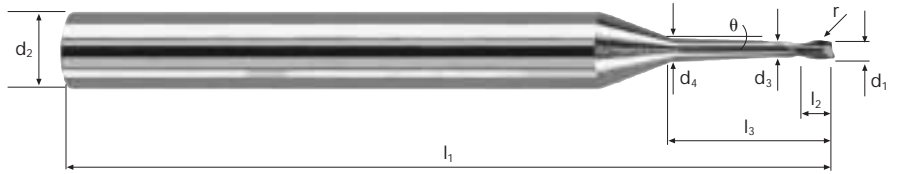
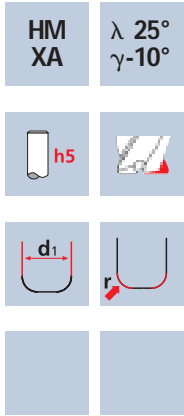
0.5	2	200	0.022	0.020	0.020	0.50	60000	2640	45
0.8	2	200	0.026	0.032	0.032	0.80	60000	3120	45
1.0	2	200	0.030	0.040	0.040	1.00	60000	3600	45
1.2	2	200	0.032	0.048	0.048	1.20	53055	3395	45
1.5	2	200	0.036	0.060	0.060	1.50	42445	3055	45
2.0	2	200	0.042	0.080	0.080	2.00	31830	2675	45
2.5	2	200	0.044	0.100	0.100	2.49	25570	2250	45
3.0	2	200	0.050	0.120	0.120	2.97	21435	2145	45

0.5	2	150	0.020	0.020	0.020	0.50	60000	2400	45
0.8	2	150	0.022	0.032	0.032	0.80	59685	2625	45
1.0	2	150	0.028	0.040	0.040	1.00	47750	2675	45
1.2	2	150	0.028	0.048	0.048	1.20	39790	2230	45
1.5	2	150	0.032	0.060	0.060	1.50	31830	2035	45
2.0	2	150	0.036	0.080	0.080	2.00	23875	1720	45
2.5	2	150	0.038	0.100	0.100	2.49	19175	1455	45
3.0	2	150	0.044	0.120	0.120	2.97	16075	1415	45



# Corner radius end mills MicroX

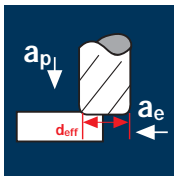
Shank  $\varnothing$  6mm, conical neck 0.9°, 8xd



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper
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Example: Order-N°.											X-Al		
											X6736		
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	d4	l1	l2	l3	$\theta$	r 0/+0.010	$\alpha$	z		
.050	0.5	6	0.45	0.56	57	0.40	4.0	0.9°	0.10	11.1°	2	●	
.080	0.8	6	0.75	0.93	57	0.65	6.4	0.9°	0.10	9.4°	2	●	
.100	1.0	6	0.95	1.18	61	0.80	8.0	0.9°	0.20	8.5°	2	●	
.108	1.2	6	1.15	1.42	61	1.00	9.6	0.9°	0.20	7.7°	2	●	
.120	1.5	6	1.45	1.79	61	1.20	12.0	0.9°	0.20	6.6°	2	●	
.140	2.0	6	1.95	2.41	66	1.60	16.0	0.9°	0.20	5.1°	2	●	
.160	2.5	6	2.45	3.03	69	2.00	20.0	0.9°	0.20	4.0°	2	●	
.180	3.0	6	2.95	3.64	75	2.40	24.0	0.9°	0.20	3.1°	2	●	
.145	2.0	6	1.95	2.41	66	1.60	16.0	0.9°	0.50	5.2°	2	●	
.165	2.5	6	2.45	3.03	69	2.00	20.0	0.9°	0.50	4.0°	2	●	
.185	3.0	6	2.95	3.64	75	2.40	24.0	0.9°	0.50	3.1°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



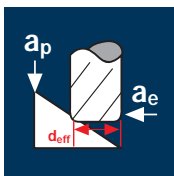
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
0.5	2	140	0.020	0.02	0.08	0.42	60000	2400	r=0.1
0.8	2	140	0.032	0.03	0.13	0.74	60000	3840	r=0.1
1.0	2	140	0.040	0.04	0.16	0.84	53055	4245	r=0.2
1.2	2	140	0.048	0.05	0.19	1.06	42040	4035	r=0.2
1.5	2	140	0.060	0.06	0.24	1.39	32060	3845	r=0.2
2.0	2	140	0.080	0.08	0.32	1.92	23210	3715	r=0.2
2.5	2	140	0.100	0.10	0.40	2.45	18190	3640	r=0.2
3.0	2	140	0.120	0.12	0.48	2.97	15005	3600	r=0.2

0.5	2	120	0.020	0.02	0.08	0.42	60000	2400	r=0.1
0.8	2	120	0.030	0.03	0.13	0.74	51620	3095	r=0.1
1.0	2	120	0.038	0.04	0.16	0.84	45475	3455	r=0.2
1.2	2	120	0.046	0.05	0.19	1.06	36035	3315	r=0.2
1.5	2	120	0.058	0.06	0.24	1.39	27480	3190	r=0.2
2.0	2	120	0.076	0.08	0.32	1.92	19895	3025	r=0.2
2.5	2	120	0.096	0.10	0.40	2.45	15590	2995	r=0.2
3.0	2	120	0.114	0.12	0.48	2.97	12860	2930	r=0.2

0.5	2	100	0.018	0.02	0.08	0.42	60000	2160	r=0.1
0.8	2	100	0.028	0.03	0.13	0.74	43015	2710	r=0.1
1.0	2	100	0.036	0.04	0.16	0.84	37895	2730	r=0.2
1.2	2	100	0.042	0.05	0.19	1.06	30030	2525	r=0.2
1.5	2	100	0.052	0.06	0.24	1.39	22900	2380	r=0.2
2.0	2	100	0.070	0.08	0.32	1.92	16580	2320	r=0.2
2.5	2	100	0.088	0.10	0.40	2.45	12995	2285	r=0.2
3.0	2	100	0.106	0.12	0.48	2.97	10720	2275	r=0.2

0.5	2	60	0.016	0.02	0.08	0.42	45475	1455	r=0.1
0.8	2	60	0.026	0.03	0.13	0.74	25810	1340	r=0.1
1.0	2	60	0.032	0.04	0.16	0.84	22735	1455	r=0.2
1.2	2	60	0.038	0.05	0.19	1.06	18020	1370	r=0.2
1.5	2	60	0.048	0.06	0.24	1.39	13740	1320	r=0.2
2.0	2	60	0.064	0.08	0.32	1.92	9945	1275	r=0.2
2.5	2	60	0.080	0.10	0.40	2.45	7795	1245	r=0.2
3.0	2	60	0.096	0.12	0.48	2.97	6430	1235	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.022	0.018	0.018	0.50	60000	2640	45
0.8	2	300	0.026	0.028	0.028	0.80	60000	3120	45
1.0	2	300	0.032	0.036	0.036	0.99	60000	3840	45
1.2	2	300	0.034	0.042	0.042	1.20	60000	4080	45
1.5	2	300	0.038	0.052	0.052	1.50	60000	4560	45
2.0	2	300	0.042	0.070	0.070	2.00	47750	4010	45
2.5	2	300	0.044	0.088	0.088	2.49	38350	3375	45
3.0	2	300	0.050	0.106	0.106	2.98	32045	3205	45

0.5	2	250	0.020	0.018	0.018	0.50	60000	2400	45
0.8	2	250	0.024	0.028	0.028	0.80	60000	2880	45
1.0	2	250	0.030	0.036	0.036	0.99	60000	3600	45
1.2	2	250	0.032	0.042	0.042	1.20	60000	3840	45
1.5	2	250	0.036	0.052	0.052	1.50	53055	3820	45
2.0	2	250	0.040	0.070	0.070	2.00	39790	3185	45
2.5	2	250	0.042	0.088	0.088	2.49	31960	2685	45
3.0	2	250	0.048	0.106	0.106	2.98	26705	2565	45

0.5	2	200	0.020	0.018	0.018	0.50	60000	2400	45
0.8	2	200	0.024	0.028	0.028	0.80	60000	2880	45
1.0	2	200	0.028	0.036	0.036	0.99	60000	3360	45
1.2	2	200	0.030	0.042	0.042	1.20	53055	3185	45
1.5	2	200	0.034	0.052	0.052	1.50	42445	2885	45
2.0	2	200	0.038	0.070	0.070	2.00	31830	2420	45
2.5	2	200	0.040	0.088	0.088	2.49	25570	2045	45
3.0	2	200	0.046	0.106	0.106	2.98	21365	1965	45

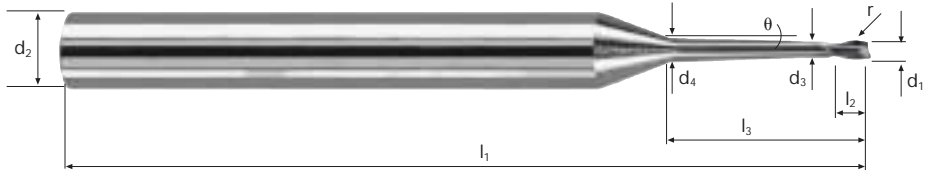
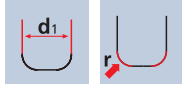
0.5	2	150	0.018	0.018	0.018	0.50	60000	2160	45
0.8	2	150	0.020	0.028	0.028	0.80	59685	2385	45
1.0	2	150	0.026	0.036	0.036	0.99	48230	2510	45
1.2	2	150	0.028	0.042	0.042	1.20	39790	2230	45
1.5	2	150	0.030	0.052	0.052	1.50	31830	1910	45
2.0	2	150	0.034	0.070	0.070	2.00	23875	1625	45
2.5	2	150	0.036	0.088	0.088	2.49	19175	1380	45
3.0	2	150	0.040	0.106	0.106	2.98	16025	1280	45

# Corner radius end mills MicroX

Shank  $\varnothing$  6mm, conical neck 0.9°, 10xd



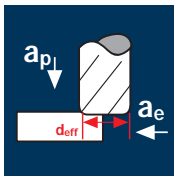
**HM**  
**XA**     $\lambda$  25°  
               $\gamma$ -10°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome</b> <b>Copper</b>
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Example: Order-N°.											X-Al		
											X6738		
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	d4	l1	l2	l3	$\theta$	r 0/+0.010	$\alpha$	z		
.050	0.5	6	0.45	0.60	57	0.40	5.0	0.9°	0.10	10.4°	2	●	
.080	0.8	6	0.75	0.99	61	0.65	8.0	0.9°	0.10	8.6°	2	●	
.100	1.0	6	0.95	1.25	61	0.80	10.0	0.9°	0.20	7.7°	2	●	
.108	1.2	6	1.15	1.51	66	1.00	12.0	0.9°	0.20	6.8°	2	●	
.120	1.5	6	1.45	1.90	66	1.20	15.0	0.9°	0.20	5.8°	2	●	
.140	2.0	6	1.95	2.55	69	1.60	20.0	0.9°	0.20	4.4°	2	●	
.160	2.5	6	2.45	3.19	75	2.00	25.0	0.9°	0.20	3.4°	2	●	
.180	3.0	6	2.95	3.84	75	2.40	30.0	0.9°	0.20	2.6°	2	●	
.145	2.0	6	1.95	2.55	69	1.60	20.0	0.9°	0.50	4.5°	2	●	
.165	2.5	6	2.45	3.19	75	2.00	25.0	0.9°	0.50	3.4°	2	●	
.185	3.0	6	2.95	3.84	75	2.40	30.0	0.9°	0.50	2.6°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



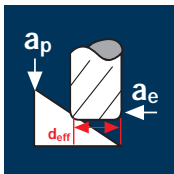
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
0.5	2	140	0.020	0.02	0.07	0.42	60000	2400	r=0.1
0.8	2	140	0.032	0.02	0.11	0.72	60000	3840	r=0.1
1.0	2	140	0.040	0.03	0.14	0.81	55020	4400	r=0.2
1.2	2	140	0.048	0.04	0.17	1.04	42850	4115	r=0.2
1.5	2	140	0.060	0.05	0.21	1.36	32770	3930	r=0.2
2.0	2	140	0.080	0.06	0.28	1.89	23580	3775	r=0.2
2.5	2	140	0.100	0.08	0.35	2.42	18415	3685	r=0.2
3.0	2	140	0.120	0.09	0.42	2.93	15210	3650	r=0.2

0.5	2	120	0.020	0.02	0.07	0.42	60000	2400	r=0.1
0.8	2	120	0.030	0.02	0.11	0.72	53055	3185	r=0.1
1.0	2	120	0.038	0.03	0.14	0.81	47160	3585	r=0.2
1.2	2	120	0.046	0.04	0.17	1.04	36730	3380	r=0.2
1.5	2	120	0.058	0.05	0.21	1.36	28085	3260	r=0.2
2.0	2	120	0.076	0.06	0.28	1.89	20210	3070	r=0.2
2.5	2	120	0.096	0.08	0.35	2.42	15785	3030	r=0.2
3.0	2	120	0.114	0.09	0.42	2.93	13035	2970	r=0.2

0.5	2	100	0.018	0.02	0.07	0.42	60000	2160	r=0.1
0.8	2	100	0.028	0.02	0.11	0.72	44210	2475	r=0.1
1.0	2	100	0.036	0.03	0.14	0.81	39300	2830	r=0.2
1.2	2	100	0.042	0.04	0.17	1.04	30610	2570	r=0.2
1.5	2	100	0.052	0.05	0.21	1.36	23405	2435	r=0.2
2.0	2	100	0.070	0.06	0.28	1.89	16840	2360	r=0.2
2.5	2	100	0.088	0.08	0.35	2.42	13155	2315	r=0.2
3.0	2	100	0.106	0.09	0.42	2.93	10865	2305	r=0.2

0.5	2	60	0.016	0.02	0.07	0.42	45475	1455	r=0.1
0.8	2	60	0.026	0.02	0.11	0.72	26525	1380	r=0.1
1.0	2	60	0.032	0.03	0.14	0.81	23580	1510	r=0.2
1.2	2	60	0.038	0.04	0.17	1.04	18365	1395	r=0.2
1.5	2	60	0.048	0.05	0.21	1.36	14045	1350	r=0.2
2.0	2	60	0.064	0.06	0.28	1.89	10105	1295	r=0.2
2.5	2	60	0.080	0.08	0.35	2.42	7890	1260	r=0.2
3.0	2	60	0.096	0.09	0.42	2.93	6520	1250	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.018	0.016	0.016	0.50	60000	2160	45
0.8	2	300	0.020	0.024	0.024	0.80	60000	2400	45
1.0	2	300	0.026	0.030	0.030	0.99	60000	3120	45
1.2	2	300	0.028	0.036	0.036	1.19	60000	3360	45
1.5	2	300	0.030	0.046	0.046	1.50	60000	3600	45
2.0	2	300	0.034	0.060	0.060	2.00	47750	3245	45
2.5	2	300	0.036	0.076	0.076	2.50	38200	2750	45
3.0	2	300	0.042	0.090	0.090	2.99	31940	2685	45

0.5	2	250	0.018	0.016	0.016	0.50	60000	2160	45
0.8	2	250	0.020	0.024	0.024	0.80	60000	2400	45
1.0	2	250	0.024	0.030	0.030	0.99	60000	2880	45
1.2	2	250	0.026	0.036	0.036	1.19	60000	3120	45
1.5	2	250	0.028	0.046	0.046	1.50	53055	2970	45
2.0	2	250	0.032	0.060	0.060	2.00	39790	2545	45
2.5	2	250	0.034	0.076	0.076	2.50	31830	2165	45
3.0	2	250	0.040	0.090	0.090	2.99	26615	2130	45

0.5	2	200	0.016	0.016	0.016	0.50	60000	1920	45
0.8	2	200	0.018	0.024	0.024	0.80	60000	2160	45
1.0	2	200	0.024	0.030	0.030	0.99	60000	2880	45
1.2	2	200	0.026	0.036	0.036	1.19	53500	2780	45
1.5	2	200	0.028	0.046	0.046	1.50	42445	2375	45
2.0	2	200	0.030	0.060	0.060	2.00	31830	1910	45
2.5	2	200	0.032	0.076	0.076	2.50	25465	1630	45
3.0	2	200	0.038	0.090	0.090	2.99	21290	1620	45

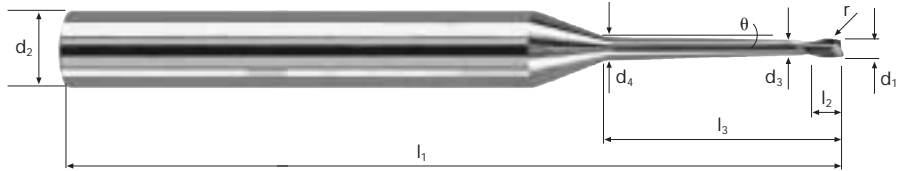
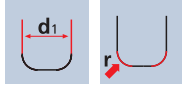
0.5	2	150	0.014	0.016	0.016	0.50	60000	1680	45
0.8	2	150	0.016	0.024	0.024	0.80	59685	1910	45
1.0	2	150	0.020	0.030	0.030	0.99	48230	1930	45
1.2	2	150	0.022	0.036	0.036	1.19	40125	1765	45
1.5	2	150	0.024	0.046	0.046	1.50	31830	1530	45
2.0	2	150	0.028	0.060	0.060	2.00	23875	1335	45
2.5	2	150	0.028	0.076	0.076	2.50	19100	1070	45
3.0	2	150	0.034	0.090	0.090	2.99	15970	1085	45

# Corner radius end mills MicroX

Shank  $\varnothing$  6mm, conical neck 0.9°, 12xd



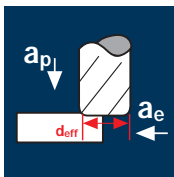
HM  
XA  $\lambda$  25°  
 $\gamma$ -10°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper
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Example: Order-N°.												X-AI	
												X6740	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	d4	l1	l2	l3	$\theta$	r 0/+0.010	$\alpha$	z		
.050	0.5	6	0.45	0.62	57	0.40	6.0	0.9°	0.10	9.8°	2	●	
.080	0.8	6	0.75	1.03	61	0.65	9.6	0.9°	0.10	7.9°	2	●	
.100	1.0	6	0.95	1.30	66	0.80	12.0	0.9°	0.20	7.0°	2	●	
.108	1.2	6	1.15	1.57	66	1.00	14.4	0.9°	0.20	6.1°	2	●	
.120	1.5	6	1.45	1.98	69	1.20	18.0	0.9°	0.20	5.1°	2	●	
.140	2.0	6	1.95	2.66	75	1.60	24.0	0.9°	0.20	3.9°	2	●	
.160	2.5	6	2.45	3.34	80	2.00	30.0	0.9°	0.20	2.9°	2	●	
.180	3.0	6	2.95	4.02	87	2.40	36.0	0.9°	0.20	2.2°	2	●	
.145	2.0	6	1.95	2.66	75	1.60	24.0	0.9°	0.50	3.9°	2	●	
.165	2.5	6	2.45	3.34	80	2.00	30.0	0.9°	0.50	3.0°	2	●	
.185	3.0	6	2.95	4.02	87	2.40	36.0	0.9°	0.50	2.2°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



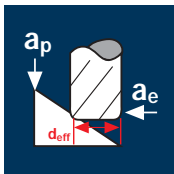
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
0.5	2	140	0.020	0.02	0.06	0.42	60000	2400	r=0.1
0.8	2	140	0.032	0.02	0.10	0.72	60000	3840	r=0.1
1.0	2	140	0.040	0.03	0.12	0.81	55020	4400	r=0.2
1.2	2	140	0.048	0.04	0.14	1.04	42850	4115	r=0.2
1.5	2	140	0.060	0.05	0.18	1.36	32770	3930	r=0.2
2.0	2	140	0.080	0.06	0.24	1.89	23580	3775	r=0.2
2.5	2	140	0.100	0.08	0.30	2.42	18415	3685	r=0.2
3.0	2	140	0.120	0.09	0.36	2.93	15210	3650	r=0.2

0.5	2	120	0.020	0.02	0.06	0.42	60000	2400	r=0.1
0.8	2	120	0.030	0.02	0.10	0.72	53055	3185	r=0.1
1.0	2	120	0.038	0.03	0.12	0.81	47160	3585	r=0.2
1.2	2	120	0.046	0.04	0.14	1.04	36730	3380	r=0.2
1.5	2	120	0.058	0.05	0.18	1.36	28085	3260	r=0.2
2.0	2	120	0.076	0.06	0.24	1.89	20210	3070	r=0.2
2.5	2	120	0.096	0.08	0.30	2.42	15785	3030	r=0.2
3.0	2	120	0.114	0.09	0.36	2.93	13035	2970	r=0.2

0.5	2	100	0.018	0.02	0.06	0.42	60000	2160	r=0.1
0.8	2	100	0.028	0.02	0.10	0.72	44210	2475	r=0.1
1.0	2	100	0.036	0.03	0.12	0.81	39300	2830	r=0.2
1.2	2	100	0.042	0.04	0.14	1.04	30610	2570	r=0.2
1.5	2	100	0.052	0.05	0.18	1.36	23405	2435	r=0.2
2.0	2	100	0.070	0.06	0.24	1.89	16840	2360	r=0.2
2.5	2	100	0.088	0.08	0.30	2.42	13155	2315	r=0.2
3.0	2	100	0.106	0.09	0.36	2.93	10865	2305	r=0.2

0.5	2	60	0.016	0.02	0.06	0.42	45475	1455	r=0.1
0.8	2	60	0.026	0.02	0.10	0.72	26525	1380	r=0.1
1.0	2	60	0.032	0.03	0.12	0.81	23580	1510	r=0.2
1.2	2	60	0.038	0.04	0.14	1.04	18365	1395	r=0.2
1.5	2	60	0.048	0.05	0.18	1.36	14045	1350	r=0.2
2.0	2	60	0.064	0.06	0.24	1.89	10105	1295	r=0.2
2.5	2	60	0.080	0.08	0.30	2.42	7890	1260	r=0.2
3.0	2	60	0.096	0.09	0.36	2.93	6520	1250	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
0.5	2	300	0.018	0.012	0.012	0.49	60000	2160	45
0.8	2	300	0.020	0.020	0.020	0.80	60000	2400	45
1.0	2	300	0.026	0.026	0.026	0.99	60000	3120	45
1.2	2	300	0.028	0.030	0.030	1.19	60000	3360	45
1.5	2	300	0.030	0.038	0.038	1.49	60000	3600	45
2.0	2	300	0.034	0.050	0.050	2.00	47750	3245	45
2.5	2	300	0.036	0.062	0.062	2.50	38200	2750	45
3.0	2	300	0.042	0.076	0.076	3.00	31830	2675	45

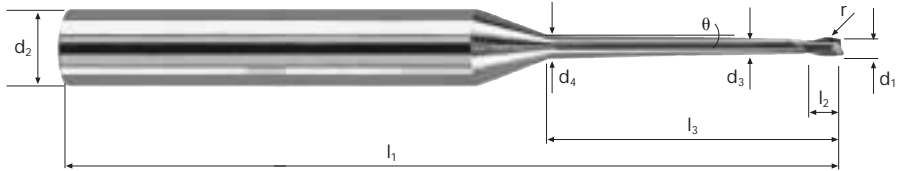
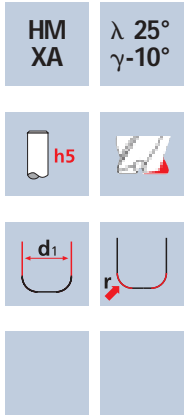
0.5	2	250	0.018	0.012	0.012	0.49	60000	2160	45
0.8	2	250	0.020	0.020	0.020	0.80	60000	2400	45
1.0	2	250	0.024	0.026	0.026	0.99	60000	2880	45
1.2	2	250	0.026	0.030	0.030	1.19	60000	3120	45
1.5	2	250	0.028	0.038	0.038	1.49	53410	2990	45
2.0	2	250	0.032	0.050	0.050	2.00	39790	2545	45
2.5	2	250	0.034	0.062	0.062	2.50	31830	2165	45
3.0	2	250	0.040	0.076	0.076	3.00	26525	2120	45

0.5	2	200	0.016	0.012	0.012	0.49	60000	1920	45
0.8	2	200	0.018	0.020	0.020	0.80	60000	2160	45
1.0	2	200	0.024	0.026	0.026	0.99	60000	2880	45
1.2	2	200	0.026	0.030	0.030	1.19	53500	2780	45
1.5	2	200	0.028	0.038	0.038	1.49	42725	2395	45
2.0	2	200	0.030	0.050	0.050	2.00	31830	1910	45
2.5	2	200	0.032	0.062	0.062	2.50	25465	1630	45
3.0	2	200	0.038	0.076	0.076	3.00	21220	1615	45

0.5	2	150	0.014	0.012	0.012	0.49	60000	1680	45
0.8	2	150	0.016	0.020	0.020	0.80	59685	1910	45
1.0	2	150	0.020	0.026	0.026	0.99	48230	1930	45
1.2	2	150	0.022	0.030	0.030	1.19	40125	1765	45
1.5	2	150	0.024	0.038	0.038	1.49	32045	1540	45
2.0	2	150	0.028	0.050	0.050	2.00	23875	1335	45
2.5	2	150	0.028	0.062	0.062	2.50	19100	1070	45
3.0	2	150	0.034	0.076	0.076	3.00	15915	1080	45

# Corner radius end mills MicroX

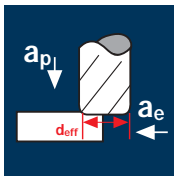
Shank  $\varnothing$  6mm, conical neck 0.9°, 15xd



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper
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Example: Order-N°.												X-Al	
												X6742	
∅ Code	d1 0/-0.01	d2 h5	d3	d4	l1	l2	l3	θ	r 0/+0.010	α	z		
.050	0.5	6	0.45	0.67	61	0.40	7.5	0.9°	0.10	9.0°	2	●	
.080	0.8	6	0.75	1.11	66	0.65	12.0	0.9°	0.10	7.1°	2	●	
.100	1.0	6	0.95	1.40	66	0.80	15.0	0.9°	0.20	6.1°	2	●	
.108	1.2	6	1.15	1.69	69	1.00	18.0	0.9°	0.20	5.3°	2	●	
.120	1.5	6	1.45	2.12	75	1.20	22.5	0.9°	0.20	4.4°	2	●	
.140	2.0	6	1.95	2.85	80	1.60	30.0	0.9°	0.20	3.3°	2	●	
.160	2.5	6	2.45	3.58	87	2.00	37.5	0.9°	0.20	2.4°	2	●	
.180	3.0	6	2.95	4.30	100	2.40	45.0	0.9°	0.20	1.8°	2	●	
.145	2.0	6	1.95	2.85	80	1.60	30.0	0.9°	0.50	3.3°	2	●	
.165	2.5	6	2.45	3.58	87	2.00	37.5	0.9°	0.50	2.5°	2	●	
.185	3.0	6	2.95	4.30	100	2.40	45.0	0.9°	0.50	1.8°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	140	0.026	0.07	0.20	0.90	49515	2575	r=0.2
1.2	2	140	0.030	0.08	0.24	1.12	39790	2385	r=0.2
1.5	2	140	0.038	0.11	0.30	1.46	30525	2320	r=0.2
2.0	2	140	0.050	0.14	0.40	1.98	22505	2250	r=0.2
2.5	2	140	0.062	0.18	0.50	2.50	17825	2210	r=0.2
3.0	2	140	0.076	0.21	0.60	3.00	14855	2260	r=0.2

Hardened tool steel  
48 - 52 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	120	0.024	0.07	0.20	0.90	42445	2035	r=0.2
1.2	2	120	0.028	0.08	0.24	1.12	34105	1910	r=0.2
1.5	2	120	0.036	0.11	0.30	1.46	26165	1885	r=0.2
2.0	2	120	0.048	0.14	0.40	1.98	19290	1850	r=0.2
2.5	2	120	0.058	0.18	0.50	2.50	15280	1770	r=0.2
3.0	2	120	0.072	0.21	0.60	3.00	12735	1835	r=0.2

Hardened tool steel  
52 - 56 HRC



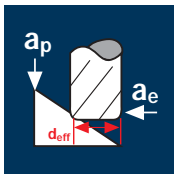
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	100	0.022	0.07	0.20	0.90	35370	1555	r=0.2
1.2	2	100	0.026	0.08	0.24	1.12	28420	1480	r=0.2
1.5	2	100	0.034	0.11	0.30	1.46	21805	1485	r=0.2
2.0	2	100	0.044	0.14	0.40	1.98	16075	1415	r=0.2
2.5	2	100	0.054	0.18	0.50	2.50	12735	1375	r=0.2
3.0	2	100	0.066	0.21	0.60	3.00	10610	1400	r=0.2

Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	60	0.020	0.07	0.20	0.90	21220	850	r=0.2
1.2	2	60	0.024	0.08	0.24	1.12	17055	820	r=0.2
1.5	2	60	0.030	0.11	0.30	1.46	13080	785	r=0.2
2.0	2	60	0.040	0.14	0.40	1.98	9645	770	r=0.2
2.5	2	60	0.050	0.18	0.50	2.50	7640	765	r=0.2
3.0	2	60	0.060	0.21	0.60	3.00	6365	765	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	300	0.022	0.044	0.044	1.00	60000	2640	45
1.2	2	300	0.024	0.052	0.052	1.20	60000	2880	45
1.5	2	300	0.028	0.064	0.064	1.50	60000	3360	45
2.0	2	300	0.030	0.086	0.086	1.99	47990	2880	45
2.5	2	300	0.032	0.108	0.108	2.48	38505	2465	45
3.0	2	300	0.036	0.128	0.128	2.97	32155	2315	45

Hardened tool steel  
48 - 52 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	250	0.020	0.044	0.044	1.00	60000	2400	45
1.2	2	250	0.022	0.052	0.052	1.20	60000	2640	45
1.5	2	250	0.026	0.064	0.064	1.50	53055	2760	45
2.0	2	250	0.028	0.086	0.086	1.99	39990	2240	45
2.5	2	250	0.030	0.108	0.108	2.48	32090	1925	45
3.0	2	250	0.034	0.128	0.128	2.97	26795	1820	45

Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	200	0.020	0.044	0.044	1.00	60000	2400	45
1.2	2	200	0.022	0.052	0.052	1.20	53055	2335	45
1.5	2	200	0.026	0.064	0.064	1.50	42445	2205	45
2.0	2	200	0.028	0.086	0.086	1.99	31990	1790	45
2.5	2	200	0.028	0.108	0.108	2.48	25670	1440	45
3.0	2	200	0.032	0.128	0.128	2.97	21435	1370	45

Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	150	0.018	0.044	0.044	1.00	47750	1720	45
1.2	2	150	0.020	0.052	0.052	1.20	39790	1590	45
1.5	2	150	0.022	0.064	0.064	1.50	31830	1400	45
2.0	2	150	0.024	0.086	0.086	1.99	23995	1150	45
2.5	2	150	0.026	0.108	0.108	2.48	19255	1000	45
3.0	2	150	0.028	0.128	0.128	2.97	16075	900	45

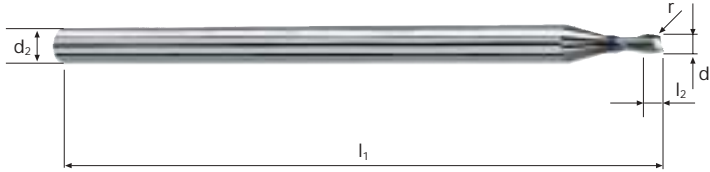


# Corner radius end mills Microcut-T1H

Shank  $\varnothing$  3mm, 1xd



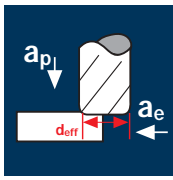
**HM**  
**XA**     $\lambda$  25°  
               $\gamma$ -10°



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	
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									DURO-S	
Example: Order-N°. <span style="border: 1px solid black; padding: 2px;"> </span>									D15751	
		Coating	Article-N°.	α-Code						
		D	15751	.100						
$\varnothing$ Code	d1 ±0.01	d2 h6	l1	l2	r 0/+0.03	$\alpha$	z			
.100	1.0	3	50	1.2	0.20	12.0°	2	●		
.108	1.2	3	50	1.4	0.20	11.0°	2	●		
.120	1.5	3	50	1.8	0.20	10.0°	2	●		
.140	2.0	3	50	2.4	0.20	7.0°	2	●		
.160	2.5	3	50	3.0	0.20	4.0°	2	●		
.180	3.0	3	50	3.6	0.20	0.0°	2	●		

### Application



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	r [mm]
1.0	2	180	0.036	0.08	0.20	0.92	60000	4320	r=0.2
1.2	2	180	0.042	0.10	0.24	1.15	49825	4185	r=0.2
1.5	2	180	0.054	0.12	0.30	1.47	38980	4210	r=0.2
2.0	2	180	0.072	0.16	0.40	1.99	28795	4145	r=0.2
2.5	2	180	0.090	0.20	0.50	2.50	22920	4125	r=0.2
3.0	2	180	0.108	0.24	0.60	2.99	19165	4140	r=0.2

Steel  
1100 - 1300 N/mm<sup>2</sup>

1.0	2	160	0.032	0.08	0.20	0.92	55360	3545	r=0.2
1.2	2	160	0.038	0.10	0.24	1.15	44290	3365	r=0.2
1.5	2	160	0.048	0.12	0.30	1.47	34645	3325	r=0.2
2.0	2	160	0.064	0.16	0.40	1.99	25595	3275	r=0.2
2.5	2	160	0.082	0.20	0.50	2.50	20370	3340	r=0.2
3.0	2	160	0.098	0.24	0.60	2.99	17035	3340	r=0.2

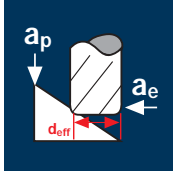
Stainless steel  
[Cr-Ni/1.4301]

1.0	2	80	0.032	0.08	0.20	0.92	27680	1770	r=0.2
1.2	2	80	0.038	0.10	0.24	1.15	22145	1685	r=0.2
1.5	2	80	0.048	0.12	0.30	1.47	17325	1665	r=0.2
2.0	2	80	0.064	0.16	0.40	1.99	12795	1640	r=0.2
2.5	2	80	0.082	0.20	0.50	2.50	10185	1670	r=0.2
3.0	2	80	0.098	0.24	0.60	2.99	8515	1670	r=0.2

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

1.0	2	60	0.026	0.08	0.20	0.92	20760	1080	r=0.2
1.2	2	60	0.030	0.10	0.24	1.15	16610	995	r=0.2
1.5	2	60	0.038	0.12	0.30	1.47	12995	990	r=0.2
2.0	2	60	0.050	0.16	0.40	1.99	9600	960	r=0.2
2.5	2	60	0.064	0.20	0.50	2.50	7640	980	r=0.2
3.0	2	60	0.076	0.24	0.60	2.99	6390	970	r=0.2

### Application



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	deff [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	β
1.0	2	300	0.028	0.042	0.042	1.00	60000	3360	45
1.2	2	300	0.030	0.050	0.050	1.20	60000	3600	45
1.5	2	300	0.034	0.064	0.064	1.50	60000	4080	45
2.0	2	300	0.038	0.084	0.084	1.99	47990	3645	45
2.5	2	300	0.040	0.106	0.106	2.48	38505	3080	45
3.0	2	300	0.046	0.126	0.126	2.97	32155	2960	45

Steel  
1100 - 1300 N/mm<sup>2</sup>

1.0	2	250	0.026	0.042	0.042	1.00	60000	3120	45
1.2	2	250	0.028	0.050	0.050	1.20	60000	3360	45
1.5	2	250	0.030	0.064	0.064	1.50	53055	3185	45
2.0	2	250	0.034	0.084	0.084	1.99	39990	2720	45
2.5	2	250	0.036	0.106	0.106	2.48	32090	2310	45
3.0	2	250	0.042	0.126	0.126	2.97	26795	2250	45

Stainless steel  
[Cr-Ni/1.4301]

1.0	2	120	0.022	0.042	0.042	1.00	38200	1680	45
1.2	2	120	0.024	0.050	0.050	1.20	31830	1530	45
1.5	2	120	0.028	0.064	0.064	1.50	25465	1425	45
2.0	2	120	0.030	0.084	0.084	1.99	19195	1150	45
2.5	2	120	0.032	0.106	0.106	2.48	15405	985	45
3.0	2	120	0.036	0.126	0.126	2.97	12860	925	45

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

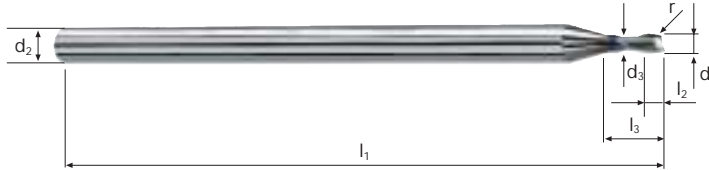
1.0	2	100	0.020	0.042	0.042	1.00	31830	1275	45
1.2	2	100	0.022	0.050	0.050	1.20	26525	1165	45
1.5	2	100	0.024	0.064	0.064	1.50	21220	1020	45
2.0	2	100	0.026	0.084	0.084	1.99	15995	830	45
2.5	2	100	0.028	0.106	0.106	2.48	12835	720	45
3.0	2	100	0.032	0.126	0.126	2.97	10720	685	45

# Corner radius end mills Microcut-T3

Shank  $\varnothing$  3mm, cylindrical neck, 3xd



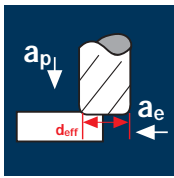
**HM**  
**Micro**  $\lambda$  25°  
 $\gamma$  6°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500			<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Cobalt-Chrome</b> <b>Gold / Platinum</b> <b>Copper</b>
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Example: Order-N°.										MICRO	
										M5752	
$\varnothing$ Code	d1 $\pm 0.01$	d2 h6	d3	l1	l2	l3	r 0/+0.03	$\alpha$	z		
.100	1.0	3	0.95	50	1.2	3.0	0.20	9.0°	2	●	
.108	1.2	3	1.15	50	1.4	3.6	0.20	8.0°	2	●	
.120	1.5	3	1.45	50	1.8	4.5	0.20	6.0°	2	●	
.140	2.0	3	1.95	50	2.4	6.0	0.20	4.0°	2	●	
.160	2.5	3	2.45	50	3.0	7.5	0.20	2.0°	2	●	
.180	3.0	3	2.95	50	3.6	9.0	0.20	0.0°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	140	0.026	0.06	0.20	0.89	50075	2605	r=0.2
1.2	2	140	0.030	0.07	0.24	1.10	40515	2430	r=0.2
1.5	2	140	0.038	0.09	0.30	1.43	31165	2370	r=0.2
2.0	2	140	0.050	0.12	0.40	1.97	22620	2260	r=0.2
2.5	2	140	0.062	0.15	0.50	2.49	17895	2220	r=0.2
3.0	2	140	0.076	0.18	0.60	3.00	14855	2260	r=0.2

Hardened tool steel  
48 - 52 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	120	0.024	0.06	0.20	0.89	42920	2060	r=0.2
1.2	2	120	0.028	0.07	0.24	1.10	34725	1945	r=0.2
1.5	2	120	0.036	0.09	0.30	1.43	26710	1925	r=0.2
2.0	2	120	0.048	0.12	0.40	1.97	19390	1860	r=0.2
2.5	2	120	0.058	0.15	0.50	2.49	15340	1780	r=0.2
3.0	2	120	0.072	0.18	0.60	3.00	12735	1835	r=0.2

Hardened tool steel  
52 - 56 HRC



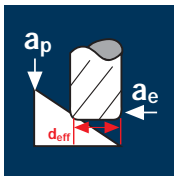
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	100	0.022	0.06	0.20	0.89	35765	1575	r=0.2
1.2	2	100	0.026	0.07	0.24	1.10	28940	1505	r=0.2
1.5	2	100	0.034	0.09	0.30	1.43	22260	1515	r=0.2
2.0	2	100	0.044	0.12	0.40	1.97	16160	1420	r=0.2
2.5	2	100	0.054	0.15	0.50	2.49	12785	1380	r=0.2
3.0	2	100	0.066	0.18	0.60	3.00	10610	1400	r=0.2

Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	60	0.020	0.06	0.20	0.89	21460	860	r=0.2
1.2	2	60	0.024	0.07	0.24	1.10	17365	835	r=0.2
1.5	2	60	0.030	0.09	0.30	1.43	13355	800	r=0.2
2.0	2	60	0.040	0.12	0.40	1.97	9695	775	r=0.2
2.5	2	60	0.050	0.15	0.50	2.49	7670	765	r=0.2
3.0	2	60	0.060	0.18	0.60	3.00	6365	765	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	300	0.022	0.042	0.042	1.00	60000	2640	45
1.2	2	300	0.024	0.050	0.050	1.20	60000	2880	45
1.5	2	300	0.028	0.062	0.062	1.50	60000	3360	45
2.0	2	300	0.030	0.082	0.082	2.00	47750	2865	45
2.5	2	300	0.032	0.102	0.102	2.49	38350	2455	45
3.0	2	300	0.036	0.122	0.122	2.97	32155	2315	45

Hardened tool steel  
48 - 52 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	250	0.020	0.042	0.042	1.00	60000	2400	45
1.2	2	250	0.022	0.050	0.050	1.20	60000	2640	45
1.5	2	250	0.026	0.062	0.062	1.50	53055	2760	45
2.0	2	250	0.028	0.082	0.082	2.00	39790	2230	45
2.5	2	250	0.030	0.102	0.102	2.49	31960	1920	45
3.0	2	250	0.034	0.122	0.122	2.97	26795	1820	45

Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	200	0.020	0.042	0.042	1.00	60000	2400	45
1.2	2	200	0.022	0.050	0.050	1.20	53055	2335	45
1.5	2	200	0.026	0.062	0.062	1.50	42445	2205	45
2.0	2	200	0.028	0.082	0.082	2.00	31830	1780	45
2.5	2	200	0.028	0.102	0.102	2.49	25570	1430	45
3.0	2	200	0.032	0.122	0.122	2.97	21435	1370	45

Hardened tool steel  
56 - 60 HRC



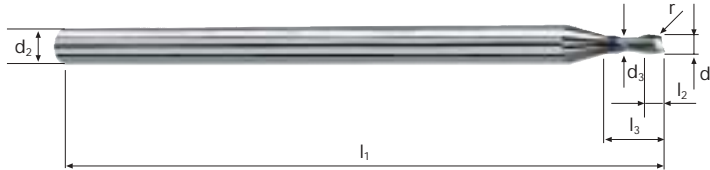
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	150	0.018	0.042	0.042	1.00	47750	1720	45
1.2	2	150	0.020	0.050	0.050	1.20	39790	1590	45
1.5	2	150	0.022	0.062	0.062	1.50	31830	1400	45
2.0	2	150	0.024	0.082	0.082	2.00	23875	1145	45
2.5	2	150	0.026	0.102	0.102	2.49	19175	995	45
3.0	2	150	0.028	0.122	0.122	2.97	16075	900	45

# Corner radius end mills Microcut-T3H

Shank Ø 3mm, cylindrical neck, 3xd



**HM**  $\lambda$  25°  
**XA**  $\gamma$ -10°

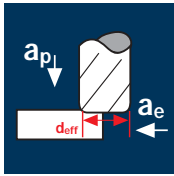


Rm 850-1100
Rm 1100-1300
Rm 1300-1500
HRC 48-56
HRC 56-60
HRC > 60
Inox Stainless
Ti Titanium



Example: Order-N°. Coating: <b>D</b> Article-N°: <b>5762</b> α-Code: <b>.100</b>										DURO-S	
Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r 0/+0.03	α	z		
.100	1.0	3	0.95	50	1.2	3.0	0.20	9.0°	2	●	
.108	1.2	3	1.15	50	1.4	3.6	0.20	8.0°	2	●	
.120	1.5	3	1.45	50	1.8	4.5	0.20	6.0°	2	●	
.140	2.0	3	1.95	50	2.4	6.0	0.20	4.0°	2	●	
.160	2.5	3	2.45	50	3.0	7.5	0.20	2.0°	2	●	
.180	3.0	3	2.95	50	3.6	9.0	0.20	0.0°	2	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

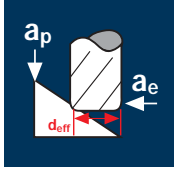
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	180	0.036	0.07	0.20	0.90	60000	4320	r=0.2
1.2	2	180	0.042	0.08	0.24	1.12	51160	4295	r=0.2
1.5	2	180	0.054	0.11	0.30	1.46	39245	4240	r=0.2
2.0	2	180	0.072	0.14	0.40	1.98	28940	4165	r=0.2
2.5	2	180	0.090	0.18	0.50	2.50	22920	4125	r=0.2
3.0	2	180	0.108	0.21	0.60	3.00	19100	4125	r=0.2

1.0	2	160	0.032	0.07	0.20	0.90	56590	3620	r=0.2
1.2	2	160	0.038	0.08	0.24	1.12	45475	3455	r=0.2
1.5	2	160	0.048	0.11	0.30	1.46	34885	3350	r=0.2
2.0	2	160	0.064	0.14	0.40	1.98	25725	3295	r=0.2
2.5	2	160	0.082	0.18	0.50	2.50	20370	3340	r=0.2
3.0	2	160	0.098	0.21	0.60	3.00	16975	3325	r=0.2

1.0	2	80	0.032	0.07	0.20	0.90	28295	1810	r=0.2
1.2	2	80	0.038	0.08	0.24	1.12	22735	1730	r=0.2
1.5	2	80	0.048	0.11	0.30	1.46	17440	1670	r=0.2
2.0	2	80	0.064	0.14	0.40	1.98	12860	1645	r=0.2
2.5	2	80	0.082	0.18	0.50	2.50	10185	1670	r=0.2
3.0	2	80	0.098	0.21	0.60	3.00	8490	1665	r=0.2

1.0	2	60	0.026	0.07	0.20	0.90	21220	1105	r=0.2
1.2	2	60	0.030	0.08	0.24	1.12	17055	1025	r=0.2
1.5	2	60	0.038	0.11	0.30	1.46	13080	995	r=0.2
2.0	2	60	0.050	0.14	0.40	1.98	9645	965	r=0.2
2.5	2	60	0.064	0.18	0.50	2.50	7640	980	r=0.2
3.0	2	60	0.076	0.21	0.60	3.00	6365	965	r=0.2

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Steel  
1100 - 1300 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	300	0.022	0.040	0.040	1.00	60000	2640	45
1.2	2	300	0.024	0.048	0.048	1.20	60000	2880	45
1.5	2	300	0.028	0.060	0.060	1.50	60000	3360	45
2.0	2	300	0.030	0.080	0.080	2.00	47750	2865	45
2.5	2	300	0.032	0.100	0.100	2.49	38350	2455	45
3.0	2	300	0.036	0.120	0.120	2.97	32155	2315	45

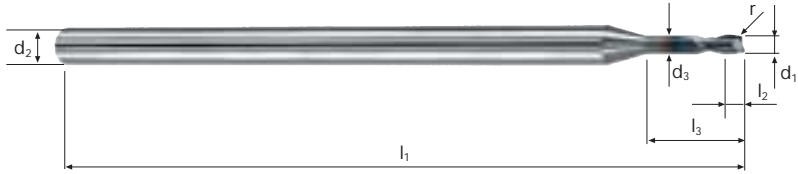
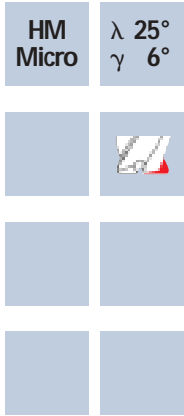
1.0	2	250	0.020	0.040	0.040	1.00	60000	2400	45
1.2	2	250	0.022	0.048	0.048	1.20	60000	2640	45
1.5	2	250	0.026	0.060	0.060	1.50	53055	2760	45
2.0	2	250	0.028	0.080	0.080	2.00	39790	2230	45
2.5	2	250	0.028	0.100	0.100	2.49	31960	1790	45
3.0	2	250	0.032	0.120	0.120	2.97	26795	1715	45

1.0	2	120	0.018	0.040	0.040	1.00	38200	1375	45
1.2	2	120	0.020	0.048	0.048	1.20	31830	1275	45
1.5	2	120	0.022	0.060	0.060	1.50	25465	1120	45
2.0	2	120	0.024	0.080	0.080	2.00	19100	915	45
2.5	2	120	0.026	0.100	0.100	2.49	15340	800	45
3.0	2	120	0.028	0.120	0.120	2.97	12860	720	45

1.0	2	100	0.016	0.040	0.040	1.00	31830	1020	45
1.2	2	100	0.016	0.048	0.048	1.20	26525	850	45
1.5	2	100	0.020	0.060	0.060	1.50	21220	850	45
2.0	2	100	0.022	0.080	0.080	2.00	15915	700	45
2.5	2	100	0.022	0.100	0.100	2.49	12785	565	45
3.0	2	100	0.026	0.120	0.120	2.97	10720	555	45

# Corner radius end mills Microcut-T5

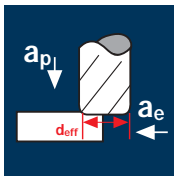
Shank  $\varnothing$  3mm, cylindrical neck, 5xd



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	Cobalt-Chrome Gold / Platinum Copper
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Example: Order-N°.										MICRO	
										M5754	
$\varnothing$ Code	d1 $\pm 0.01$	d2 $\frac{h6}{h6}$	d3	l1	l2	l3	r $0/+0.03$	$\alpha$	Z		
.100	1.0	3	0.95	50	1.2	5.0	0.20	7.0°	2	●	
.108	1.2	3	1.15	50	1.4	6.0	0.20	6.0°	2	●	
.120	1.5	3	1.45	50	1.8	7.5	0.20	5.0°	2	●	
.140	2.0	3	1.95	50	2.4	10.0	0.20	3.0°	2	●	
.160	2.5	3	2.45	50	3.0	12.5	0.20	1.5°	2	●	
.180	3.0	3	2.95	50	3.6	15.0	0.20	0.0°	2	●	

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	140	0.026	0.05	0.20	0.86	51820	2695	r=0.2
1.2	2	140	0.030	0.06	0.24	1.09	40885	2455	r=0.2
1.5	2	140	0.038	0.08	0.30	1.42	31385	2385	r=0.2
2.0	2	140	0.050	0.10	0.40	1.95	22855	2285	r=0.2
2.5	2	140	0.062	0.13	0.50	2.47	18040	2235	r=0.2
3.0	2	140	0.076	0.15	0.60	2.99	14905	2265	r=0.2

Hardened tool steel  
48 - 52 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	120	0.024	0.05	0.20	0.86	44415	2130	r=0.2
1.2	2	120	0.028	0.06	0.24	1.09	35045	1965	r=0.2
1.5	2	120	0.036	0.08	0.30	1.42	26900	1935	r=0.2
2.0	2	120	0.048	0.10	0.40	1.95	19590	1880	r=0.2
2.5	2	120	0.058	0.13	0.50	2.47	15465	1795	r=0.2
3.0	2	120	0.072	0.15	0.60	2.99	12775	1840	r=0.2

Hardened tool steel  
52 - 56 HRC



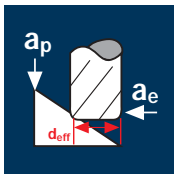
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	100	0.022	0.05	0.20	0.86	37015	1630	r=0.2
1.2	2	100	0.026	0.06	0.24	1.09	29205	1520	r=0.2
1.5	2	100	0.034	0.08	0.30	1.42	22415	1525	r=0.2
2.0	2	100	0.044	0.10	0.40	1.95	16325	1435	r=0.2
2.5	2	100	0.054	0.13	0.50	2.47	12885	1390	r=0.2
3.0	2	100	0.066	0.15	0.60	2.99	10645	1405	r=0.2

Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	60	0.020	0.05	0.20	0.86	22210	890	r=0.2
1.2	2	60	0.024	0.06	0.24	1.09	17520	840	r=0.2
1.5	2	60	0.030	0.08	0.30	1.42	13450	805	r=0.2
2.0	2	60	0.040	0.10	0.40	1.95	9795	785	r=0.2
2.5	2	60	0.050	0.13	0.50	2.47	7730	775	r=0.2
3.0	2	60	0.060	0.15	0.60	2.99	6390	765	r=0.2

## Application



## Material

Hardened tool steel  
42 - 48 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	300	0.022	0.040	0.040	1.00	60000	2640	45
1.2	2	300	0.024	0.048	0.048	1.20	60000	2880	45
1.5	2	300	0.028	0.060	0.060	1.50	60000	3360	45
2.0	2	300	0.030	0.080	0.080	2.00	47750	2865	45
2.5	2	300	0.032	0.100	0.100	2.49	38350	2455	45
3.0	2	300	0.036	0.120	0.120	2.97	32155	2315	45

Hardened tool steel  
48 - 52 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	250	0.020	0.040	0.040	1.00	60000	2400	45
1.2	2	250	0.022	0.048	0.048	1.20	60000	2640	45
1.5	2	250	0.026	0.060	0.060	1.50	53055	2760	45
2.0	2	250	0.028	0.080	0.080	2.00	39790	2230	45
2.5	2	250	0.030	0.100	0.100	2.49	31960	1920	45
3.0	2	250	0.034	0.120	0.120	2.97	26795	1820	45

Hardened tool steel  
52 - 56 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	200	0.020	0.040	0.040	1.00	60000	2400	45
1.2	2	200	0.022	0.048	0.048	1.20	53055	2335	45
1.5	2	200	0.026	0.060	0.060	1.50	42445	2205	45
2.0	2	200	0.028	0.080	0.080	2.00	31830	1780	45
2.5	2	200	0.028	0.100	0.100	2.49	25570	1430	45
3.0	2	200	0.032	0.120	0.120	2.97	21435	1370	45

Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	150	0.018	0.040	0.040	1.00	47750	1720	45
1.2	2	150	0.020	0.048	0.048	1.20	39790	1590	45
1.5	2	150	0.022	0.060	0.060	1.50	31830	1400	45
2.0	2	150	0.024	0.080	0.080	2.00	23875	1145	45
2.5	2	150	0.026	0.100	0.100	2.49	19175	995	45
3.0	2	150	0.028	0.120	0.120	2.97	16075	900	45

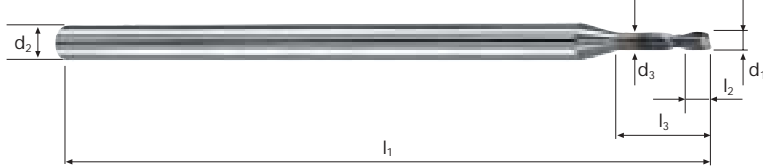


# Corner radius end mills Microcut-T5H

Shank  $\varnothing$  3mm, cylindrical neck, 5xd



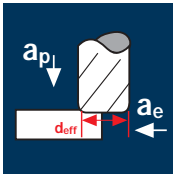
**HM**  $\lambda$  25°  
**XA**  $\gamma$ -10°



<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60	<b>Inox</b> Stainless	<b>Ti</b> Titanium	
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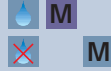
Example: Order-N°.										DURO-S	
										D5764	
$\varnothing$ Code	d1 $\pm 0.01$	d2 h6	d3	l1	l2	l3	r 0/+0.03	$\alpha$	z		
.100	1.0	3	0.95	50	1.2	5.0	0.20	7.0°	2	●	
.108	1.2	3	1.15	50	1.4	6.0	0.20	6.0°	2	●	
.120	1.5	3	1.45	50	1.8	7.5	0.20	5.0°	2	●	
.140	2.0	3	1.95	50	2.4	10.0	0.20	3.0°	2	●	
.160	2.5	3	2.45	50	3.0	12.5	0.20	1.5°	2	●	
.180	3.0	3	2.95	50	3.6	15.0	0.20	0.0°	2	●	

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	180	0.036	0.05	0.20	0.86	60000	4320	r=0.2
1.2	2	180	0.042	0.06	0.24	1.09	52565	4415	r=0.2
1.5	2	180	0.054	0.08	0.30	1.42	40350	4360	r=0.2
2.0	2	180	0.072	0.10	0.40	1.95	29385	4230	r=0.2
2.5	2	180	0.090	0.13	0.50	2.47	23195	4175	r=0.2
3.0	2	180	0.108	0.15	0.60	2.99	19165	4140	r=0.2

Steel  
1100 - 1300 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	160	0.032	0.05	0.20	0.86	59220	3790	r=0.2
1.2	2	160	0.038	0.06	0.24	1.09	46725	3550	r=0.2
1.5	2	160	0.048	0.08	0.30	1.42	35865	3445	r=0.2
2.0	2	160	0.064	0.10	0.40	1.95	26120	3345	r=0.2
2.5	2	160	0.082	0.13	0.50	2.47	20620	3380	r=0.2
3.0	2	160	0.098	0.15	0.60	2.99	17035	3340	r=0.2

Stainless steel  
[Cr-Ni/1.4301]



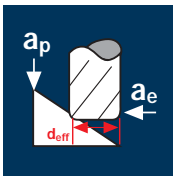
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	80	0.032	0.05	0.20	0.86	29610	1895	r=0.2
1.2	2	80	0.038	0.06	0.24	1.09	23365	1775	r=0.2
1.5	2	80	0.048	0.08	0.30	1.42	17935	1720	r=0.2
2.0	2	80	0.064	0.10	0.40	1.95	13060	1670	r=0.2
2.5	2	80	0.082	0.13	0.50	2.47	10310	1690	r=0.2
3.0	2	80	0.098	0.15	0.60	2.99	8515	1670	r=0.2

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	60	0.026	0.05	0.20	0.86	22210	1155	r=0.2
1.2	2	60	0.030	0.06	0.24	1.09	17520	1050	r=0.2
1.5	2	60	0.038	0.08	0.30	1.42	13450	1020	r=0.2
2.0	2	60	0.050	0.10	0.40	1.95	9795	980	r=0.2
2.5	2	60	0.064	0.13	0.50	2.47	7730	990	r=0.2
3.0	2	60	0.076	0.15	0.60	2.99	6390	970	r=0.2

## Application



## Material

Steel  
850 - 1100 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	300	0.022	0.038	0.038	0.99	60000	2640	45
1.2	2	300	0.024	0.046	0.046	1.20	60000	2880	45
1.5	2	300	0.028	0.058	0.058	1.50	60000	3360	45
2.0	2	300	0.030	0.076	0.076	2.00	47750	2865	45
2.5	2	300	0.032	0.096	0.096	2.49	38350	2455	45
3.0	2	300	0.036	0.114	0.114	2.98	32045	2305	45

Steel  
1100 - 1300 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	250	0.020	0.038	0.038	0.99	60000	2400	45
1.2	2	250	0.022	0.046	0.046	1.20	60000	2640	45
1.5	2	250	0.026	0.058	0.058	1.50	53055	2760	45
2.0	2	250	0.028	0.076	0.076	2.00	39790	2230	45
2.5	2	250	0.028	0.096	0.096	2.49	31960	1790	45
3.0	2	250	0.032	0.114	0.114	2.98	26705	1710	45

Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	120	0.018	0.038	0.038	0.99	38585	1390	45
1.2	2	120	0.020	0.046	0.046	1.20	31830	1275	45
1.5	2	120	0.022	0.058	0.058	1.50	25465	1120	45
2.0	2	120	0.024	0.076	0.076	2.00	19100	915	45
2.5	2	120	0.026	0.096	0.096	2.49	15340	800	45
3.0	2	120	0.028	0.114	0.114	2.98	12820	720	45

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



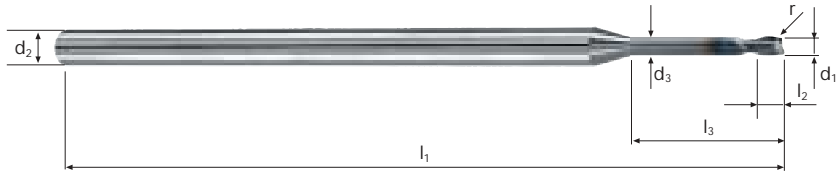
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	100	0.016	0.038	0.038	0.99	32155	1030	45
1.2	2	100	0.016	0.046	0.046	1.20	26525	850	45
1.5	2	100	0.020	0.058	0.058	1.50	21220	850	45
2.0	2	100	0.022	0.076	0.076	2.00	15915	700	45
2.5	2	100	0.022	0.096	0.096	2.49	12785	565	45
3.0	2	100	0.026	0.114	0.114	2.98	10680	555	45

# Corner radius end mills Microcut-T8

Shank  $\varnothing$  3mm, cylindrical neck, 8xd



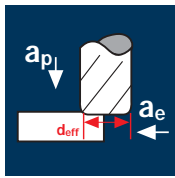
**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



**Rm** < 850   **Rm** 850-1100   **Rm** 1100-1300   **Rm** 1300-1500   **Inox** Stainless   **Ti** Titanium   **Cobalt-Chrome Gold / Platinum Copper**

Example: Order-N°.										MICRO	
										M5756	
$\varnothing$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r 0/+0.03	$\alpha$	Z		
.100	1.0	3	0.95	50	1.2	8.0	0.20	5.0°	2	●	
.108	1.2	3	1.15	50	1.4	9.6	0.20	4.0°	2	●	
.120	1.5	3	1.45	60	1.8	12.0	0.20	3.0°	2	●	
.140	2.0	3	1.95	60	2.4	16.0	0.20	2.0°	2	●	
.160	2.5	3	2.45	60	3.0	20.0	0.20	1.0°	2	●	
.180	3.0	3	2.95	60	3.6	24.0	0.20	0.0°	2	●	

### Application



### Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	r [mm]
1.0	2	140	0.026	0.04	0.18	0.84	53055	2760	r=0.2
1.2	2	140	0.030	0.05	0.22	1.06	42040	2520	r=0.2
1.5	2	140	0.038	0.06	0.27	1.39	32060	2435	r=0.2
2.0	2	140	0.050	0.08	0.36	1.92	23210	2320	r=0.2
2.5	2	140	0.062	0.10	0.45	2.45	18190	2255	r=0.2
3.0	2	140	0.076	0.12	0.54	2.97	15005	2280	r=0.2

Hardened tool steel  
48 - 52 HRC

**D**

1.0	2	120	0.024	0.04	0.18	0.84	45475	2185	r=0.2
1.2	2	120	0.028	0.05	0.22	1.06	36035	2020	r=0.2
1.5	2	120	0.036	0.06	0.27	1.39	27480	1980	r=0.2
2.0	2	120	0.048	0.08	0.36	1.92	19895	1910	r=0.2
2.5	2	120	0.058	0.10	0.45	2.45	15590	1810	r=0.2
3.0	2	120	0.072	0.12	0.54	2.97	12860	1850	r=0.2

Hardened tool steel  
52 - 56 HRC

**D**

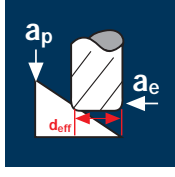
1.0	2	100	0.022	0.04	0.18	0.84	37895	1665	r=0.2
1.2	2	100	0.026	0.05	0.22	1.06	30030	1560	r=0.2
1.5	2	100	0.034	0.06	0.27	1.39	22900	1555	r=0.2
2.0	2	100	0.044	0.08	0.36	1.92	16580	1460	r=0.2
2.5	2	100	0.054	0.10	0.45	2.45	12995	1405	r=0.2
3.0	2	100	0.066	0.12	0.54	2.97	10720	1415	r=0.2

Hardened tool steel  
56 - 60 HRC

**D**

1.0	2	60	0.020	0.04	0.18	0.84	22735	910	r=0.2
1.2	2	60	0.024	0.05	0.22	1.06	18020	865	r=0.2
1.5	2	60	0.030	0.06	0.27	1.39	13740	825	r=0.2
2.0	2	60	0.040	0.08	0.36	1.92	9945	795	r=0.2
2.5	2	60	0.050	0.10	0.45	2.45	7795	780	r=0.2
3.0	2	60	0.060	0.12	0.54	2.97	6430	770	r=0.2

### Application



### Material

Hardened tool steel  
42 - 48 HRC

**D**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
1.0	2	300	0.022	0.038	0.038	0.99	60000	2640	45
1.2	2	300	0.024	0.046	0.046	1.20	60000	2880	45
1.5	2	300	0.028	0.058	0.058	1.50	60000	3360	45
2.0	2	300	0.030	0.076	0.076	2.00	47750	2865	45
2.5	2	300	0.032	0.096	0.096	2.49	38350	2455	45
3.0	2	300	0.036	0.114	0.114	2.98	32045	2305	45

Hardened tool steel  
48 - 52 HRC

**D**

1.0	2	250	0.020	0.038	0.038	0.99	60000	2400	45
1.2	2	250	0.022	0.046	0.046	1.20	60000	2640	45
1.5	2	250	0.026	0.058	0.058	1.50	53055	2760	45
2.0	2	250	0.028	0.076	0.076	2.00	39790	2230	45
2.5	2	250	0.030	0.096	0.096	2.49	31960	1920	45
3.0	2	250	0.034	0.114	0.114	2.98	26705	1815	45

Hardened tool steel  
52 - 56 HRC

**D**

1.0	2	200	0.020	0.038	0.038	0.99	60000	2400	45
1.2	2	200	0.022	0.046	0.046	1.20	53055	2335	45
1.5	2	200	0.026	0.058	0.058	1.50	42445	2205	45
2.0	2	200	0.028	0.076	0.076	2.00	31830	1780	45
2.5	2	200	0.028	0.096	0.096	2.49	25570	1430	45
3.0	2	200	0.032	0.114	0.114	2.98	21365	1365	45

Hardened tool steel  
56 - 60 HRC

**D**

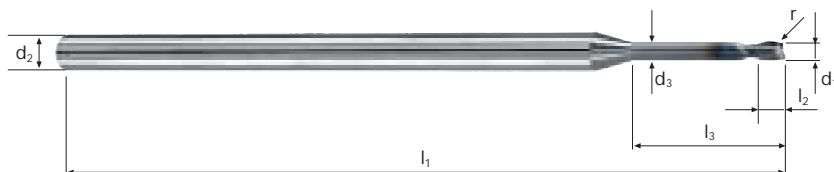
1.0	2	150	0.018	0.038	0.038	0.99	48230	1735	45
1.2	2	150	0.020	0.046	0.046	1.20	39790	1590	45
1.5	2	150	0.022	0.058	0.058	1.50	31830	1400	45
2.0	2	150	0.024	0.076	0.076	2.00	23875	1145	45
2.5	2	150	0.026	0.096	0.096	2.49	19175	995	45
3.0	2	150	0.028	0.114	0.114	2.98	16025	895	45

# Corner radius end mills Microcut-T8H

Shank  $\varnothing$  3mm, cylindrical neck, 8xd



**HM  
XA**      $\lambda$  25°  
                   $\gamma$ -10°



**Rm** 850-1100     **Rm** 1100-1300     **Rm** 1300-1500     **HRC** 48-56     **HRC** 56-60     **HRC** > 60     **Inox** Stainless     **Ti** Titanium



										DURO-S	
Example: Order-N°. <b>D</b> <b>5766</b> <b>.100</b>										<b>D5766</b>	
$\varnothing$ Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r 0/+0.03	$\alpha$	Z		
.100	1.0	3	0.95	50	1.2	8.0	0.20	5.0°	2	●	
.108	1.2	3	1.15	50	1.4	9.6	0.20	4.0°	2	●	
.120	1.5	3	1.45	60	1.8	12.0	0.20	3.0°	2	●	
.140	2.0	3	1.95	60	2.4	16.0	0.20	2.0°	2	●	
.160	2.5	3	2.45	60	3.0	20.0	0.20	1.0°	2	●	
.180	3.0	3	2.95	60	3.6	24.0	0.20	0.0°	2	●	



# End milling tools for aluminium and copper

## Smooth-edged, cylindrical

### Normal version

N° 15520 / 15620 **new!** d1 2 – 20



X-Generation	<b>X</b>	HM MG10	90°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	451
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N° 15525 / 15625 **new!** d1 6 – 20



X-Generation	<b>X</b>	HM MG10	90°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	453
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N° 15530 / 15630 **new!** d1 3 – 20



X-Generation	<b>X</b>	HM MG10	90°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	455
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N° 15535 / 15635 **new!** d1 6 – 20



X-Generation	<b>X</b>	HM MG10	90°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	457
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N° 5272 / 5500 d1 2 – 20



Base-X	<b>B</b>	HM MG10	45°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	459
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N° 5273 d1 3 – 20



Base-X	<b>B</b>	HM MG10	45°	Al Aluminium > 99%	Plastic Thermoplast		461
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III

### Medium length version

N° 15550 / 15650 **new!** d1 3 – 20



X-Generation	<b>X</b>	HM MG10	90°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	463
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N° 15560 / 15660 **new!** d1 3 – 20



X-Generation	<b>X</b>	HM MG10	90°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	465
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N° 5278 d1 3 – 16



Base-X	<b>B</b>	HM MG10	45°	Al Aluminium > 99%	Plastic Thermoplast		467
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### Long version

N° 15561 / 15661 **new!** d1 6 – 20






X-Generation	<b>X</b>	HM MG10	90°	Al Aluminium Alloy	Cu Copper	Plastic Thermoplast	469
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# End milling tools for aluminium and copper

## Smooth-edged, with corner radius

### Normal version

<b>N° 5275</b> 	d1 3 - 25 r 0.5, r 1.0, r 1.5, r 2.0, r 2.5	X-Generation <b>X</b>	<b>HM MG10</b>		<b>Al</b> Aluminium Alloy	<b>Cu</b> Copper	<b>Plastic</b> Thermoplast	471
<b>N° 5271</b> 	d1 10 - 25 r 1.5, r 2.0, r 2.5, r 4.0	X-Generation <b>X</b>	<b>HM MG10</b>		<b>Al</b> Aluminium Alloy			473
<b>N° 5276</b> 	d1 6 - 25 r 1.0, r 1.5, r 2.0, r 2.5	X-Generation <b>X</b>	<b>HM MG10</b>		<b>Al</b> Aluminium Alloy	<b>Cu</b> Copper	<b>Plastic</b> Thermoplast	475

### Medium length version

<b>N° 5277</b> 	d1 6 - 20 r 1.0, r 1.5, r 2.0	X-Generation <b>X</b>	<b>HM MG10</b>		<b>Al</b> Aluminium Alloy	<b>Cu</b> Copper	<b>Plastic</b> Thermoplast	477
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# End milling tools for aluminium and copper

## Profiled, cylindrical

### Normal version

N° 5297 / 5397 d1 6 – 20



X-Generation	<b>X</b>	HM MG10	45°	Al Aluminium Alloy	Cu Copper		479
X-Generation	<b>X</b>	HM MG10	r	Al Aluminium Alloy			481
	HSS	HSS-E Co8	45°	Al Aluminium Alloy	Cu Copper		483

N° 15278 d1 16 – 25



r 2.0

N° 0391 d1 6 – 25



### Medium length version

N° 15297 / 15397 d1 8 – 20



N° 15298 / 15398 d1 8 – 25



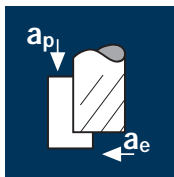
N° 0393 d1 10 – 25



X-Generation	<b>X</b>	HM MG10	45°	Al Aluminium Alloy	Cu Copper		485
X-Generation	<b>X</b>	HM MG10	45°	Al Aluminium Alloy	Cu Copper		487
	HSS	HSS-E Co8	45°	Al Aluminium Alloy	Cu Copper		489

III

## Application



## Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	550	0.055	4.5	1.8	58360	6420	52.0
4	2	550	0.075	6.0	2.4	43770	6565	94.5
5	2	550	0.090	7.5	3.0	35015	6305	142.0
6	2	550	0.120	9.0	3.6	29180	7005	227.0
8	2	550	0.160	12.0	4.8	21885	7005	403.5
10	2	550	0.200	15.0	6.0	17510	7005	630.5
12	2	550	0.220	18.0	7.2	14590	6420	832.0
16	2	550	0.245	24.0	9.6	10940	5360	1235.0
20	2	550	0.285	30.0	12.0	8755	4990	1796.5

Unalloyed copper

3	2	400	0.045	4.5	1.8	42445	3820	31.0
4	2	400	0.060	6.0	2.4	31830	3820	55.0
5	2	400	0.070	7.5	3.0	25465	3565	80.0
6	2	400	0.095	9.0	3.6	21220	4030	130.5
8	2	400	0.130	12.0	4.8	15915	4140	238.5
10	2	400	0.160	15.0	6.0	12735	4075	367.0
12	2	400	0.175	18.0	7.2	10610	3715	481.5
16	2	400	0.195	24.0	9.6	7960	3105	715.5
20	2	400	0.230	30.0	12.0	6365	2930	1055.0

Thermoplastics

3	2	1000	0.055	4.5	1.8	60000	6600	53.5
4	2	1000	0.075	6.0	2.4	60000	9000	129.5
5	2	1000	0.090	7.5	3.0	60000	10800	243.0
6	2	1000	0.120	9.0	3.6	53055	12735	412.5
8	2	1000	0.160	12.0	4.8	39790	12735	733.5
10	2	1000	0.200	15.0	6.0	31830	12730	1145.5
12	2	1000	0.220	18.0	7.2	26525	11670	1512.5
16	2	1000	0.245	24.0	9.6	19895	9750	2246.5
20	2	1000	0.285	30.0	12.0	15915	9070	3265.0

Cast aluminium Si 6%-15%

3	2	350	0.040	4.5	1.8	37135	2970	24.0
4	2	350	0.055	6.0	2.4	27855	3065	44.0
5	2	350	0.065	7.5	3.0	22280	2895	65.0
6	2	350	0.085	9.0	3.6	18570	3155	102.0
8	2	350	0.110	12.0	4.8	13925	3065	176.5
10	2	350	0.140	15.0	6.0	11140	3120	281.0
12	2	350	0.155	18.0	7.2	9285	2880	373.0
16	2	350	0.170	24.0	9.6	6965	2370	546.0
20	2	350	0.200	30.0	12.0	5570	2230	803.0

## Application



## Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	450	0.040	3.0	3	47750	3820	34.5
4	2	450	0.055	4.0	4	35810	3940	63.0
5	2	450	0.065	5.0	5	28650	3725	93.0
6	2	450	0.085	6.0	6	23875	4060	146.0
8	2	450	0.110	8.0	8	17905	3940	252.0
10	2	450	0.140	10.0	10	14325	4010	401.0
12	2	450	0.155	12.0	12	11935	3700	533.0
16	2	450	0.170	16.0	16	8955	3045	779.5
20	2	450	0.200	20.0	20	7160	2865	1146.0

Unalloyed copper

3	2	350	0.030	3.0	3	37135	2230	20.0
4	2	350	0.045	4.0	4	27855	2505	40.0
5	2	350	0.050	5.0	5	22280	2230	56.0
6	2	350	0.070	6.0	6	18570	2600	93.5
8	2	350	0.090	8.0	8	13925	2505	160.5
10	2	350	0.110	10.0	10	11140	2450	245.0
12	2	350	0.125	12.0	12	9285	2320	334.0
16	2	350	0.135	16.0	16	6965	1880	481.5
20	2	350	0.160	20.0	20	5570	1780	712.0

Thermoplastics

3	2	800	0.040	3.0	3	60000	4800	43.0
4	2	800	0.055	4.0	4	60000	6600	105.5
5	2	800	0.065	5.0	5	50930	6620	165.5
6	2	800	0.085	6.0	6	42445	7215	259.5
8	2	800	0.110	8.0	8	31830	7005	448.5
10	2	800	0.140	10.0	10	25465	7130	713.0
12	2	800	0.155	12.0	12	21220	6580	947.5
16	2	800	0.170	16.0	16	15915	5410	1385.0
20	2	800	0.200	20.0	20	12735	5095	2038.0

Cast aluminium Si 6%-15%

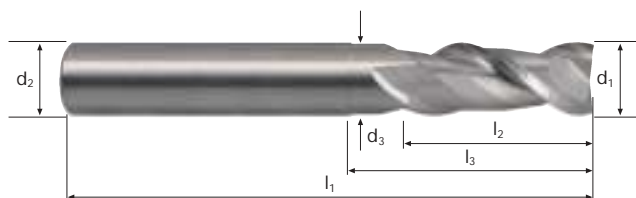
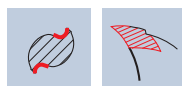
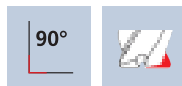
3	2	300	0.030	3.0	3	31830	1910	17.0
4	2	300	0.040	4.0	4	23875	1910	30.5
5	2	300	0.045	5.0	5	19100	1720	43.0
6	2	300	0.060	6.0	6	15915	1910	69.0
8	2	300	0.075	8.0	8	11935	1790	114.5
10	2	300	0.100	10.0	10	9550	1910	191.0
12	2	300	0.110	12.0	12	7960	1750	252.0
16	2	300	0.120	16.0	16	5970	1435	367.5
20	2	300	0.140	20.0	20	4775	1335	534.0

# Cylindrical end mills AX-NV2

Smooth-edged, normal version with short neck



**HM**  
**MG10**   λ 40°  
                  γ 20°



**new!**

Roughing



Finishing



**Rm**  
< 850

**Al**  
Aluminium  
> 99%

**Al**  
Aluminium  
Alloy

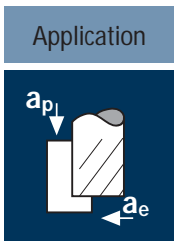
**Al**  
Aluminium  
Cast

**Cu**  
Copper

**Plastic**  
Thermoplast

III

Ø Code	d1 h6	d2 h6	d3	l1	l2	l3	α	Z	CELERO	
									15620	C15620
									15520	C15520
.140	2	6	1.9	57	7	10	7.0°	2	●	●
.180	3	6	2.8	57	8	14	5.5°	2	●	●
.220	4	6	3.7	57	11	16	4.0°	2	●	●
.260	5	6	4.6	57	13	18	2.0°	2	●	●
.300	6	6	5.5	57	13	20	0.0°	2	●	●
.391	8	8	7.4	63	19	26	0.0°	2	●	●
.450	10	10	9.2	72	22	31	0.0°	2	●	●
.501	12	12	11.0	83	26	37	0.0°	2	●	●
.610	16	16	15.0	92	32	43	0.0°	2	●	●
.682	20	20	19.0	104	38	53	0.0°	2	●	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	2	650	0.065	9.0	3.3	34485	4485	133.0
8	2	650	0.090	12.0	4.4	25865	4655	246.0
10	2	650	0.110	15.0	5.5	20690	4550	375.5
12	2	650	0.120	18.0	6.6	17240	4140	492.0
16	2	650	0.135	24.0	8.8	12930	3490	737.0
20	2	650	0.155	30.0	11.0	10345	3205	1057.5

Material

Unalloyed copper

6	2	500	0.050	9.0	3.3	26525	2655	79.0
8	2	500	0.070	12.0	4.4	19895	2785	147.0
10	2	500	0.090	15.0	5.5	15915	2865	236.5
12	2	500	0.095	18.0	6.6	13265	2520	299.5
16	2	500	0.105	24.0	8.8	9945	2090	441.5
20	2	500	0.125	30.0	11.0	7960	1990	656.5

Material

Thermoplastics

6	2	1200	0.065	9.0	3.3	60000	7800	231.5
8	2	1200	0.090	12.0	4.4	47750	8595	454.0
10	2	1200	0.110	15.0	5.5	38200	8405	693.5
12	2	1200	0.120	18.0	6.6	31830	7640	907.5
16	2	1200	0.135	24.0	8.8	23875	6445	1361.0
20	2	1200	0.155	30.0	11.0	19100	5920	1953.5

Material

Cast aluminium Si 6%-15%

6	2	450	0.045	9.0	3.3	23875	2150	64.0
8	2	450	0.060	12.0	4.4	17905	2150	113.5
10	2	450	0.075	15.0	5.5	14325	2150	177.5
12	2	450	0.085	18.0	6.6	11935	2030	241.0
16	2	450	0.095	24.0	8.8	8955	1700	359.0
20	2	450	0.110	30.0	11.0	7160	1575	520.0



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	2	550	0.045	5.4	6	29180	2625	85.0
8	2	550	0.060	7.2	8	21885	2625	151.0
10	2	550	0.075	9.0	10	17510	2625	236.5
12	2	550	0.085	10.8	12	14590	2480	321.5
16	2	550	0.095	14.4	16	10940	2080	479.0
20	2	550	0.110	18.0	20	8755	1925	693.0

Material

Unalloyed copper

6	2	450	0.040	5.4	6	23875	1910	62.0
8	2	450	0.050	7.2	8	17905	1790	103.0
10	2	450	0.060	9.0	10	14325	1720	155.0
12	2	450	0.070	10.8	12	11935	1670	216.5
16	2	450	0.075	14.4	16	8955	1345	310.0
20	2	450	0.090	18.0	20	7160	1290	464.5

Material

Thermoplastics

6	2	1000	0.045	5.4	6	53055	4775	154.5
8	2	1000	0.060	7.2	8	39790	4775	275.0
10	2	1000	0.075	9.0	10	31830	4775	430.0
12	2	1000	0.085	10.8	12	26525	4510	584.5
16	2	1000	0.095	14.4	16	19895	3780	871.0
20	2	1000	0.110	18.0	20	15915	3500	1260.0

Material

Cast aluminium Si 6%-15%

6	2	400	0.035	5.4	6	21220	1485	48.0
8	2	400	0.040	7.2	8	15915	1275	73.5
10	2	400	0.055	9.0	10	12735	1400	126.0
12	2	400	0.060	10.8	12	10610	1275	165.0
16	2	400	0.065	14.4	16	7960	1035	238.5
20	2	400	0.075	18.0	20	6365	955	344.0

# Cylindrical end mills AX-NV2

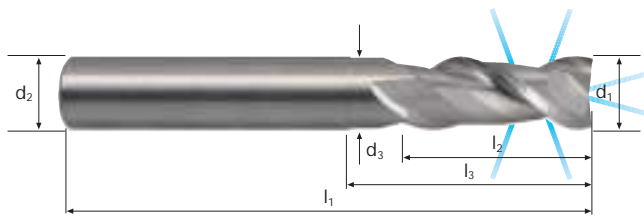
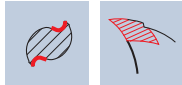
Smooth-edged, normal version with short neck, with integral cooling channel



HM  
MG10  $\lambda$  40°  
 $\gamma$  20°

90°

Vario



new!

Roughing



Finishing



Rm  
< 850

Al  
Aluminium  
> 99%

Al  
Aluminium  
Alloy

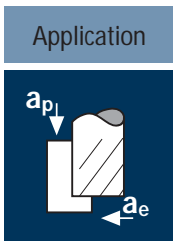
Al  
Aluminium  
Cast

Cu  
Copper

Plastic  
Thermoplast

III

Example: Order-N°.		Coating <b>C</b>		Article-N°. <b>15625</b>		ø-Code <b>.300</b>				CELERO
									<b>15625</b>	<b>C15625</b>
									<b>15525</b>	<b>C15525</b>
Ø Code	d1 h6	d2 h6	d3	l1	l2	l3	z			
.300	6	6	5.5	57	13	20	2	●	●	●
.391	8	8	7.4	63	19	26	2	●	●	●
.450	10	10	9.2	72	22	31	2	●	●	●
.501	12	12	11.0	83	26	37	2	●	●	●
.610	16	16	15.0	92	32	43	2	●	●	●
.682	20	20	19.0	104	38	53	2	●	●	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	550	0.050	4.5	1.4	58360	8755	55.0
4	3	550	0.065	6.0	1.8	43770	8535	92.0
5	3	550	0.085	7.5	2.3	35015	8930	154.0
6	3	550	0.110	9.0	2.7	29180	9630	234.0
8	3	550	0.135	12.0	3.6	21885	8865	383.0
10	3	550	0.165	15.0	4.5	17510	8665	585.0
12	3	550	0.200	18.0	5.4	14590	8755	851.0
16	3	550	0.215	24.0	7.2	10940	7055	1219.0
20	3	550	0.250	30.0	9.0	8755	6565	1772.5

Unalloyed copper

3	3	400	0.040	4.5	1.4	42445	5095	31.0
4	3	400	0.050	6.0	1.8	31830	4775	51.5
5	3	400	0.070	7.5	2.3	25465	5350	90.5
6	3	400	0.090	9.0	2.7	21220	5730	139.0
8	3	400	0.110	12.0	3.6	15915	5250	227.0
10	3	400	0.130	15.0	4.5	12735	4965	335.0
12	3	400	0.160	18.0	5.4	10610	5095	495.0
16	3	400	0.170	24.0	7.2	7960	4060	701.5
20	3	400	0.200	30.0	9.0	6365	3820	1031.5

Thermoplastics

3	3	1000	0.050	4.5	1.4	60000	9000	54.5
4	3	1000	0.065	6.0	1.8	60000	11700	126.5
5	3	1000	0.085	7.5	2.3	60000	15300	258.0
6	3	1000	0.110	9.0	2.7	53055	17510	425.5
8	3	1000	0.135	12.0	3.6	39790	16115	696.0
10	3	1000	0.165	15.0	4.5	31830	15755	1063.5
12	3	1000	0.200	18.0	5.4	26525	15915	1547.0
16	3	1000	0.215	24.0	7.2	19895	12830	2217.0
20	3	1000	0.250	30.0	9.0	15915	11935	3222.5

Cast aluminium Si 6%-15%

3	3	350	0.035	4.5	1.4	37135	3900	23.5
4	3	350	0.045	6.0	1.8	27855	3760	40.5
5	3	350	0.060	7.5	2.3	22280	4010	67.5
6	3	350	0.075	9.0	2.7	18570	4180	101.5
8	3	350	0.095	12.0	3.6	13925	3970	171.5
10	3	350	0.115	15.0	4.5	11140	3845	259.5
12	3	350	0.140	18.0	5.4	9285	3900	379.0
16	3	350	0.150	24.0	7.2	6965	3135	541.5
20	3	350	0.175	30.0	9.0	5570	2925	790.0



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	450	0.035	1.8	3	47750	5015	27.0
4	3	450	0.045	2.4	4	35810	4835	46.5
5	3	450	0.060	3.0	5	28650	5155	77.5
6	3	450	0.075	3.6	6	23875	5370	116.0
8	3	450	0.095	4.8	8	17905	5105	196.0
10	3	450	0.115	6.0	10	14325	4940	296.5
12	3	450	0.140	7.2	12	11935	5015	433.5
16	3	450	0.150	9.6	16	8955	4030	619.0
20	3	450	0.175	12.0	20	7160	3760	902.5

Unalloyed copper

3	3	350	0.030	1.8	3	37135	3340	18.0
4	3	350	0.035	2.4	4	27855	2925	28.0
5	3	350	0.050	3.0	5	22280	3340	50.0
6	3	350	0.060	3.6	6	18570	3345	72.5
8	3	350	0.075	4.8	8	13925	3135	120.5
10	3	350	0.090	6.0	10	11140	3010	180.5
12	3	350	0.110	7.2	12	9285	3065	265.0
16	3	350	0.120	9.6	16	6965	2505	385.0
20	3	350	0.140	12.0	20	5570	2340	561.5

Thermoplastics

3	3	800	0.035	1.8	3	60000	6300	34.0
4	3	800	0.045	2.4	4	60000	8100	78.0
5	3	800	0.060	3.0	5	50930	9165	137.5
6	3	800	0.075	3.6	6	42445	9550	206.5
8	3	800	0.095	4.8	8	31830	9070	348.5
10	3	800	0.115	6.0	10	25465	8785	527.0
12	3	800	0.140	7.2	12	21220	8910	770.0
16	3	800	0.150	9.6	16	15915	7160	1100.0
20	3	800	0.175	12.0	20	12735	6685	1604.5

Cast aluminium Si 6%-15%

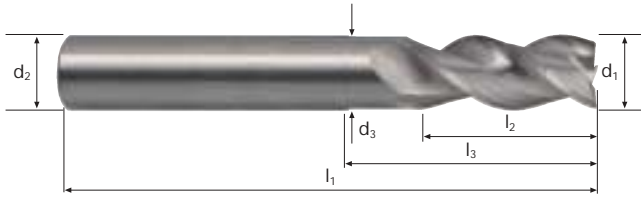
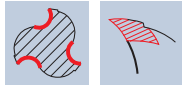
3	3	300	0.025	1.8	3	31830	2385	13.0
4	3	300	0.030	2.4	4	23875	2150	20.5
5	3	300	0.040	3.0	5	19100	2290	34.5
6	3	300	0.055	3.6	6	15915	2625	56.5
8	3	300	0.065	4.8	8	11935	2325	89.5
10	3	300	0.080	6.0	10	9550	2290	137.5
12	3	300	0.100	7.2	12	7960	2390	206.5
16	3	300	0.105	9.6	16	5970	1880	289.0
20	3	300	0.125	12.0	20	4775	1790	429.5

# Cylindrical end mills AX-NV3

Smooth-edged, normal version with short neck



**HM**  
**MG10**     $\lambda$  40°  
                   $\gamma$  20°



**new!**

Roughing



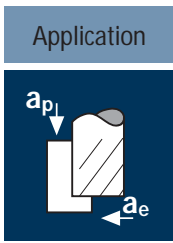
Finishing



**Rm** < 850    **Al** Aluminium > 99%    **Al** Aluminium Alloy    **Al** Aluminium Cast    **Cu** Copper    **Plastic** Thermoplast

III

Example: Order-N°.		Coating	Article-N°.	α-Code						CELERO
		<b>C</b>	<b>15630</b>	<b>.180</b>					<b>15630</b>	<b>C15630</b>
									<b>15530</b>	<b>C15530</b>
Ø Code	d1 h6	d2 h6	d3	l1	l2	l3	α	Z		
.180	3	6	2.8	57	8	14	5.0°	3	●	●
.220	4	6	3.7	57	11	16	3.0°	3	●	●
.260	5	6	4.6	57	13	18	1.5°	3	●	●
.300	6	6	5.5	57	13	20	0.0°	3	●	●
.391	8	8	7.4	63	19	26	0.0°	3	●	●
.450	10	10	9.2	72	22	31	0.0°	3	●	●
.501	12	12	11.0	83	26	37	0.0°	3	●	●
.610	16	16	15.0	92	32	43	0.0°	3	●	●
.682	20	20	19.0	104	38	53	0.0°	3	●	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	650	0.060	9.0	2.4	34485	6205	134.0
8	3	650	0.075	12.0	3.2	25865	5820	223.5
10	3	650	0.090	15.0	4.0	20690	5585	335.0
12	3	650	0.110	18.0	4.8	17240	5690	491.5
16	3	650	0.120	24.0	6.4	12930	4655	715.0
20	3	650	0.140	30.0	8.0	10345	4345	1043.0

Material

Unalloyed copper

6	3	500	0.050	9.0	2.4	26525	3980	86.0
8	3	500	0.060	12.0	3.2	19895	3580	137.5
10	3	500	0.070	15.0	4.0	15915	3340	200.5
12	3	500	0.090	18.0	4.8	13265	3580	309.5
16	3	500	0.095	24.0	6.4	9945	2835	435.5
20	3	500	0.110	30.0	8.0	7960	2625	630.0

Material

Thermoplastics

6	3	1200	0.060	9.0	2.4	60000	10800	233.5
8	3	1200	0.075	12.0	3.2	47750	10745	412.5
10	3	1200	0.090	15.0	4.0	38200	10315	619.0
12	3	1200	0.110	18.0	4.8	31830	10505	907.5
16	3	1200	0.120	24.0	6.4	23875	8595	1320.0
20	3	1200	0.140	30.0	8.0	19100	8020	1925.0

Material

Cast aluminium Si 6%-15%

6	3	450	0.040	9.0	2.4	23875	2865	62.0
8	3	450	0.050	12.0	3.2	17905	2685	103.0
10	3	450	0.065	15.0	4.0	14325	2795	167.5
12	3	450	0.075	18.0	4.8	11935	2685	232.0
16	3	450	0.085	24.0	6.4	8955	2285	351.0
20	3	450	0.095	30.0	8.0	7160	2040	489.5



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	550	0.040	3.0	6	29180	3500	63.0
8	3	550	0.050	4.0	8	21885	3285	105.0
10	3	550	0.065	5.0	10	17510	3415	171.0
12	3	550	0.075	6.0	12	14590	3285	236.5
16	3	550	0.085	8.0	16	10940	2790	357.0
20	3	550	0.095	10.0	20	8755	2495	499.0

Material

Unalloyed copper

6	3	450	0.035	3.0	6	23875	2505	45.0
8	3	450	0.040	4.0	8	17905	2150	69.0
10	3	450	0.050	5.0	10	14325	2150	107.5
12	3	450	0.060	6.0	12	11935	2150	155.0
16	3	450	0.065	8.0	16	8955	1745	223.5
20	3	450	0.075	10.0	20	7160	1610	322.0

Material

Thermoplastics

6	3	1000	0.040	3.0	6	53055	6365	114.5
8	3	1000	0.050	4.0	8	39790	5970	191.0
10	3	1000	0.065	5.0	10	31830	6205	310.5
12	3	1000	0.075	6.0	12	26525	5970	430.0
16	3	1000	0.085	8.0	16	19895	5075	649.5
20	3	1000	0.095	10.0	20	15915	4535	907.0

Material

Cast aluminium Si 6%-15%

6	3	400	0.030	3.0	6	21220	1910	34.5
8	3	400	0.035	4.0	8	15915	1670	53.5
10	3	400	0.045	5.0	10	12735	1720	86.0
12	3	400	0.055	6.0	12	10610	1750	126.0
16	3	400	0.060	8.0	16	7960	1435	183.5
20	3	400	0.070	10.0	20	6365	1335	267.0

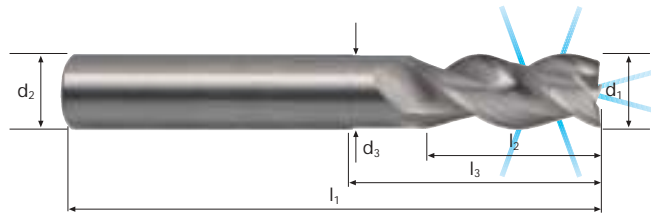
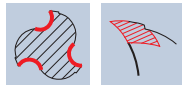
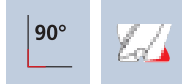


# Cylindrical end mills AX-NV3

Smooth-edged, normal version with short neck, with integral cooling channel



**HM**  
**MG10**     $\lambda$  40°  
                   $\gamma$  20°



**new!**

Roughing



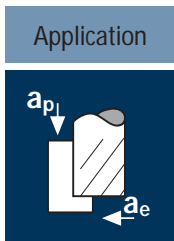
Finishing



Rm < 850			Al Aluminium > 99%	Al Aluminium Alloy	Al Aluminium Cast		Cu Copper	Plastic Thermoplast	
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Example: Order-N°.		Coating <b>C</b>	Article-N°. <b>15635</b>	α-Code <b>.300</b>					CELERO
Ø Code	d1 h6	d2 h6	d3	l1	l2	l3	Z		
.300	6	6	5.5	57	13	20	3	●	●
.391	8	8	7.4	63	19	26	3	●	●
.450	10	10	9.2	72	22	31	3	●	●
.501	12	12	11.0	83	26	37	3	●	●
.610	16	16	15.0	92	32	43	3	●	●
.682	20	20	19.0	104	38	53	3	●	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	550	0.040	4.5	1.4	58360	4670	29.5
4	2	550	0.055	6.0	1.8	43770	4815	52.0
5	2	550	0.070	7.5	2.3	35015	4900	84.5
6	2	550	0.090	9.0	2.7	29180	5250	127.5
8	2	550	0.120	12.0	3.6	21885	5250	227.0
10	2	550	0.150	15.0	4.5	17510	5255	354.5
12	2	550	0.165	18.0	5.4	14590	4815	468.0
16	2	550	0.185	24.0	7.2	10940	4050	700.0
20	2	550	0.215	30.0	9.0	8755	3765	1016.5

Unalloyed copper

3	2	400	0.030	4.5	1.4	42445	2545	15.5
4	2	400	0.045	6.0	1.8	31830	2865	31.0
5	2	400	0.055	7.5	2.3	25465	2800	47.5
6	2	400	0.070	9.0	2.7	21220	2970	72.0
8	2	400	0.095	12.0	3.6	15915	3025	130.5
10	2	400	0.120	15.0	4.5	12735	3055	206.0
12	2	400	0.130	18.0	5.4	10610	2760	268.5
16	2	400	0.150	24.0	7.2	7960	2390	413.0
20	2	400	0.170	30.0	9.0	6365	2165	584.5

Thermoplastics

3	2	1000	0.040	4.5	1.4	60000	4800	29.0
4	2	1000	0.055	6.0	1.8	60000	6600	71.5
5	2	1000	0.070	7.5	2.3	60000	8400	142.0
6	2	1000	0.090	9.0	2.7	53055	9550	232.0
8	2	1000	0.120	12.0	3.6	39790	9550	412.5
10	2	1000	0.150	15.0	4.5	31830	9550	644.5
12	2	1000	0.165	18.0	5.4	26525	8755	851.0
16	2	1000	0.185	24.0	7.2	19895	7360	1272.0
20	2	1000	0.215	30.0	9.0	15915	6845	1848.0

Cast aluminium Si 6%-15%

3	2	350	0.030	4.5	1.4	37135	2230	13.5
4	2	350	0.040	6.0	1.8	27855	2230	24.0
5	2	350	0.050	7.5	2.3	22280	2230	37.5
6	2	350	0.065	9.0	2.7	18570	2415	58.5
8	2	350	0.085	12.0	3.6	13925	2365	102.0
10	2	350	0.105	15.0	4.5	11140	2340	158.0
12	2	350	0.115	18.0	5.4	9285	2135	207.5
16	2	350	0.130	24.0	7.2	6965	1810	313.0
20	2	350	0.150	30.0	9.0	5570	1670	451.0



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	450	0.030	1.5	3	47750	2865	13.0
4	2	450	0.040	2.0	4	35810	2865	23.0
5	2	450	0.050	2.5	5	28650	2865	36.0
6	2	450	0.065	3.0	6	23875	3105	56.0
8	2	450	0.085	4.0	8	17905	3045	97.5
10	2	450	0.105	5.0	10	14325	3010	150.5
12	2	450	0.115	6.0	12	11935	2745	197.5
16	2	450	0.130	8.0	16	8955	2330	298.0
20	2	450	0.150	10.0	20	7160	2150	430.0

Unalloyed copper

3	2	350	0.025	1.5	3	37135	1855	8.5
4	2	350	0.030	2.0	4	27855	1670	13.5
5	2	350	0.040	2.5	5	22280	1780	22.5
6	2	350	0.050	3.0	6	18570	1855	33.5
8	2	350	0.070	4.0	8	13925	1950	62.5
10	2	350	0.085	5.0	10	11140	1895	95.0
12	2	350	0.090	6.0	12	9285	1670	120.0
16	2	350	0.105	8.0	16	6965	1465	187.5
20	2	350	0.120	10.0	20	5570	1335	267.0

Thermoplastics

3	2	800	0.030	1.5	3	60000	3600	16.0
4	2	800	0.040	2.0	4	60000	4800	38.5
5	2	800	0.050	2.5	5	50930	5095	63.5
6	2	800	0.065	3.0	6	42445	5520	99.5
8	2	800	0.085	4.0	8	31830	5410	173.0
10	2	800	0.105	5.0	10	25465	5350	267.5
12	2	800	0.115	6.0	12	21220	4880	351.5
16	2	800	0.130	8.0	16	15915	4140	530.0
20	2	800	0.150	10.0	20	12735	3820	764.0

Cast aluminium Si 6%-15%

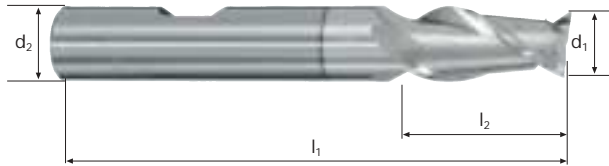
3	2	300	0.020	1.5	3	31830	1275	5.5
4	2	300	0.030	2.0	4	23875	1435	11.5
5	2	300	0.035	2.5	5	19100	1335	16.5
6	2	300	0.045	3.0	6	15915	1430	25.5
8	2	300	0.060	4.0	8	11935	1430	46.0
10	2	300	0.075	5.0	10	9550	1435	72.0
12	2	300	0.080	6.0	12	7960	1275	92.0
16	2	300	0.090	8.0	16	5970	1075	137.5
20	2	300	0.105	10.0	20	4775	1005	201.0

# Cylindrical end mills Alucut

Smooth-edged, normal version



**HM**  
**MG10**    λ 40°  
                  γ 18°



Roughing



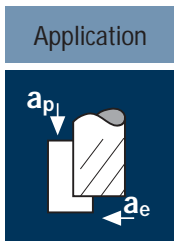
Finishing



<b>Rm</b> < 850		<b>Al</b> Aluminium > 99%	<b>Al</b> Aluminium Alloy	<b>Al</b> Aluminium Cast		<b>Cu</b> Copper	<b>Plastic</b> Thermoplast
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III

Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z	Example: Order-N°.	
								Coating <b>C</b>	Article-N° <b>5500</b>
								<b>5500</b>	<b>CELERO</b> <b>C5500</b>
								<b>5272</b>	<b>C5272</b>
<b>.140</b>	2	6	54	6	0.10	7.0°	2	●	●
<b>.180</b>	3	6	57	7	0.10	5.5°	2	●	●
<b>.220</b>	4	6	57	8	0.10	4.0°	2	●	●
<b>.260</b>	5	6	57	10	0.15	2.0°	2	●	●
<b>.300</b>	6	6	57	10	0.15	0.0°	2	●	●
<b>.391</b>	8	8	63	16	0.15	0.0°	2	●	●
<b>.450</b>	10	10	72	19	0.20	0.0°	2	●	●
<b>.501</b>	12	12	83	22	0.20	0.0°	2	●	●
<b>.610</b>	16	16	92	26	0.20	0.0°	2	●	●
<b>.682</b>	20	20	104	32	0.20	0.0°	2	●	●



Material

Unalloyed aluminium

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	280	0.030	4.5	0.8	29710	1785	6.0
4	2	280	0.040	6.0	1.0	22280	1780	10.5
5	2	280	0.050	7.5	1.3	17825	1785	16.5
6	2	280	0.060	9.0	1.5	14855	1785	24.0
8	2	280	0.080	12.0	2.0	11140	1780	42.5
10	2	280	0.100	15.0	2.5	8915	1785	67.0
12	2	280	0.120	18.0	3.0	7425	1780	96.0
16	2	280	0.160	24.0	4.0	5570	1780	171.0
20	2	280	0.200	30.0	5.0	4455	1780	267.0

Wrought aluminium alloys Si < 6%

3	2	450	0.025	4.5	0.8	47750	2390	8.0
4	2	450	0.035	6.0	1.0	35810	2505	15.0
5	2	450	0.040	7.5	1.3	28650	2290	21.5
6	2	450	0.050	9.0	1.5	23875	2390	32.5
8	2	450	0.065	12.0	2.0	17905	2330	56.0
10	2	450	0.085	15.0	2.5	14325	2435	91.5
12	2	450	0.100	18.0	3.0	11935	2385	129.0
16	2	450	0.135	24.0	4.0	8955	2420	232.5
20	2	450	0.165	30.0	5.0	7160	2365	355.0

Unalloyed copper

3	2	350	0.020	4.5	0.8	37135	1485	5.0
4	2	350	0.030	6.0	1.0	27855	1670	10.0
5	2	350	0.035	7.5	1.3	22280	1560	14.5
6	2	350	0.045	9.0	1.5	18570	1670	22.5
8	2	350	0.055	12.0	2.0	13925	1530	36.5
10	2	350	0.070	15.0	2.5	11140	1560	58.5
12	2	350	0.085	18.0	3.0	9285	1580	85.5
16	2	350	0.115	24.0	4.0	6965	1600	153.5
20	2	350	0.145	30.0	5.0	5570	1615	242.5

Thermoplastics

3	2	1000	0.025	4.5	0.8	60000	3000	10.0
4	2	1000	0.035	6.0	1.0	60000	4200	25.0
5	2	1000	0.040	7.5	1.3	60000	4800	45.0
6	2	1000	0.050	9.0	1.5	53055	5305	71.5
8	2	1000	0.065	12.0	2.0	39790	5175	124.0
10	2	1000	0.085	15.0	2.5	31830	5410	203.0
12	2	1000	0.100	18.0	3.0	26525	5305	286.5
16	2	1000	0.135	24.0	4.0	19895	5370	515.5
20	2	1000	0.165	30.0	5.0	15915	5250	787.5



Material

Unalloyed aluminium

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	250	0.020	1.5	3	26525	1060	5.0
4	2	250	0.030	2.0	4	19895	1195	9.5
5	2	250	0.035	2.5	5	15915	1115	14.0
6	2	250	0.045	3.0	6	13265	1195	21.5
8	2	250	0.055	4.0	8	9945	1095	35.0
10	2	250	0.070	5.0	10	7960	1115	56.0
12	2	250	0.085	6.0	12	6630	1125	81.0
16	2	250	0.115	8.0	16	4975	1145	146.5
20	2	250	0.145	10.0	20	3980	1155	231.0

Wrought aluminium alloys Si < 6%

3	2	380	0.020	1.5	3	40320	1615	7.5
4	2	380	0.025	2.0	4	30240	1510	12.0
5	2	380	0.030	2.5	5	24190	1450	18.0
6	2	380	0.040	3.0	6	20160	1615	29.0
8	2	380	0.050	4.0	8	15120	1510	48.5
10	2	380	0.065	5.0	10	12095	1570	78.5
12	2	380	0.075	6.0	12	10080	1510	108.5
16	2	380	0.100	8.0	16	7560	1510	193.5
20	2	380	0.125	10.0	20	6050	1515	303.0

Unalloyed copper

3	2	300	0.015	1.5	3	31830	955	4.5
4	2	300	0.020	2.0	4	23875	955	7.5
5	2	300	0.030	2.5	5	19100	1145	14.5
6	2	300	0.035	3.0	6	15915	1115	20.0
8	2	300	0.045	4.0	8	11935	1075	34.5
10	2	300	0.055	5.0	10	9550	1050	52.5
12	2	300	0.065	6.0	12	7960	1035	74.5
16	2	300	0.090	8.0	16	5970	1075	137.5
20	2	300	0.110	10.0	20	4775	1050	210.0

Thermoplastics

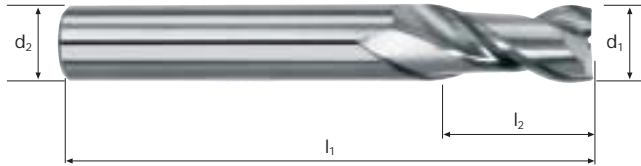
3	2	800	0.020	1.5	3	60000	2400	11.0
4	2	800	0.030	2.0	4	60000	3600	29.0
5	2	800	0.035	2.5	5	50930	3565	44.5
6	2	800	0.045	3.0	6	42445	3820	69.0
8	2	800	0.055	4.0	8	31830	3500	112.0
10	2	800	0.070	5.0	10	25465	3565	178.5
12	2	800	0.085	6.0	12	21220	3605	259.5
16	2	800	0.115	8.0	16	15915	3660	468.5
20	2	800	0.145	10.0	20	12735	3695	739.0

# Cylindrical end mills

Smooth-edged, normal version



**HM**  
**MG10**      $\lambda$  40°  
                       $\gamma$  25°



Roughing



Finishing



**Al**  
Aluminium  
> 99%

**Al**  
Aluminium  
Alloy

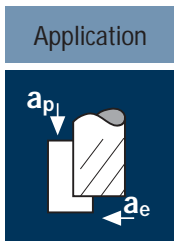
**Al**  
Aluminium  
Cast

**Cu**  
Copper

**Plastic**  
Thermoplast

III

Example: Order-N°.		Coating <b>C</b>	Article-N°. <b>5273</b>	α-Code <b>.180</b>				5273	CELERO C5273
Ø Code	d1 e8	d2 h6	l1	l2	45°	α	z		
.180	3	6	57	7	0.10	6.0°	2	●	●
.220	4	6	57	8	0.10	4.0°	2	●	●
.260	5	6	57	10	0.15	2.0°	2	●	●
.300	6	6	57	10	0.15	0.0°	2	●	●
.391	8	8	63	16	0.15	0.0°	2	●	●
.450	10	10	72	19	0.20	0.0°	2	●	●
.501	12	12	83	22	0.20	0.0°	2	●	●
.610	16	16	92	26	0.20	0.0°	2	●	●
.682	20	20	104	32	0.20	0.0°	2	●	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	550	0.050	4.5	1.2	58360	5835	31.5
4	2	550	0.065	6.0	1.6	43770	5690	54.5
5	2	550	0.080	7.5	2.0	35015	5600	84.0
6	2	550	0.110	9.0	2.4	29180	6420	138.5
8	2	550	0.145	12.0	3.2	21885	6345	243.5
10	2	550	0.180	15.0	4.0	17510	6305	378.5
12	2	550	0.195	18.0	4.8	14590	5690	491.5
16	2	550	0.220	24.0	6.4	10940	4815	739.5
20	2	550	0.255	30.0	8.0	8755	4465	1071.5

Unalloyed copper

3	2	400	0.040	4.5	1.2	42445	3395	18.5
4	2	400	0.050	6.0	1.6	31830	3185	30.5
5	2	400	0.065	7.5	2.0	25465	3310	49.5
6	2	400	0.090	9.0	2.4	21220	3820	82.5
8	2	400	0.115	12.0	3.2	15915	3660	140.5
10	2	400	0.145	15.0	4.0	12735	3695	221.5
12	2	400	0.155	18.0	4.8	10610	3290	284.5
16	2	400	0.175	24.0	6.4	7960	2785	428.0
20	2	400	0.205	30.0	8.0	6365	2610	626.5

Thermoplastics

3	2	1000	0.050	4.5	1.2	60000	6000	32.5
4	2	1000	0.065	6.0	1.6	60000	7800	75.0
5	2	1000	0.080	7.5	2.0	60000	9600	144.0
6	2	1000	0.110	9.0	2.4	53055	11670	252.0
8	2	1000	0.145	12.0	3.2	39790	11540	443.0
10	2	1000	0.180	15.0	4.0	31830	11460	687.5
12	2	1000	0.195	18.0	4.8	26525	10345	894.0
16	2	1000	0.220	24.0	6.4	19895	8755	1345.0
20	2	1000	0.255	30.0	8.0	15915	8115	1947.5

Cast aluminium Si 6%-15%

3	2	350	0.035	4.5	1.2	37135	2600	14.0
4	2	350	0.045	6.0	1.6	27855	2505	24.0
5	2	350	0.055	7.5	2.0	22280	2450	37.0
6	2	350	0.075	9.0	2.4	18570	2785	60.0
8	2	350	0.100	12.0	3.2	13925	2785	107.0
10	2	350	0.125	15.0	4.0	11140	2785	167.0
12	2	350	0.135	18.0	4.8	9285	2505	216.5
16	2	350	0.155	24.0	6.4	6965	2160	332.0
20	2	350	0.180	30.0	8.0	5570	2005	481.0



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	450	0.035	2.1	3	47750	3345	21.0
4	2	450	0.045	2.8	4	35810	3225	36.0
5	2	450	0.055	3.5	5	28650	3150	55.0
6	2	450	0.075	4.2	6	23875	3580	90.0
8	2	450	0.100	5.6	8	17905	3580	160.5
10	2	450	0.125	7.0	10	14325	3580	250.5
12	2	450	0.135	8.4	12	11935	3220	324.5
16	2	450	0.155	11.2	16	8955	2775	497.5
20	2	450	0.180	14.0	20	7160	2580	722.5

Unalloyed copper

3	2	350	0.030	2.1	3	37135	2230	14.0
4	2	350	0.035	2.8	4	27855	1950	22.0
5	2	350	0.045	3.5	5	22280	2005	35.0
6	2	350	0.060	4.2	6	18570	2230	56.0
8	2	350	0.080	5.6	8	13925	2230	100.0
10	2	350	0.100	7.0	10	11140	2230	156.0
12	2	350	0.110	8.4	12	9285	2045	206.0
16	2	350	0.125	11.2	16	6965	1740	312.0
20	2	350	0.145	14.0	20	5570	1615	452.0

Thermoplastics

3	2	800	0.035	2.1	3	60000	4200	26.5
4	2	800	0.045	2.8	4	60000	5400	60.5
5	2	800	0.055	3.5	5	50930	5600	98.0
6	2	800	0.075	4.2	6	42445	6365	160.5
8	2	800	0.100	5.6	8	31830	6365	285.0
10	2	800	0.125	7.0	10	25465	6365	445.5
12	2	800	0.135	8.4	12	21220	5730	577.5
16	2	800	0.155	11.2	16	15915	4935	884.5
20	2	800	0.180	14.0	20	12735	4585	1284.0

Cast aluminium Si 6%-15%

3	2	300	0.025	2.1	3	31830	1590	10.0
4	2	300	0.030	2.8	4	23875	1435	16.0
5	2	300	0.040	3.5	5	19100	1530	27.0
6	2	300	0.055	4.2	6	15915	1750	44.0
8	2	300	0.070	5.6	8	11935	1670	75.0
10	2	300	0.090	7.0	10	9550	1720	120.5
12	2	300	0.095	8.4	12	7960	1510	152.0
16	2	300	0.110	11.2	16	5970	1315	235.5
20	2	300	0.125	14.0	20	4775	1195	334.5

# Cylindrical end mills AX-NV2

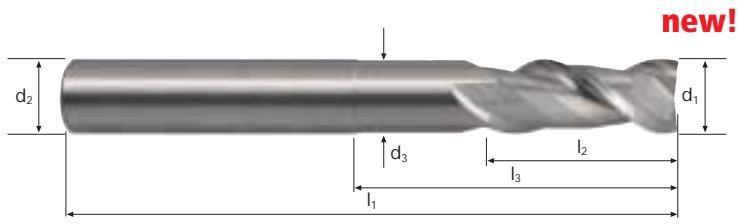
Smooth-edged, medium length version with neck



**HM MG10**  $\lambda$  40°  $\gamma$  20°

90°

Vario



Roughing

Finishing

Rm < 850

Al Aluminium > 99%

Al Aluminium Alloy

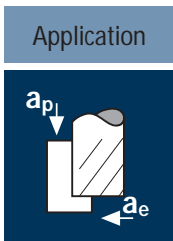
Al Aluminium Cast

Cu Copper

Plastic Thermoplast



Ø Code	d1 h6	d2 h6	d3	l1	l2	l3	α	z	Example: Order-N°. C 15650 .180	
									15650	C15650
.180	3	6	2.8	63	8	20	5.0°	2	●	●
.220	4	6	3.7	63	11	22	3.5°	2	●	●
.260	5	6	4.6	63	13	24	1.5°	2	●	●
.300	6	6	5.5	63	13	26	0.0°	2	●	●
.391	8	8	7.4	72	19	35	0.0°	2	●	●
.450	10	10	9.2	84	22	43	0.0°	2	●	●
.501	12	12	11.0	97	26	51	0.0°	2	●	●
.610	16	16	15.0	108	32	59	0.0°	2	●	●
.682	20	20	19.0	122	38	71	0.0°	2	●	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	550	0.045	3.6	1.2	58360	7880	34.0
4	3	550	0.060	4.8	1.6	43770	7880	60.5
5	3	550	0.075	6.0	2.0	35015	7880	94.5
6	3	550	0.100	7.2	2.4	29180	8755	151.5
8	3	550	0.120	9.6	3.2	21885	7880	242.0
10	3	550	0.150	12.0	4.0	17510	7880	378.0
12	3	550	0.180	14.4	4.8	14590	7880	544.5
16	3	550	0.190	19.2	6.4	10940	6235	766.0
20	3	550	0.225	24.0	8.0	8755	5910	1134.5

Unalloyed copper

3	3	400	0.035	3.6	1.2	42445	4455	19.0
4	3	400	0.050	4.8	1.6	31830	4775	36.5
5	3	400	0.060	6.0	2.0	25465	4585	55.0
6	3	400	0.080	7.2	2.4	21220	5095	88.0
8	3	400	0.095	9.6	3.2	15915	4535	139.5
10	3	400	0.120	12.0	4.0	12735	4585	220.0
12	3	400	0.145	14.4	4.8	10610	4615	319.0
16	3	400	0.150	19.2	6.4	7960	3580	440.0
20	3	400	0.180	24.0	8.0	6365	3435	659.5

Thermoplastics

3	3	1000	0.045	3.6	1.2	60000	8100	35.0
4	3	1000	0.060	4.8	1.6	60000	10800	83.0
5	3	1000	0.075	6.0	2.0	60000	13500	162.0
6	3	1000	0.100	7.2	2.4	53055	15915	275.0
8	3	1000	0.120	9.6	3.2	39790	14325	440.0
10	3	1000	0.150	12.0	4.0	31830	14325	687.5
12	3	1000	0.180	14.4	4.8	26525	14325	990.0
16	3	1000	0.190	19.2	6.4	19895	11340	1393.5
20	3	1000	0.225	24.0	8.0	15915	10745	2063.0

Cast aluminium Si 6%-15%

3	3	350	0.030	3.6	1.2	37135	3340	14.5
4	3	350	0.040	4.8	1.6	27855	3345	25.5
5	3	350	0.055	6.0	2.0	22280	3675	44.0
6	3	350	0.070	7.2	2.4	18570	3900	67.5
8	3	350	0.085	9.6	3.2	13925	3550	109.0
10	3	350	0.105	12.0	4.0	11140	3510	168.5
12	3	350	0.125	14.4	4.8	9285	3480	240.5
16	3	350	0.135	19.2	6.4	6965	2820	346.5
20	3	350	0.160	24.0	8.0	5570	2675	513.5



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	3	450	0.030	1.2	3	47750	4300	15.5
4	3	450	0.040	1.6	4	35810	4295	27.5
5	3	450	0.055	2.0	5	28650	4725	47.5
6	3	450	0.070	2.4	6	23875	5015	72.0
8	3	450	0.085	3.2	8	17905	4565	117.0
10	3	450	0.105	4.0	10	14325	4510	180.5
12	3	450	0.125	4.8	12	11935	4475	258.0
16	3	450	0.135	6.4	16	8955	3625	371.0
20	3	450	0.160	8.0	20	7160	3435	549.5

Unalloyed copper

3	3	350	0.025	1.2	3	37135	2785	10.0
4	3	350	0.030	1.6	4	27855	2505	16.0
5	3	350	0.045	2.0	5	22280	3010	30.0
6	3	350	0.055	2.4	6	18570	3065	44.0
8	3	350	0.070	3.2	8	13925	2925	75.0
10	3	350	0.085	4.0	10	11140	2840	113.5
12	3	350	0.100	4.8	12	9285	2785	160.5
16	3	350	0.110	6.4	16	6965	2300	235.5
20	3	350	0.130	8.0	20	5570	2170	347.0

Thermoplastics

3	3	800	0.030	1.2	3	60000	5400	19.5
4	3	800	0.040	1.6	4	60000	7200	46.0
5	3	800	0.055	2.0	5	50930	8405	84.0
6	3	800	0.070	2.4	6	42445	8915	128.5
8	3	800	0.085	3.2	8	31830	8115	207.5
10	3	800	0.105	4.0	10	25465	8020	321.0
12	3	800	0.125	4.8	12	21220	7960	458.5
16	3	800	0.135	6.4	16	15915	6445	660.0
20	3	800	0.160	8.0	20	12735	6115	978.5

Cast aluminium Si 6%-15%

3	3	300	0.020	1.2	3	31830	1910	7.0
4	3	300	0.030	1.6	4	23875	2150	14.0
5	3	300	0.040	2.0	5	19100	2290	23.0
6	3	300	0.050	2.4	6	15915	2385	34.5
8	3	300	0.060	3.2	8	11935	2150	55.0
10	3	300	0.075	4.0	10	9550	2150	86.0
12	3	300	0.090	4.8	12	7960	2150	124.0
16	3	300	0.095	6.4	16	5970	1700	174.0
20	3	300	0.110	8.0	20	4775	1575	252.0

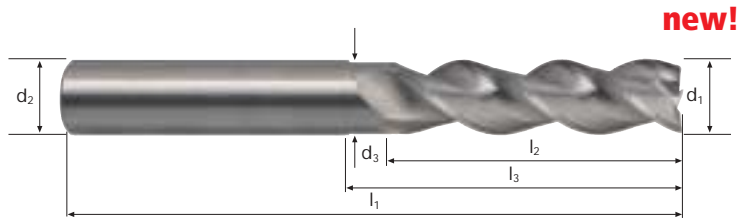
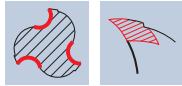


# Cylindrical end mills AX-NV3

Smooth-edged, medium length version with short neck



HM  
MG10    λ 40°  
                  γ 20°



Roughing



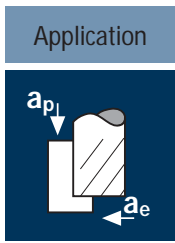
Finishing



Rm < 850		Al Aluminium > 99%	Al Aluminium Alloy	Al Aluminium Cast		Cu Copper	Plastic Thermoplast
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III

Ø Code	d1 h6	d2 h6	d3	l1	l2	l3	α	Z	CELERO	
									15660	C15660
									15660	C15660
									15560	C15560
.180	3	6	2.8	63	14	20	5.0°	3	●	●
.220	4	6	3.7	63	17	22	3.5°	3	●	●
.260	5	6	4.6	63	19	24	1.5°	3	●	●
.300	6	6	5.5	63	19	26	0.0°	3	●	●
.391	8	8	7.4	72	28	35	0.0°	3	●	●
.450	10	10	9.2	84	34	43	0.0°	3	●	●
.501	12	12	11.0	97	40	51	0.0°	3	●	●
.610	16	16	15.0	108	48	59	0.0°	3	●	●
.682	20	20	19.0	122	56	71	0.0°	3	●	●



Material

Unalloyed aluminium

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	280	0.030	4.5	0.5	29710	1785	3.5
4	2	280	0.040	6.0	0.6	22280	1780	6.5
5	2	280	0.050	7.5	0.8	17825	1785	10.0
6	2	280	0.060	9.0	0.9	14855	1785	14.5
8	2	280	0.080	12.0	1.2	11140	1780	25.5
10	2	280	0.100	15.0	1.5	8915	1785	40.0
12	2	280	0.120	18.0	1.8	7425	1780	57.5
16	2	280	0.160	24.0	2.4	5570	1780	102.5

Wrought aluminium alloys Si < 6%

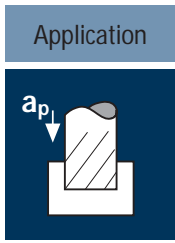
3	2	450	0.025	4.5	0.5	47750	2390	5.0
4	2	450	0.035	6.0	0.6	35810	2505	9.0
5	2	450	0.040	7.5	0.8	28650	2290	13.0
6	2	450	0.050	9.0	0.9	23875	2390	19.5
8	2	450	0.065	12.0	1.2	17905	2330	33.5
10	2	450	0.085	15.0	1.5	14325	2435	55.0
12	2	450	0.100	18.0	1.8	11935	2385	77.5
16	2	450	0.135	24.0	2.4	8955	2420	139.5

Unalloyed copper

3	2	350	0.020	4.5	0.5	37135	1485	3.0
4	2	350	0.030	6.0	0.6	27855	1670	6.0
5	2	350	0.035	7.5	0.8	22280	1560	9.0
6	2	350	0.045	9.0	0.9	18570	1670	13.5
8	2	350	0.055	12.0	1.2	13925	1530	22.0
10	2	350	0.070	15.0	1.5	11140	1560	35.0
12	2	350	0.085	18.0	1.8	9285	1580	51.0
16	2	350	0.115	24.0	2.4	6965	1600	92.0

Thermoplastics

3	2	1000	0.025	4.5	0.5	60000	3000	6.0
4	2	1000	0.035	6.0	0.6	60000	4200	15.0
5	2	1000	0.040	7.5	0.8	60000	4800	27.0
6	2	1000	0.050	9.0	0.9	53055	5305	43.0
8	2	1000	0.065	12.0	1.2	39790	5175	74.5
10	2	1000	0.085	15.0	1.5	31830	5410	121.5
12	2	1000	0.100	18.0	1.8	26525	5305	172.0
16	2	1000	0.135	24.0	2.4	19895	5370	309.5



Material

Unalloyed aluminium

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	250	0.020	1.5	3	26525	1060	5.0
4	2	250	0.030	2.0	4	19895	1195	9.5
5	2	250	0.035	2.5	5	15915	1115	14.0
6	2	250	0.045	3.0	6	13265	1195	21.5
8	2	250	0.055	4.0	8	9945	1095	35.0
10	2	250	0.070	5.0	10	7960	1115	56.0
12	2	250	0.085	6.0	12	6630	1125	81.0
16	2	250	0.115	8.0	16	4975	1145	146.5

Wrought aluminium alloys Si < 6%

3	2	380	0.015	1.5	3	40320	1210	5.5
4	2	380	0.025	2.0	4	30240	1510	12.0
5	2	380	0.030	2.5	5	24190	1450	18.0
6	2	380	0.035	3.0	6	20160	1410	25.5
8	2	380	0.045	4.0	8	15120	1360	43.5
10	2	380	0.055	5.0	10	12095	1330	66.5
12	2	380	0.070	6.0	12	10080	1410	101.5
16	2	380	0.090	8.0	16	7560	1360	174.0

Unalloyed copper

3	2	300	0.015	1.5	3	31830	955	4.5
4	2	300	0.020	2.0	4	23875	955	7.5
5	2	300	0.025	2.5	5	19100	955	12.0
6	2	300	0.030	3.0	6	15915	955	17.0
8	2	300	0.040	4.0	8	11935	955	30.5
10	2	300	0.050	5.0	10	9550	955	48.0
12	2	300	0.060	6.0	12	7960	955	69.0
16	2	300	0.080	8.0	16	5970	955	122.0

Thermoplastics

3	2	800	0.015	1.5	3	60000	1800	8.0
4	2	800	0.025	2.0	4	60000	3000	24.0
5	2	800	0.030	2.5	5	50930	3055	38.0
6	2	800	0.035	3.0	6	42445	2970	53.5
8	2	800	0.045	4.0	8	31830	2865	91.5
10	2	800	0.055	5.0	10	25465	2800	140.0
12	2	800	0.070	6.0	12	21220	2970	214.0
16	2	800	0.090	8.0	16	15915	2865	366.5

# Cylindrical end mills

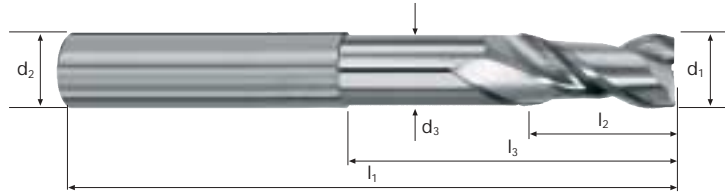
Smooth-edged, medium length version with neck



**HM**  
**MG10**

$\lambda$  **40°**  
 $\gamma$  **25°**

45°



Roughing



Finishing

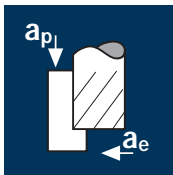


Al Aluminium > 99%    Al Aluminium Alloy    Al Aluminium Cast    Cu Copper    Plastic Thermoplast

III

Example: Order-N°.										CELERO	
										5278	C5278
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z		
.180	3	6	2.8	63	7	11	0.10	5.0°	2	●	●
.220	4	6	3.7	63	8	13	0.10	3.5°	2	●	●
.260	5	6	4.6	63	10	16	0.15	1.5°	2	●	●
.300	6	6	5.5	63	13	26	0.15	0.0°	2	●	●
.391	8	8	7.4	72	16	35	0.15	0.0°	2	●	●
.450	10	10	9.2	84	19	43	0.20	0.0°	2	●	●
.501	12	12	11.0	97	22	51	0.20	0.0°	2	●	●
.610	16	16	15.0	108	26	59	0.20	0.0°	2	●	●

### Application



### Material

Wrought aluminium alloys Si < 6%

Unalloyed copper

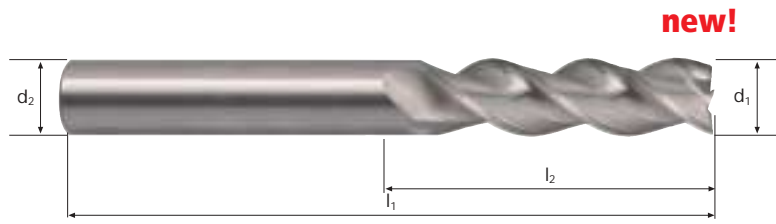
Thermoplastics

Cast aluminium Si 6%-15%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	350	0.065	18.0	0.9	18570	3620	58.5
8	3	350	0.080	24.0	1.2	13925	3340	96.0
10	3	350	0.100	30.0	1.5	11140	3340	150.5
12	3	350	0.120	36.0	1.8	9285	3345	217.0
16	3	350	0.130	48.0	2.4	6965	2715	313.0
20	3	350	0.150	60.0	3.0	5570	2505	451.0
6	3	220	0.050	18.0	0.9	11670	1750	28.5
8	3	220	0.065	24.0	1.2	8755	1705	49.0
10	3	220	0.080	30.0	1.5	7005	1680	75.5
12	3	220	0.095	36.0	1.8	5835	1665	108.0
16	3	220	0.105	48.0	2.4	4375	1380	159.0
20	3	220	0.120	60.0	3.0	3500	1260	227.0
6	3	600	0.065	18.0	0.9	31830	6205	100.5
8	3	600	0.080	24.0	1.2	23875	5730	165.0
10	3	600	0.100	30.0	1.5	19100	5730	258.0
12	3	600	0.120	36.0	1.8	15915	5730	371.5
16	3	600	0.130	48.0	2.4	11935	4655	536.5
20	3	600	0.150	60.0	3.0	9550	4300	774.0
6	3	200	0.045	18.0	0.9	10610	1430	23.0
8	3	200	0.055	24.0	1.2	7960	1315	38.0
10	3	200	0.070	30.0	1.5	6365	1335	60.0
12	3	200	0.085	36.0	1.8	5305	1355	88.0
16	3	200	0.090	48.0	2.4	3980	1075	124.0
20	3	200	0.105	60.0	3.0	3185	1005	181.0

# Cylindrical end mills AX-V3

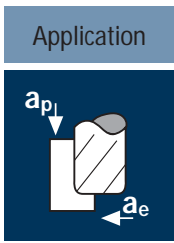
Smooth-edged, long version



Rm < 850	Al Aluminium > 99%	Al Aluminium Alloy	Al Aluminium Cast	Cu Copper	Plastic Thermoplast
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∅ Code	d1 h6	d2 h6	l1	l2	Z	Example: Order-N°.	
						15661	C15661
Coating: C    Article-N°: 15661    α-Code: .300							
.300	6	6	70	26	3	15661	C15661
.391	8	8	80	36	3	15561	C15561
.450	10	10	95	45	3		
.501	12	12	110	53	3		
.610	16	16	123	63	3		
.682	20	20	141	75	3		



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	450	0.045	2.4	1.4	47750	4300	14.5
4	2	450	0.060	3.2	1.8	35810	4295	24.5
5	2	450	0.075	4.0	2.3	28650	4300	39.5
6	2	450	0.095	4.8	2.7	23875	4535	59.0
8	2	450	0.130	6.4	3.6	17905	4655	107.5
10	2	450	0.160	8.0	4.5	14325	4585	165.0
12	2	450	0.175	9.6	5.4	11935	4175	216.5
16	2	450	0.195	12.8	7.2	8955	3490	321.5
20	2	450	0.230	16.0	9.0	7160	3295	474.5

Material

Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	350	0.035	2.4	1.4	37135	2600	8.5
4	2	350	0.050	3.2	1.8	27855	2785	16.0
5	2	350	0.060	4.0	2.3	22280	2675	24.0
6	2	350	0.075	4.8	2.7	18570	2785	36.0
8	2	350	0.105	6.4	3.6	13925	2925	67.5
10	2	350	0.130	8.0	4.5	11140	2895	104.0
12	2	350	0.140	9.6	5.4	9285	2600	135.0
16	2	350	0.155	12.8	7.2	6965	2160	199.0
20	2	350	0.185	16.0	9.0	5570	2060	296.5

Material

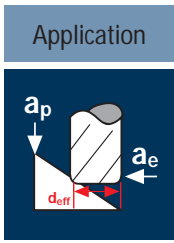
Thermoplastics

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	800	0.045	2.4	1.4	60000	5400	17.5
4	2	800	0.060	3.2	1.8	60000	7200	41.5
5	2	800	0.075	4.0	2.3	50930	7640	69.0
6	2	800	0.095	4.8	2.7	42445	8065	104.5
8	2	800	0.130	6.4	3.6	31830	8275	190.5
10	2	800	0.160	8.0	4.5	25465	8150	293.5
12	2	800	0.175	9.6	5.4	21220	7425	385.0
16	2	800	0.195	12.8	7.2	15915	6205	572.0
20	2	800	0.230	16.0	9.0	12735	5860	844.0

Material

Cast aluminium Si 6%-15%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
3	2	300	0.030	2.4	1.4	31830	1910	6.0
4	2	300	0.040	3.2	1.8	23875	1910	11.0
5	2	300	0.055	4.0	2.3	19100	2100	19.0
6	2	300	0.065	4.8	2.7	15915	2070	27.0
8	2	300	0.090	6.4	3.6	11935	2150	49.5
10	2	300	0.110	8.0	4.5	9550	2100	75.5
12	2	300	0.125	9.6	5.4	7960	1990	103.0
16	2	300	0.135	12.8	7.2	5970	1610	148.5
20	2	300	0.160	16.0	9.0	4775	1530	220.5



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	600	0.055	0.25	0.25	2.97	60000	6600	45
4	2	600	0.075	0.30	0.30	3.93	48600	7290	45
5	2	600	0.090	0.35	0.35	4.89	39060	7030	45
6	2	600	0.120	0.40	0.40	5.98	31940	7665	45
8	2	600	0.160	0.45	0.45	7.96	23995	7680	45
10	2	600	0.200	0.50	0.50	10.00	19100	7640	45
12	2	600	0.220	0.60	0.60	11.97	15955	7020	45
16	2	600	0.245	0.75	0.75	15.98	11950	5855	45
20	2	600	0.285	1.00	1.00	19.86	9615	5480	45

Material

Unalloyed copper

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	450	0.045	0.25	0.25	2.97	48230	4340	45
4	2	450	0.060	0.30	0.30	3.93	36450	4375	45
5	2	450	0.070	0.35	0.35	4.89	29295	4100	45
6	2	450	0.095	0.40	0.40	5.98	23955	4550	45
8	2	450	0.130	0.45	0.45	7.96	17995	4680	45
10	2	450	0.160	0.50	0.50	10.00	14325	4585	45
12	2	450	0.175	0.60	0.60	11.97	11965	4190	45
16	2	450	0.195	0.75	0.75	15.98	8965	3495	45
20	2	450	0.230	1.00	1.00	19.86	7215	3320	45

Material

Thermoplastics

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	1000	0.055	0.25	0.25	2.97	60000	6600	45
4	2	1000	0.075	0.30	0.30	3.93	60000	9000	45
5	2	1000	0.090	0.35	0.35	4.89	60000	10800	45
6	2	1000	0.120	0.40	0.40	5.98	53230	12775	45
8	2	1000	0.160	0.45	0.45	7.96	39990	12795	45
10	2	1000	0.200	0.50	0.50	10.00	31830	12730	45
12	2	1000	0.220	0.60	0.60	11.97	26595	11700	45
16	2	1000	0.245	0.75	0.75	15.98	19920	9760	45
20	2	1000	0.285	1.00	1.00	19.86	16030	9135	45

Material

Cast aluminium Si 6%-15%

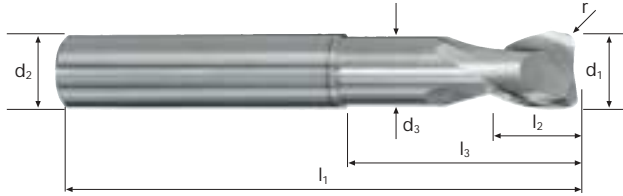
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
3	2	400	0.040	0.25	0.25	2.97	42870	3430	45
4	2	400	0.055	0.30	0.30	3.93	32400	3565	45
5	2	400	0.065	0.35	0.35	4.89	26040	3385	45
6	2	400	0.085	0.40	0.40	5.98	21290	3620	45
8	2	400	0.110	0.45	0.45	7.96	15995	3520	45
10	2	400	0.140	0.50	0.50	10.00	12735	3565	45
12	2	400	0.155	0.60	0.60	11.97	10635	3295	45
16	2	400	0.170	0.75	0.75	15.98	7970	2710	45
20	2	400	0.200	1.00	1.00	19.86	6410	2565	45

# Corner radius end mills AluSpeed

Smooth-edged, normal version



<b>HM</b>	$\lambda$ 30°
<b>MG10</b>	$\gamma$ 15°



Roughing



Finishing

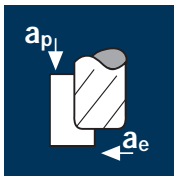


<b>Rm</b> < 850		<b>Al</b> Aluminium > 99%	<b>Al</b> Aluminium Alloy	<b>Al</b> Aluminium Cast		<b>Cu</b> Copper	<b>Plastic</b> Thermoplast	
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III


Example: Order-N°.										CELERO	
										5275	C5275
$\emptyset$ Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	$\alpha$	z		
.180	3	6	2.8	57	4	9	0.5	6.0°	2	●	●
.220	4	6	3.7	57	5	12	0.5	4.0°	2	●	●
.260	5	6	4.6	57	6	15	0.5	2.0°	2	●	●
.300	6	6	5.5	57	7	20	1.0	0.0°	2	●	●
.391	8	8	7.4	63	9	26	1.0	0.0°	2	●	●
.450	10	10	9.2	72	11	31	1.5	0.0°	2	●	●
.501	12	12	11.0	83	13	37	1.5	0.0°	2	●	●
.610	16	16	15.0	92	17	43	2.0	0.0°	2	●	●
.682	20	20	19.0	104	21	53	2.0	0.0°	2	●	●
.772	25	25	24.0	121	26	64	2.5	0.0°	2	●	●

### Application




### Material

Wrought aluminium alloys Si < 6%




d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	2	300	0.145	8.0	4.5	9550	2770	99.5
12	2	300	0.175	9.6	5.4	7960	2785	144.5
16	2	300	0.235	12.8	7.2	5970	2805	258.5
20	2	300	0.320	16.0	9.0	4775	3055	440.0
25	2	300	0.400	20.0	11.3	3820	3055	690.5

Unalloyed copper



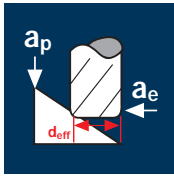
10	2	200	0.115	8.0	4.5	6365	1465	52.5
12	2	200	0.140	9.6	5.4	5305	1485	77.0
16	2	200	0.190	12.8	7.2	3980	1510	139.0
20	2	200	0.255	16.0	9.0	3185	1625	234.0
25	2	200	0.320	20.0	11.3	2545	1630	367.0

Thermoplastics




10	2	600	0.145	8.0	4.5	19100	5540	199.5
12	2	600	0.175	9.6	5.4	15915	5570	288.5
16	2	600	0.235	12.8	7.2	11935	5610	517.0
20	2	600	0.320	16.0	9.0	9550	6110	880.0
25	2	600	0.400	20.0	11.3	7640	6110	1375.0

### Application



### Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
10	2	350	0.180	0.50	0.50	10.00	11140	4010	45
12	2	350	0.220	0.60	0.60	11.97	9310	4095	45
16	2	350	0.290	0.75	0.75	15.98	6970	4045	45
20	2	350	0.400	1.00	1.00	19.95	5585	4470	45
25	2	350	0.500	1.80	1.80	24.84	4485	4485	45

Unalloyed copper



10	2	300	0.145	0.50	0.50	10.00	9550	2770	45
12	2	300	0.175	0.60	0.60	11.97	7980	2795	45
16	2	300	0.230	0.75	0.75	15.98	5975	2750	45
20	2	300	0.320	1.00	1.00	19.95	4785	3060	45
25	2	300	0.400	1.80	1.80	24.84	3845	3075	45

Thermoplastics



10	2	700	0.180	0.50	0.50	10.00	22280	8020	45
12	2	700	0.220	0.60	0.60	11.97	18615	8190	45
16	2	700	0.290	0.75	0.75	15.98	13945	8090	45
20	2	700	0.400	1.00	1.00	19.95	11170	8935	45
25	2	700	0.500	1.80	1.80	24.84	8970	8970	45



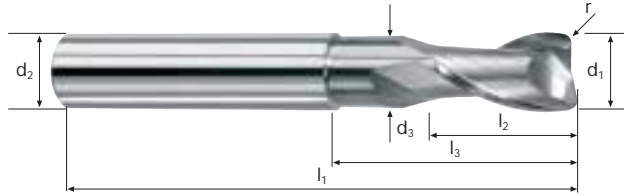
# Corner radius end mills AX-R

Smooth-edged, normal version



HM  
MG10

$\lambda$  30°  
 $\gamma$  15°



Roughing



Finishing



Al  
Aluminium  
> 99%

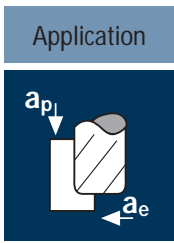
Al  
Aluminium  
Alloy

Cu  
Copper

Plastic  
Thermoplast

III

Example: Order-N°.		Coating		Article-N°.		α-Code			
				<b>5271</b>		<b>.450</b>			
								<b>5271</b>	
Ø Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	Z	
.450	10	10	9.2	72	16	31	1.5	2	●
.501	12	12	11.0	83	19	37	1.5	2	●
.610	16	16	15.0	92	25	43	2.0	2	●
.682	20	20	19.0	104	31	53	2.0	2	●
.503	12	12	11.0	83	19	37	2.5	2	●
.612	16	16	15.0	92	25	43	2.5	2	●
.684	20	20	19.0	104	31	53	2.5	2	●
.774	25	25	24.0	121	39	64	2.5	2	●
.614	16	16	15.0	92	25	43	4.0	2	●
.686	20	20	19.0	104	31	53	4.0	2	●
.776	25	25	24.0	121	39	64	4.0	2	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	450	0.085	5.4	2.1	23875	6090	69.0
8	3	450	0.110	7.2	2.8	17905	5910	119.0
10	3	450	0.140	9.0	3.5	14325	6015	189.5
12	3	450	0.155	10.8	4.2	11935	5550	251.5
16	3	450	0.170	14.4	5.6	8955	4565	368.0
20	3	450	0.185	18.0	7.0	7160	3975	501.0
25	3	450	0.205	22.5	8.8	5730	3525	698.0

Material

Unalloyed copper

6	3	350	0.070	5.4	2.1	18570	3900	44.0
8	3	350	0.090	7.2	2.8	13925	3760	76.0
10	3	350	0.110	9.0	3.5	11140	3675	116.0
12	3	350	0.125	10.8	4.2	9285	3480	158.0
16	3	350	0.135	14.4	5.6	6965	2820	227.5
20	3	350	0.150	18.0	7.0	5570	2505	315.5
25	3	350	0.165	22.5	8.8	4455	2205	434.0

Material

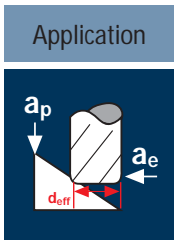
Thermoplastics

6	3	800	0.085	5.4	2.1	42445	10825	123.0
8	3	800	0.110	7.2	2.8	31830	10505	212.0
10	3	800	0.140	9.0	3.5	25465	10695	337.0
12	3	800	0.155	10.8	4.2	21220	9865	447.5
16	3	800	0.170	14.4	5.6	15915	8115	654.5
20	3	800	0.185	18.0	7.0	12735	7070	891.0
25	3	800	0.205	22.5	8.8	10185	6265	1233.5

Material

Cast aluminium Si 6%-15%

6	3	300	0.060	5.4	2.1	15915	2865	32.5
8	3	300	0.075	7.2	2.8	11935	2685	54.0
10	3	300	0.100	9.0	3.5	9550	2865	90.0
12	3	300	0.110	10.8	4.2	7960	2625	119.0
16	3	300	0.120	14.4	5.6	5970	2150	173.5
20	3	300	0.130	18.0	7.0	4775	1860	234.5
25	3	300	0.145	22.5	8.8	3820	1660	327.0



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	3	600	0.110	0.40	0.40	5.98	31940	10540	45
8	3	600	0.145	0.45	0.45	7.96	23995	10440	45
10	3	600	0.180	0.50	0.50	10.00	19100	10315	45
12	3	600	0.195	0.60	0.60	11.97	15955	9335	45
16	3	600	0.220	0.75	0.75	15.98	11950	7885	45
20	3	600	0.240	1.00	1.00	19.86	9615	6925	45
25	3	600	0.265	1.50	1.50	24.65	7750	6160	45

Material

Unalloyed copper

6	3	450	0.090	0.40	0.40	5.98	23955	6470	45
8	3	450	0.115	0.45	0.45	7.96	17995	6210	45
10	3	450	0.145	0.50	0.50	10.00	14325	6230	45
12	3	450	0.155	0.60	0.60	11.97	11965	5565	45
16	3	450	0.175	0.75	0.75	15.98	8965	4705	45
20	3	450	0.190	1.00	1.00	19.86	7215	4115	45
25	3	450	0.210	1.50	1.50	24.65	5810	3660	45

Material

Thermoplastics

6	3	1000	0.110	0.40	0.40	5.98	53230	17565	45
8	3	1000	0.145	0.45	0.45	7.96	39990	17395	45
10	3	1000	0.180	0.50	0.50	10.00	31830	17190	45
12	3	1000	0.195	0.60	0.60	11.97	26595	15560	45
16	3	1000	0.220	0.75	0.75	15.98	19920	13145	45
20	3	1000	0.240	1.00	1.00	19.86	16030	11540	45
25	3	1000	0.265	1.50	1.50	24.65	12915	10265	45

Material

Cast aluminium Si 6%-15%

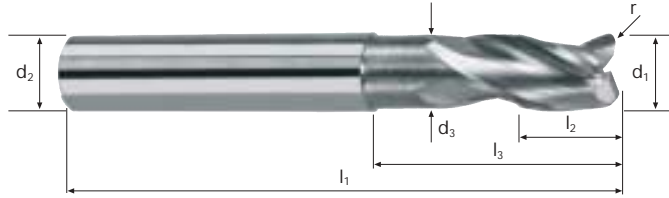
6	3	400	0.075	0.40	0.40	5.98	21290	4790	45
8	3	400	0.100	0.45	0.45	7.96	15995	4800	45
10	3	400	0.125	0.50	0.50	10.00	12735	4775	45
12	3	400	0.135	0.60	0.60	11.97	10635	4305	45
16	3	400	0.155	0.75	0.75	15.98	7970	3705	45
20	3	400	0.170	1.00	1.00	19.86	6410	3270	45
25	3	400	0.185	1.50	1.50	24.65	5165	2865	45

# Corner radius end mills AX-3R

Smooth-edged, normal version



<b>HM MG10</b>	$\lambda$ 30° $\gamma$ 15°



Roughing



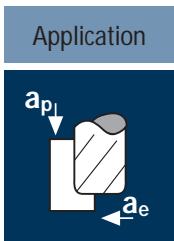
Finishing



<b>Rm</b> < 850			<b>Al</b> Aluminium > 99%	<b>Al</b> Aluminium Alloy	<b>Al</b> Aluminium Cast		<b>Cu</b> Copper	<b>Plastic</b> Thermoplast
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Example: Order-N°.									CELERO	
Coating		Article-N°.		α-Code					5276	C5276
<b>C</b>		<b>5276</b>		<b>.300</b>						
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	r 0/+0,03	Z		
.300	6	6	5.5	57	7	20	1.0	3	●	●
.391	8	8	7.4	63	9	26	1.0	3	●	●
.450	10	10	9.2	72	11	31	1.5	3	●	●
.501	12	12	11.0	83	13	37	1.5	3	●	●
.610	16	16	15.0	92	17	43	2.0	3	●	●
.682	20	20	19.0	104	21	53	2.0	3	●	●
.772	25	25	24.0	121	26	64	2.5	3	●	●



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	2	400	0.095	3.6	1.5	21220	4030	114.5
8	2	400	0.130	4.8	2.0	15915	4140	153.0
10	2	400	0.160	6.0	2.5	12730	4075	191.0
12	2	400	0.175	7.2	3.0	10610	3715	229.0
16	2	400	0.195	9.6	4.0	7960	3105	305.5
20	2	400	0.230	12.0	5.0	6365	2930	382.0

Material

Unalloyed copper

6	2	300	0.075	3.6	1.5	15915	2385	86.0
8	2	300	0.105	4.8	2.0	11935	2505	114.5
10	2	300	0.130	6.0	2.5	9550	2485	143.5
12	2	300	0.140	7.2	3.0	7960	2230	172.0
16	2	300	0.155	9.6	4.0	5970	1850	229.0
20	2	300	0.185	12.0	5.0	4775	1765	286.5

Material

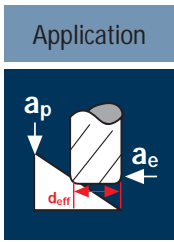
Thermoplastics

6	2	700	0.095	3.6	1.5	37135	7055	200.5
8	2	700	0.130	4.8	2.0	27850	7240	267.5
10	2	700	0.160	6.0	2.5	22280	7130	334.0
12	2	700	0.175	7.2	3.0	18570	6500	401.0
16	2	700	0.195	9.6	4.0	13925	5430	534.5
20	2	700	0.230	12.0	5.0	11140	5125	668.5

Material

Cast aluminium Si 6%-15%

6	2	250	0.065	3.6	1.5	13265	1725	71.5
8	2	250	0.090	4.8	2.0	9945	1790	95.5
10	2	250	0.110	6.0	2.5	7960	1750	119.5
12	2	250	0.125	7.2	3.0	6630	1660	143.0
16	2	250	0.135	9.6	4.0	4975	1345	191.0
20	2	250	0.160	12.0	5.0	3980	1275	239.0



Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	β
6	2	500	0.110	0.35	0.35	5.99	26570	5845	45
8	2	500	0.145	0.40	0.40	7.98	19945	5785	45
10	2	500	0.180	0.45	0.45	10.00	15915	5730	45
12	2	500	0.240	0.50	0.50	12.00	13265	6365	45
16	2	500	0.320	0.60	0.60	16.00	9945	6365	45
20	2	500	0.400	0.75	0.75	19.98	7965	6370	45

Material

Unalloyed copper

6	2	400	0.090	0.35	0.35	5.99	21255	3825	45
8	2	400	0.115	0.40	0.40	7.98	15955	3670	45
10	2	400	0.145	0.45	0.45	10.00	12735	3695	45
12	2	400	0.190	0.50	0.50	12.00	10610	4030	45
16	2	400	0.255	0.60	0.60	16.00	7960	4060	45
20	2	400	0.320	0.75	0.75	19.98	6375	4080	45

Material

Thermoplastics

6	2	800	0.110	0.35	0.35	5.99	42515	9355	45
8	2	800	0.145	0.40	0.40	7.98	31910	9255	45
10	2	800	0.180	0.45	0.45	10.00	25465	9165	45
12	2	800	0.240	0.50	0.50	12.00	21220	10185	45
16	2	800	0.320	0.60	0.60	16.00	15915	10185	45
20	2	800	0.400	0.75	0.75	19.98	12745	10195	45

Material

Cast aluminium Si 6%-15%

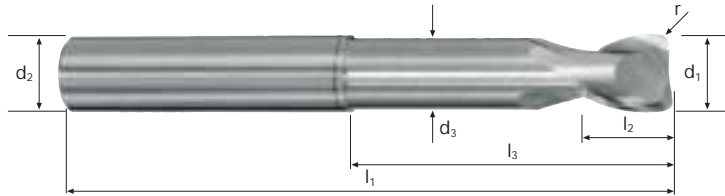
6	2	300	0.075	0.35	0.35	5.99	15945	2390	45
8	2	300	0.100	0.40	0.40	7.98	11965	2395	45
10	2	300	0.125	0.45	0.45	10.00	9550	2390	45
12	2	300	0.170	0.50	0.50	12.00	7960	2705	45
16	2	300	0.225	0.60	0.60	16.00	5970	2685	45
20	2	300	0.280	0.75	0.75	19.98	4780	2675	45

# Corner radius end mills AluSpeed

Smooth-edged, medium length version



**HM**  
**MG10**     $\lambda$  30°  
                   $\gamma$  15°



Roughing



Finishing

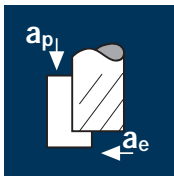


**Rm** < 850    **Al** Aluminium > 99%    **Al** Aluminium Alloy    **Al** Aluminium Cast    **Cu** Copper    **Plastic** Thermoplast

III

Example: Order-N°.		Coating <b>C</b>	Article-N°. <b>5277</b>	$\alpha$ -Code <b>.300</b>					<b>5277</b>	<b>C5277</b>	<b>CELERO</b>
$\emptyset$ Code	$d_1$ e8	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ 0/+0,03	$Z$			
<b>.300</b>	6	6	5.5	70	7	33	1.0	2	●	●	
<b>.391</b>	8	8	7.4	80	9	43	1.0	2	●	●	
<b>.450</b>	10	10	9.2	84	11	43	1.5	2	●	●	
<b>.501</b>	12	12	11.0	97	13	51	1.5	2	●	●	
<b>.610</b>	16	16	15.0	115	17	66	2.0	2	●	●	
<b>.682</b>	20	20	19.0	130	21	79	2.0	2	●	●	

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	600	0.065	9	3.6	31830	6205	201.0
8	3	600	0.090	12	4.8	23875	6445	371.0
10	3	600	0.110	15	6.0	19100	6305	567.5
12	3	600	0.135	18	7.2	15915	6445	835.5
16	3	600	0.180	24	9.6	11935	6445	1485.0
20	3	600	0.220	30	12.0	9550	6305	2270.0

Unalloyed copper



6	3	400	0.065	9	3.6	21220	4140	134.0
8	3	400	0.090	12	4.8	15915	4295	247.5
10	3	400	0.110	15	6.0	12735	4205	378.5
12	3	400	0.135	18	7.2	10610	4295	556.5
16	3	400	0.180	24	9.6	7960	4300	990.5
20	3	400	0.220	30	12.0	6365	4200	1512.0

Thermoplastics



6	3	800	0.065	9	3.6	42445	8275	268.0
8	3	800	0.090	12	4.8	31830	8595	495.0
10	3	800	0.110	15	6.0	25465	8405	756.5
12	3	800	0.135	18	7.2	21220	8595	1114.0
16	3	800	0.180	24	9.6	15915	8595	1980.5
20	3	800	0.220	30	12.0	12735	8405	3026.0

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	500	0.060	9.0	6	26525	4775	258.0
8	3	500	0.080	12.0	8	19895	4775	458.5
10	3	500	0.100	15.0	10	15915	4775	716.5
12	3	500	0.120	18.0	12	13265	4775	1031.5
16	3	500	0.160	24.0	16	9945	4775	1833.5
20	3	500	0.200	30.0	20	7960	4775	2865.0

Unalloyed copper



6	3	270	0.060	9.0	6	14325	2580	139.5
8	3	270	0.080	12.0	8	10745	2580	247.5
10	3	270	0.100	15.0	10	8595	2580	387.0
12	3	270	0.120	18.0	12	7160	2580	557.5
16	3	270	0.160	24.0	16	5370	2580	990.5
20	3	270	0.200	30.0	20	4295	2575	1545.0

Thermoplastics



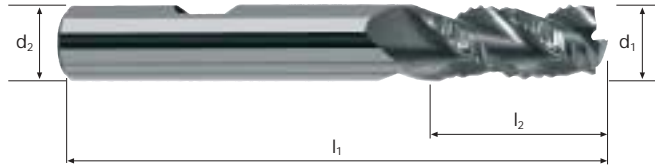
6	3	800	0.060	9.0	6	42445	7640	412.5
8	3	800	0.080	12.0	8	31830	7640	733.5
10	3	800	0.100	15.0	10	25465	7640	1146.0
12	3	800	0.120	18.0	12	21220	7640	1650.0
16	3	800	0.160	24.0	16	15915	7640	2934.0
20	3	800	0.200	30.0	20	12735	7640	4584.0

# Cylindrical end mills AX-FP

Profiled, normal version



**HM** λ 40°  
**MG10** γ 18°



Roughing



Finishing



**Rm**  
< 850

**Al**  
Aluminium  
> 99%

**Al**  
Aluminium  
Alloy

**Al**  
Aluminium  
Cast

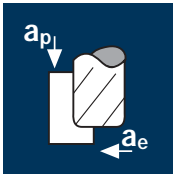
**Cu**  
Copper

**Plastic**  
Thermoplast

III

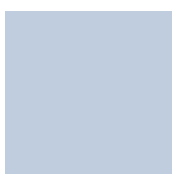
Example: Order-N°.							Coating		Article-N°.		α-Code		CELERO		
							<b>C</b>	<b>5397</b>	<b>.300</b>					<b>C5397</b>	
														<b>C5297</b>	
Ø Code	d1 e8	d2 h6	l1	l2	45°	z									
.300	6	6	57	13	0.40	3									
.391	8	8	63	19	0.40	3									
.450	10	10	72	22	0.40	3									
.501	12	12	83	26	0.40	3									
.610	16	16	92	32	0.50	3									
.682	20	20	104	38	0.50	3									

### Application



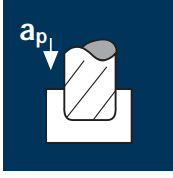
### Material

Wrought aluminium alloys Si < 6%



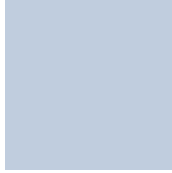
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
16	3	2500	0.080	16	11.2	49735	11935	2139.0
20	3	2500	0.100	20	14.0	39790	11935	3342.0
25	3	2500	0.125	25	17.5	31830	11935	5221.5

### Application



### Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
16	3	2200	0.080	16	16	43770	10505	2689.5
20	3	2200	0.100	20	20	35015	10505	4202.0
25	3	2200	0.125	25	25	28010	10505	6565.5

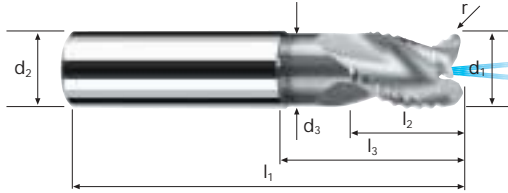


# Cylindrical end mills AX-FP Incool

Profiled, normal version with short neck, with integral cooling channel



**HM**  
**MG10**     $\lambda$  40°  
                   $\gamma$  18°



Roughing



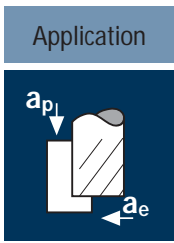
Finishing



<b>Rm</b> < 850				<b>Al</b> Aluminium Alloy	<b>Al</b> Aluminium Cast				
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III

Example: Order-N°.									Coating	Article-N°.	α-Code	CELERO
									<b>C</b>	<b>15278</b>	<b>.610</b>	
<b>Ø</b> Code	<b>d1</b> e8	<b>d2</b> h6	<b>d3</b>	<b>l1</b>	<b>l2</b>	<b>l3</b>	<b>r</b> 0/+0,03	<b>z</b>				<b>C15278</b>
<b>.610</b>	16	16	15.0	82	18	36	2.0	3				●
<b>.682</b>	20	20	19.0	92	22	44	2.0	3				●
<b>.772</b>	25	25	24.0	110	27	54	2.0	3				●



Material

Wrought aluminium alloys Si < 6%

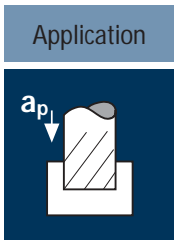
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	345	0.055	9	2.4	18305	3020	65.0
8	3	345	0.070	12	3.2	13730	2885	111.0
10	3	345	0.090	15	4.0	10980	2965	178.0
12	3	345	0.125	18	4.8	9150	3430	296.5
16	3	345	0.170	24	6.4	6865	3500	537.5
20	3	345	0.210	30	8.0	5490	3460	830.5
25	3	345	0.265	38	10.0	4395	3495	1310.5

Unalloyed copper

6	3	147	0.055	9	2.4	7800	1285	28.0
8	3	147	0.070	12	3.2	5850	1230	47.0
10	3	147	0.090	15	4.0	4680	1265	76.0
12	3	147	0.125	18	4.8	3900	1465	126.5
16	3	147	0.170	24	6.4	2925	1490	229.0
20	3	147	0.210	30	8.0	2340	1475	354.0
25	3	147	0.265	38	10.0	1870	1485	557.0

Thermoplastics

6	3	360	0.055	9	2.4	19100	3150	68.0
8	3	360	0.070	12	3.2	14325	3010	115.5
10	3	360	0.090	15	4.0	11460	3095	185.5
12	3	360	0.125	18	4.8	9550	3580	309.5
16	3	360	0.170	24	6.4	7160	3650	560.5
20	3	360	0.210	30	8.0	5730	3610	866.5
25	3	360	0.265	38	10.0	4585	3645	1367.0

Material

Wrought aluminium alloys Si < 6%

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
6	3	315	0.045	6	6	16710	2255	81.0
8	3	315	0.055	8	8	12535	2070	132.5
10	3	315	0.070	10	10	10025	2105	210.5
12	3	315	0.100	12	12	8355	2505	360.5
16	3	315	0.135	16	16	6265	2535	649.0
20	3	315	0.170	20	20	5015	2560	1024.0
25	3	315	0.210	25	25	4010	2525	1578.0

Unalloyed copper

6	3	136	0.045	6	6	7215	975	35.0
8	3	136	0.055	8	8	5410	895	57.5
10	3	136	0.070	10	10	4330	910	91.0
12	3	136	0.100	12	12	3610	1085	156.0
16	3	136	0.135	16	16	2705	1095	280.5
20	3	136	0.170	20	20	2165	1105	442.0
25	3	136	0.210	25	25	1730	1090	681.5

Thermoplastics

6	3	335	0.045	6	6	17775	2400	86.5
8	3	335	0.055	8	8	13330	2200	141.0
10	3	335	0.070	10	10	10665	2240	224.0
12	3	335	0.100	12	12	8885	2665	384.0
16	3	335	0.135	16	16	6665	2700	691.0
20	3	335	0.170	20	20	5330	2720	1088.0
25	3	335	0.210	25	25	4265	2685	1678.0

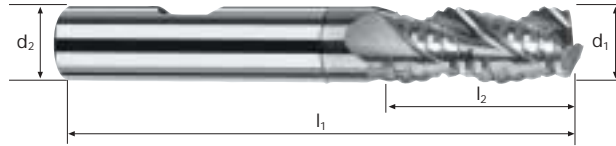

# Cylindrical end mills

Profiled, normal version



HSS-E  
Co8

$\lambda$  40°  
 $\gamma$  18°



Roughing



Finishing

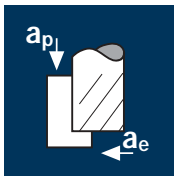


Rm < 850		Al Aluminium > 99%	Al Aluminium Alloy			Cu Copper	Plastic Thermoplast	
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III

Example: Order-N°.								Coating		Article-N°		α-Code		CELERO	
								C		0391		.300		C0391	
Ø Code	d1 k8	d2 h6	l1	l2	45°	α	Z								
.300	6	6	57	13	0.4	0.0°	3	●							
.402	8	10	69	19	0.4	2.5°	3	●							
.450	10	10	72	22	0.4	0.0°	3	●							
.501	12	12	83	26	0.4	0.0°	3	●							
.610	16	16	92	32	0.5	0.0°	3	●							
.682	20	20	104	38	0.5	0.0°	3	●							
.772	25	25	121	45	0.7	0.0°	3	●							

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
8	3	600	0.090	16	2.4	23875	6445	247.5
10	3	600	0.110	20	3.0	19100	6305	378.5
12	3	600	0.135	24	3.6	15915	6445	557.0
16	3	600	0.180	32	4.8	11935	6445	990.0
20	3	600	0.220	40	6.0	9550	6305	1513.0

Unalloyed copper



8	3	400	0.090	16	2.4	15915	4295	165.0
10	3	400	0.110	20	3.0	12735	4205	252.5
12	3	400	0.135	24	3.6	10610	4295	371.0
16	3	400	0.180	32	4.8	7960	4300	660.5
20	3	400	0.220	40	6.0	6365	4200	1008.0

Thermoplastics



8	3	800	0.090	16	2.4	31830	8595	330.0
10	3	800	0.110	20	3.0	25465	8405	504.5
12	3	800	0.135	24	3.6	21220	8595	742.5
16	3	800	0.180	32	4.8	15915	8595	1320.0
20	3	800	0.220	40	6.0	12735	8405	2017.0

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
8	3	500	0.080	5.6	8	19895	4775	214.0
10	3	500	0.100	7.0	10	15915	4775	334.5
12	3	500	0.120	8.4	12	13265	4775	481.5
16	3	500	0.160	11.2	16	9945	4775	855.5
20	3	500	0.200	14.0	20	7960	4775	1337.0

Unalloyed copper



8	3	270	0.080	5.6	8	10745	2580	115.5
10	3	270	0.100	7.0	10	8595	2580	180.5
12	3	270	0.120	8.4	12	7160	2580	260.0
16	3	270	0.160	11.2	16	5370	2580	462.5
20	3	270	0.200	14.0	20	4295	2575	721.0

Thermoplastics



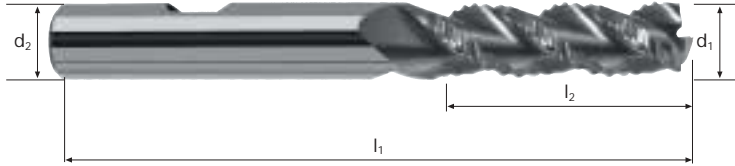
8	3	800	0.080	5.6	8	31830	7640	342.5
10	3	800	0.100	7.0	10	25465	7640	535.0
12	3	800	0.120	8.4	12	21220	7640	770.0
16	3	800	0.160	11.2	16	15915	7640	1369.0
20	3	800	0.200	14.0	20	12735	7640	2139.0

# Cylindrical end mills AX-FP

Profiled, medium length version



**HM**  
**MG10**     $\lambda$  **40°**  
               $\gamma$  **18°**



Roughing



Finishing

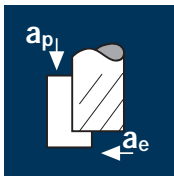


Rm < 850		Al Aluminium > 99%	Al Aluminium Alloy	Al Aluminium Cast		Cu Copper	Plastic Thermoplast
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Example: Order-N°.							CELERO	
		Coating	Article-N°	α-Code			C15397	
		<b>C</b>	<b>15397</b>	<b>.391</b>			C15297	
∅ Code	d1 e8	d2 h6	l1	l2	45°	z		
.391	8	8	72	28	0.40	3	●	
.450	10	10	84	34	0.40	3	●	
.501	12	12	97	40	0.40	3	●	
.610	16	16	108	48	0.50	3	●	
.682	20	20	122	56	0.50	3	●	

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
8	3	600	0.090	12	3.2	23875	6445	247.5
10	3	600	0.110	15	4.0	19100	6305	378.5
12	3	600	0.135	18	4.8	15915	6445	557.0
16	3	600	0.180	24	6.4	11935	6445	990.0
20	3	600	0.220	30	8.0	9550	6305	1513.0
25	3	600	0.280	38	10.0	7640	6420	2407.5

Unalloyed copper



8	3	400	0.090	12	3.2	15915	4295	165.0
10	3	400	0.110	15	4.0	12735	4205	252.5
12	3	400	0.135	18	4.8	10610	4295	371.0
16	3	400	0.180	24	6.4	7960	4300	660.5
20	3	400	0.220	30	8.0	6365	4200	1008.0
25	3	400	0.280	38	10.0	5095	4280	1605.0

Thermoplastics



8	3	800	0.090	12	3.2	31830	8595	330.0
10	3	800	0.110	15	4.0	25465	8405	504.5
12	3	800	0.135	18	4.8	21220	8595	742.5
16	3	800	0.180	24	6.4	15915	8595	1320.0
20	3	800	0.220	30	8.0	12735	8405	2017.0
25	3	800	0.280	38	10.0	10185	8555	3208.0

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
8	3	500	0.080	6.4	8	19895	4775	244.5
10	3	500	0.100	8.0	10	15915	4775	382.0
12	3	500	0.120	9.6	12	13265	4775	550.0
16	3	500	0.160	12.8	16	9945	4775	978.0
20	3	500	0.200	16.0	20	7960	4775	1528.0
25	3	500	0.250	20.0	25	6365	4775	2387.5

Unalloyed copper



8	3	270	0.080	6.4	8	10745	2580	132.0
10	3	270	0.100	8.0	10	8595	2580	206.5
12	3	270	0.120	9.6	12	7160	2580	297.0
16	3	270	0.160	12.8	16	5370	2580	528.5
20	3	270	0.200	16.0	20	4295	2575	824.0
25	3	270	0.250	20.0	25	3440	2580	1290.0

Thermoplastics



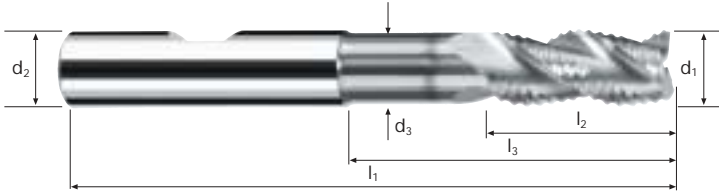
8	3	800	0.080	6.4	8	31830	7640	391.0
10	3	800	0.100	8.0	10	25465	7640	611.0
12	3	800	0.120	9.6	12	21220	7640	880.0
16	3	800	0.160	12.8	16	15915	7640	1564.5
20	3	800	0.200	16.0	20	12735	7640	2445.0
25	3	800	0.250	20.0	25	10185	7640	3820.0

# Cylindrical end mills AX-FP

Profiled, medium length version with neck



HM  
MG10    λ 40°  
                 γ 18°



Roughing



Finishing

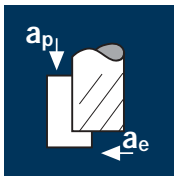


Rm < 850			Al Aluminium > 99%	Al Aluminium Alloy	Al Aluminium Cast		Cu Copper	Plastic Thermoplast	
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Example: Order-N°.									CELERO	
									C15398	
									C15298	
∅ Code	d1 e8	d2 h6	d3	l1	l2	l3	45°	z		
.391	8	8	7.4	72	19	35	0.40	3	●	
.450	10	10	9.2	84	22	43	0.40	3	●	
.501	12	12	11.0	97	26	51	0.40	3	●	
.610	16	16	15.0	108	32	59	0.50	3	●	
.682	20	20	19.0	122	38	71	0.50	3	●	
.772	25	25	24.0	144	45	87	0.70	3	●	

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	3	173	0.060	30	2.0	5505	990	59.5
12	3	173	0.090	36	2.4	4590	1240	107.0
16	3	173	0.120	48	3.2	3440	1240	190.5
20	3	173	0.145	60	4.0	2755	1200	288.0
25	3	173	0.185	75	5.0	2205	1225	459.5

Unalloyed copper



10	3	73	0.060	30	2.0	2325	420	25.0
12	3	73	0.090	36	2.4	1935	520	45.0
16	3	73	0.120	48	3.2	1450	520	80.0
20	3	73	0.145	60	4.0	1160	505	121.0
25	3	73	0.185	75	5.0	930	515	193.0

Thermoplastics



10	3	183	0.060	30	2.0	5825	1050	63.0
12	3	183	0.090	36	2.4	4855	1310	113.0
16	3	183	0.120	48	3.2	3640	1310	201.0
20	3	183	0.145	60	4.0	2915	1270	305.0
25	3	183	0.185	75	5.0	2330	1295	485.5

## Application



## Material

Wrought aluminium alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
10	3	157	0.050	5	10	5000	750	37.5
12	3	157	0.070	6.0	12	4165	875	63.0
16	3	157	0.095	8.0	16	3125	890	114.0
20	3	157	0.120	10.0	20	2500	900	180.0
25	3	157	0.145	12.5	25	2000	870	272.0

Unalloyed copper



10	3	68	0.050	5.0	10	2165	325	16.5
12	3	68	0.070	6.0	12	1805	380	27.5
16	3	68	0.095	8.0	16	1355	385	49.5
20	3	68	0.120	10.0	20	1080	390	78.0
25	3	68	0.145	12.5	25	865	375	117.0

Thermoplastics



10	3	168	0.050	5.0	10	5350	805	40.5
12	3	168	0.070	6.0	12	4455	935	67.5
16	3	168	0.095	8.0	16	3340	950	121.5
20	3	168	0.120	10.0	20	2675	965	193.0
25	3	168	0.145	12.5	25	2140	930	290.5

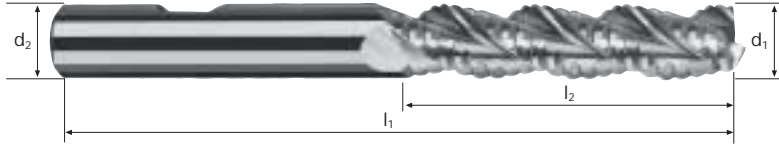
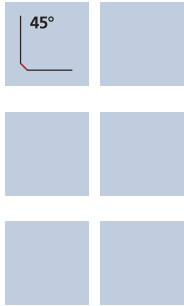


# Cylindrical end mills

Profiled, medium length version



**HSS-E**  
**Co8**    λ **40°**  
                  γ **18°**



Roughing



Finishing



<b>Rm</b> < 850		<b>Al</b> Aluminium > 99%	<b>Al</b> Aluminium Alloy		<b>Cu</b> Copper	<b>Plastic</b> Thermoplast
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III

Example: Order-N°.							CELERO	
	Coating		Article-N°.		α-Code		C0393	
	<b>C</b>		<b>0393</b>		<b>.450</b>			
Ø Code	d1 k8	d2 h6	l1	l2	45°	z		
<b>.450</b>	10	10	95	45	0.4	3	●	
<b>.501</b>	12	12	110	53	0.4	3	●	
<b>.610</b>	16	16	123	63	0.5	3	●	
<b>.682</b>	20	20	141	75	0.5	3	●	
<b>.772</b>	25	25	166	90	0.7	3	●	

# End milling tools for graphite

## Micro with ball nose








### Assortment list

Ball nose end mills	495 - 498
Corner radius end mills	499 - 501
Cylindrical end mills	502 - 503

### Shank $\varnothing$ 6mm, tolerance r $\pm 0.005$

N° 6062	<b>new!</b>	d1 1.5 - 6.0		X-Generation <b>X</b>	HM XA	3xd	<b>C</b> Graphite			505
N° 6064	<b>new!</b>	d1 0.2 - 6.0		X-Generation <b>X</b>	HM XA	5xd	<b>C</b> Graphite			507
N° 6066	<b>new!</b>	d1 0.2 - 6.0		X-Generation <b>X</b>	HM XA	8xd	<b>C</b> Graphite			509
N° 6068	<b>new!</b>	d1 0.4 - 6.0		X-Generation <b>X</b>	HM XA	10xd	<b>C</b> Graphite			511
N° 6070	<b>new!</b>	d1 0.4 - 2.0		X-Generation <b>X</b>	HM XA	12xd	<b>C</b> Graphite			513






### Shank $\varnothing$ 3mm, tolerance r $\pm 0.01$

N° 5782		d1 0.2 - 3.0		Base-X <b>B</b>	HM Micro	3xd	<b>C</b> Graphite			515
N° 5784		d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	5xd	<b>C</b> Graphite			517
N° 5786		d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	8xd	<b>C</b> Graphite			519
N° 5787		d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	10xd	<b>C</b> Graphite			521
N° 5791		d1 1.0 - 3.0		Base-X <b>B</b>	HM Micro	12xd	<b>C</b> Graphite			523
N° 5793		d1 1.0 - 3.0		Base-X <b>B</b>	HM Micro	15xd	<b>C</b> Graphite			525
N° 15795		d1 1.0 - 3.0		Base-X <b>B</b>	HM Micro	20xd	<b>C</b> Graphite			527




# End milling tools for graphite

## Micro with corner radius

### Shank $\varnothing$ 6mm, tolerance r $\pm 0.005$

N° 6032	<b>new!</b>	d1 1.5 – 6.0 r 0.2, r 0.5		X-Generation	X	HM XA	3xd	C Graphite			529
N° 6034	<b>new!</b>	d1 0.2 – 6.0 r 0.05, r 0.1, r 0.2, r 0.5		X-Generation	X	HM XA	5xd	C Graphite			531
N° 6036	<b>new!</b>	d1 0.2 – 6.0 r 0.05, r 0.1, r 0.2, r 0.5		X-Generation	X	HM XA	8xd	C Graphite			533
N° 6038	<b>new!</b>	d1 0.4 – 6.0 r 0.05, r 0.1, r 0.2, r 0.5		X-Generation	X	HM XA	10xd	C Graphite			535
N° 6040	<b>new!</b>	d1 0.4 – 2.0 r 0.05, r 0.1, r 0.2		X-Generation	X	HM XA	12xd	C Graphite			537





### Shank $\varnothing$ 3mm, tolerance r 0/+0.03

N° 5752		d1 1.0 – 3.0 r 0.2		Base-X	B	HM Micro	3xd	C Graphite			539
N° 5754		d1 1.0 – 3.0 r 0.2		Base-X	B	HM Micro	5xd	C Graphite			541
N° 5756		d1 1.0 – 3.0 r 0.2		Base-X	B	HM Micro	8xd	C Graphite			543

IV

# End milling tools for graphite




## Micro cylindrical

Shank $\varnothing$ 3mm									
N° 5712	d1 0.2 - 3.0		Base-X <b>B</b>	HM Micro	3xd	<b>C</b> Graphite			545
N° 5714	d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	5xd	<b>C</b> Graphite			547
N° 5716	d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	8xd	<b>C</b> Graphite			549
N° 5717	d1 0.5 - 3.0		Base-X <b>B</b>	HM Micro	10xd	<b>C</b> Graphite			551




# End milling tools for graphite

## Ball nose

### Tolerance r ±0.005

N° 7480	<b>new!</b>	d1 6 – 12		X-Generation <b>X</b>	HM XA	3xd	<b>C</b> Graphite			553
N° 7484	<b>new!</b>	d1 6 – 12		X-Generation <b>X</b>	HM XA	6xd	<b>C</b> Graphite			555
N° 7488	<b>new!</b>	d1 6 – 12		X-Generation <b>X</b>	HM XA	9xd	<b>C</b> Graphite			557

### Tolerance r e8 (-/-)

N° 5680		d1 2.0 – 10.0		Base-X <b>B</b>	HM XA		<b>C</b> Graphite			559
N° 5675		d1 3 – 12		Base-X <b>B</b>	HM XA		<b>C</b> Graphite			561
N° 5695		d1 2 – 12		Base-X <b>B</b>	HM XA		<b>C</b> Graphite			563

IV





# End milling tools for graphite

## Corner radius

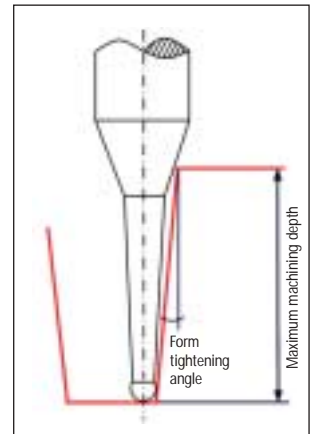
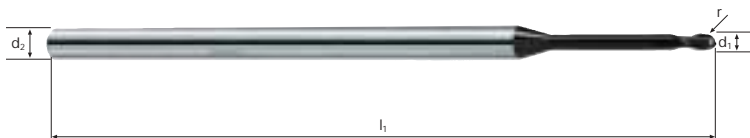
### Long version, extra-long version

N° 7284	<b>new!</b>	d1 6 – 12 r 0.5, r 1.0		X-Generation <b>X</b>	HM XA	6xd	<b>C</b> Graphite			565
N° 7288	<b>new!</b>	d1 6 – 12 r 0.5, r 1.0		X-Generation <b>X</b>	HM XA	9xd	<b>C</b> Graphite			567

### Various versions

N° 5630		d1 6 – 12 r 1.0, r 1.5		Base-X <b>B</b>	HM XA		<b>C</b> Graphite			569
N° 5640		d1 2 – 12 r 0.15, r 0.2, r 0.3, r 0.5		Base-X <b>B</b>	HM XA		<b>C</b> Graphite			571
N° 5645		d1 2 – 12 r 0.15, r 0.2, r 0.3, r 0.5		Base-X <b>B</b>	HM XA		<b>C</b> Graphite			573
N° 5650		d1 10 – 12 r 0.5		Base-X <b>B</b>	HM XA		<b>C</b> Graphite			575

# Assortment list for ball nose end mills



Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle <small>- = workpiece contour lies outside of collision area with tool</small>					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
0.20	6.00	57	2.00	0.10	0°	0.94	0.97	1.00	1.08	1.17	B6064020	507
	6.00	57	2.00	0.10	0°	1.54	1.59	1.65	1.77	1.91	B6066020	509
	3.00	40	2.00	0.10	0°	0.56	0.59	0.62	0.70	0.79	B5782020	515
0.30	6.00	57	2.00	0.15	0°	1.49	1.54	1.59	1.71	1.85	B6064030	507
	6.00	57	2.00	0.15	0°	2.39	2.47	2.56	2.75	2.96	B6066030	509
	3.00	40	2.00	0.15	0°	0.94	0.99	1.04	1.16	1.32	B5782030	515
0.40	6.00	57	2.00	0.20	0°	1.99	2.06	2.13	2.28	2.46	B6064040	507
	6.00	57	2.00	0.20	0°	3.19	3.30	3.41	3.66	3.95	B6066040	509
	6.00	57	2.00	0.20	0°	3.99	4.12	4.27	4.58	4.94	B6068040	511
0.50	6.00	57	2.00	0.25	0°	4.79	4.95	5.12	5.50	5.94	B6070040	513
	3.00	40	2.00	0.20	0°	1.24	1.30	1.37	1.53	1.73	B5782040	515
	6.00	57	2.00	0.25	0°	2.49	2.57	2.66	2.85	3.07	B6064050	507
0.60	6.00	57	2.00	0.25	0°	3.99	4.12	4.26	4.57	4.93	B6066050	509
	6.00	57	2.00	0.25	0°	4.99	5.16	5.33	5.72	6.17	B6068050	511
	6.00	57	2.00	0.25	0°	5.99	6.19	6.40	6.87	7.42	B6070050	513
0.70	3.00	40	2.00	0.25	0°	1.49	1.54	1.59	1.70	1.82	B5782050	515
	3.00	40	2.00	0.25	0°	2.49	2.57	2.66	2.85	3.07	B5784050	517
	3.00	40	2.00	0.25	0°	3.99	4.12	4.26	4.57	4.93	B5786050	519
0.80	3.00	40	2.00	0.25	0°	4.99	5.16	5.33	5.72	6.17	B5787050	521
	6.00	57	2.00	0.30	0°	2.99	3.09	3.19	3.41	3.67	B6064060	507
	6.00	57	2.00	0.30	0°	4.79	4.95	5.11	5.48	5.91	B6066060	509
0.90	6.00	57	2.00	0.30	0°	5.99	6.19	6.40	6.86	7.40	B6068060	511
	6.00	57	2.00	0.30	0°	7.19	7.43	7.68	8.24	8.90	B6070060	513
	3.00	40	2.00	0.30	0°	1.79	1.85	1.90	2.03	2.18	B5782060	515
0.90	3.00	40	2.00	0.30	0°	2.99	3.09	3.19	3.41	3.67	B5784060	517
	3.00	40	2.00	0.30	0°	4.79	4.95	5.11	5.48	5.91	B5786060	519
	3.00	40	2.00	0.30	0°	5.99	6.19	6.40	6.86	7.40	B5787060	521
0.90	3.00	40	2.00	0.35	0°	3.49	3.60	3.72	3.98	4.28	B5784070	517
	6.00	57	2.00	0.40	0°	3.99	4.12	4.25	4.55	4.89	B6064080	507
	6.00	57	2.00	0.40	0°	6.39	6.60	6.82	7.31	7.88	B6066080	509
0.90	6.00	57	2.00	0.40	0°	7.99	8.25	8.53	9.15	9.87	B6068080	511
	6.00	57	2.00	0.40	0°	9.59	9.91	10.24	10.99	11.86	B6070080	513
	3.00	40	2.00	0.40	0°	2.39	2.46	2.54	2.71	2.91	B5782080	515
0.90	3.00	40	2.00	0.40	0°	3.99	4.12	4.25	4.55	4.89	B5784080	517
	3.00	40	2.00	0.40	0°	6.39	6.60	6.82	7.31	7.88	B5786080	519
	3.00	40	2.00	0.40	0°	7.99	8.25	8.53	9.15	9.87	B5787080	521
0.90	3.00	40	2.00	0.45	0°	4.49	4.63	4.78	5.12	5.50	B5784090	517

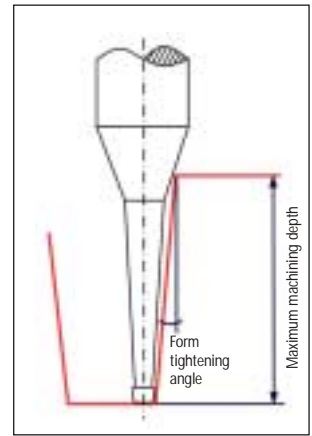
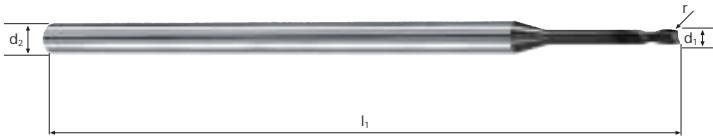
Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
1.00	6.00	57	2.00	0.50	0°	5.09	5.24	5.41	5.79	6.23	B6064100	507
	6.00	57	2.00	0.50	0°	8.09	8.35	8.62	9.24	9.96	B6066100	509
	6.00	57	2.00	0.50	0°	10.09	10.41	10.76	11.54	12.45	B6068100	511
	6.00	57	2.00	0.50	0°	12.09	12.48	12.90	13.84	14.93	B6070100	513
	3.00	50	2.00	0.50	0°	2.99	3.08	3.17	3.38	3.63	B5782100	515
	3.00	50	2.00	0.50	0°	4.99	5.15	5.31	5.68	6.11	B5784100	517
	3.00	50	2.00	0.50	0°	7.99	8.25	8.52	9.13	9.84	B5786100	519
	3.00	50	2.00	0.50	0°	9.99	10.32	10.66	11.43	12.33	B5787100	521
	3.00	50	2.00	0.50	0°	11.99	12.38	12.80	13.73	14.81	B5791100	523
	3.00	60	2.00	0.50	0°	14.99	15.49	16.01	17.18	18.55	B5793100	525
	3.00	60	2.00	0.50	0°	19.99	20.65	21.36	-	-	B15795100	527
	1.20	3.00	50	2.00	0.60	0°	3.59	3.70	3.81	4.06	4.35	B5782108
3.00		50	2.00	0.60	0°	5.99	6.18	6.38	6.82	7.33	B5784108	517
3.00		50	2.00	0.60	0°	9.59	9.90	10.23	10.96	11.81	B5786108	519
3.00		50	2.00	0.60	0°	11.99	12.38	12.80	13.72	14.79	B5787108	521
3.00		60	2.00	0.60	0°	14.39	14.86	15.36	16.48	-	B5791108	523
3.00		60	2.00	0.60	0°	17.99	18.58	19.21	20.62	-	B5793108	525
3.00		60	2.00	0.60	0°	23.99	24.78	25.63	-	-	B15795108	527
1.50	6.00	57	2.00	0.75	0°	4.59	4.72	4.86	5.18	5.55	B6062120	505
	6.00	57	2.00	0.75	0°	7.59	7.82	8.07	8.63	9.28	B6064120	507
	6.00	57	2.00	0.75	0°	12.09	12.47	12.88	13.80	14.87	B6066120	509
	6.00	57	2.00	0.75	0°	15.09	15.57	16.09	17.25	18.60	B6068120	511
	6.00	61	2.00	0.75	0°	18.09	18.67	19.30	20.70	22.33	B6070120	513
	3.00	50	2.00	0.75	0°	4.49	4.62	4.76	5.07	5.43	B5782120	515
	3.00	50	2.00	0.75	0°	7.49	7.72	7.97	8.52	9.16	B5784120	517
	3.00	60	2.00	0.75	0°	11.99	12.38	12.78	13.70	14.76	B5786120	519
	3.00	60	2.00	0.75	0°	14.99	15.48	15.99	17.15	-	B5787120	521
	3.00	60	2.00	0.75	0°	17.99	18.58	19.20	-	-	B5791120	523
	3.00	70	2.00	0.75	0°	22.49	23.23	24.02	-	-	B5793120	525
	3.00	70	2.00	0.75	0°	29.99	30.98	32.04	-	-	B15795120	527
1.80	3.00	50	2.00	0.90	0°	8.99	9.27	9.56	10.22	10.99	B5784132	517
2.00	6.00	57	2.00	1.00	0°	6.09	6.26	6.45	6.87	7.35	B6062140	505
	6.00	57	2.00	1.00	0°	10.09	10.40	10.73	11.47	12.33	B6064140	507
	6.00	57	2.00	1.00	0°	16.09	16.60	17.15	18.37	19.79	B6066140	509
	6.00	61	2.00	1.00	0°	20.09	20.73	21.42	22.96	24.76	B6068140	511
	6.00	66	2.00	1.00	0°	24.09	24.87	25.70	27.56	29.73	B6070140	513
	3.00	50	2.00	1.00	0°	5.99	6.17	6.35	6.76	7.24	B5782140	515
	3.00	50	2.00	1.00	0°	9.99	10.30	10.63	11.36	-	B5784140	517
	3.00	60	2.00	1.00	0°	15.99	16.50	17.05	-	-	B5786140	519
	3.00	60	2.00	1.00	0°	19.99	20.64	21.32	-	-	B5787140	521
	3.00	60	2.00	1.00	0°	23.99	24.77	25.60	-	-	B5791140	523
	3.00	70	2.00	1.00	0°	29.99	30.97	-	-	-	B5793140	525
	3.00	80	2.00	1.00	0°	39.99	41.31	-	-	-	B15795140	527
3.00	40	2.00	1.00	0°	3.90	4.03	4.17	4.49	4.89	B5680140	559	
3.00	100	3.00	1.00	0°	3.90	4.03	4.17	4.49	4.89	B5695140	563	
2.30	3.00	50	2.00	1.15	0°	11.49	11.85	12.22	-	-	B5784152	517
2.50	3.00	50	2.00	1.25	0°	7.49	7.71	7.94	-	-	B5782160	515
	3.00	50	2.00	1.25	0°	12.49	12.88	13.28	-	-	B5784160	517
	3.00	60	2.00	1.25	0°	19.99	20.63	-	-	-	B5786160	519
	3.00	60	2.00	1.25	0°	24.99	25.80	-	-	-	B5787160	521
	3.00	70	2.00	1.25	0°	29.99	-	-	-	-	B5791160	523
	3.00	70	2.00	1.25	0°	37.49	-	-	-	-	B5793160	525
	3.00	80	2.00	1.25	0°	49.99	-	-	-	-	B15795160	527
3.00	40	2.00	1.25	0°	4.90	5.06	5.24	5.64	-	B5680160	559	
2.80	3.00	50	2.00	1.40	0°	13.99	-	-	-	-	B5784172	517



Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle - = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
3.00	6.00	57	2.00	1.50	0°	9.27	9.54	9.82	10.46	11.20	B6062180	505
	6.00	57	2.00	1.50	0°	15.27	15.74	16.24	17.36	18.66	B6064180	507
	6.00	61	2.00	1.50	0°	18.27	18.84	19.45	20.81	22.39	B6064182	507
	6.00	66	2.00	1.50	0°	24.27	25.04	25.87	27.71	29.84	B6066180	509
	6.00	75	2.00	1.50	0°	30.27	31.25	32.29	34.60	-	B6068180	511
	3.00	50	2.00	1.50	0°	8.90	-	-	-	-	B5782180	515
	3.00	50	2.00	1.50	0°	14.90	-	-	-	-	B5784180	517
	3.00	60	2.00	1.50	0°	23.90	-	-	-	-	B5786180	519
	3.00	60	2.00	1.50	0°	29.90	-	-	-	-	B5787180	521
	3.00	70	2.00	1.50	0°	35.90	-	-	-	-	B5791180	523
	3.00	80	2.00	1.50	0°	44.90	-	-	-	-	B5793180	525
	3.00	90	2.00	1.50	0°	59.90	-	-	-	-	B15795180	527
	3.00	40	2.00	1.50	0°	7.90	-	-	-	-	B5680180	559
	6.00	75	2.00	1.50	0°	27.37	28.48	29.70	32.48	-	B5675180	561
	3.00	100	3.00	1.50	0°	5.90	-	-	-	-	B5695180	563
3.50	4.00	50	2.00	1.75	0°	11.90	-	-	-	-	B5680200	559
4.00	6.00	57	2.00	2.00	0°	12.27	12.62	13.00	13.83	14.81	B6062220	505
	6.00	61	2.00	2.00	0°	20.27	20.89	21.56	23.03	-	B6064220	507
	6.00	66	2.00	2.00	0°	25.27	26.06	26.90	28.78	-	B6064222	507
	6.00	75	2.00	2.00	0°	32.27	33.30	34.39	-	-	B6066220	509
	6.00	80	2.00	2.00	0°	40.27	41.57	42.95	-	-	B6068220	511
	4.00	50	2.00	2.00	0°	13.90	-	-	-	-	B5680220	559
	6.00	75	2.00	2.00	0°	30.61	31.84	33.18	-	-	B5675220	561
	4.00	100	3.00	2.00	0°	8.90	-	-	-	-	B5695220	563
5.00	6.00	57	2.00	2.50	0°	15.27	15.71	16.17	-	-	B6062260	505
	6.00	66	2.00	2.50	0°	25.27	26.04	26.60	-	-	B6064260	507
	6.00	80	2.00	2.50	0°	40.27	41.55	-	-	-	B6066260	509
	6.00	100	2.00	2.50	0°	50.27	51.89	-	-	-	B6068260	511
	5.00	50	2.00	2.50	0°	19.90	-	-	-	-	B5680260	559
	6.00	80	2.00	2.50	0°	38.84	40.40	-	-	-	B5675260	561
	5.00	100	3.00	2.50	0°	10.90	-	-	-	-	B5695260	563
6.00	6.00	57	2.00	3.00	0°	18.27	-	-	-	-	B6062300	505
	6.00	69	2.00	3.00	0°	30.27	-	-	-	-	B6064300	507
	6.00	87	2.00	3.00	0°	48.27	-	-	-	-	B6066300	509
	6.00	100	2.00	3.00	0°	60.27	-	-	-	-	B6068300	511
	6.00	57	2.00	3.00	0°	20.83	-	-	-	-	B7480300	553
	6.00	80	2.00	3.00	0°	43.83	-	-	-	-	B7484300	555
	6.00	100	2.00	3.00	0°	63.83	-	-	-	-	B7488300	557
	6.00	65	2.00	3.00	0°	19.90	-	-	-	-	B5680300	559
	6.00	80	2.00	3.00	0°	44.08	-	-	-	-	B5675300	561
	6.00	150	3.00	3.00	0°	14.90	-	-	-	-	B5695300	563
8.00	8.00	63	2.00	4.00	0°	27.02	-	-	-	-	B7480391	553
	8.00	90	2.00	4.00	0°	54.02	-	-	-	-	B7484391	555
	8.00	120	2.00	4.00	0°	84.02	-	-	-	-	B7488391	557
	8.00	65	2.00	4.00	0°	19.90	-	-	-	-	B5680391	559
	8.00	90	2.00	4.00	0°	54.31	-	-	-	-	B5675391	561
	8.00	150	3.00	4.00	0°	19.90	-	-	-	-	B5695391	563
10.00	10.00	72	2.00	5.00	0°	32.39	-	-	-	-	B7480450	553
	10.00	105	2.00	5.00	0°	65.39	-	-	-	-	B7484450	555
	10.00	135	2.00	5.00	0°	95.39	-	-	-	-	B7488450	557
	10.00	75	2.00	5.00	0°	24.90	-	-	-	-	B5680450	559
	10.00	100	2.00	5.00	0°	60.78	-	-	-	-	B5675450	561
	10.00	175	3.00	5.00	0°	24.90	-	-	-	-	B5695450	563



# Assortment list for corner radius end mills

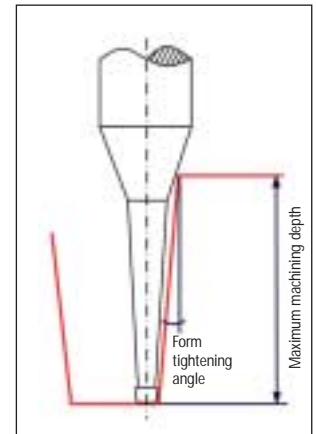
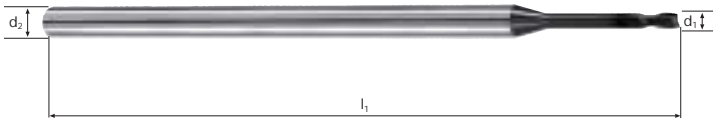


Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle - = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
0.20	6.00	57	2.00	-	0°	0.94	0.97	1.01	1.09	1.19	B6034020	531
	6.00	57	2.00	-	0°	1.54	1.59	1.65	1.78	1.94	B6036020	533
0.30	6.00	57	2.00	-	0°	1.49	1.55	1.60	1.73	1.88	B6034030	531
	6.00	57	2.00	-	0°	2.39	2.48	2.57	2.77	3.00	B6036030	533
0.40	6.00	57	2.00	0.05	0°	1.99	2.06	2.14	2.30	2.49	B6034040	531
	6.00	57	2.00	0.05	0°	3.19	3.30	3.42	3.68	3.98	B6036040	533
	6.00	57	2.00	0.05	0°	3.99	4.13	4.28	4.60	4.98	B6038040	535
	6.00	57	2.00	0.05	0°	4.79	4.96	5.13	5.52	5.97	B6040040	537
0.50	6.00	57	2.00	0.05	0°	2.49	2.58	2.67	2.88	3.21	B6034048	531
	6.00	57	2.00	0.10	0°	2.49	2.58	2.67	2.87	3.10	B6034050	531
	6.00	57	2.00	0.05	0°	3.99	4.13	4.28	4.60	4.98	B6036048	533
	6.00	57	2.00	0.10	0°	3.99	4.13	4.27	4.59	4.97	B6036050	533
	6.00	57	2.00	0.05	0°	4.99	5.16	5.35	5.75	6.22	B6038048	535
	6.00	57	2.00	0.10	0°	4.99	5.16	5.34	5.74	6.21	B6038050	535
0.60	6.00	57	2.00	0.05	0°	5.99	6.20	6.41	6.90	7.46	B6040048	537
	6.00	57	2.00	0.10	0°	5.99	6.20	6.41	6.89	7.45	B6040050	537
	6.00	57	2.00	0.10	0°	2.99	3.09	3.20	3.44	3.72	B6034060	531
	6.00	57	2.00	0.10	0°	4.79	4.95	5.13	5.51	5.96	B6036060	533
	6.00	57	2.00	0.10	0°	5.99	6.20	6.41	6.89	7.45	B6038060	535
	6.00	57	2.00	0.10	0°	7.19	7.44	7.70	8.27	8.94	B6040060	537
0.80	6.00	57	2.00	0.10	0°	3.99	4.13	4.27	4.59	4.97	B6034080	531
	6.00	57	2.00	0.10	0°	6.39	6.61	6.84	7.35	7.95	B6036080	533
	6.00	57	2.00	0.10	0°	7.99	8.26	8.55	9.19	9.94	B6038080	535
	6.00	57	2.00	0.10	0°	9.59	9.92	10.26	11.03	11.93	B6040080	537
	6.00	57	2.00	0.10	0°	5.09	5.26	5.44	5.85	6.32	B6034098	531
	6.00	57	2.00	0.20	0°	5.09	5.26	5.43	5.83	6.30	B6034100	531
1.00	6.00	57	2.00	0.10	0°	8.09	8.36	8.65	9.30	10.05	B6036098	533
	6.00	57	2.00	0.20	0°	8.09	8.36	8.64	9.28	10.03	B6036100	533
	6.00	57	2.00	0.10	0°	10.09	10.43	10.79	11.60	12.54	B6038098	535
	6.00	57	2.00	0.20	0°	10.09	10.42	10.78	11.58	12.52	B6038100	535
	6.00	57	2.00	0.10	0°	12.09	12.49	12.93	13.90	15.03	B6040098	537
	6.00	57	2.00	0.20	0°	12.09	12.49	12.92	13.88	15.00	B6040100	537
1.20	3.00	50	2.00	0.20	0°	2.99	3.09	3.20	3.43	3.70	B5752100	539
	3.00	50	2.00	0.20	0°	4.99	5.16	5.33	5.73	6.18	B5754100	541
	3.00	50	2.00	0.20	0°	7.99	8.26	8.54	9.18	9.91	B5756100	543
1.20	3.00	50	2.00	0.20	0°	3.59	3.71	3.84	4.12	4.44	B5752108	539
	3.00	50	2.00	0.20	0°	5.99	6.19	6.40	6.88	7.43	B5754108	541

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle – = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
1.20	3.00	50	2.00	0.20	0°	9.59	9.91	10.26	11.02	11.90	B5756108	543
1.50	6.00	57	2.00	0.20	0°	4.59	4.74	4.90	5.26	5.68	B6032120	529
	6.00	57	2.00	0.20	0°	7.59	7.84	8.11	8.71	9.41	B6034120	531
	6.00	57	2.00	0.20	0°	12.09	12.49	12.92	13.88	15.00	B6036120	533
	6.00	57	2.00	0.20	0°	15.09	15.59	16.13	17.33	18.73	B6038120	535
	6.00	61	2.00	0.20	0°	18.09	18.69	19.34	20.78	22.46	B6040120	537
	3.00	50	2.00	0.20	0°	4.49	4.64	4.80	5.15	5.56	B5752120	539
	3.00	50	2.00	0.20	0°	7.49	7.74	8.01	8.60	9.29	B5754120	541
	3.00	60	2.00	0.20	0°	11.99	12.39	12.82	13.78	14.89	B5756120	543
2.00	6.00	57	2.00	0.20	0°	6.09	6.29	6.50	6.98	7.54	B6032140	529
	6.00	57	2.00	0.20	0°	10.09	10.42	10.78	11.58	12.52	B6034140	531
	6.00	57	2.00	0.20	0°	16.09	16.63	17.20	18.48	19.98	B6036140	533
	6.00	61	2.00	0.20	0°	20.09	20.76	21.48	23.08	24.95	B6038140	535
	6.00	66	2.00	0.20	0°	24.09	24.89	25.76	27.68	29.92	B6040140	537
	3.00	50	2.00	0.20	0°	5.99	6.19	6.40	6.88	7.43	B5752140	539
	3.00	50	2.00	0.20	0°	9.99	10.33	10.68	11.48	12.40	B5754140	541
	3.00	60	2.00	0.20	0°	15.99	16.53	17.10	18.38	19.86	B5756140	543
	3.00	40	3.00	0.15	0°	5.90	6.10	6.31	6.79	7.32	B5640140	571
	3.00	60	3.00	0.15	0°	8.90	9.20	9.52	10.23	11.05	B5645140	573
2.50	3.00	50	2.00	0.20	0°	7.49	7.74	8.01	8.60	9.29	B5752160	539
	3.00	50	2.00	0.20	0°	12.49	12.91	13.36	14.35	15.51	B5754160	541
	3.00	60	2.00	0.20	0°	19.99	20.66	21.38	22.98	24.83	B5756160	543
3.00	6.00	57	2.00	0.20	0°	9.27	9.58	9.91	10.65	11.51	B6032180	529
	6.00	57	2.00	0.20	0°	15.27	15.78	16.33	17.55	18.96	B6034180	531
	6.00	61	2.00	0.20	0°	18.27	18.89	19.54	21.00	22.69	B6034182	531
	6.00	66	2.00	0.20	0°	24.27	25.09	25.96	27.90	-	B6036180	533
	6.00	75	2.00	0.20	0°	30.27	31.29	32.38	34.80	-	B6038180	535
	3.00	50	2.00	0.20	0°	8.90	-	-	-	-	B5752180	539
	3.00	50	2.00	0.20	0°	14.90	-	-	-	-	B5754180	541
	3.00	60	2.00	0.20	0°	23.90	-	-	-	-	B5756180	543
	3.00	40	3.00	0.15	0°	11.90	-	-	-	-	B5640180	571
	3.00	60	3.00	0.15	0°	2.90	-	-	-	-	B5645180	573
4.00	6.00	57	2.00	0.20	0°	12.27	12.68	13.12	14.10	15.23	B6032215	529
	6.00	57	2.00	0.50	0°	12.27	12.67	13.10	14.05	15.16	B6032220	529
	6.00	61	2.00	0.20	0°	20.27	20.95	21.68	23.30	-	B6034215	531
	6.00	66	2.00	0.20	0°	25.27	26.12	27.03	-	-	B6034217	531
	6.00	61	2.00	0.50	0°	20.27	20.94	21.66	23.25	-	B6034220	531
	6.00	66	2.00	0.50	0°	25.27	26.11	27.01	29.00	-	B6034220	531
	6.00	75	2.00	0.20	0°	32.27	33.36	34.52	-	-	B6036215	533
	6.00	75	2.00	0.50	0°	32.27	33.35	34.50	-	-	B6036220	533
	6.00	80	2.00	0.20	0°	40.27	41.63	43.07	-	-	B6038215	535
	6.00	80	2.00	0.50	0°	40.27	41.62	43.05	-	-	B6038220	535
	4.00	50	3.00	0.20	0°	13.90	-	-	-	-	B5640220	571
	4.00	60	3.00	0.20	0°	3.90	-	-	-	-	B5645220	573
5.00	6.00	57	2.00	0.20	0°	15.27	15.78	16.33	-	-	B6032255	529
	6.00	57	2.00	0.50	0°	15.27	15.77	16.31	-	-	B6032260	529
	6.00	66	2.00	0.20	0°	25.27	26.12	27.03	-	-	B6034255	531
	6.00	66	2.00	0.50	0°	25.27	26.11	27.01	-	-	B6034260	531
	6.00	80	2.00	0.20	0°	40.27	41.63	-	-	-	B6036255	533
	6.00	80	2.00	0.50	0°	40.27	41.62	-	-	-	B6036260	533
	6.00	100	2.00	0.20	0°	50.27	51.96	-	-	-	B6038255	535
	6.00	100	2.00	0.50	0°	50.27	51.95	-	-	-	B6038260	535
	5.00	50	3.00	0.30	0°	15.90	-	-	-	-	B5640260	571
	5.00	70	3.00	0.30	0°	4.90	-	-	-	-	B5645260	573

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle - = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
6.00	6.00	57	2.00	0.20	0°	18.27	-	-	-	-	B6032295	529
	6.00	57	2.00	0.50	0°	18.27	-	-	-	-	B6032300	529
	6.00	69	2.00	0.20	0°	30.27	-	-	-	-	B6034295	531
	6.00	69	2.00	0.50	0°	30.27	-	-	-	-	B6034300	531
	6.00	87	2.00	0.20	0°	48.27	-	-	-	-	B6036295	533
	6.00	87	2.00	0.50	0°	48.27	-	-	-	-	B6036300	533
	6.00	100	2.00	0.20	0°	60.27	-	-	-	-	B6038295	535
	6.00	100	2.00	0.50	0°	60.27	-	-	-	-	B6038300	535
	6.00	80	2.00	0.50	0°	43.83	-	-	-	-	B7284300	565
	6.00	80	2.00	1.00	0°	43.83	-	-	-	-	B7284297	565
	6.00	100	2.00	0.50	0°	63.83	-	-	-	-	B7288300	567
	6.00	100	2.00	1.00	0°	63.83	-	-	-	-	B7288297	567
	6.00	70	2.00	1.00	0°	33.83	-	-	-	-	B5630300	569
	6.00	65	3.00	0.30	0°	19.90	-	-	-	-	B5640300	571
	6.00	100	3.00	0.30	0°	5.90	-	-	-	-	B5645300	573
8.00	8.00	90	2.00	0.50	0°	54.02	-	-	-	-	B7284391	565
	8.00	90	2.00	1.00	0°	54.02	-	-	-	-	B7284388	565
	8.00	120	2.00	0.50	0°	84.02	-	-	-	-	B7288391	567
	8.00	120	2.00	1.00	0°	84.02	-	-	-	-	B7288388	567
	8.00	80	2.00	1.00	0°	44.02	-	-	-	-	B5630391	569
	8.00	65	3.00	0.50	0°	19.90	-	-	-	-	B5640391	571
	8.00	100	3.00	0.50	0°	7.90	-	-	-	-	B5645391	573
10.00	10.00	105	2.00	0.50	0°	65.39	-	-	-	-	B7284450	565
	10.00	105	2.00	1.00	0°	65.39	-	-	-	-	B7284445	565
	10.00	135	2.00	0.50	0°	95.39	-	-	-	-	B7288450	567
	10.00	135	2.00	1.00	0°	95.39	-	-	-	-	B7288445	567
	10.00	84	2.00	1.50	0°	44.39	-	-	-	-	B5630450	569
	10.00	75	3.00	0.50	0°	24.90	-	-	-	-	B5640450	571
	10.00	100	3.00	0.50	0°	9.90	-	-	-	-	B5645450	573
	10.00	125	3.00	0.50	0°	9.90	-	-	-	-	B5650450	575
12.00	12.00	120	2.00	0.50	0°	75.77	-	-	-	-	B7284501	565
	12.00	120	2.00	1.00	0°	75.77	-	-	-	-	B7284496	565
	12.00	160	2.00	0.50	0°	115.77	-	-	-	-	B7288501	567
	12.00	160	2.00	1.00	0°	115.77	-	-	-	-	B7288496	567
	12.00	97	2.00	1.50	0°	52.77	-	-	-	-	B5630501	569
	12.00	75	3.00	0.50	0°	24.90	-	-	-	-	B5640501	571
	12.00	100	3.00	0.50	0°	11.90	-	-	-	-	B5645501	573
	12.00	125	3.00	0.50	0°	11.90	-	-	-	-	B5650501	575

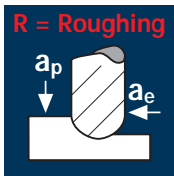
# Assortment list for cylindrical end mills



Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle - = workpiece contour lies outside of collision area with tool					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
0.20	3.00	40.00	2.00	-	0°	0.54	0.56	0.58	0.63	0.69	B5712020	545
0.30	3.00	40.00	2.00	-	0°	0.89	0.93	0.96	1.04	1.14	B5712030	545
0.40	3.00	40.00	2.00	-	0°	1.19	1.24	1.28	1.39	1.51	B5712040	545
0.50	3.00	40.00	2.00	-	0°	1.49	1.55	1.60	1.73	1.88	B5712050	545
	3.00	40.00	2.00	-	0°	2.49	2.58	2.67	2.88	3.12	B5714050	547
	3.00	40.00	2.00	-	0°	3.99	4.13	4.28	4.61	4.99	B5716050	549
	3.00	40.00	2.00	-	0°	4.99	5.17	5.35	5.76	6.23	B5717050	551
0.60	3.00	40.00	2.00	-	0°	1.79	1.86	1.93	2.08	2.25	B5712060	545
	3.00	40.00	2.00	-	0°	2.99	3.10	3.21	3.46	3.75	B5714060	547
	3.00	40.00	2.00	-	0°	4.79	4.96	5.13	5.53	5.98	B5716060	549
	3.00	40.00	2.00	-	0°	5.99	6.20	6.42	6.91	7.48	B5717060	551
0.70	3.00	40.00	2.00	-	0°	3.49	3.61	3.74	4.02	4.37	B5714070	547
0.80	3.00	40.00	2.00	-	0°	2.39	2.48	2.57	2.77	3.00	B5712080	545
	3.00	40.00	2.00	-	0°	3.99	4.13	4.28	4.61	4.99	B5714080	547
	3.00	40.00	2.00	-	0°	6.39	6.61	6.85	7.37	7.97	B5716080	549
	3.00	40.00	2.00	-	0°	7.99	8.27	8.56	9.21	9.96	B5717080	551
0.90	3.00	40.00	2.00	-	0°	4.49	4.65	4.81	5.18	5.61	B5714090	547
1.00	3.00	50.00	2.00	0.07	0°	2.99	3.10	3.21	3.46	3.75	B5712100	545
	3.00	50.00	2.00	0.07	0°	4.99	5.17	5.35	5.76	6.23	B5714100	547
	3.00	50.00	2.00	0.07	0°	7.99	8.27	8.56	9.21	9.96	B5716100	549
	3.00	50.00	2.00	0.07	0°	9.99	10.33	10.70	11.51	12.45	B5717100	551
1.20	3.00	50.00	2.00	0.07	0°	3.59	3.72	3.85	4.15	4.49	B5712108	545
	3.00	50.00	2.00	0.07	0°	5.99	6.20	6.42	6.91	7.48	B5714108	547
	3.00	50.00	2.00	0.07	0°	9.59	9.92	10.27	11.05	11.95	B5716108	549
	3.00	50.00	2.00	0.07	0°	11.99	12.40	12.84	13.81	14.93	B5717108	551
1.50	3.00	50.00	2.00	0.07	0°	4.49	4.65	4.81	5.18	5.61	B5712120	545
	3.00	50.00	2.00	0.07	0°	7.49	7.75	8.02	8.63	9.34	B5714120	547
	3.00	60.00	2.00	0.07	0°	11.99	12.40	12.84	13.81	-	B5716120	549
	3.00	60.00	2.00	0.07	0°	14.99	15.50	16.05	17.26	-	B5717120	551
1.80	3.00	50.00	2.00	0.07	0°	8.99	9.30	9.63	10.36	11.20	B5714132	547
2.00	3.00	50.00	2.00	0.10	0°	5.99	6.20	6.42	6.91	7.48	B5712140	545
	3.00	50.00	2.00	0.10	0°	9.99	10.33	10.70	11.51	-	B5714140	547
	3.00	60.00	2.00	0.10	0°	15.99	16.54	17.12	-	-	B5716140	549
	3.00	60.00	2.00	0.10	0°	19.99	20.67	21.39	-	-	B5717140	551
2.30	3.00	50.00	2.00	0.10	0°	11.49	11.88	12.30	-	-	B5714152	547

Structural dimensions						Maximum machining depth in mm for corresponding form tightening angle <small>- = workpiece contour lies outside of collision area with tool</small>					Identification	
d1	d2	l1	z	r	θ	0°	0.5°	1°	2°	3°	Order-N°.	Page
2.50	3.00	50.00	2.00	0.10	0°	7.49	7.75	8.02	-	-	B5712160	545
	3.00	50.00	2.00	0.10	0°	12.49	12.92	13.37	-	-	B5714160	547
	3.00	60.00	2.00	0.10	0°	19.99	20.67	-	-	-	B5716160	549
	3.00	60.00	2.00	0.10	0°	24.99	25.84	-	-	-	B5717160	551
2.80	3.00	50.00	2.00	0.10	0°	13.99	-	-	-	-	B5714172	547
3.00	3.00	50.00	2.00	0.10	0°	8.99	-	-	-	-	B5712180	545
	3.00	50.00	2.00	0.10	0°	14.99	-	-	-	-	B5714180	547
	3.00	60.00	2.00	0.10	0°	23.99	-	-	-	-	B5716180	549
	3.00	60.00	2.00	0.10	0°	29.99	-	-	-	-	B5717180	551

### Application

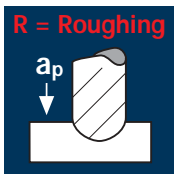


### Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.018	0.75	0.90	540	900	1080	1620
2.0	2	0.024	1.00	1.20	720	1200	1440	2160
3.0	2	0.035	1.50	1.80	1050	1750	2100	3150
4.0	2	0.047	2.00	2.40	1410	2350	2820	4230
5.0	2	0.059	2.50	3.00	1770	2950	3540	5310
6.0	2	0.071	3.00	3.60	2130	3550	4260	6390

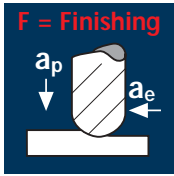


Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.014	0.75	1.50	420	700	840	1260
2.0	2	0.018	1.00	2.00	540	900	1080	1620
3.0	2	0.027	1.50	3.00	810	1350	1620	2430
4.0	2	0.036	2.00	4.00	1080	1800	2160	3240
5.0	2	0.045	2.50	5.00	1350	2250	2700	4050
6.0	2	0.055	3.00	6.00	1650	2750	3300	4950

### Application

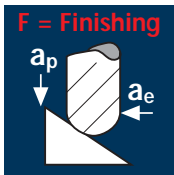


### Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.020	0.23	0.30	600	1000	1200	1800
2.0	2	0.027	0.30	0.40	810	1350	1620	2430
3.0	2	0.040	0.45	0.60	1200	2000	2400	3600
4.0	2	0.053	0.60	0.80	1590	2650	3180	4770
5.0	2	0.067	0.75	1.00	2010	3350	4020	6030
6.0	2	0.080	0.90	1.20	2400	4000	4800	7200



Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.020	0.30	0.30	600	1000	1200	1800
2.0	2	0.027	0.40	0.40	810	1350	1620	2430
3.0	2	0.040	0.60	0.60	1200	2000	2400	3600
4.0	2	0.053	0.80	0.80	1590	2650	3180	4770
5.0	2	0.067	1.00	1.00	2010	3350	4020	6030
6.0	2	0.080	1.20	1.20	2400	4000	4800	7200

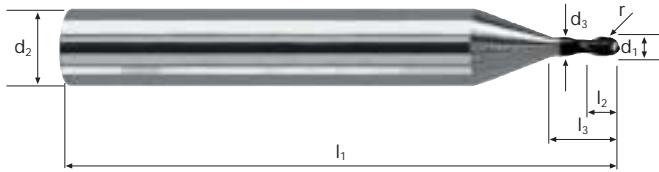
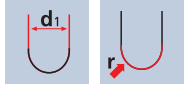


# Ball nose end mills MicrospheroXG

Shank Ø 6mm, cylindrical neck, 3xd



HM  
XA     $\lambda$  30°  
           $\gamma$  15°



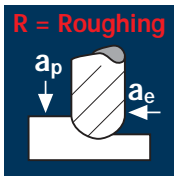
**new!**



Example: Order-N°.										DIAPLUS		
		Coating	Article-N°.	α-Code								
		<b>B</b>	<b>6062</b>	<b>.120</b>							<b>B6062</b>	
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	α	z			
.120	1.5	6	1.4	57	1.5	4.5	0.75	10.3°	2	●		
.140	2.0	6	1.9	57	2.0	6.0	1.00	9.0°	2	●		
.180	3.0	6	2.8	57	3.0	9.0	1.50	6.4°	2	●		
.220	4.0	6	3.8	57	4.0	12.0	2.00	4.1°	2	●		
.260	5.0	6	4.8	57	5.0	15.0	2.50	2.0°	2	●		
.300	6.0	6	5.8	57	6.0	18.0	3.00	0.0°	2	●		

IV

### Application



### Material

Graphite

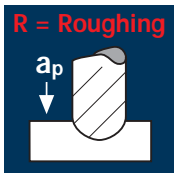
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.10	0.10	60	100	120	180
0.3	2	0.004	0.15	0.20	120	200	240	360
0.4	2	0.005	0.20	0.25	150	250	300	450
0.5	2	0.006	0.25	0.30	180	300	360	540
0.6	2	0.007	0.25	0.35	210	350	420	630
0.8	2	0.009	0.35	0.50	270	450	540	810
1.0	2	0.012	0.45	0.60	360	600	720	1080
1.5	2	0.018	0.70	0.90	540	900	1080	1620
2.0	2	0.024	0.90	1.20	720	1200	1440	2160

Graphite

**B**

3.0	2	0.035	1.35	1.80	1050	1750	2100	3150
4.0	2	0.047	1.80	2.40	1410	2350	2820	4230
5.0	2	0.059	2.25	3.00	1770	2950	3540	5310
6.0	2	0.071	2.70	3.60	2130	3550	4260	6390



Graphite

**B**

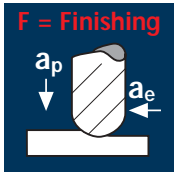
0.2	2	0.002	0.10	0.20	60	100	120	180
0.3	2	0.003	0.15	0.30	90	150	180	270
0.4	2	0.004	0.20	0.40	120	200	240	360
0.5	2	0.005	0.25	0.50	150	250	300	450
0.6	2	0.005	0.25	0.60	150	250	300	450
0.8	2	0.007	0.35	0.80	210	350	420	630
1.0	2	0.009	0.45	1.00	270	450	540	810
1.5	2	0.014	0.70	1.50	420	700	840	1260
2.0	2	0.018	0.90	2.00	540	900	1080	1620

Graphite

**B**

3.0	2	0.027	1.35	3.00	810	1350	1620	2430
4.0	2	0.036	1.80	4.00	1080	1800	2160	3240
5.0	2	0.045	2.25	5.00	1350	2250	2700	4050
6.0	2	0.055	2.70	6.00	1650	2750	3300	4950

### Application



### Material

Graphite

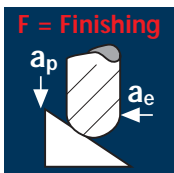
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.003	0.03	0.04	90	150	180	270
0.3	2	0.004	0.04	0.06	120	200	240	360
0.4	2	0.005	0.06	0.08	150	250	300	450
0.5	2	0.007	0.07	0.10	210	350	420	630
0.6	2	0.008	0.08	0.12	240	400	480	720
0.8	2	0.011	0.11	0.16	330	550	660	990
1.0	2	0.013	0.14	0.20	390	650	780	1170
1.5	2	0.020	0.21	0.30	600	1000	1200	1800
2.0	2	0.027	0.28	0.40	810	1350	1620	2430

Graphite

**B**

3.0	2	0.040	0.42	0.60	1200	2000	2400	3600
4.0	2	0.053	0.56	0.80	1590	2650	3180	4770
5.0	2	0.067	0.70	1.00	2010	3350	4020	6030
6.0	2	0.080	0.84	1.20	2400	4000	4800	7200



Graphite

**B**

0.2	2	0.003	0.04	0.04	90	150	180	270
0.3	2	0.004	0.05	0.05	120	200	240	360
0.4	2	0.005	0.07	0.07	150	250	300	450
0.5	2	0.007	0.09	0.09	210	350	420	630
0.6	2	0.008	0.11	0.11	240	400	480	720
0.8	2	0.011	0.14	0.14	330	550	660	990
1.0	2	0.013	0.18	0.18	390	650	780	1170
1.5	2	0.020	0.27	0.27	600	1000	1200	1800
2.0	2	0.027	0.36	0.36	810	1350	1620	2430

Graphite

**B**

3.0	2	0.040	0.54	0.54	1200	2000	2400	3600
4.0	2	0.053	0.72	0.72	1590	2650	3180	4770
5.0	2	0.067	0.90	0.90	2010	3350	4020	6030
6.0	2	0.080	1.08	1.08	2400	4000	4800	7200

# Ball nose end mills MicrospheroXG

Shank  $\varnothing$  6mm, cylindrical neck, 5xd

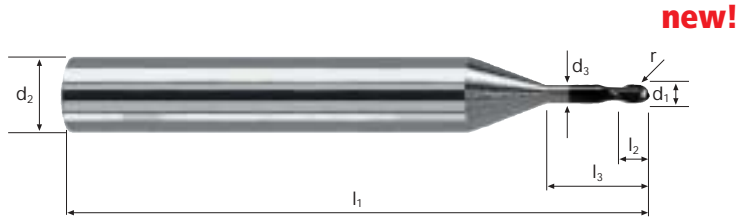


**HM**  $\lambda$  30°  
**XA**  $\gamma$  15°

**h5**

**d1**

**r**

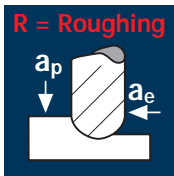


**C** Graphite

**CF/GF** Fiber Reinforced Plastics

Example: Order-N°.										DIAPLUS	
										B6064	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	Z		
.020	0.2	6	0.18	57	0.2	1.0	0.10	13.9°	2	●	
.030	0.3	6	0.25	57	0.3	1.5	0.15	13.3°	2	●	
.040	0.4	6	0.35	57	0.4	2.0	0.20	12.8°	2	●	
.050	0.5	6	0.45	57	0.5	2.5	0.25	12.3°	2	●	
.060	0.6	6	0.55	57	0.6	3.0	0.30	11.9°	2	●	
.080	0.8	6	0.75	57	0.8	4.0	0.40	11.0°	2	●	
.100	1.0	6	0.90	57	1.0	5.0	0.50	10.1°	2	●	
.120	1.5	6	1.40	57	1.5	7.5	0.75	8.4°	2	●	
.140	2.0	6	1.90	57	2.0	10.0	1.00	6.9°	2	●	
.180	3.0	6	2.80	57	3.0	15.0	1.50	4.4°	2	●	
.182	3.0	6	2.80	61	3.0	18.0	1.50	3.9°	2	●	
.220	4.0	6	3.80	61	4.0	20.0	2.00	2.6°	2	●	
.222	4.0	6	3.80	66	4.0	25.0	2.00	2.2°	2	●	
.260	5.0	6	4.80	66	5.0	25.0	2.50	1.2°	2	●	
.300	6.0	6	5.80	69	6.0	30.0	3.00	0.0°	2	●	

### Application



### Material

Graphite

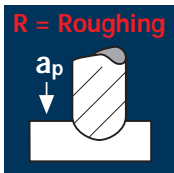
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.10	0.10	60	100	120	180
0.3	2	0.004	0.10	0.20	120	200	240	360
0.4	2	0.005	0.15	0.25	150	250	300	450
0.5	2	0.006	0.20	0.30	180	300	360	540
0.6	2	0.007	0.25	0.35	210	350	420	630
0.8	2	0.009	0.30	0.50	270	450	540	810
1.0	2	0.012	0.40	0.60	360	600	720	1080
1.5	2	0.018	0.60	0.90	540	900	1080	1620
2.0	2	0.024	0.80	1.20	720	1200	1440	2160

Graphite

**B**

3.0	2	0.035	1.20	1.80	1050	1750	2100	3150
4.0	2	0.047	1.60	2.40	1410	2350	2820	4230
5.0	2	0.059	2.00	3.00	1770	2950	3540	5310
6.0	2	0.071	2.40	3.60	2130	3550	4260	6390



Graphite

**B**

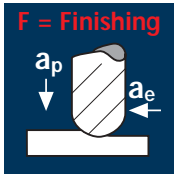
0.2	2	0.002	0.10	0.20	60	100	120	180
0.3	2	0.003	0.10	0.30	90	150	180	270
0.4	2	0.004	0.15	0.40	120	200	240	360
0.5	2	0.005	0.20	0.50	150	250	300	450
0.6	2	0.005	0.25	0.60	150	250	300	450
0.8	2	0.007	0.30	0.80	210	350	420	630
1.0	2	0.009	0.40	1.00	270	450	540	810
1.5	2	0.014	0.60	1.50	420	700	840	1260
2.0	2	0.018	0.80	2.00	540	900	1080	1620

Graphite

**B**

3.0	2	0.027	1.20	3.00	810	1350	1620	2430
4.0	2	0.036	1.60	4.00	1080	1800	2160	3240
5.0	2	0.045	2.00	5.00	1350	2250	2700	4050
6.0	2	0.055	2.40	6.00	1650	2750	3300	4950

### Application



### Material

Graphite

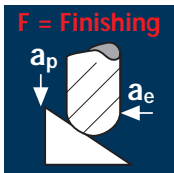
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.003	0.02	0.04	90	150	180	270
0.3	2	0.004	0.04	0.05	120	200	240	360
0.4	2	0.005	0.05	0.07	150	250	300	450
0.5	2	0.007	0.06	0.09	210	350	420	630
0.6	2	0.008	0.07	0.11	240	400	480	720
0.8	2	0.011	0.10	0.14	330	550	660	990
1.0	2	0.013	0.12	0.18	390	650	780	1170
1.5	2	0.020	0.18	0.27	600	1000	1200	1800
2.0	2	0.027	0.24	0.36	810	1350	1620	2430

Graphite

**B**

3.0	2	0.040	0.36	0.54	1200	2000	2400	3600
4.0	2	0.053	0.48	0.72	1590	2650	3180	4770
5.0	2	0.067	0.60	0.90	2010	3350	4020	6030
6.0	2	0.080	0.72	1.08	2400	4000	4800	7200



Graphite

**B**

0.2	2	0.003	0.03	0.03	90	150	180	270
0.3	2	0.004	0.05	0.05	120	200	240	360
0.4	2	0.005	0.06	0.06	150	250	300	450
0.5	2	0.007	0.08	0.08	210	350	420	630
0.6	2	0.008	0.10	0.10	240	400	480	720
0.8	2	0.011	0.13	0.13	330	550	660	990
1.0	2	0.013	0.16	0.16	390	650	780	1170
1.5	2	0.020	0.24	0.24	600	1000	1200	1800
2.0	2	0.027	0.32	0.32	810	1350	1620	2430

Graphite

**B**

3.0	2	0.040	0.48	0.48	1200	2000	2400	3600
4.0	2	0.053	0.64	0.64	1590	2650	3180	4770
5.0	2	0.067	0.80	0.80	2010	3350	4020	6030
6.0	2	0.080	0.96	0.96	2400	4000	4800	7200

# Ball nose end mills MicrospheroXG

Shank  $\varnothing$  6mm, cylindrical neck, 8xd



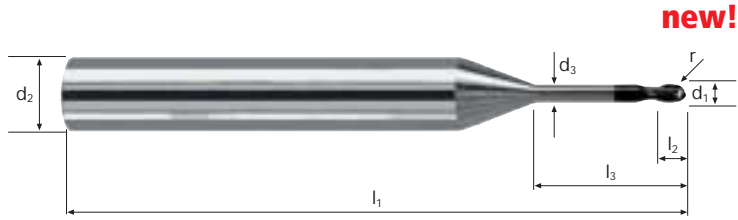
HM  
XA

$\lambda$  30°  
 $\gamma$  15°

h5

d1

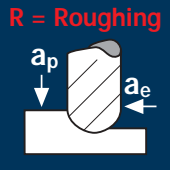

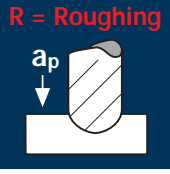

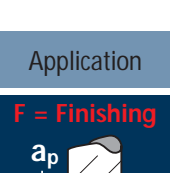



r



C  
Graphite

CF/GF  
Fiber Reinforced Plastics

Example: Order-N°.										DIAPLUS	
										B6066	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	z		
.020	0.2	6	0.18	57	0.2	1.6	0.10	13.2°	2	●	
.030	0.3	6	0.25	57	0.3	2.4	0.15	12.4°	2	●	
.040	0.4	6	0.35	57	0.4	3.2	0.20	11.7°	2	●	
.050	0.5	6	0.45	57	0.5	4.0	0.25	11.1°	2	●	
.060	0.6	6	0.55	57	0.6	4.8	0.30	10.5°	2	●	
.080	0.8	6	0.75	57	0.8	6.4	0.40	9.4°	2	●	
.100	1.0	6	0.90	57	1.0	8.0	0.50	8.4°	2	●	
.120	1.5	6	1.40	57	1.5	12.0	0.75	6.5°	2	●	
.140	2.0	6	1.90	61	2.0	16.0	1.00	5.1°	2	●	
.180	3.0	6	2.80	66	3.0	24.0	1.50	3.1°	2	●	
.220	4.0	6	3.80	75	4.0	32.0	2.00	1.7°	2	●	
.260	5.0	6	4.80	80	5.0	40.0	2.50	0.8°	2	●	
.300	6.0	6	5.80	87	6.0	48.0	3.00	0.0°	2	●	

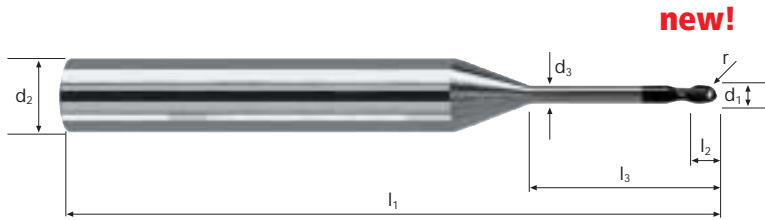
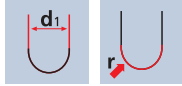
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite  <b>B</b>	0.4	2	0.005	0.15	0.15	150	250	300	450
		0.5	2	0.006	0.20	0.20	180	300	360	540
		0.6	2	0.007	0.25	0.25	210	350	420	630
		0.8	2	0.009	0.30	0.30	270	450	540	810
		1.0	2	0.012	0.40	0.40	360	600	720	1080
		1.5	2	0.018	0.60	0.60	540	900	1080	1620
		2.0	2	0.024	0.80	0.80	720	1200	1440	2160
		3.0	2	0.035	1.20	1.20	1050	1750	2100	3150
		4.0	2	0.047	1.60	1.60	1410	2350	2820	4230
		5.0	2	0.059	2.00	2.00	1770	2950	3540	5310
6.0	2	0.071	2.40	2.40	2130	3550	4260	6390		
<b>R = Roughing</b> 	Graphite  <b>B</b>	0.4	2	0.003	0.10	0.40	90	150	180	270
		0.5	2	0.004	0.15	0.50	120	200	240	360
		0.6	2	0.004	0.20	0.60	120	200	240	360
		0.8	2	0.006	0.25	0.80	180	300	360	540
		1.0	2	0.007	0.30	1.00	210	350	420	630
		1.5	2	0.011	0.45	1.50	330	550	660	990
		2.0	2	0.015	0.60	2.00	450	750	900	1350
		3.0	2	0.022	0.90	3.00	660	1100	1320	1980
		4.0	2	0.029	1.20	4.00	870	1450	1740	2610
		5.0	2	0.036	1.50	5.00	1080	1800	2160	3240
6.0	2	0.044	1.80	6.00	1320	2200	2640	3960		
<b>R = Roughing</b> 	Graphite  <b>B</b>	0.4	2	0.005	0.04	0.06	150	250	300	450
		0.5	2	0.007	0.05	0.08	210	350	420	630
		0.6	2	0.008	0.06	0.10	240	400	480	720
		0.8	2	0.011	0.08	0.13	330	550	660	990
		1.0	2	0.013	0.10	0.16	390	650	780	1170
		1.5	2	0.020	0.15	0.24	600	1000	1200	1800
		2.0	2	0.027	0.20	0.32	810	1350	1620	2430
		3.0	2	0.040	0.30	0.48	1200	2000	2400	3600
		4.0	2	0.053	0.40	0.64	1590	2650	3180	4770
		5.0	2	0.067	0.50	0.80	2010	3350	4020	6030
6.0	2	0.080	0.60	0.96	2400	4000	4800	7200		
<b>F = Finishing</b> 	Graphite  <b>B</b>	0.4	2	0.005	0.06	0.06	150	250	300	450
		0.5	2	0.007	0.07	0.07	210	350	420	630
		0.6	2	0.008	0.08	0.08	240	400	480	720
		0.8	2	0.011	0.11	0.11	330	550	660	990
		1.0	2	0.013	0.14	0.14	390	650	780	1170
		1.5	2	0.020	0.21	0.21	600	1000	1200	1800
		2.0	2	0.027	0.28	0.28	810	1350	1620	2430
		3.0	2	0.040	0.42	0.42	1200	2000	2400	3600
		4.0	2	0.053	0.56	0.56	1590	2650	3180	4770
		5.0	2	0.067	0.70	0.70	2010	3350	4020	6030
6.0	2	0.080	0.84	0.84	2400	4000	4800	7200		

# Ball nose end mills MicrospheroXG

Shank  $\varnothing$  6mm, cylindrical neck, 10xd

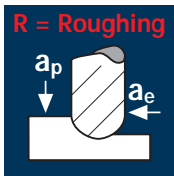


HM  
XA  $\lambda$  30°  
 $\gamma$  15°



Example: Order-N°.										DIAPLUS	
			Coating <b>B</b>	Article-N°. <b>6068</b>	$\alpha$ -Code <b>.040</b>						
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	Z		
.040	0.4	6	0.35	57	0.4	4.0	0.20	11.1°	2	●	
.050	0.5	6	0.45	57	0.5	5.0	0.25	10.4°	2	●	
.060	0.6	6	0.55	57	0.6	6.0	0.30	9.7°	2	●	
.080	0.8	6	0.75	57	0.8	8.0	0.40	8.5°	2	●	
.100	1.0	6	0.90	57	1.0	10.0	0.50	7.5°	2	●	
.120	1.5	6	1.40	61	1.5	15.0	0.75	5.7°	2	●	
.140	2.0	6	1.90	66	2.0	20.0	1.00	4.3°	2	●	
.180	3.0	6	2.80	75	3.0	30.0	1.50	2.5°	2	●	
.220	4.0	6	3.80	80	4.0	40.0	2.00	1.4°	2	●	
.260	5.0	6	4.80	100	5.0	50.0	2.50	0.6°	2	●	
.300	6.0	6	5.80	100	6.0	60.0	3.00	0.0°	2	●	

### Application

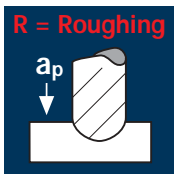


### Material

Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.4	2	0.004	0.10	0.15	120	200	240	360
0.5	2	0.005	0.15	0.20	150	250	300	450
0.6	2	0.006	0.20	0.25	180	300	360	540
0.8	2	0.008	0.25	0.30	240	400	480	720
1.0	2	0.009	0.30	0.40	270	450	540	810
1.5	2	0.014	0.45	0.60	420	700	840	1260
2.0	2	0.019	0.60	0.80	570	950	1140	1710

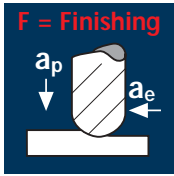


Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.4	2	0.003	0.10	0.40	90	150	180	270
0.5	2	0.004	0.10	0.50	120	200	240	360
0.6	2	0.004	0.10	0.60	120	200	240	360
0.8	2	0.006	0.15	0.80	180	300	360	540
1.0	2	0.007	0.20	1.00	210	350	420	630
1.5	2	0.011	0.30	1.50	330	550	660	990
2.0	2	0.015	0.40	2.00	450	750	900	1350

### Application

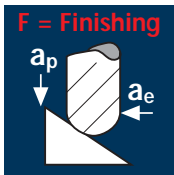


### Material

Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.4	2	0.004	0.04	0.06	120	200	240	360
0.5	2	0.005	0.05	0.07	150	250	300	450
0.6	2	0.006	0.06	0.08	180	300	360	540
0.8	2	0.009	0.08	0.11	270	450	540	810
1.0	2	0.011	0.10	0.14	330	550	660	990
1.5	2	0.016	0.15	0.21	480	800	960	1440
2.0	2	0.021	0.20	0.28	630	1050	1260	1890



Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.4	2	0.004	0.04	0.04	120	200	240	360
0.5	2	0.005	0.05	0.05	150	250	300	450
0.6	2	0.006	0.06	0.06	180	300	360	540
0.8	2	0.009	0.08	0.08	270	450	540	810
1.0	2	0.011	0.10	0.10	330	550	660	990
1.5	2	0.016	0.15	0.15	480	800	960	1440
2.0	2	0.021	0.20	0.20	630	1050	1260	1890

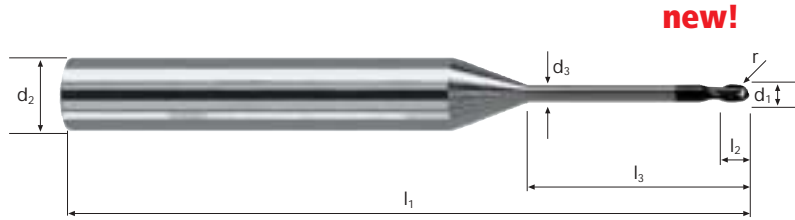
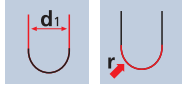


# Ball nose end mills MicrospheroXG

Shank  $\varnothing$  6mm, cylindrical neck, 12xd



**HM**  $\lambda$  30°  
**XA**  $\gamma$  15°

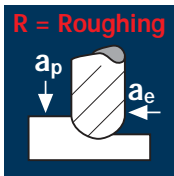


				<b>C</b> Graphite							<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°.										DIAPLUS		
			Coating <b>B</b>	Article-N° <b>6070</b>	$\alpha$ -Code <b>.040</b>						<b>B6070</b>	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	z			
.040	0.4	6	0.35	57	0.4	4.8	0.20	10.5°	2	●		
.050	0.5	6	0.45	57	0.5	6.0	0.25	9.7°	2	●		
.060	0.6	6	0.55	57	0.6	7.2	0.30	9.0°	2	●		
.080	0.8	6	0.75	57	0.8	9.6	0.40	7.8°	2	●		
.100	1.0	6	0.90	61	1.0	12.0	0.50	6.8°	2	●		
.120	1.5	6	1.40	66	1.5	18.0	0.75	5.0°	2	●		
.140	2.0	6	1.90	69	2.0	24.0	1.00	3.4°	2	●		

### Application

### Material



Graphite

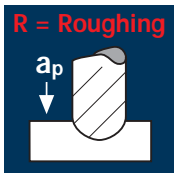
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.10	0.10	60	100	120	180
0.3	2	0.003	0.15	0.20	90	150	180	270
0.4	2	0.004	0.20	0.25	120	200	240	360
0.5	2	0.005	0.25	0.30	150	250	300	450
0.6	2	0.006	0.30	0.35	180	300	360	540
0.8	2	0.008	0.40	0.50	240	400	480	720
1.0	2	0.009	0.50	0.60	270	450	540	810
1.2	2	0.011	0.60	0.70	330	550	660	990
1.5	2	0.014	0.75	0.90	420	700	840	1260

Graphite

**B**

2.0	2	0.019	1.00	1.20	570	950	1140	1710
2.5	2	0.024	1.25	1.50	720	1200	1440	2160
3.0	2	0.028	1.50	1.80	840	1400	1680	2520



Graphite

**B**

0.2	2	0.001	0.10	0.20	30	50	60	90
0.3	2	0.002	0.15	0.30	60	100	120	180
0.4	2	0.003	0.20	0.40	90	150	180	270
0.5	2	0.004	0.25	0.50	120	200	240	360
0.6	2	0.004	0.30	0.60	120	200	240	360
0.8	2	0.006	0.40	0.80	180	300	360	540
1.0	2	0.007	0.50	1.00	210	350	420	630
1.2	2	0.009	0.60	1.20	270	450	540	810
1.5	2	0.011	0.75	1.50	330	550	660	990

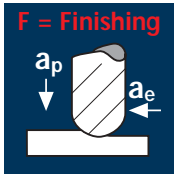
Graphite

**B**

2.0	2	0.015	1.00	2.00	450	750	900	1350
2.5	2	0.018	1.25	2.50	540	900	1080	1620
3.0	2	0.022	1.50	3.00	660	1100	1320	1980

### Application

### Material



Graphite

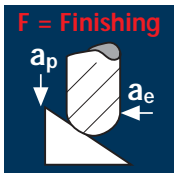
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.03	0.04	60	100	120	180
0.3	2	0.003	0.05	0.06	90	150	180	270
0.4	2	0.004	0.06	0.08	120	200	240	360
0.5	2	0.005	0.08	0.10	150	250	300	450
0.6	2	0.006	0.09	0.12	180	300	360	540
0.8	2	0.009	0.12	0.16	270	450	540	810
1.0	2	0.011	0.15	0.20	330	550	660	990
1.2	2	0.013	0.18	0.24	390	650	780	1170
1.5	2	0.016	0.23	0.30	480	800	960	1440

Graphite

**B**

2.0	2	0.021	0.30	0.40	630	1050	1260	1890
2.5	2	0.027	0.38	0.50	810	1350	1620	2430
3.0	2	0.032	0.45	0.60	960	1600	1920	2880



Graphite

**B**

0.2	2	0.002	0.04	0.04	60	100	120	180
0.3	2	0.003	0.06	0.06	90	150	180	270
0.4	2	0.004	0.08	0.08	120	200	240	360
0.5	2	0.005	0.10	0.10	150	250	300	450
0.6	2	0.006	0.12	0.12	180	300	360	540
0.8	2	0.009	0.16	0.16	270	450	540	810
1.0	2	0.011	0.20	0.20	330	550	660	990
1.2	2	0.013	0.24	0.24	390	650	780	1170
1.5	2	0.016	0.30	0.30	480	800	960	1440

Graphite

**B**

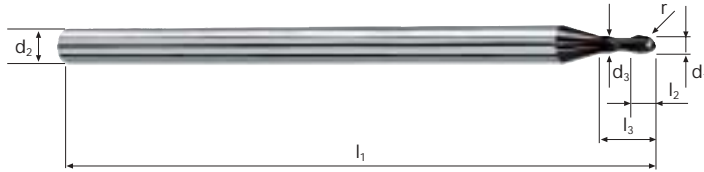
2.0	2	0.021	0.40	0.40	630	1050	1260	1890
2.5	2	0.027	0.50	0.50	810	1350	1620	2430
3.0	2	0.032	0.60	0.60	960	1600	1920	2880

# Ball nose end mills Microcut-B3

Shank  $\varnothing$  3mm, cylindrical neck, 3xd



<b>HM</b>	$\lambda$ 30°
<b>Micro</b>	$\gamma$ 5°

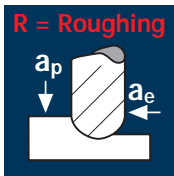


			<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°.										DIAMANT	
										B5782	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.01$	$\alpha$	$Z$		
.020	0.2	3	0.18	40	0.2	0.6	0.10	9.4°	2	●	
.030	0.3	3	0.25	40	0.3	0.9	0.15	9.0°	2	●	
.040	0.4	3	0.35	40	0.5	1.2	0.20	8.7°	2	●	
.050	0.5	3	0.45	40	0.6	1.5	0.25	11.8°	2	●	
.060	0.6	3	0.55	40	0.7	1.8	0.30	11.2°	2	●	
.080	0.8	3	0.75	40	0.9	2.4	0.40	10.1°	2	●	
.100	1.0	3	0.95	50	1.2	3.0	0.50	9.0°	2	●	
.108	1.2	3	1.15	50	1.4	3.6	0.60	7.9°	2	●	
.120	1.5	3	1.45	50	1.8	4.5	0.75	6.5°	2	●	
.140	2.0	3	1.95	50	2.4	6.0	1.00	4.1°	2	●	
.160	2.5	3	2.45	50	3.0	7.5	1.25	2.0°	2	●	
.180	3.0	3	2.95	50	3.6	9.0	1.50	0.0°	2	●	

IV

### Application



### Material

Graphite

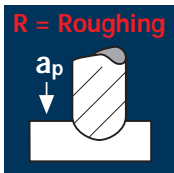
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.25	0.30	150	250	300	450
0.6	2	0.006	0.25	0.35	180	300	360	540
0.7	2	0.007	0.30	0.40	210	350	420	630
0.8	2	0.008	0.35	0.50	240	400	480	720
0.9	2	0.008	0.40	0.55	240	400	480	720
1.0	2	0.009	0.45	0.60	270	450	540	810
1.2	2	0.011	0.55	0.70	330	550	660	990
1.5	2	0.014	0.70	0.90	420	700	840	1260
1.8	2	0.017	0.80	1.10	510	850	1020	1530

Graphite

**B**

2.0	2	0.019	0.90	1.20	570	950	1140	1710
2.3	2	0.022	1.05	1.40	660	1100	1320	1980
2.5	2	0.024	1.15	1.50	720	1200	1440	2160
2.8	2	0.026	1.25	1.70	780	1300	1560	2340
3.0	2	0.028	1.35	1.80	840	1400	1680	2520



Graphite

**B**

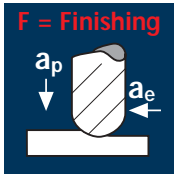
0.5	2	0.004	0.25	0.50	120	200	240	360
0.6	2	0.004	0.25	0.60	120	200	240	360
0.7	2	0.005	0.30	0.70	150	250	300	450
0.8	2	0.006	0.35	0.80	180	300	360	540
0.9	2	0.007	0.40	0.90	210	350	420	630
1.0	2	0.007	0.45	1.00	210	350	420	630
1.2	2	0.009	0.55	1.20	270	450	540	810
1.5	2	0.011	0.70	1.50	330	550	660	990
1.8	2	0.013	0.80	1.80	390	650	780	1170

Graphite

**B**

2.0	2	0.015	0.90	2.00	450	750	900	1350
2.3	2	0.017	1.05	2.30	510	850	1020	1530
2.5	2	0.018	1.15	2.50	540	900	1080	1620
2.8	2	0.020	1.25	2.80	600	1000	1200	1800
3.0	2	0.022	1.35	3.00	660	1100	1320	1980

### Application



### Material

Graphite

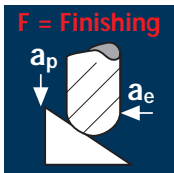
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.07	0.10	150	250	300	450
0.6	2	0.006	0.08	0.12	180	300	360	540
0.7	2	0.007	0.10	0.14	210	350	420	630
0.8	2	0.009	0.11	0.16	270	450	540	810
0.9	2	0.010	0.13	0.18	300	500	600	900
1.0	2	0.011	0.14	0.20	330	550	660	990
1.2	2	0.013	0.17	0.24	390	650	780	1170
1.5	2	0.016	0.21	0.30	480	800	960	1440
1.8	2	0.019	0.25	0.36	570	950	1140	1710

Graphite

**B**

2.0	2	0.021	0.28	0.40	630	1050	1260	1890
2.3	2	0.025	0.32	0.46	750	1250	1500	2250
2.5	2	0.027	0.35	0.50	810	1350	1620	2430
2.8	2	0.030	0.39	0.56	900	1500	1800	2700
3.0	2	0.032	0.42	0.60	960	1600	1920	2880



Graphite

**B**

0.5	2	0.005	0.09	0.09	150	250	300	450
0.6	2	0.006	0.11	0.11	180	300	360	540
0.7	2	0.007	0.13	0.13	210	350	420	630
0.8	2	0.009	0.14	0.14	270	450	540	810
0.9	2	0.010	0.16	0.16	300	500	600	900
1.0	2	0.011	0.18	0.18	330	550	660	990
1.2	2	0.013	0.22	0.22	390	650	780	1170
1.5	2	0.016	0.27	0.27	480	800	960	1440
1.8	2	0.019	0.32	0.32	570	950	1140	1710

Graphite

**B**

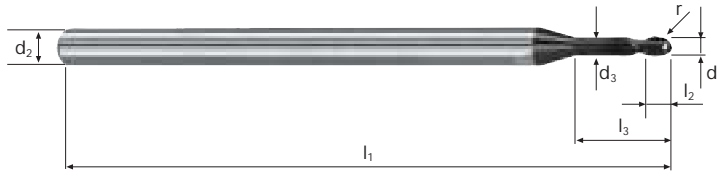
2.0	2	0.021	0.36	0.36	630	1050	1260	1890
2.3	2	0.025	0.41	0.41	750	1250	1500	2250
2.5	2	0.027	0.45	0.45	810	1350	1620	2430
2.8	2	0.030	0.50	0.50	900	1500	1800	2700
3.0	2	0.032	0.54	0.54	960	1600	1920	2880

# Ball nose end mills Microcut-B5

Shank  $\varnothing$  3mm, cylindrical neck, 5xd



HM  
Micro  $\lambda$  30°  
 $\gamma$  5°



**C**  
Graphite

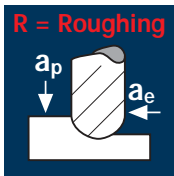
**CF/GF**  
Fiber Reinforced Plastics

										DIAMANT		
Example: Order-N°. <span style="margin-left: 20px;">Coating</span> <span style="margin-left: 20px;">Article-N°.</span> <span style="margin-left: 20px;"><math>\alpha</math>-Code</span> <span style="margin-left: 20px;"><b>B</b></span> <span style="margin-left: 20px;"><b>5784</b></span> <span style="margin-left: 20px;"><b>.050</b></span>												
										<input type="text" value=""/>	<b>B5784</b>	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ $\frac{h6}{3}$	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.01$	$\alpha$	Z			
.050	0.5	3	0.45	40	0.6	2.5	0.25	10.1°	2	●		
.060	0.6	3	0.55	40	0.7	3.0	0.30	9.4°	2	●		
.070	0.7	3	0.65	40	0.8	3.5	0.35	8.7°	2	●		
.080	0.8	3	0.75	40	1.0	4.0	0.40	8.1°	2	●		
.090	0.9	3	0.85	40	1.1	4.5	0.45	7.4°	2	●		
.100	1.0	3	0.95	50	1.2	5.0	0.50	6.9°	2	●		
.108	1.2	3	1.15	50	1.4	6.0	0.60	5.8°	2	●		
.120	1.5	3	1.45	50	1.8	7.5	0.75	4.5°	2	●		
.132	1.8	3	1.75	50	2.2	9.0	0.90	3.3°	2	●		
.140	2.0	3	1.95	50	2.4	10.0	1.00	2.7°	2	●		
.152	2.3	3	2.25	50	2.8	11.5	1.15	1.8°	2	●		
.160	2.5	3	2.45	50	3.0	12.5	1.25	1.2°	2	●		
.172	2.8	3	2.75	50	3.4	14.0	1.40	0.5°	2	●		
.180	3.0	3	2.95	50	3.6	15.0	1.50	0.0°	2	●		

**IV**

### Application

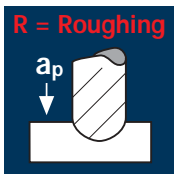
### Material



Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.20	0.30	150	250	300	450
0.6	2	0.006	0.25	0.35	180	300	360	540
0.8	2	0.008	0.30	0.50	240	400	480	720
1.0	2	0.009	0.40	0.60	270	450	540	810
1.2	2	0.011	0.50	0.70	330	550	660	990
1.5	2	0.014	0.60	0.90	420	700	840	1260
2.0	2	0.019	0.80	1.20	570	950	1140	1710
2.5	2	0.024	1.00	1.50	720	1200	1440	2160
3.0	2	0.028	1.20	1.80	840	1400	1680	2520



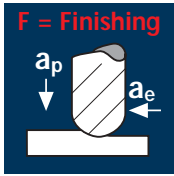
Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.004	0.20	0.50	120	200	240	360
0.6	2	0.004	0.25	0.60	120	200	240	360
0.8	2	0.006	0.30	0.80	180	300	360	540
1.0	2	0.007	0.40	1.00	210	350	420	630
1.2	2	0.009	0.50	1.20	270	450	540	810
1.5	2	0.011	0.60	1.50	330	550	660	990
2.0	2	0.015	0.80	2.00	450	750	900	1350
2.5	2	0.018	1.00	2.50	540	900	1080	1620
3.0	2	0.022	1.20	3.00	660	1100	1320	1980

### Application

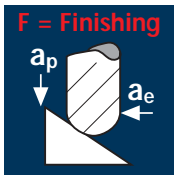
### Material



Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.06	0.09	150	250	300	450
0.6	2	0.006	0.07	0.11	180	300	360	540
0.8	2	0.009	0.10	0.14	270	450	540	810
1.0	2	0.011	0.12	0.18	330	550	660	990
1.2	2	0.013	0.14	0.22	390	650	780	1170
1.5	2	0.016	0.18	0.27	480	800	960	1440
2.0	2	0.021	0.24	0.36	630	1050	1260	1890
2.5	2	0.027	0.30	0.45	810	1350	1620	2430
3.0	2	0.032	0.36	0.54	960	1600	1920	2880



Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.08	0.08	150	250	300	450
0.6	2	0.006	0.10	0.10	180	300	360	540
0.8	2	0.009	0.13	0.13	270	450	540	810
1.0	2	0.011	0.16	0.16	330	550	660	990
1.2	2	0.013	0.19	0.19	390	650	780	1170
1.5	2	0.016	0.24	0.24	480	800	960	1440
2.0	2	0.021	0.32	0.32	630	1050	1260	1890
2.5	2	0.027	0.40	0.40	810	1350	1620	2430
3.0	2	0.032	0.48	0.48	960	1600	1920	2880

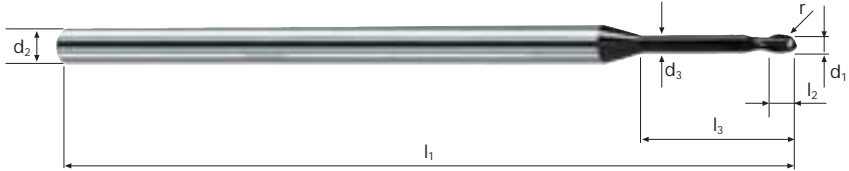
# Ball nose end mills Microcut-B8

Shank  $\varnothing$  3mm, cylindrical neck, 8xd



**HM**  
**Micro**

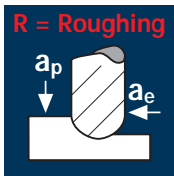
$\lambda$  **30°**  
 $\gamma$  **5°**



				<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°.										<b>DIAMANT</b>	
			Coating <b>B</b>	Article-N°. <b>5786</b>	$\alpha$ -Code <b>.050</b>					<b>B5786</b>	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.01$	$\alpha$	$z$		
.050	0.5	3	0.45	40	0.6	4.0	0.25	8.4°	2	●	
.060	0.6	3	0.55	40	0.7	4.8	0.30	7.6°	2	●	
.080	0.8	3	0.75	40	1.0	6.4	0.40	6.2°	2	●	
.100	1.0	3	0.95	50	1.2	8.0	0.50	5.1°	2	●	
.108	1.2	3	1.15	50	1.4	9.6	0.60	4.2°	2	●	
.120	1.5	3	1.45	60	1.8	12.0	0.75	3.1°	2	●	
.140	2.0	3	1.95	60	2.4	16.0	1.00	1.7°	2	●	
.160	2.5	3	2.45	60	3.0	20.0	1.25	0.8°	2	●	
.180	3.0	3	2.95	60	3.6	24.0	1.50	0.0°	2	●	

### Application

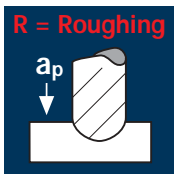


### Material

Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.20	0.20	150	250	300	450
0.6	2	0.006	0.25	0.25	180	300	360	540
0.8	2	0.008	0.30	0.30	240	400	480	720
1.0	2	0.009	0.40	0.40	270	450	540	810
1.2	2	0.011	0.50	0.50	330	550	660	990
1.5	2	0.014	0.60	0.60	420	700	840	1260
2.0	2	0.019	0.80	0.80	570	950	1140	1710
2.5	2	0.024	1.00	1.00	720	1200	1440	2160
3.0	2	0.028	1.20	1.20	840	1400	1680	2520

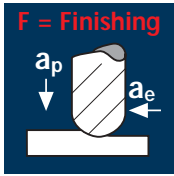


Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.003	0.15	0.50	90	150	180	270
0.6	2	0.003	0.20	0.60	90	150	180	270
0.8	2	0.004	0.25	0.80	120	200	240	360
1.0	2	0.005	0.30	1.00	150	250	300	450
1.2	2	0.007	0.35	1.20	210	350	420	630
1.5	2	0.008	0.45	1.50	240	400	480	720
2.0	2	0.011	0.60	2.00	330	550	660	990
2.5	2	0.014	0.75	2.50	420	700	840	1260
3.0	2	0.016	0.90	3.00	480	800	960	1440

### Application

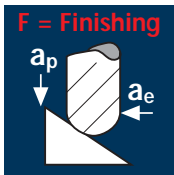


### Material

Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.05	0.08	150	250	300	450
0.6	2	0.006	0.06	0.10	180	300	360	540
0.8	2	0.009	0.08	0.13	270	450	540	810
1.0	2	0.011	0.10	0.16	330	550	660	990
1.2	2	0.013	0.12	0.19	390	650	780	1170
1.5	2	0.016	0.15	0.24	480	800	960	1440
2.0	2	0.021	0.20	0.32	630	1050	1260	1890
2.5	2	0.027	0.25	0.40	810	1350	1620	2430
3.0	2	0.032	0.30	0.48	960	1600	1920	2880



Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.07	0.07	150	250	300	450
0.6	2	0.006	0.08	0.08	180	300	360	540
0.8	2	0.009	0.11	0.11	270	450	540	810
1.0	2	0.011	0.14	0.14	330	550	660	990
1.2	2	0.013	0.17	0.17	390	650	780	1170
1.5	2	0.016	0.21	0.21	480	800	960	1440
2.0	2	0.021	0.28	0.28	630	1050	1260	1890
2.5	2	0.027	0.35	0.35	810	1350	1620	2430
3.0	2	0.032	0.42	0.42	960	1600	1920	2880

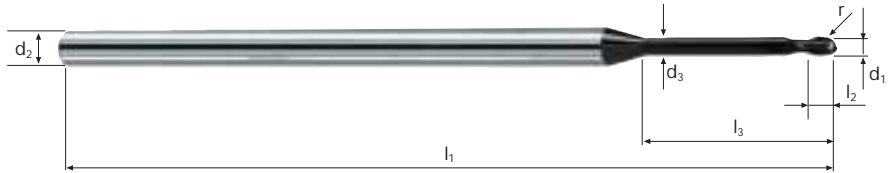


# Ball nose end mills Microcut-B10

Shank  $\varnothing$  3mm, cylindrical neck, 10xd



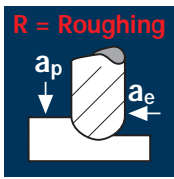
<b>HM</b>	$\lambda$ 30°
<b>Micro</b>	$\gamma$ 5°



				<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
--	--	--	--	----------------------	--	--	--	--	--	---

Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r ±0.01	α	z	DIAMANT	
Example: Order-N°: <b>B</b> <b>5787</b> <b>.050</b>											
										<b>B5787</b>	
<b>.050</b>	0.5	3	0.45	40	0.6	5.0	0.25	7.5°	2	●	
<b>.060</b>	0.6	3	0.55	40	0.7	6.0	0.30	6.7°	2	●	
<b>.080</b>	0.8	3	0.75	40	1.0	8.0	0.40	5.4°	2	●	
<b>.100</b>	1.0	3	0.95	50	1.2	10.0	0.50	4.3°	2	●	
<b>.108</b>	1.2	3	1.15	50	1.4	12.0	0.60	3.5°	2	●	
<b>.120</b>	1.5	3	1.45	60	1.8	15.0	0.75	2.6°	2	●	
<b>.140</b>	2.0	3	1.95	60	2.4	20.0	1.00	1.4°	2	●	
<b>.160</b>	2.5	3	2.45	60	3.0	25.0	1.25	0.6°	2	●	
<b>.180</b>	3.0	3	2.95	60	3.6	30.0	1.50	0.0°	2	●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	

### Application

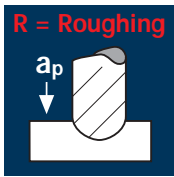


### Material

Graphite

B

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
					vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
1.0	2	0.007	0.30	0.40	210	350	420	630
1.2	2	0.008	0.35	0.50	240	400	480	720
1.5	2	0.011	0.45	0.60	330	550	660	990
2.0	2	0.014	0.60	0.80	420	700	840	1260
2.5	2	0.018	0.75	1.00	540	900	1080	1620
3.0	2	0.021	0.90	1.20	630	1050	1260	1890

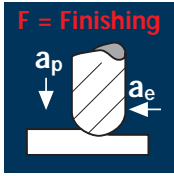


Graphite

B

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
					vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
1.0	2	0.005	0.20	1.00	150	250	300	450
1.2	2	0.007	0.25	1.20	210	350	420	630
1.5	2	0.008	0.30	1.50	240	400	480	720
2.0	2	0.011	0.40	2.00	330	550	660	990
2.5	2	0.014	0.50	2.50	420	700	840	1260
3.0	2	0.016	0.60	3.00	480	800	960	1440

### Application

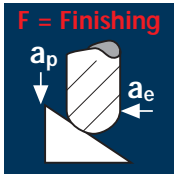


### Material

Graphite

B

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
					vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
1.0	2	0.008	0.10	0.14	240	400	480	720
1.2	2	0.010	0.12	0.17	300	500	600	900
1.5	2	0.012	0.15	0.21	360	600	720	1080
2.0	2	0.016	0.20	0.28	480	800	960	1440
2.5	2	0.020	0.25	0.35	600	1000	1200	1800
3.0	2	0.024	0.30	0.42	720	1200	1440	2160



Graphite

B

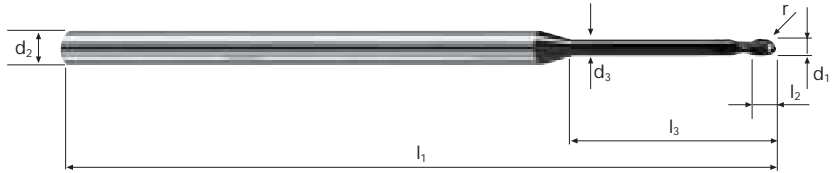
d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
					vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
1.0	2	0.008	0.10	0.10	240	400	480	720
1.2	2	0.010	0.12	0.12	300	500	600	900
1.5	2	0.012	0.15	0.15	360	600	720	1080
2.0	2	0.016	0.20	0.20	480	800	960	1440
2.5	2	0.020	0.25	0.25	600	1000	1200	1800
3.0	2	0.024	0.30	0.30	720	1200	1440	2160

# Ball nose end mills Microcut-B12

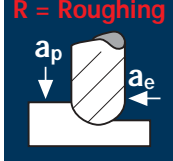
Shank  $\varnothing$  3mm, cylindrical neck, 12xd

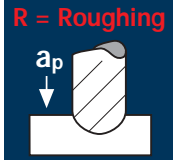


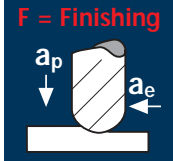
**HM**  
**Micro**     $\lambda$  30°  
                   $\gamma$  5°

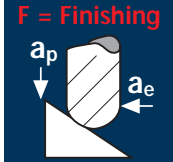


Example: Order-N°.										DIAMANT	
										B5791	●
Coating: <b>B</b> Article-N°: <b>5791</b> $\alpha$ -Code: <b>.100</b>											
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.01$	$\alpha$	$z$		
.100	1.0	3	0.95	50	1.2	12.0	0.50	3.8°	2	●	
.108	1.2	3	1.15	60	1.4	14.4	0.60	3.0°	2	●	
.120	1.5	3	1.45	60	1.8	18.0	0.75	2.2°	2	●	
.140	2.0	3	1.95	60	2.4	24.0	1.00	1.2°	2	●	
.160	2.5	3	2.45	70	3.0	30.0	1.25	0.5°	2	●	
.180	3.0	3	2.95	70	3.6	36.0	1.50	0.0°	2	●	

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
							vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
<b>R = Roughing</b> 	Graphite	1.0	2	0.007	0.20	0.30	210	350	420	630
		1.2	2	0.008	0.25	0.35	240	400	480	720
		1.5	2	0.011	0.30	0.45	330	550	660	990
		2.0	2	0.014	0.40	0.60	420	700	840	1260
		2.5	2	0.018	0.50	0.75	540	900	1080	1620
		3.0	2	0.021	0.60	0.90	630	1050	1260	1890

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
							vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
<b>R = Roughing</b> 	Graphite	1.0	2	0.005	0.10	1.00	150	250	300	450
		1.2	2	0.007	0.10	1.20	210	350	420	630
		1.5	2	0.008	0.15	1.50	240	400	480	720
		2.0	2	0.011	0.20	2.00	330	550	660	990
		2.5	2	0.014	0.25	2.50	420	700	840	1260
		3.0	2	0.016	0.30	3.00	480	800	960	1440

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
							vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
<b>F = Finishing</b> 	Graphite	1.0	2	0.008	0.08	0.10	240	400	480	720
		1.2	2	0.010	0.10	0.12	300	500	600	900
		1.5	2	0.012	0.12	0.15	360	600	720	1080
		2.0	2	0.016	0.16	0.20	480	800	960	1440
		2.5	2	0.020	0.20	0.25	600	1000	1200	1800
		3.0	2	0.024	0.24	0.30	720	1200	1440	2160

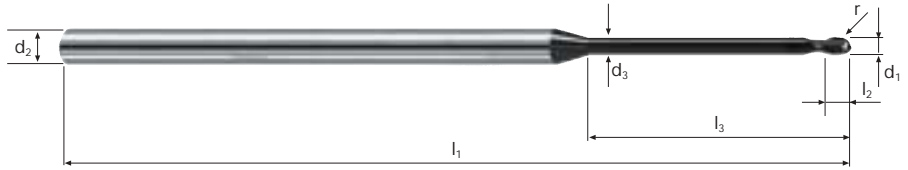
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
							vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
<b>F = Finishing</b> 	Graphite	1.0	2	0.008	0.08	0.08	240	400	480	720
		1.2	2	0.010	0.10	0.10	300	500	600	900
		1.5	2	0.012	0.12	0.12	360	600	720	1080
		2.0	2	0.016	0.16	0.16	480	800	960	1440
		2.5	2	0.020	0.20	0.20	600	1000	1200	1800
		3.0	2	0.024	0.24	0.24	720	1200	1440	2160

# Ball nose end mills Microcut-B15

Shank  $\varnothing$  3mm, cylindrical neck, 15 $\times$ d



HM Micro	$\lambda$ 30° $\gamma$ 5°



				<b>C</b> Graphite						CF/GF Fiber Reinforced Plastics
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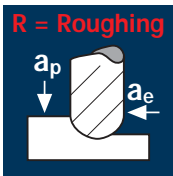
Example: Order-N°.										DIAMANT	
										B5793	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.01$	$\alpha$	$z$		
.100	1.0	3	0.95	60	1.2	15.0	0.50	3.2°	2	●	
.108	1.2	3	1.15	60	1.4	18.0	0.60	2.5°	2	●	
.120	1.5	3	1.45	70	1.8	22.5	0.75	1.8°	2	●	
.140	2.0	3	1.95	70	2.4	30.0	1.00	1.0°	2	●	
.160	2.5	3	2.45	70	3.0	37.5	1.25	0.4°	2	●	
.180	3.0	3	2.95	80	3.6	45.0	1.50	0.0°	2	●	

IV

Application

Material

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
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Graphite

**B**

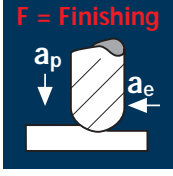
1.0	2	0.007	0.15	0.20	210	350	420	630
1.2	2	0.008	0.20	0.25	240	400	480	720
1.5	2	0.011	0.25	0.30	330	550	660	990
2.0	2	0.014	0.30	0.40	420	700	840	1260
2.5	2	0.018	0.40	0.50	540	900	1080	1620
3.0	2	0.021	0.45	0.60	630	1050	1260	1890




Application

Material

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
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Graphite

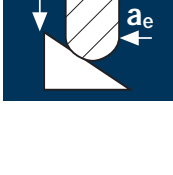
**B**

1.0	2	0.008	0.06	0.08	240	400	480	720
1.2	2	0.010	0.07	0.10	300	500	600	900
1.5	2	0.012	0.09	0.12	360	600	720	1080
2.0	2	0.016	0.12	0.16	480	800	960	1440
2.5	2	0.020	0.15	0.20	600	1000	1200	1800
3.0	2	0.024	0.18	0.24	720	1200	1440	2160


Application

Material

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
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Graphite

**B**

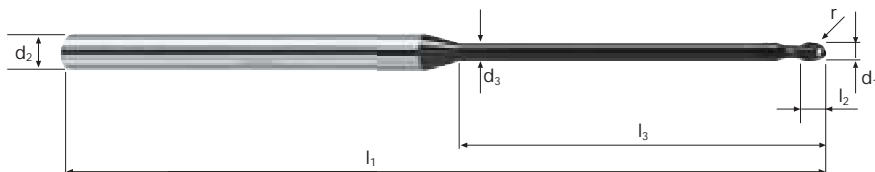
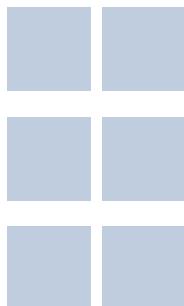
1.0	2	0.008	0.06	0.06	240	400	480	720
1.2	2	0.010	0.07	0.07	300	500	600	900
1.5	2	0.012	0.09	0.09	360	600	720	1080
2.0	2	0.016	0.12	0.12	480	800	960	1440
2.5	2	0.020	0.15	0.15	600	1000	1200	1800
3.0	2	0.024	0.18	0.18	720	1200	1440	2160


# Ball nose end mills Microcut-B20

Shank  $\varnothing$  3mm, cylindrical neck, 20xd



<b>HM</b>	$\lambda$ <b>30°</b>
<b>Micro</b>	$\gamma$ <b>5°</b>

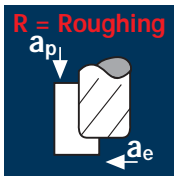


				<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°: Coating: <b>B</b> Article-N°: <b>15795</b> $\alpha$ -Code: <b>.100</b>										DIAMANT	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ $h_6$	$d_3$	$l_1$	$l_2$	$l_3$	$r$ $\pm 0.01$	$\alpha$	$z$		<b>B15795</b>
.100	1.0	3	0.95	60	1.2	20.0	0.50	2.5°	2	●	
.108	1.2	3	1.15	60	1.4	24.0	0.60	2.0°	2	●	
.120	1.5	3	1.45	70	1.8	30.0	0.75	1.4°	2	●	
.140	2.0	3	1.95	80	2.4	40.0	1.00	0.8°	2	●	
.160	2.5	3	2.45	80	3.0	50.0	1.25	0.3°	2	●	
.180	3.0	3	2.95	90	3.6	60.0	1.50	0.0°	2	●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	
										●	

IV

### Application

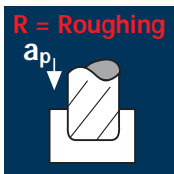


### Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.018	0.75	0.90	540	900	1080	1620
2.0	2	0.024	1.00	1.20	720	1200	1440	2160
3.0	2	0.035	1.50	1.80	1050	1750	2100	3150
4.0	2	0.047	2.00	2.40	1410	2350	2820	4230
5.0	2	0.059	2.50	3.00	1770	2950	3540	5310
6.0	2	0.071	3.00	3.60	2130	3550	4260	6390

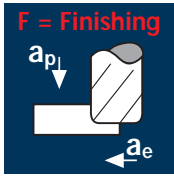


Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.014	0.75	1.50	420	700	840	1260
2.0	2	0.018	1.00	2.00	540	900	1080	1620
3.0	2	0.027	1.50	3.00	810	1350	1620	2430
4.0	2	0.036	2.00	4.00	1080	1800	2160	3240
5.0	2	0.045	2.50	5.00	1350	2250	2700	4050
6.0	2	0.055	3.00	6.00	1650	2750	3300	4950

### Application

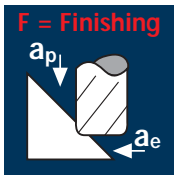


### Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.020	0.23	0.30	600	1000	1200	1800
2.0	2	0.027	0.30	0.40	810	1350	1620	2430
3.0	2	0.040	0.45	0.60	1200	2000	2400	3600
4.0	2	0.053	0.60	0.80	1590	2650	3180	4770
5.0	2	0.067	0.75	1.00	2010	3350	4020	6030
6.0	2	0.080	0.90	1.20	2400	4000	4800	7200



Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.5	2	0.020	0.30	0.30	600	1000	1200	1800
2.0	2	0.027	0.40	0.40	810	1350	1620	2430
3.0	2	0.040	0.60	0.60	1200	2000	2400	3600
4.0	2	0.053	0.80	0.80	1590	2650	3180	4770
5.0	2	0.067	1.00	1.00	2010	3350	4020	6030
6.0	2	0.080	1.20	1.20	2400	4000	4800	7200

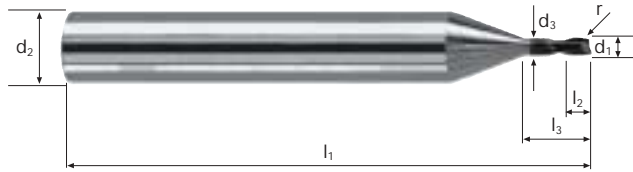
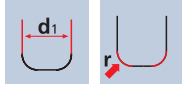


# Corner radius end mills MicrotoroXG

Shank  $\varnothing$  6mm, cylindrical neck, 3xd



**HM**  
**XA**     $\lambda$  30°  
               $\gamma$  15°

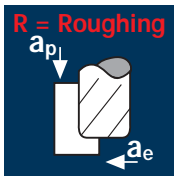


**new!**



Example: Order-N°.										DIAPLUS		
			Coating <b>B</b>	Article-N° <b>6032</b>	$\alpha$ -Code <b>.120</b>							
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	z			
.120	1.5	6	1.40	57	1.5	4.5	0.20	9.9°	2	●		
.140	2.0	6	1.90	57	2.0	6.0	0.20	8.5°	2	●		
.180	3.0	6	2.80	57	3.0	9.0	0.20	5.8°	2	●		
.215	4.0	6	3.80	57	4.0	12.0	0.20	3.7°	2	●		
.220	4.0	6	3.80	57	4.0	12.0	0.50	3.7°	2	●		
.255	5.0	6	4.80	57	5.0	15.0	0.20	1.7°	2	●		
.260	5.0	6	4.80	57	5.0	15.0	0.50	1.8°	2	●		
.295	6.0	6	5.80	57	6.0	18.0	0.20	0.0°	2	●		
.300	6.0	6	5.80	57	6.0	18.0	0.50	0.0°	2	●		

### Application



### Material

Graphite

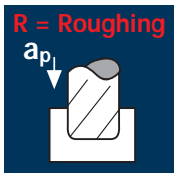
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.10	0.10	60	100	120	180
0.3	2	0.004	0.15	0.20	120	200	240	360
0.4	2	0.005	0.20	0.25	150	250	300	450
0.5	2	0.006	0.25	0.30	180	300	360	540
0.6	2	0.007	0.25	0.35	210	350	420	630
0.8	2	0.009	0.35	0.50	270	450	540	810
1.0	2	0.012	0.45	0.60	360	600	720	1080
1.5	2	0.018	0.70	0.90	540	900	1080	1620
2.0	2	0.024	0.90	1.20	720	1200	1440	2160

Graphite

**B**

3.0	2	0.035	1.35	1.80	1050	1750	2100	3150
4.0	2	0.047	1.80	2.40	1410	2350	2820	4230
5.0	2	0.059	2.25	3.00	1770	2950	3540	5310
6.0	2	0.071	2.70	3.60	2130	3550	4260	6390



Graphite

**B**

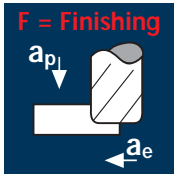
0.2	2	0.002	0.10	0.20	60	100	120	180
0.3	2	0.003	0.15	0.30	90	150	180	270
0.4	2	0.004	0.20	0.40	120	200	240	360
0.5	2	0.005	0.25	0.50	150	250	300	450
0.6	2	0.005	0.25	0.60	150	250	300	450
0.8	2	0.007	0.35	0.80	210	350	420	630
1.0	2	0.009	0.45	1.00	270	450	540	810
1.5	2	0.014	0.70	1.50	420	700	840	1260
2.0	2	0.018	0.90	2.00	540	900	1080	1620

Graphite

**B**

3.0	2	0.027	1.35	3.00	810	1350	1620	2430
4.0	2	0.036	1.80	4.00	1080	1800	2160	3240
5.0	2	0.045	2.25	5.00	1350	2250	2700	4050
6.0	2	0.055	2.70	6.00	1650	2750	3300	4950

### Application



### Material

Graphite

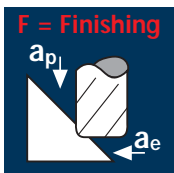
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.003	0.03	0.04	90	150	180	270
0.3	2	0.004	0.04	0.06	120	200	240	360
0.4	2	0.005	0.06	0.08	150	250	300	450
0.5	2	0.007	0.07	0.10	210	350	420	630
0.6	2	0.008	0.08	0.12	240	400	480	720
0.8	2	0.011	0.11	0.16	330	550	660	990
1.0	2	0.013	0.14	0.20	390	650	780	1170
1.5	2	0.020	0.21	0.30	600	1000	1200	1800
2.0	2	0.027	0.28	0.40	810	1350	1620	2430

Graphite

**B**

3.0	2	0.040	0.42	0.60	1200	2000	2400	3600
4.0	2	0.053	0.56	0.80	1590	2650	3180	4770
5.0	2	0.067	0.70	1.00	2010	3350	4020	6030
6.0	2	0.080	0.84	1.20	2400	4000	4800	7200



Graphite

**B**

0.2	2	0.003	0.04	0.04	90	150	180	270
0.3	2	0.004	0.05	0.05	120	200	240	360
0.4	2	0.005	0.07	0.07	150	250	300	450
0.5	2	0.007	0.09	0.09	210	350	420	630
0.6	2	0.008	0.11	0.11	240	400	480	720
0.8	2	0.011	0.14	0.14	330	550	660	990
1.0	2	0.013	0.18	0.18	390	650	780	1170
1.5	2	0.020	0.27	0.27	600	1000	1200	1800
2.0	2	0.027	0.36	0.36	810	1350	1620	2430

Graphite

**B**

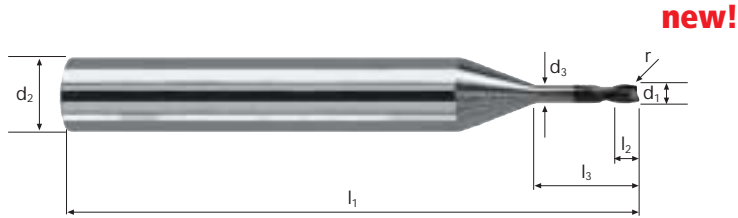
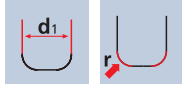
3.0	2	0.040	0.54	0.54	1200	2000	2400	3600
4.0	2	0.053	0.72	0.72	1590	2650	3180	4770
5.0	2	0.067	0.90	0.90	2010	3350	4020	6030
6.0	2	0.080	1.08	1.08	2400	4000	4800	7200

# Corner radius end mills MicrotoroXG

Shank  $\varnothing$  6mm, cylindrical neck, 5xd



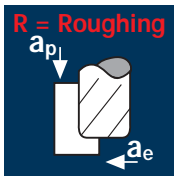
HM  
XA  $\lambda$  30°  
 $\gamma$  15°



				<b>C</b> Graphite							CF/GF Fiber Reinforced Plastics
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Example: Order-N°.										DIAPLUS	
										B6034	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	Z		
.020	0.2	6	0.18	57	0.2	1.0	-	13.8°	2	●	
.030	0.3	6	0.25	57	0.3	1.5	-	13.2°	2	●	
.040	0.4	6	0.35	57	0.4	2.0	0.05	12.7°	2	●	
.048	0.5	6	0.45	57	0.5	2.5	0.05	12.2°	2	●	
.050	0.5	6	0.45	57	0.5	2.5	0.10	12.2°	2	●	
.060	0.6	6	0.55	57	0.6	3.0	0.10	11.7°	2	●	
.080	0.8	6	0.75	57	0.8	4.0	0.10	10.8°	2	●	
.098	1.0	6	0.90	57	1.0	5.0	0.10	9.9°	2	●	
.100	1.0	6	0.90	57	1.0	5.0	0.20	9.9°	2	●	
.120	1.5	6	1.40	57	1.5	7.5	0.20	8.1°	2	●	
.140	2.0	6	1.90	57	2.0	10.0	0.20	6.6°	2	●	
.180	3.0	6	2.80	57	3.0	15.0	0.20	4.2°	2	●	
.182	3.0	6	2.80	61	3.0	18.0	0.20	3.7°	2	●	
.215	4.0	6	3.80	61	4.0	20.0	0.20	2.4°	2	●	
.217	4.0	6	3.80	66	4.0	25.0	0.20	2.0°	2	●	
.220	4.0	6	3.80	61	4.0	20.0	0.50	2.5°	2	●	
.222	4.0	6	3.80	66	4.0	25.0	0.50	2.1°	2	●	
.255	5.0	6	4.80	66	5.0	25.0	0.20	1.1°	2	●	
.260	5.0	6	4.80	66	5.0	25.0	0.50	1.1°	2	●	
.295	6.0	6	5.80	69	6.0	30.0	0.20	0.0°	2	●	
.300	6.0	6	5.80	69	6.0	30.0	0.50	0.0°	2	●	

### Application



### Material

Graphite

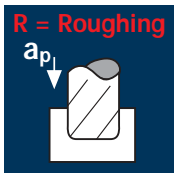
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.10	0.10	60	100	120	180
0.3	2	0.004	0.10	0.20	120	200	240	360
0.4	2	0.005	0.15	0.25	150	250	300	450
0.5	2	0.006	0.20	0.30	180	300	360	540
0.6	2	0.007	0.25	0.35	210	350	420	630
0.8	2	0.009	0.30	0.50	270	450	540	810
1.0	2	0.012	0.40	0.60	360	600	720	1080
1.5	2	0.018	0.60	0.90	540	900	1080	1620
2.0	2	0.024	0.80	1.20	720	1200	1440	2160

Graphite

**B**

3.0	2	0.035	1.20	1.80	1050	1750	2100	3150
4.0	2	0.047	1.60	2.40	1410	2350	2820	4230
5.0	2	0.059	2.00	3.00	1770	2950	3540	5310
6.0	2	0.071	2.40	3.60	2130	3550	4260	6390



Graphite

**B**

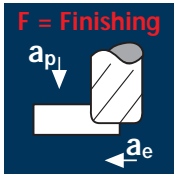
0.2	2	0.002	0.10	0.20	60	100	120	180
0.3	2	0.003	0.10	0.30	90	150	180	270
0.4	2	0.004	0.15	0.40	120	200	240	360
0.5	2	0.005	0.20	0.50	150	250	300	450
0.6	2	0.005	0.25	0.60	150	250	300	450
0.8	2	0.007	0.30	0.80	210	350	420	630
1.0	2	0.009	0.40	1.00	270	450	540	810
1.5	2	0.014	0.60	1.50	420	700	840	1260
2.0	2	0.018	0.80	2.00	540	900	1080	1620

Graphite

**B**

3.0	2	0.027	1.20	3.00	810	1350	1620	2430
4.0	2	0.036	1.60	4.00	1080	1800	2160	3240
5.0	2	0.045	2.00	5.00	1350	2250	2700	4050
6.0	2	0.055	2.40	6.00	1650	2750	3300	4950

### Application



### Material

Graphite

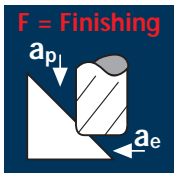
**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.003	0.02	0.04	90	150	180	270
0.3	2	0.004	0.04	0.05	120	200	240	360
0.4	2	0.005	0.05	0.07	150	250	300	450
0.5	2	0.007	0.06	0.09	210	350	420	630
0.6	2	0.008	0.07	0.11	240	400	480	720
0.8	2	0.011	0.10	0.14	330	550	660	990
1.0	2	0.013	0.12	0.18	390	650	780	1170
1.5	2	0.020	0.18	0.27	600	1000	1200	1800
2.0	2	0.027	0.24	0.36	810	1350	1620	2430

Graphite

**B**

3.0	2	0.040	0.36	0.54	1200	2000	2400	3600
4.0	2	0.053	0.48	0.72	1590	2650	3180	4770
5.0	2	0.067	0.60	0.90	2010	3350	4020	6030
6.0	2	0.080	0.72	1.08	2400	4000	4800	7200



Graphite

**B**

0.2	2	0.003	0.03	0.03	90	150	180	270
0.3	2	0.004	0.05	0.05	120	200	240	360
0.4	2	0.005	0.06	0.06	150	250	300	450
0.5	2	0.007	0.08	0.08	210	350	420	630
0.6	2	0.008	0.10	0.10	240	400	480	720
0.8	2	0.011	0.13	0.13	330	550	660	990
1.0	2	0.013	0.16	0.16	390	650	780	1170
1.5	2	0.020	0.24	0.24	600	1000	1200	1800
2.0	2	0.027	0.32	0.32	810	1350	1620	2430

Graphite

**B**

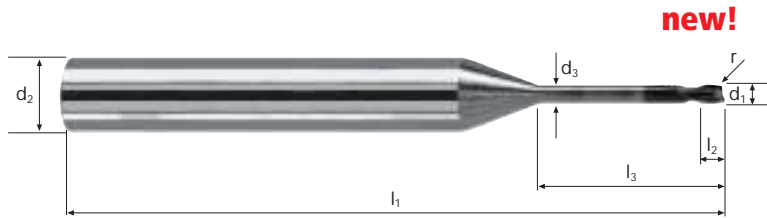
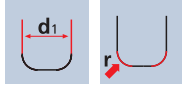
3.0	2	0.040	0.48	0.48	1200	2000	2400	3600
4.0	2	0.053	0.64	0.64	1590	2650	3180	4770
5.0	2	0.067	0.80	0.80	2010	3350	4020	6030
6.0	2	0.080	0.96	0.96	2400	4000	4800	7200

# Corner radius end mills MicrotoroXG

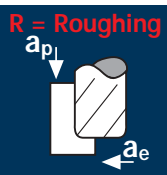

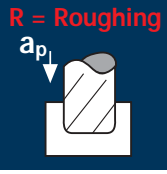

Shank Ø 6mm, cylindrical neck, 8xd

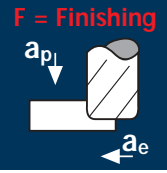

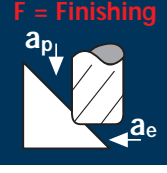



HM  
XA  $\lambda$  30°  
 $\gamma$  15°



Example: Order-N°.										DIAPLUS		
		Coating <b>B</b>	Article-N°. <b>6036</b>	α-Code <b>.020</b>							<b>B6036</b>	
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	α	Z			
.020	0.2	6	0.18	57	0.2	1.6	-	13.2°	2	●		
.030	0.3	6	0.25	57	0.3	2.4	-	12.3°	2	●		
.040	0.4	6	0.35	57	0.4	3.2	0.05	11.6°	2	●		
.048	0.5	6	0.45	57	0.5	4.0	0.05	10.9°	2	●		
.050	0.5	6	0.45	57	0.5	4.0	0.10	11.0°	2	●		
.060	0.6	6	0.55	57	0.6	4.8	0.10	10.3°	2	●		
.080	0.8	6	0.75	57	0.8	6.4	0.10	9.2°	2	●		
.098	1.0	6	0.90	57	1.0	8.0	0.10	8.2°	2	●		
.100	1.0	6	0.90	57	1.0	8.0	0.20	8.3°	2	●		
.120	1.5	6	1.40	57	1.5	12.0	0.20	6.4°	2	●		
.140	2.0	6	1.90	61	2.0	16.0	0.20	4.9°	2	●		
.180	3.0	6	2.80	66	3.0	24.0	0.20	2.9°	2	●		
.215	4.0	6	3.80	75	4.0	32.0	0.20	1.7°	2	●		
.220	4.0	6	3.80	75	4.0	32.0	0.50	1.7°	2	●		
.255	5.0	6	4.80	80	5.0	40.0	0.20	0.7°	2	●		
.260	5.0	6	4.80	80	5.0	40.0	0.50	0.7°	2	●		
.295	6.0	6	5.80	87	6.0	48.0	0.20	0.0°	2	●		
.300	6.0	6	5.80	87	6.0	48.0	0.50	0.0°	2	●		

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite 	0.4	2	0.005	0.15	0.15	150	250	300	450
		0.5	2	0.006	0.20	0.20	180	300	360	540
		0.6	2	0.007	0.25	0.25	210	350	420	630
		0.8	2	0.009	0.30	0.30	270	450	540	810
		1.0	2	0.012	0.40	0.40	360	600	720	1080
		1.5	2	0.018	0.60	0.60	540	900	1080	1620
		2.0	2	0.024	0.80	0.80	720	1200	1440	2160
		3.0	2	0.035	1.20	1.20	1050	1750	2100	3150
		4.0	2	0.047	1.60	1.60	1410	2350	2820	4230
		5.0	2	0.059	2.00	2.00	1770	2950	3540	5310
6.0	2	0.071	2.40	2.40	2130	3550	4260	6390		
<b>R = Roughing</b> 	Graphite 	0.4	2	0.004	0.10	0.40	120	200	240	360
		0.5	2	0.005	0.15	0.50	150	250	300	450
		0.6	2	0.005	0.20	0.60	150	250	300	450
		0.8	2	0.007	0.25	0.80	210	350	420	630
		1.0	2	0.009	0.30	1.00	270	450	540	810
		1.5	2	0.014	0.45	1.50	420	700	840	1260
		2.0	2	0.018	0.60	2.00	540	900	1080	1620
		3.0	2	0.027	0.90	3.00	810	1350	1620	2430
		4.0	2	0.036	1.20	4.00	1080	1800	2160	3240
		5.0	2	0.045	1.50	5.00	1350	2250	2700	4050
6.0	2	0.055	1.80	6.00	1650	2750	3300	4950		

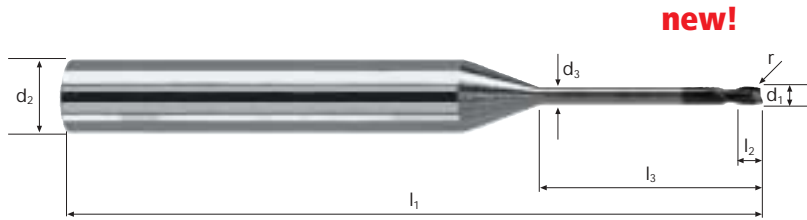
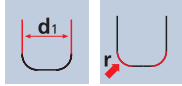
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite 	0.4	2	0.005	0.04	0.06	150	250	300	450
		0.5	2	0.007	0.05	0.08	210	350	420	630
		0.6	2	0.008	0.06	0.10	240	400	480	720
		0.8	2	0.011	0.08	0.13	330	550	660	990
		1.0	2	0.013	0.10	0.16	390	650	780	1170
		1.5	2	0.020	0.15	0.24	600	1000	1200	1800
		2.0	2	0.027	0.20	0.32	810	1350	1620	2430
		3.0	2	0.040	0.30	0.48	1200	2000	2400	3600
		4.0	2	0.053	0.40	0.64	1590	2650	3180	4770
		5.0	2	0.067	0.50	0.80	2010	3350	4020	6030
6.0	2	0.080	0.60	0.96	2400	4000	4800	7200		
<b>F = Finishing</b> 	Graphite 	0.4	2	0.005	0.06	0.06	150	250	300	450
		0.5	2	0.007	0.07	0.07	210	350	420	630
		0.6	2	0.008	0.08	0.08	240	400	480	720
		0.8	2	0.011	0.11	0.11	330	550	660	990
		1.0	2	0.013	0.14	0.14	390	650	780	1170
		1.5	2	0.020	0.21	0.21	600	1000	1200	1800
		2.0	2	0.027	0.28	0.28	810	1350	1620	2430
		3.0	2	0.040	0.42	0.42	1200	2000	2400	3600
		4.0	2	0.053	0.56	0.56	1590	2650	3180	4770
		5.0	2	0.067	0.70	0.70	2010	3350	4020	6030
6.0	2	0.080	0.84	0.84	2400	4000	4800	7200		

# Corner radius end mills MicrotoroXG

Shank  $\varnothing$  6mm, cylindrical neck, 10xd

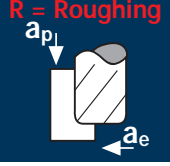
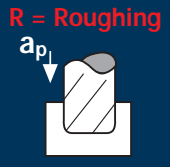


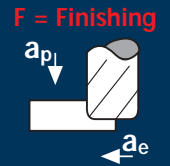
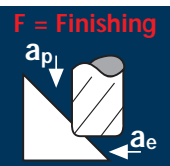
HM  
XA  $\lambda$  30°  
 $\gamma$  15°



				<b>C</b> Graphite							CF/GF Fiber Reinforced Plastics
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Example: Order-N°.										DIAPLUS	
										B6038	
$\varnothing$ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r $\pm 0.005$	$\alpha$	Z		
.040	0.4	6	0.35	57	0.4	4.0	0.05	11.0°	2	●	
.048	0.5	6	0.45	57	0.5	5.0	0.05	10.2°	2	●	
.050	0.5	6	0.45	57	0.5	5.0	0.10	10.3°	2	●	
.060	0.6	6	0.55	57	0.6	6.0	0.10	9.6°	2	●	
.080	0.8	6	0.75	57	0.8	8.0	0.10	8.4°	2	●	
.098	1.0	6	0.90	57	1.0	10.0	0.10	7.4°	2	●	
.100	1.0	6	0.90	57	1.0	10.0	0.20	7.4°	2	●	
.120	1.5	6	1.40	61	1.5	15.0	0.20	5.5°	2	●	
.140	2.0	6	1.90	66	2.0	20.0	0.20	4.2°	2	●	
.180	3.0	6	2.80	75	3.0	30.0	0.20	2.5°	2	●	
.215	4.0	6	3.80	80	4.0	40.0	0.20	1.4°	2	●	
.220	4.0	6	3.80	80	4.0	40.0	0.50	1.4°	2	●	
.255	5.0	6	4.80	100	5.0	50.0	0.20	0.6°	2	●	
.260	5.0	6	4.80	100	5.0	50.0	0.50	0.6°	2	●	
.295	6.0	6	5.80	100	6.0	60.0	0.20	0.0°	2	●	
.300	6.0	6	5.80	100	6.0	60.0	0.50	0.0°	2	●	

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
							vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
<b>R = Roughing</b> 	Graphite	0.4	2	0.004	0.10	0.15	120	200	240	360
		0.5	2	0.005	0.15	0.20	150	250	300	450
		0.6	2	0.006	0.20	0.25	180	300	360	540
		0.8	2	0.008	0.25	0.30	240	400	480	720
		1.0	2	0.009	0.30	0.40	270	450	540	810
		1.5	2	0.014	0.45	0.60	420	700	840	1260
		2.0	2	0.019	0.60	0.80	570	950	1140	1710
<b>R = Roughing</b> 	Graphite	0.4	2	0.003	0.10	0.40	90	150	180	270
		0.5	2	0.004	0.10	0.50	120	200	240	360
		0.6	2	0.004	0.10	0.60	120	200	240	360
		0.8	2	0.006	0.15	0.80	180	300	360	540
		1.0	2	0.007	0.20	1.00	210	350	420	630
		1.5	2	0.011	0.30	1.50	330	550	660	990
		2.0	2	0.015	0.40	2.00	450	750	900	1350

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup>	n=25000 min <sup>-1</sup>	n=30000 min <sup>-1</sup>	n=45000 min <sup>-1</sup>
							vf [mm/min]	vf [mm/min]	vf [mm/min]	vf [mm/min]
<b>F = Finishing</b> 	Graphite	0.4	2	0.004	0.04	0.06	120	200	240	360
		0.5	2	0.005	0.05	0.07	150	250	300	450
		0.6	2	0.006	0.06	0.08	180	300	360	540
		0.8	2	0.009	0.08	0.11	270	450	540	810
		1.0	2	0.011	0.10	0.14	330	550	660	990
		1.5	2	0.016	0.15	0.21	480	800	960	1440
		2.0	2	0.021	0.20	0.28	630	1050	1260	1890
<b>F = Finishing</b> 	Graphite	0.4	2	0.004	0.04	0.04	120	200	240	360
		0.5	2	0.005	0.05	0.05	150	250	300	450
		0.6	2	0.006	0.06	0.06	180	300	360	540
		0.8	2	0.009	0.08	0.08	270	450	540	810
		1.0	2	0.011	0.10	0.10	330	550	660	990
		1.5	2	0.016	0.15	0.15	480	800	960	1440
		2.0	2	0.021	0.20	0.20	630	1050	1260	1890

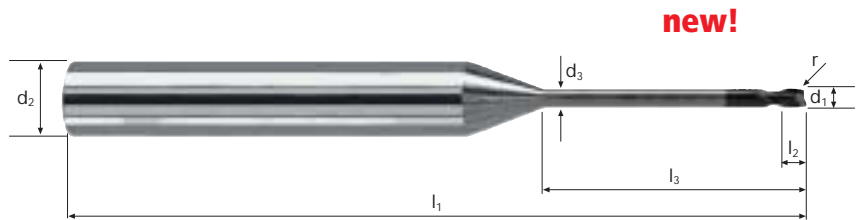
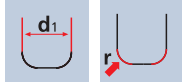


# Corner radius end mills MicrotoroXG

Shank Ø 6mm, cylindrical neck, 12xd



HM  
XA  $\lambda$  30°  
 $\gamma$  15°



new!



Example: Order-N°.										DIAPLUS	
										B6040	
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	$\alpha$	Z		
.040	0.4	6	0.35	57	0.4	4.8	0.05	10.4°	2	●	
.048	0.5	6	0.45	57	0.5	6.0	0.05	9.6°	2	●	
.050	0.5	6	0.45	57	0.5	6.0	0.10	9.7°	2	●	
.060	0.6	6	0.55	57	0.6	7.2	0.10	8.9°	2	●	
.080	0.8	6	0.75	57	0.8	9.6	0.10	7.7°	2	●	
.098	1.0	6	0.90	61	1.0	12.0	0.10	6.7°	2	●	
.100	1.0	6	0.90	61	1.0	12.0	0.20	6.7°	2	●	
.120	1.5	6	1.40	66	1.5	18.0	0.20	4.9°	2	●	
.140	2.0	6	1.90	69	2.0	24.0	0.20	3.7°	2	●	

**Application**

**R = Roughing**

**Material**

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.009	0.50	0.60	270	450	540	810
1.2	2	0.011	0.60	0.70	330	550	660	990
1.5	2	0.014	0.75	0.90	420	700	840	1260
2.0	2	0.019	1.00	1.20	570	950	1140	1710
2.5	2	0.024	1.25	1.50	720	1200	1440	2160
3.0	2	0.028	1.50	1.80	840	1400	1680	2520

**Application**

**R = Roughing**

**Material**

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.007	0.50	1.00	210	350	420	630
1.2	2	0.009	0.60	1.20	270	450	540	810
1.5	2	0.011	0.75	1.50	330	550	660	990
2.0	2	0.015	1.00	2.00	450	750	900	1350
2.5	2	0.018	1.25	2.50	540	900	1080	1620
3.0	2	0.022	1.50	3.00	660	1100	1320	1980

**Application**

**F = Finishing**

**Material**

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.011	0.15	0.20	330	550	660	990
1.2	2	0.013	0.18	0.24	390	650	780	1170
1.5	2	0.016	0.23	0.30	480	800	960	1440
2.0	2	0.021	0.30	0.40	630	1050	1260	1890
2.5	2	0.027	0.38	0.50	810	1350	1620	2430
3.0	2	0.032	0.45	0.60	960	1600	1920	2880

**Application**

**F = Finishing**

**Material**

Graphite

**B**

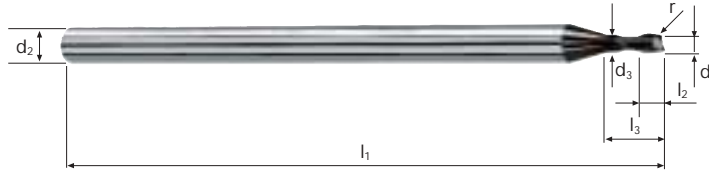
d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.011	0.20	0.20	330	550	660	990
1.2	2	0.013	0.24	0.24	390	650	780	1170
1.5	2	0.016	0.30	0.30	480	800	960	1440
2.0	2	0.021	0.40	0.40	630	1050	1260	1890
2.5	2	0.027	0.50	0.50	810	1350	1620	2430
3.0	2	0.032	0.60	0.60	960	1600	1920	2880

# Corner radius end mills Microcut-T3

Shank  $\varnothing$  3mm, cylindrical neck, 3xd



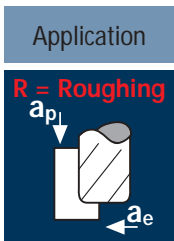
**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



				<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°.										<b>DIAMANT</b>	
			Coating <b>B</b>	Article-N°. <b>5752</b>	$\alpha$ -Code <b>.100</b>					<b>B5752</b>	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ 0/+0.03	$\alpha$	$z$		
<b>.100</b>	1.0	3	0.95	50	1.2	3.0	0.20	11.6°	2	●	
<b>.108</b>	1.2	3	1.15	50	1.4	3.6	0.20	10.9°	2	●	
<b>.120</b>	1.5	3	1.45	50	1.8	4.5	0.20	10.0°	2	●	
<b>.140</b>	2.0	3	1.95	50	2.4	6.0	0.20	8.6°	2	●	
<b>.160</b>	2.5	3	2.45	50	3.0	7.5	0.20	7.2°	2	●	
<b>.180</b>	3.0	3	2.95	50	3.6	9.0	0.20	0.0°	2	●	

**IV**

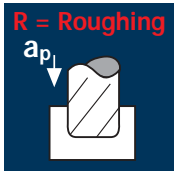


Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.009	0.45	0.60	270	450	540	810
1.2	2	0.011	0.55	0.70	330	550	660	990
1.5	2	0.014	0.70	0.90	420	700	840	1260
2.0	2	0.019	0.90	1.20	570	950	1140	1710
2.5	2	0.024	1.15	1.50	720	1200	1440	2160
3.0	2	0.028	1.35	1.80	840	1400	1680	2520

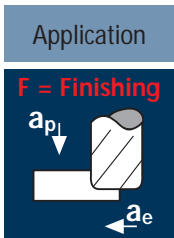


Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.007	0.45	1.00	210	350	420	630
1.2	2	0.009	0.55	1.20	270	450	540	810
1.5	2	0.011	0.70	1.50	330	550	660	990
2.0	2	0.015	0.90	2.00	450	750	900	1350
2.5	2	0.018	1.15	2.50	540	900	1080	1620
3.0	2	0.022	1.35	3.00	660	1100	1320	1980

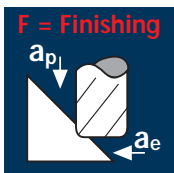


Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.011	0.14	0.20	330	550	660	990
1.2	2	0.013	0.17	0.24	390	650	780	1170
1.5	2	0.016	0.21	0.30	480	800	960	1440
2.0	2	0.021	0.28	0.40	630	1050	1260	1890
2.5	2	0.027	0.35	0.50	810	1350	1620	2430
3.0	2	0.032	0.42	0.60	960	1600	1920	2880



Material

Graphite

**B**


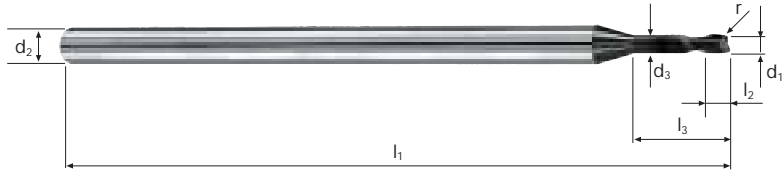
d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.011	0.18	0.18	330	550	660	990
1.2	2	0.013	0.22	0.22	390	650	780	1170
1.5	2	0.016	0.27	0.27	480	800	960	1440
2.0	2	0.021	0.36	0.36	630	1050	1260	1890
2.5	2	0.027	0.45	0.45	810	1350	1620	2430
3.0	2	0.032	0.54	0.54	960	1600	1920	2880

# Corner radius end mills Microcut-T5

Shank Ø 3mm, cylindrical neck, 5xd



**HM** λ 25°  
**Micro** γ 6°

**C** Graphite **CF/GF** Fiber Reinforced Plastics

Example: Order-N°. **B** **5754** **.100**

										DIAMANT	
										<b>B5754</b>	
Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	r 0/+0.03	α	z		
.100	1.0	3	0.95	50	1.2	5.0	0.20	10.0°	2	●	
.108	1.2	3	1.15	50	1.4	6.0	0.20	9.2°	2	●	
.120	1.5	3	1.45	50	1.8	7.5	0.20	8.2°	2	●	
.140	2.0	3	1.95	50	2.4	10.0	0.20	6.6°	2	●	
.160	2.5	3	2.45	50	3.0	12.5	0.20	5.3°	2	●	
.180	3.0	3	2.95	50	3.6	15.0	0.20	0.0°	2	●	

IV

Application

**R = Roughing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.009	0.40	0.60	270	450	540	810
1.2	2	0.011	0.50	0.70	330	550	660	990
1.5	2	0.014	0.60	0.90	420	700	840	1260
2.0	2	0.019	0.80	1.20	570	950	1140	1710
2.5	2	0.024	1.00	1.50	720	1200	1440	2160
3.0	2	0.028	1.20	1.80	840	1400	1680	2520

Application

**R = Roughing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.007	0.40	1.00	210	350	420	630
1.2	2	0.009	0.50	1.20	270	450	540	810
1.5	2	0.011	0.60	1.50	330	550	660	990
2.0	2	0.015	0.80	2.00	450	750	900	1350
2.5	2	0.018	1.00	2.50	540	900	1080	1620
3.0	2	0.022	1.20	3.00	660	1100	1320	1980

Application

**F = Finishing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.011	0.12	0.18	330	550	660	990
1.2	2	0.013	0.14	0.22	390	650	780	1170
1.5	2	0.016	0.18	0.27	480	800	960	1440
2.0	2	0.021	0.24	0.36	630	1050	1260	1890
2.5	2	0.027	0.30	0.45	810	1350	1620	2430
3.0	2	0.032	0.36	0.54	960	1600	1920	2880

Application

**F = Finishing**

Material

Graphite

**B**

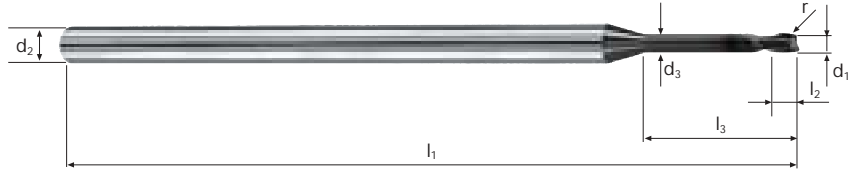
d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
1.0	2	0.011	0.16	0.16	330	550	660	990
1.2	2	0.013	0.19	0.19	390	650	780	1170
1.5	2	0.016	0.24	0.24	480	800	960	1440
2.0	2	0.021	0.32	0.32	630	1050	1260	1890
2.5	2	0.027	0.40	0.40	810	1350	1620	2430
3.0	2	0.032	0.48	0.48	960	1600	1920	2880

# Corner radius end mills Microcut-T8

Shank  $\varnothing$  3mm, cylindrical neck, 8xd



**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



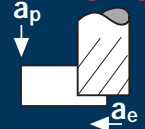
				<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
--	--	--	--	----------------------	--	--	--	--	--	---

										DIAMANT	
Example: Order-N°. <b>B 5756 .100</b>										B5756	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	$r$ 0/+0.03	$\alpha$	$z$		
.100	1.0	3	0.95	50	1.2	8.0	0.20	8.3°	2	●	
.108	1.2	3	1.15	50	1.4	9.6	0.20	7.5°	2	●	
.120	1.5	3	1.45	60	1.8	12.0	0.20	6.4°	2	●	
.140	2.0	3	1.95	60	2.4	16.0	0.20	4.9°	2	●	
.160	2.5	3	2.45	60	3.0	20.0	0.20	3.8°	2	●	
.180	3.0	3	2.95	60	3.6	24.0	0.20	0.0°	2	●	

IV

**Application**

**R = Roughing**



**Material**

Graphite

⊗ **B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.10	0.10	60	100	120	180
0.3	2	0.003	0.15	0.20	90	150	180	270
0.4	2	0.004	0.20	0.25	120	200	240	360
0.5	2	0.005	0.25	0.30	150	250	300	450
0.6	2	0.006	0.25	0.35	180	300	360	540
0.8	2	0.008	0.35	0.50	240	400	480	720
1.0	2	0.009	0.45	0.60	270	450	540	810
1.2	2	0.011	0.55	0.70	330	550	660	990
1.5	2	0.014	0.70	0.90	420	700	840	1260


**Material**

Graphite

⊗ **B**

2.0	2	0.019	0.90	1.20	570	950	1140	1710
2.5	2	0.024	1.15	1.50	720	1200	1440	2160
3.0	2	0.028	1.35	1.80	840	1400	1680	2520

**R = Roughing**



**Material**

Graphite

⊗ **B**

0.2	2	0.001	0.10	0.20	30	50	60	90
0.3	2	0.002	0.15	0.30	60	100	120	180
0.4	2	0.003	0.20	0.40	90	150	180	270
0.5	2	0.004	0.25	0.50	120	200	240	360
0.6	2	0.004	0.25	0.60	120	200	240	360
0.8	2	0.006	0.35	0.80	180	300	360	540
1.0	2	0.007	0.45	1.00	210	350	420	630
1.2	2	0.009	0.55	1.20	270	450	540	810
1.5	2	0.011	0.70	1.50	330	550	660	990

**Material**

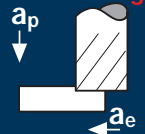
Graphite

⊗ **B**

2.0	2	0.015	0.90	2.00	450	750	900	1350
2.5	2	0.018	1.15	2.50	540	900	1080	1620
3.0	2	0.022	1.35	3.00	660	1100	1320	1980

**Application**

**F = Finishing**



**Material**

Graphite

⊗ **B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.2	2	0.002	0.03	0.04	60	100	120	180
0.3	2	0.003	0.04	0.06	90	150	180	270
0.4	2	0.004	0.06	0.08	120	200	240	360
0.5	2	0.005	0.07	0.10	150	250	300	450
0.6	2	0.006	0.08	0.12	180	300	360	540
0.8	2	0.009	0.11	0.16	270	450	540	810
1.0	2	0.011	0.14	0.20	330	550	660	990
1.2	2	0.013	0.17	0.24	390	650	780	1170
1.5	2	0.016	0.21	0.30	480	800	960	1440


**Material**

Graphite

⊗ **B**

2.0	2	0.021	0.28	0.40	630	1050	1260	1890
2.5	2	0.027	0.35	0.50	810	1350	1620	2430
3.0	2	0.032	0.42	0.60	960	1600	1920	2880

**F = Finishing**



**Material**

Graphite

⊗ **B**

0.2	2	0.002	0.04	0.04	60	100	120	180
0.3	2	0.003	0.05	0.05	90	150	180	270
0.4	2	0.004	0.07	0.07	120	200	240	360
0.5	2	0.005	0.09	0.09	150	250	300	450
0.6	2	0.006	0.11	0.11	180	300	360	540
0.8	2	0.009	0.14	0.14	270	450	540	810
1.0	2	0.011	0.18	0.18	330	550	660	990
1.2	2	0.013	0.22	0.22	390	650	780	1170
1.5	2	0.016	0.27	0.27	480	800	960	1440

**Material**

Graphite

⊗ **B**

2.0	2	0.021	0.36	0.36	630	1050	1260	1890
2.5	2	0.027	0.45	0.45	810	1350	1620	2430
3.0	2	0.032	0.54	0.54	960	1600	1920	2880

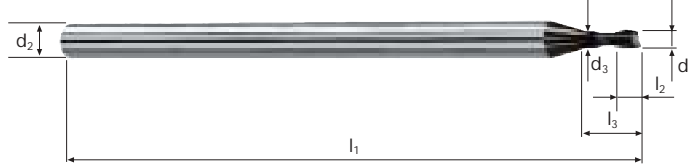


# Cylindrical end mills Microcut-C3

Shank  $\varnothing$  3mm, cylindrical neck, 3xd



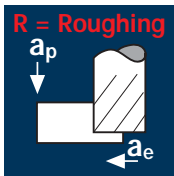
**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



				<b>C</b> Graphite							<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°.										DIAMANT	
										B5712	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	45°	$\alpha$	z		
.020	0.2	3	0.18	40	0.2	0.6	-	13.5°	2	●	
.030	0.3	3	0.25	40	0.3	0.9	-	12.7°	2	●	
.040	0.4	3	0.35	40	0.5	1.2	-	12.0°	2	●	
.050	0.5	3	0.45	40	0.6	1.5	-	11.4°	2	●	
.060	0.6	3	0.55	40	0.7	1.8	-	10.7°	2	●	
.080	0.8	3	0.75	40	0.9	2.4	-	9.5°	2	●	
.100	1.0	3	0.95	50	1.2	3.0	0.07	8.4°	2	●	
.108	1.2	3	1.15	50	1.4	3.6	0.07	7.3°	2	●	
.120	1.5	3	1.45	50	1.8	4.5	0.07	5.8°	2	●	
.140	2.0	3	1.95	50	2.4	6.0	0.10	3.6°	2	●	
.160	2.5	3	2.45	50	3.0	7.5	0.10	1.7°	2	●	
.180	3.0	3	2.95	50	3.6	9.0	0.10	0.0°	2	●	

### Application



### Material

Graphite

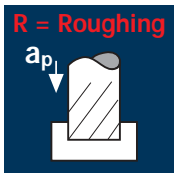
**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.25	0.30	150	250	300	450
0.6	2	0.006	0.25	0.35	180	300	360	540
0.7	2	0.007	0.30	0.40	210	350	420	630
0.8	2	0.008	0.35	0.50	240	400	480	720
0.9	2	0.008	0.40	0.55	240	400	480	720
1.0	2	0.009	0.45	0.60	270	450	540	810
1.2	2	0.011	0.55	0.70	330	550	660	990
1.5	2	0.014	0.70	0.90	420	700	840	1260
1.8	2	0.017	0.80	1.10	510	850	1020	1530

Graphite

**B**

2.0	2	0.019	0.90	1.20	570	950	1140	1710
2.3	2	0.022	1.05	1.40	660	1100	1320	1980
2.5	2	0.024	1.15	1.50	720	1200	1440	2160
2.8	2	0.026	1.25	1.70	780	1300	1560	2340
3.0	2	0.028	1.35	1.80	840	1400	1680	2520



Graphite

**B**

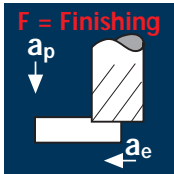
0.5	2	0.004	0.25	0.50	120	200	240	360
0.6	2	0.004	0.25	0.60	120	200	240	360
0.7	2	0.005	0.30	0.70	150	250	300	450
0.8	2	0.006	0.35	0.80	180	300	360	540
0.9	2	0.007	0.40	0.90	210	350	420	630
1.0	2	0.007	0.45	1.00	210	350	420	630
1.2	2	0.009	0.55	1.20	270	450	540	810
1.5	2	0.011	0.70	1.50	330	550	660	990
1.8	2	0.013	0.80	1.80	390	650	780	1170

Graphite

**B**

2.0	2	0.015	0.90	2.00	450	750	900	1350
2.3	2	0.017	1.05	2.30	510	850	1020	1530
2.5	2	0.018	1.15	2.50	540	900	1080	1620
2.8	2	0.020	1.25	2.80	600	1000	1200	1800
3.0	2	0.022	1.35	3.00	660	1100	1320	1980

### Application



### Material

Graphite

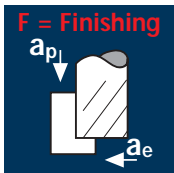
**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.07	0.10	150	250	300	450
0.6	2	0.006	0.08	0.12	180	300	360	540
0.7	2	0.007	0.10	0.14	210	350	420	630
0.8	2	0.009	0.11	0.16	270	450	540	810
0.9	2	0.010	0.13	0.18	300	500	600	900
1.0	2	0.011	0.14	0.20	330	550	660	990
1.2	2	0.013	0.17	0.24	390	650	780	1170
1.5	2	0.016	0.21	0.30	480	800	960	1440
1.8	2	0.019	0.25	0.36	570	950	1140	1710

Graphite

**B**

2.0	2	0.021	0.28	0.40	630	1050	1260	1890
2.3	2	0.025	0.32	0.46	750	1250	1500	2250
2.5	2	0.027	0.35	0.50	810	1350	1620	2430
2.8	2	0.030	0.39	0.56	900	1500	1800	2700
3.0	2	0.032	0.42	0.60	960	1600	1920	2880



Graphite

**B**

0.5	2	0.005	0.09	0.09	150	250	300	450
0.6	2	0.006	0.11	0.11	180	300	360	540
0.7	2	0.007	0.13	0.13	210	350	420	630
0.8	2	0.009	0.14	0.14	270	450	540	810
0.9	2	0.010	0.16	0.16	300	500	600	900
1.0	2	0.011	0.18	0.18	330	550	660	990
1.2	2	0.013	0.22	0.22	390	650	780	1170
1.5	2	0.016	0.27	0.27	480	800	960	1440
1.8	2	0.019	0.32	0.32	570	950	1140	1710

Graphite

**B**

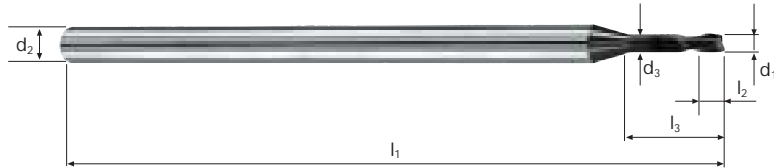
2.0	2	0.021	0.36	0.36	630	1050	1260	1890
2.3	2	0.025	0.41	0.41	750	1250	1500	2250
2.5	2	0.027	0.45	0.45	810	1350	1620	2430
2.8	2	0.030	0.50	0.50	900	1500	1800	2700
3.0	2	0.032	0.54	0.54	960	1600	1920	2880

# Cylindrical end mills Microcut-C5

Shank Ø 3mm, cylindrical neck, 5xd



HM  
Micro  $\lambda$  25°  
 $\gamma$  6°



C Graphite CF/GF Fiber Reinforced Plastics

Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	45°	$\alpha$	z	DIAMANT	IV
										B5714	
Example: Order-N°. <span style="margin-left: 100px;">Coating</span> <span style="margin-left: 20px;">Article-N°.</span> <span style="margin-left: 20px;"><math>\alpha</math>-Code</span> <span style="margin-left: 100px;"><b>B</b></span> <span style="margin-left: 20px;"><b>5714</b></span> <span style="margin-left: 20px;"><b>.050</b></span>											
.050	0.5	3	0.45	40	0.6	2.5	-	9.8°	2	●	
.060	0.6	3	0.55	40	0.7	3.0	-	9.1°	2	●	
.070	0.7	3	0.65	40	0.8	3.5	-	8.4°	2	●	
.080	0.8	3	0.75	40	1.0	4.0	-	7.7°	2	●	
.090	0.9	3	0.85	40	1.1	4.5	-	7.1°	2	●	
.100	1.0	3	0.95	50	1.2	5.0	0.07	6.5°	2	●	
.108	1.2	3	1.15	50	1.4	6.0	0.07	5.5°	2	●	
.120	1.5	3	1.45	50	1.8	7.5	0.07	4.2°	2	●	
.132	1.8	3	1.75	50	2.2	9.0	0.07	3.1°	2	●	
.140	2.0	3	1.95	50	2.4	10.0	0.10	2.4°	2	●	
.152	2.3	3	2.25	50	2.8	11.5	0.10	1.6°	2	●	
.160	2.5	3	2.45	50	3.0	12.5	0.10	1.1°	2	●	
.172	2.8	3	2.75	50	3.4	14.0	0.10	0.5°	2	●	
.180	3.0	3	2.95	50	3.6	15.0	0.10	0.0°	2	●	

Application

**R = Roughing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.20	0.30	150	250	300	450
0.6	2	0.006	0.25	0.35	180	300	360	540
0.8	2	0.008	0.30	0.50	240	400	480	720
1.0	2	0.009	0.40	0.60	270	450	540	810
1.2	2	0.011	0.50	0.70	330	550	660	990
1.5	2	0.014	0.60	0.90	420	700	840	1260
2.0	2	0.019	0.80	1.20	570	950	1140	1710
2.5	2	0.024	1.00	1.50	720	1200	1440	2160
3.0	2	0.028	1.20	1.80	840	1400	1680	2520

Application

**R = Roughing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.004	0.20	0.50	120	200	240	360
0.6	2	0.004	0.25	0.60	120	200	240	360
0.8	2	0.006	0.30	0.80	180	300	360	540
1.0	2	0.007	0.40	1.00	210	350	420	630
1.2	2	0.009	0.50	1.20	270	450	540	810
1.5	2	0.011	0.60	1.50	330	550	660	990
2.0	2	0.015	0.80	2.00	450	750	900	1350
2.5	2	0.018	1.00	2.50	540	900	1080	1620
3.0	2	0.022	1.20	3.00	660	1100	1320	1980

Application

**F = Finishing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.06	0.09	150	250	300	450
0.6	2	0.006	0.07	0.11	180	300	360	540
0.8	2	0.009	0.10	0.14	270	450	540	810
1.0	2	0.011	0.12	0.18	330	550	660	990
1.2	2	0.013	0.14	0.22	390	650	780	1170
1.5	2	0.016	0.18	0.27	480	800	960	1440
2.0	2	0.021	0.24	0.36	630	1050	1260	1890
2.5	2	0.027	0.30	0.45	810	1350	1620	2430
3.0	2	0.032	0.36	0.54	960	1600	1920	2880

Application

**F = Finishing**

Material

Graphite

**B**

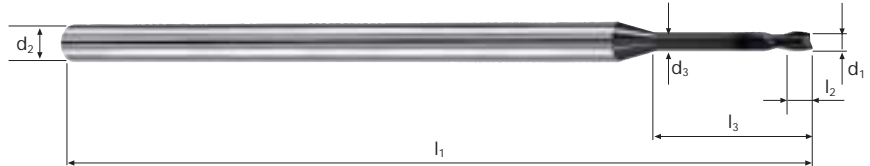
d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.08	0.08	150	250	300	450
0.6	2	0.006	0.10	0.10	180	300	360	540
0.8	2	0.009	0.13	0.13	270	450	540	810
1.0	2	0.011	0.16	0.16	330	550	660	990
1.2	2	0.013	0.19	0.19	390	650	780	1170
1.5	2	0.016	0.24	0.24	480	800	960	1440
2.0	2	0.021	0.32	0.32	630	1050	1260	1890
2.5	2	0.027	0.40	0.40	810	1350	1620	2430
3.0	2	0.032	0.48	0.48	960	1600	1920	2880

# Cylindrical end mills Microcut-C8

Shank  $\varnothing$  3mm, cylindrical neck, 8xd



**HM**  $\lambda$  25°  
**Micro**  $\gamma$  6°



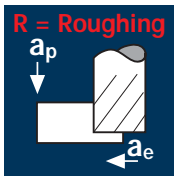
**C** Graphite **CF/GF** Fiber Reinforced Plastics

Example: Order-N°.										DIAMANT		
			Coating <b>B</b>	Article-N°. <b>5716</b>	$\alpha$ -Code <b>.050</b>					<input type="text"/>	<b>B5716</b>	
$\varnothing$ Code	$d_1$ $\pm 0.01$	$d_2$ h6	$d_3$	$l_1$	$l_2$	$l_3$	45°	$\alpha$	z			
.050	0.5	3	0.45	40	0.6	4.0	-	8.2°	2	●		
.060	0.6	3	0.55	40	0.7	4.8	-	7.4°	2	●		
.080	0.8	3	0.75	40	1.0	6.4	-	6.0°	2	●		
.100	1.0	3	0.95	50	1.2	8.0	0.07	4.9°	2	●		
.108	1.2	3	1.15	50	1.4	9.6	0.07	4.0°	2	●		
.120	1.5	3	1.45	60	1.8	12.0	0.07	2.9°	2	●		
.140	2.0	3	1.95	60	2.4	16.0	0.10	1.6°	2	●		
.160	2.5	3	2.45	60	3.0	20.0	0.10	0.7°	2	●		
.180	3.0	3	2.95	60	3.6	24.0	0.10	0.0°	2	●		

**IV**

### Application

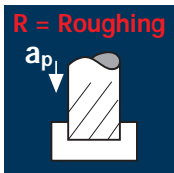
### Material



Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.20	0.20	150	250	300	450
0.6	2	0.006	0.25	0.25	180	300	360	540
0.8	2	0.008	0.30	0.30	240	400	480	720
1.0	2	0.009	0.40	0.40	270	450	540	810
1.2	2	0.011	0.50	0.50	330	550	660	990
1.5	2	0.014	0.60	0.60	420	700	840	1260
2.0	2	0.019	0.80	0.80	570	950	1140	1710
2.5	2	0.024	1.00	1.00	720	1200	1440	2160
3.0	2	0.028	1.20	1.20	840	1400	1680	2520

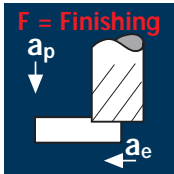
Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.003	0.15	0.50	90	150	180	270
0.6	2	0.003	0.20	0.60	90	150	180	270
0.8	2	0.004	0.25	0.80	120	200	240	360
1.0	2	0.005	0.30	1.00	150	250	300	450
1.2	2	0.007	0.35	1.20	210	350	420	630
1.5	2	0.008	0.45	1.50	240	400	480	720
2.0	2	0.011	0.60	2.00	330	550	660	990
2.5	2	0.014	0.75	2.50	420	700	840	1260
3.0	2	0.016	0.90	3.00	480	800	960	1440


### Application

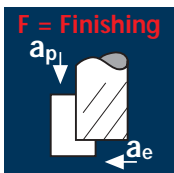
### Material



Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.05	0.08	150	250	300	450
0.6	2	0.006	0.06	0.09	180	300	360	540
0.8	2	0.009	0.08	0.12	270	450	540	810
1.0	2	0.011	0.10	0.15	330	550	660	990
1.2	2	0.013	0.12	0.18	390	650	780	1170
1.5	2	0.016	0.15	0.23	480	800	960	1440
2.0	2	0.021	0.20	0.30	630	1050	1260	1890
2.5	2	0.027	0.25	0.38	810	1350	1620	2430
3.0	2	0.032	0.30	0.45	960	1600	1920	2880

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=15000 min <sup>-1</sup> vf [mm/min]	n=25000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	n=45000 min <sup>-1</sup> vf [mm/min]
0.5	2	0.005	0.07	0.07	150	250	300	450
0.6	2	0.006	0.08	0.08	180	300	360	540
0.8	2	0.009	0.11	0.11	270	450	540	810
1.0	2	0.011	0.14	0.14	330	550	660	990
1.2	2	0.013	0.17	0.17	390	650	780	1170
1.5	2	0.016	0.21	0.21	480	800	960	1440
2.0	2	0.021	0.28	0.28	630	1050	1260	1890
2.5	2	0.027	0.35	0.35	810	1350	1620	2430
3.0	2	0.032	0.42	0.42	960	1600	1920	2880

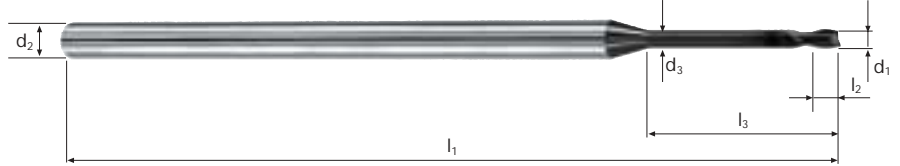

# Cylindrical end mills Microcut-C10

Shank Ø 3mm, cylindrical neck, 10xd



HM  
Micro

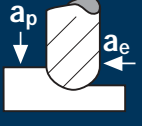

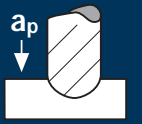

$\lambda$  25°  
 $\gamma$  6°

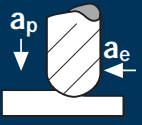





C  
Graphite

CF/GF  
Fiber Reinforced Plastics

										DIAMANT	
Example: Order-N°.										B5717	
Coating: <b>B</b> Article-N°: <b>5717</b> α-Code: <b>.050</b>											
Ø Code	d1 ±0.01	d2 h6	d3	l1	l2	l3	45°	α	z		
.050	0.5	3	0.45	40	0.6	5.0	-	7.4°	2	●	
.060	0.6	3	0.55	40	0.7	6.0	-	6.5°	2	●	
.080	0.8	3	0.75	40	1.0	8.0	-	5.2°	2	●	
.100	1.0	3	0.95	50	1.2	10.0	0.07	4.2°	2	●	
.108	1.2	3	1.15	50	1.4	12.0	0.07	3.4°	2	●	
.120	1.5	3	1.45	60	1.8	15.0	0.07	2.5°	2	●	
.140	2.0	3	1.95	60	2.4	20.0	0.10	1.4°	2	●	
.160	2.5	3	2.45	60	3.0	25.0	0.10	0.6°	2	●	
.180	3.0	3	2.95	60	3.6	30.0	0.10	0.0°	2	●	

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite   <b>B</b>	6	2	0.071	3.00	3.60	1420	2130	2840	4260
		8	2	0.094	4.00	4.80	1880	2820	3760	5640
		10	2	0.118	5.00	6.00	2360	3540	4720	7080
		12	2	0.141	6.00	7.20	2820	4230	5640	8460
<b>R = Roughing</b> 	Graphite   <b>B</b>	6	2	0.055	3.00	6.0	1100	1650	2200	3300
		8	2	0.073	4.00	8.0	1460	2190	2920	4380
		10	2	0.091	5.00	10.0	1820	2730	3640	5460
		12	2	0.109	6.00	12.0	2180	3270	4360	6540

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite   <b>B</b>	6	2	0.080	0.90	1.20	1600	2400	3200	4800
		8	2	0.107	1.20	1.60	2140	3210	4280	6420
		10	2	0.133	1.50	2.00	2660	3990	5320	7980
		12	2	0.160	1.80	2.40	3200	4800	6400	9600
<b>F = Finishing</b> 	Graphite   <b>B</b>	6	2	0.080	1.20	0.40	1600	2400	3200	4800
		8	2	0.107	1.60	0.40	2140	3210	4280	6420
		10	2	0.133	2.00	0.40	2660	3990	5320	7980
		12	2	0.160	2.40	0.40	3200	4800	6400	9600

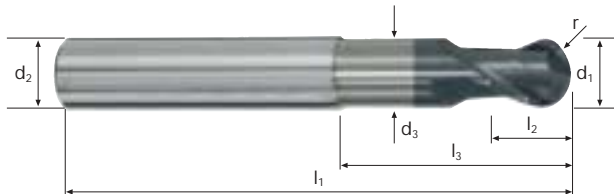
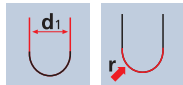


# Ball nose end mills SpheroXG

Tolerance r  $\pm 0.005$



**HM**  $\lambda 30^\circ$   
**XA**  $\gamma 15^\circ$

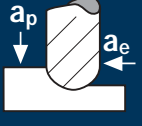

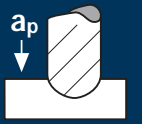



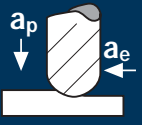



**new!**

			<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°.									DIAPLUS	
									<b>B7480</b>	
Coating	Article-N°.		α-Code							
<b>B</b>	<b>7480</b>		<b>.300</b>							
Ø Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	Z		
<b>.300</b>	6	6	5.5	57	6	20	3.0	2	●	
<b>.391</b>	8	8	7.4	63	8	26	4.0	2	●	
<b>.450</b>	10	10	9.2	72	10	31	5.0	2	●	
<b>.501</b>	12	12	11.0	83	12	37	6.0	2	●	

**IV**

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite   <b>B</b>	6	2	0.071	2.70	3.60	1420	2130	2840	4260
		8	2	0.094	3.60	4.80	1880	2820	3760	5640
		10	2	0.118	4.50	6.00	2360	3540	4720	7080
		12	2	0.141	5.40	7.20	2820	4230	5640	8460
<b>R = Roughing</b> 	Graphite   <b>B</b>	6	2	0.055	2.70	6.0	1100	1650	2200	3300
		8	2	0.073	3.60	8.0	1460	2190	2920	4380
		10	2	0.091	4.50	10.0	1820	2730	3640	5460
		12	2	0.109	5.40	12.0	2180	3270	4360	6540

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite   <b>B</b>	6	2	0.080	0.85	1.20	1600	2400	3200	4800
		8	2	0.107	1.10	1.60	2140	3210	4280	6420
		10	2	0.133	1.40	2.00	2660	3990	5320	7980
		12	2	0.160	1.70	2.40	3200	4800	6400	9600
<b>F = Finishing</b> 	Graphite   <b>B</b>	6	2	0.080	1.10	0.35	1600	2400	3200	4800
		8	2	0.107	1.45	0.35	2140	3210	4280	6420
		10	2	0.133	1.80	0.35	2660	3990	5320	7980
		12	2	0.160	2.15	0.35	3200	4800	6400	9600

# Ball nose end mills SpheroXG

Tolerance r ±0.005



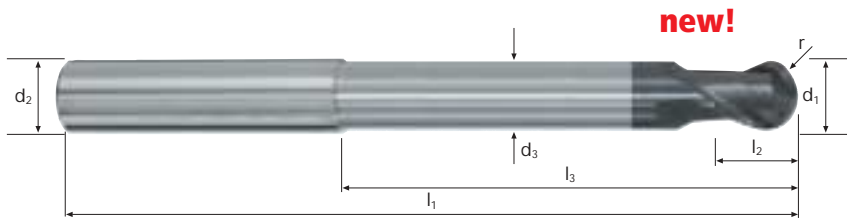
HM  
XA

$\lambda$  30°  
 $\gamma$  15°

$h_5$

$d_1$

$r$

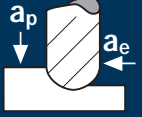





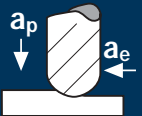



C Graphite

CF/GF Fiber Reinforced Plastics

Example: Order-N°.									DIAPLUS		
		Coating	Article-N°.			α-Code					
		B	7484			.300				B7484	
∅ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	Z			
.300	6	6	5.5	80	6	43	3.0	2	●		
.391	8	8	7.4	90	8	53	4.0	2	●		
.450	10	10	9.2	105	10	64	5.0	2	●		
.501	12	12	11.0	120	12	74	6.0	2	●		

IV

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite   <b>B</b>	6	2	0.071	2.40	2.40	1420	2130	2840	4260
		8	2	0.094	3.20	3.20	1880	2820	3760	5640
		10	2	0.118	4.00	4.00	2360	3540	4720	7080
		12	2	0.141	4.80	4.80	2820	4230	5640	8460
<b>R = Roughing</b> 	Graphite   <b>B</b>	6	2	0.044	1.80	6.0	880	1320	1760	2640
		8	2	0.058	2.40	8.0	1160	1740	2320	3480
		10	2	0.073	3.00	10.0	1460	2190	2920	4380
		12	2	0.087	3.60	12.0	1740	2610	3480	5220

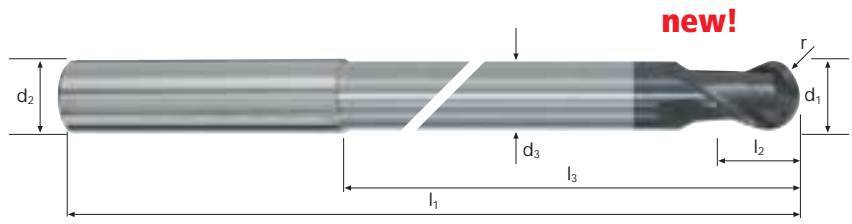
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite   <b>B</b>	6	2	0.080	0.60	0.95	1600	2400	3200	4800
		8	2	0.107	0.80	1.30	2140	3210	4280	6420
		10	2	0.133	1.00	1.60	2660	3990	5320	7980
		12	2	0.160	1.20	1.90	3200	4800	6400	9600
<b>F = Finishing</b> 	Graphite   <b>B</b>	6	2	0.080	0.85	0.30	1600	2400	3200	4800
		8	2	0.107	1.10	0.30	2140	3210	4280	6420
		10	2	0.133	1.40	0.30	2660	3990	5320	7980
		12	2	0.160	1.70	0.30	3200	4800	6400	9600

# Ball nose end mills SpheroXG

Tolerance r ±0.005



HM XA	$\lambda$ 30° $\gamma$ 15°



				<b>C</b> Graphite					CF/GF Fiber Reinforced Plastics
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Example: Order-N°.									DIAPLUS		
		Coating <b>B</b>	Article-N°. <b>7488</b>	α-Code <b>.300</b>						<b>B7488</b>	
∅ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	z			
.300	6	6	5.5	100	6	63	3.0	2	●		
.391	8	8	7.4	120	8	83	4.0	2	●		
.450	10	10	9.2	135	10	94	5.0	2	●		
.501	12	12	11.0	160	12	114	6.0	2	●		

**Application**

**R = Roughing**

**Material**

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2.0	2	0.019	0.90	1.20	380	570	760	1140
2.5	2	0.024	1.15	1.50	480	720	960	1440
3.0	2	0.028	1.35	1.80	560	840	1120	1680
3.5	2	0.033	1.60	2.10	660	990	1320	1980
4.0	2	0.038	1.80	2.40	760	1140	1520	2280
5.0	2	0.047	2.25	3.00	940	1410	1880	2820
6.0	2	0.056	2.70	3.60	1120	1680	2240	3360
8.0	2	0.075	3.60	4.80	1500	2250	3000	4500
10.0	2	0.094	4.50	6.00	1880	2820	3760	5640

**Application**

**R = Roughing**

**Material**

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2.0	2	0.015	1.00	2.0	300	450	600	900
2.5	2	0.018	1.25	2.5	360	540	720	1080
3.0	2	0.022	1.50	3.0	440	660	880	1320
3.5	2	0.025	1.75	3.5	500	750	1000	1500
4.0	2	0.029	2.00	4.0	580	870	1160	1740
5.0	2	0.036	2.50	5.0	720	1080	1440	2160
6.0	2	0.044	3.00	6.0	880	1320	1760	2640
8.0	2	0.058	4.00	8.0	1160	1740	2320	3480
10.0	2	0.073	5.00	10.0	1460	2190	2920	4380

**Application**

**F = Finishing**

**Material**

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2.0	2	0.021	0.30	0.40	420	630	840	1260
2.5	2	0.027	0.40	0.50	540	810	1080	1620
3.0	2	0.032	0.45	0.60	640	960	1280	1920
3.5	2	0.037	0.55	0.70	740	1110	1480	2220
4.0	2	0.043	0.60	0.80	860	1290	1720	2580
5.0	2	0.053	0.75	1.00	1060	1590	2120	3180
6.0	2	0.064	0.90	1.20	1280	1920	2560	3840
8.0	2	0.085	1.20	1.60	1700	2550	3400	5100
10.0	2	0.107	1.50	2.00	2140	3210	4280	6420

**Application**

**F = Finishing**

**Material**

Graphite

**B**

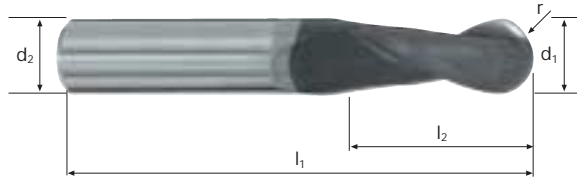
d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2.0	2	0.021	4	0.30	420	630	840	1260
2.5	2	0.027	5	0.40	540	810	1080	1620
3.0	2	0.032	6	0.45	640	960	1280	1920
3.5	2	0.037	7	0.55	740	1110	1480	2220
4.0	2	0.043	8	0.60	860	1290	1720	2580
5.0	2	0.053	10	0.75	1060	1590	2120	3180
6.0	2	0.064	12	0.90	1280	1920	2560	3840
8.0	2	0.085	16	1.20	1700	2550	3400	5100
10.0	2	0.107	20	1.50	2140	3210	4280	6420

# Ball nose end mills

Tolerance r e8 (-/-)



HM  
XA    λ 30°  
          γ 10°



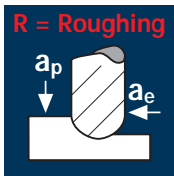
C Graphite      CF/GF Fiber Reinforced Plastics

Example: Order-N°.								DIAMANT	IV
		Coating <b>B</b>	Article-N°. <b>5680</b>	α-Code <b>.140</b>				<b>B5680</b>	
Ø Code	d1	d2 h6	l1	l2	r e8	α	Z		
.140	2.0	3	40	4	1.00	5.3°	2	●	
.160	2.5	3	40	5	1.25	2.9°	2	●	
.180	3.0	3	40	8	1.50	0.0°	2	●	
.200	3.5	4	50	12	1.75	2.6°	2	●	
.220	4.0	4	50	14	2.00	0.0°	2	●	
.260	5.0	5	50	20	2.50	0.0°	2	●	
.300	6.0	6	65	20	3.00	0.0°	2	●	
.391	8.0	8	65	20	4.00	0.0°	2	●	
.450	10.0	10	75	25	5.00	0.0°	2	●	

CNC Radius R					CNC Radius R				
Radius e8					Radius e8				
d1	r	Minimum	Maximum	R	d1	r	Minimum	Maximum	R
2.0	1.00	0.972	0.986	0.979	4.0	2.00	1.972	1.986	1.979
2.5	1.25	1.222	1.236	1.229	5.0	2.50	2.472	2.486	2.479
3.0	1.50	1.472	1.486	1.479	6.0	3.00	2.972	2.986	2.979
3.5	1.75	1.722	1.736	1.729	8.0	4.00	3.962	3.980	3.971
					10.0	5.00	4.962	4.980	4.971

### Application

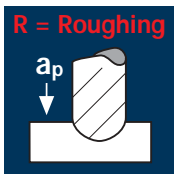


### Material

Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
3	2	0.028	1.20	1.80	560	840	1120	1680
4	2	0.038	1.60	2.40	760	1140	1520	2280
5	2	0.047	2.00	3.00	940	1410	1880	2820
6	2	0.056	2.40	3.60	1120	1680	2240	3360
8	2	0.075	3.20	4.80	1500	2250	3000	4500
10	2	0.094	4.00	6.00	1880	2820	3760	5640
12	2	0.113	4.80	7.20	2260	3390	4520	6780

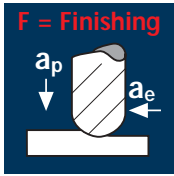


Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
3	2	0.022	1.20	3.0	440	660	880	1320
4	2	0.029	1.60	4.0	580	870	1160	1740
5	2	0.036	2.00	5.0	720	1080	1440	2160
6	2	0.044	2.40	6.0	880	1320	1760	2640
8	2	0.058	3.20	8.0	1160	1740	2320	3480
10	2	0.073	4.00	10.0	1460	2190	2920	4380
12	2	0.087	4.80	12.0	1740	2610	3480	5220

### Application

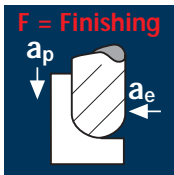


### Material

Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
3	2	0.032	0.40	0.55	640	960	1280	1920
4	2	0.043	0.55	0.70	860	1290	1720	2580
5	2	0.053	0.70	0.90	1060	1590	2120	3180
6	2	0.064	0.85	1.10	1280	1920	2560	3840
8	2	0.085	1.10	1.45	1700	2550	3400	5100
10	2	0.107	1.40	1.80	2140	3210	4280	6420
12	2	0.128	1.70	2.15	2560	3840	5120	7680



Graphite

**B**

d1 [mm]	z	fz [mm]	ap [mm]	ae [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
3	2	0.032	4.5	0.45	640	960	1280	1920
4	2	0.043	6.0	0.60	860	1290	1720	2580
5	2	0.053	7.5	0.75	1060	1590	2120	3180
6	2	0.064	9.0	0.90	1280	1920	2560	3840
8	2	0.085	12.0	1.20	1700	2550	3400	5100
10	2	0.107	15.0	1.50	2140	3210	4280	6420
12	2	0.128	18.0	1.80	2560	3840	5120	7680

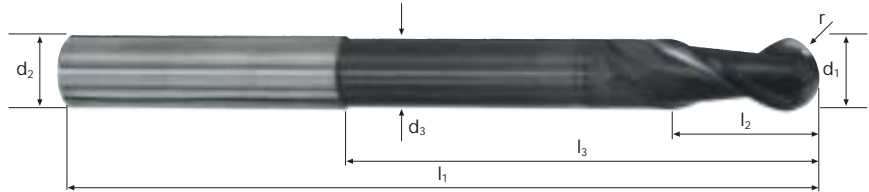


# Ball nose end mills

Tolerance r e8 (-/-)

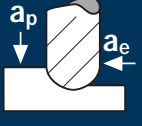

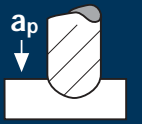



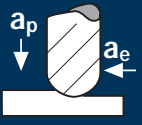

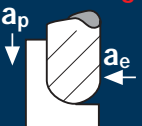

HM	$\lambda 40^\circ$
XA	$\gamma 20^\circ$



				<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°. <b>B</b> 5675 .180										<b>DIAMANT</b>	
										<b>B5675</b>	IV
Ø Code	d1	d2 h6	d3	l1	l2	l3	r e8	$\alpha$	z		
.180	3	6	2.8	75	6	27	1.5	3.0°	2	●	
.220	4	6	3.7	75	8	30	2.0	2.0°	2	●	
.260	5	6	4.6	80	10	38	2.5	1.0°	2	●	
.300	6	6	5.5	80	12	43	3.0	0.0°	2	●	
.391	8	8	7.4	90	16	53	4.0	0.0°	2	●	
.450	10	10	9.2	100	20	59	5.0	0.0°	2	●	
.501	12	12	11.0	120	24	74	6.0	0.0°	2	●	
<b>CNC Radius R</b>											
			Tolerance e8		Radius						
	d1	r			Minimum	Maximum				<b>R</b>	
	3	1.5	-0.028	-0.014	1.472	1.486				1.479	
	4	2.0			1.972	1.986				1.979	
	5	2.5			2.472	2.486				2.479	
	6	3.0			2.972	2.986				2.979	
	8	4.0	-0.038	-0.020	3.962	3.980				3.971	
	10	5.0			4.962	4.980				4.971	
	12	6.0			5.962	5.980				5.971	

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	
<b>R = Roughing</b> 	Graphite  <b>B</b>	2	3	0.019	0.70	0.90	570	855	1140	1710	
		3	3	0.028	1.05	1.35	840	1260	1680	2520	
		4	3	0.038	1.40	1.80	1140	1710	2280	3420	
		5	3	0.047	1.75	2.25	1410	2115	2820	4230	
		6	3	0.056	2.10	2.70	1680	2520	3360	5040	
		8	3	0.075	2.80	3.60	2250	3375	4500	6750	
		10	3	0.094	3.50	4.50	2820	4230	5640	8460	
		12	3	0.113	4.20	5.40	3390	5085	6780	10170	
<b>R = Roughing</b> 	Graphite  <b>B</b>	2	3	0.015	0.60	2.0	450	675	900	1350	
		3	3	0.022	0.90	3.0	660	990	1320	1980	
		4	3	0.029	1.20	4.0	870	1305	1740	2610	
		5	3	0.036	1.50	5.0	1080	1620	2160	3240	
		6	3	0.044	1.80	6.0	1320	1980	2640	3960	
		8	3	0.058	2.40	8.0	1740	2610	3480	5220	
		10	3	0.073	3.00	10.0	2190	3285	4380	6570	
		12	3	0.087	3.60	12.0	2610	3915	5220	7830	

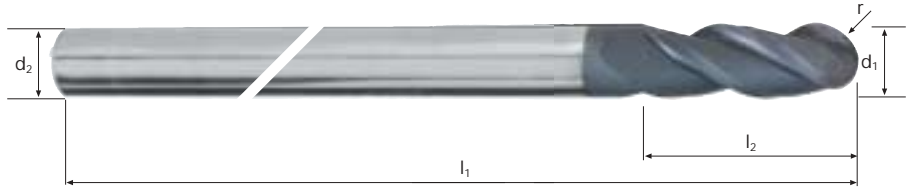
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	
<b>F = Finishing</b> 	Graphite  <b>B</b>	2	3	0.021	0.25	0.30	630	945	1260	1890	
		3	3	0.032	0.35	0.50	960	1440	1920	2880	
		4	3	0.043	0.50	0.65	1290	1935	2580	3870	
		5	3	0.053	0.60	0.80	1590	2385	3180	4770	
		6	3	0.064	0.70	0.95	1920	2880	3840	5760	
		8	3	0.085	0.95	1.30	2550	3825	5100	7650	
		10	3	0.107	1.20	1.60	3210	4815	6420	9630	
		12	3	0.128	1.45	1.90	3840	5760	7680	11520	
<b>F = Finishing</b> 	Graphite  <b>B</b>	2	3	0.021	2.4	0.30	630	945	1260	1890	
		3	3	0.032	3.6	0.45	960	1440	1920	2880	
		4	3	0.043	4.8	0.60	1290	1935	2580	3870	
		5	3	0.053	6.0	0.75	1590	2385	3180	4770	
		6	3	0.064	7.2	0.90	1920	2880	3840	5760	
		8	3	0.085	9.6	1.20	2550	3825	5100	7650	
		10	3	0.107	12.0	1.50	3210	4815	6420	9630	
		12	3	0.128	14.4	1.80	3840	5760	7680	11520	

# Ball nose end mills

Tolerance r e8 (-/-)



HM  
XA    λ 40°  
         γ 15°



C Graphite      CF/GF Fiber Reinforced Plastics

Example:  
Order-N°.

Coating    Article-N°    α-Code  
**B**    **5695**    **.140**

DIAMANT

B5695

IV

∅ Code	d1	d2 h6	l1	l2	r e8	α	Z
.140	2	3	100	4	1.0	5.0°	3
.180	3	3	100	6	1.5	0.0°	3
.220	4	4	100	9	2.0	0.0°	3
.260	5	5	100	11	2.5	0.0°	3
.300	6	6	150	15	3.0	0.0°	3
.391	8	8	150	20	4.0	0.0°	3
.450	10	10	175	25	5.0	0.0°	3
.501	12	12	175	30	6.0	0.0°	3

CNC Radius R						
d1	r	Tolerance e8		Radius		R
				Minimum	Maximum	
2	1.0	-0.028	-0.014	0.972	0.986	0.979
3	1.5			1.472	1.486	1.479
4	2.0			1.972	1.986	1.979
5	2.5			2.472	2.486	2.479
6	3.0			2.972	2.986	2.979
8	4.0			-0.038	-0.020	3.962
10	5.0	4.962	4.980			4.971
12	6.0	5.962	5.980			5.971

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite	6	2	0.056	4.80	2.40	1120	1680	2240	3360
		8	2	0.075	6.40	3.20	1500	2250	3000	4500
		10	2	0.094	8.00	4.00	1880	2820	3760	5640
		12	2	0.113	9.60	4.80	2260	3390	4520	6780
<b>R = Roughing</b> 	Graphite	6	2	0.044	3.0	6.0	880	1320	1760	2640
		8	2	0.058	4.0	8.0	1160	1740	2320	3480
		10	2	0.073	5.0	10.0	1460	2190	2920	4380
		12	2	0.087	6.0	12.0	1740	2610	3480	5220

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite	6	2	0.080	0.48	2.70	1600	2400	3200	4800
		8	2	0.107	0.64	3.60	2140	3210	4280	6420
		10	2	0.133	0.80	4.50	2660	3990	5320	7980
		12	2	0.160	0.96	5.40	3200	4800	6400	9600
<b>F = Finishing</b> 	Graphite	6	2	0.080	0.90	0.90	1600	2400	3200	4800
		8	2	0.107	1.20	1.20	2140	3210	4280	6420
		10	2	0.133	1.50	1.50	2660	3990	5320	7980
		12	2	0.160	1.80	1.80	3200	4800	6400	9600

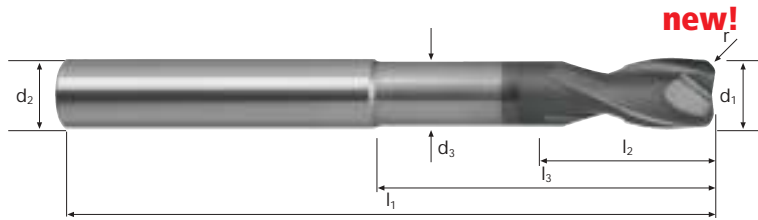
# Corner radius end mills ToroXG

Long version



**HM**  
**XA**

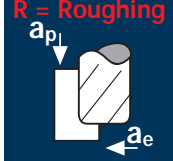
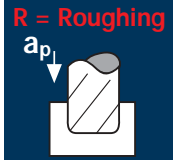
$\lambda$  **30°**  
 $\gamma$  **15°**

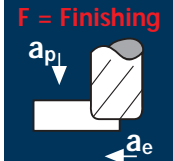



C Graphite
 CF/GF Fiber Reinforced Plastics

Example: Order-N°.									DIAPLUS	
Coating: <b>B</b> Article-N°: <b>7284</b> α-Code: <b>.300</b>										
∅ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	z	<b>B7284</b>	
.300	6	6	5.5	80	6	43	0.5	2	●	
.297	6	6	5.5	80	6	43	1.0	2	●	
.391	8	8	7.4	90	8	53	0.5	2	●	
.388	8	8	7.4	90	8	53	1.0	2	●	
.450	10	10	9.2	105	10	64	0.5	2	●	
.445	10	10	9.2	105	10	64	1.0	2	●	
.501	12	12	11.0	120	12	74	0.5	2	●	
.496	12	12	11.0	120	12	74	1.0	2	●	

IV

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite	6	2	0.056	4.80	1.20	1120	1680	2240	3360
		8	2	0.075	6.40	1.60	1500	2250	3000	4500
		10	2	0.094	8.00	2.00	1880	2820	3760	5640
		12	2	0.113	9.60	2.40	2260	3390	4520	6780
<b>R = Roughing</b> 	Graphite	6	2	0.044	2.10	6.0	880	1320	1760	2640
		8	2	0.058	2.80	8.0	1160	1740	2320	3480
		10	2	0.073	3.50	10.0	1460	2190	2920	4380
		12	2	0.087	4.20	12.0	1740	2610	3480	5220

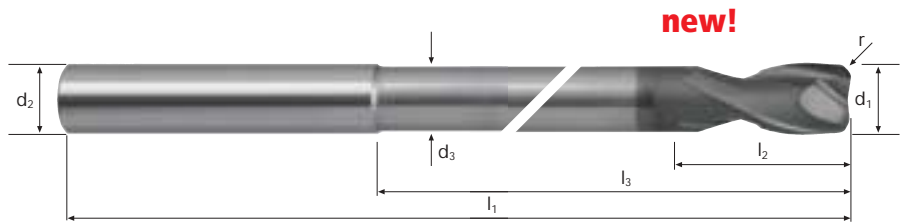
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite	6	2	0.080	0.36	1.50	1600	2400	3200	4800
		8	2	0.107	0.48	2.00	2140	3210	4280	6420
		10	2	0.133	0.60	2.50	2660	3990	5320	7980
		12	2	0.160	0.72	3.00	3200	4800	6400	9600
<b>F = Finishing</b> 	Graphite	6	2	0.080	0.84	0.84	1600	2400	3200	4800
		8	2	0.107	1.12	1.12	2140	3210	4280	6420
		10	2	0.133	1.40	1.40	2660	3990	5320	7980
		12	2	0.160	1.68	1.68	3200	4800	6400	9600

# Corner radius end mills ToroXG

Extra-long version



HM XA	$\lambda$ 30° $\gamma$ 15°



			<b>C</b> Graphite						CF/GF Fiber Reinforced Plastics
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Example: Order-N°: <span style="margin-left: 20px;">Coating</span> <b>B</b> <span style="margin-left: 20px;">Article-N°</span> <b>7288</b> <span style="margin-left: 20px;">α-Code</span> <b>.300</b>									DIAPLUS	
∅ Code	d1 0/-0.01	d2 h5	d3	l1	l2	l3	r ±0.005	Z	<b>B7288</b>	
.300	6	6	5.5	100	6	63	0.5	2	●	
.297	6	6	5.5	100	6	63	1.0	2	●	
.391	8	8	7.4	120	8	83	0.5	2	●	
.388	8	8	7.4	120	8	83	1.0	2	●	
.450	10	10	9.2	135	10	94	0.5	2	●	
.445	10	10	9.2	135	10	94	1.0	2	●	
.501	12	12	11.0	160	12	114	0.5	2	●	
.496	12	12	11.0	160	12	114	1.0	2	●	

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite	6	2	0.071	4.80	2.40	1420	2130	2840	4260
		8	2	0.094	6.40	3.20	1880	2820	3760	5640
		10	2	0.118	8.00	4.00	2360	3540	4720	7080
		12	2	0.141	9.60	4.80	2820	4230	5640	8460
<b>R = Roughing</b> 	Graphite	6	2	0.055	3.0	6.0	1100	1650	2200	3300
		8	2	0.073	4.0	8.0	1460	2190	2920	4380
		10	2	0.091	5.0	10.0	1820	2730	3640	5460
		12	2	0.109	6.0	12.0	2180	3270	4360	6540

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite	6	2	0.080	0.60	2.70	1600	2400	3200	4800
		8	2	0.107	0.80	3.60	2140	3210	4280	6420
		10	2	0.133	1.00	4.50	2660	3990	5320	7980
		12	2	0.160	1.20	5.40	3200	4800	6400	9600
<b>F = Finishing</b> 	Graphite	6	2	0.080	1.08	1.08	1600	2400	3200	4800
		8	2	0.107	1.44	1.44	2140	3210	4280	6420
		10	2	0.133	1.80	1.80	2660	3990	5320	7980
		12	2	0.160	2.16	2.16	3200	4800	6400	9600





Application

**R = Roughing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2	3	0.024	4.0	0.50	720	1080	1440	2160
3	3	0.035	6.0	0.75	1050	1575	2100	3150
4	3	0.047	8.0	1.00	1410	2115	2820	4230
5	3	0.059	10.0	1.25	1770	2655	3540	5310
6	3	0.071	12.0	1.50	2130	3195	4260	6390
8	3	0.094	16.0	2.00	2820	4230	5640	8460
10	3	0.118	20.0	2.50	3540	5310	7080	10620
12	3	0.141	24.0	3.00	4230	6345	8460	12690

Application

**R = Roughing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2	3	0.018	0.60	2.0	540	810	1080	1620
3	3	0.027	0.90	3.0	810	1215	1620	2430
4	3	0.036	1.20	4.0	1080	1620	2160	3240
5	3	0.045	1.50	5.0	1350	2025	2700	4050
6	3	0.055	1.80	6.0	1650	2475	3300	4950
8	3	0.073	2.40	8.0	2190	3285	4380	6570
10	3	0.091	3.00	10.0	2730	4095	5460	8190
12	3	0.109	3.60	12.0	3270	4905	6540	9810

Application

**F = Finishing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2	3	0.027	0.20	0.80	810	1215	1620	2430
3	3	0.040	0.30	1.20	1200	1800	2400	3600
4	3	0.053	0.40	1.60	1590	2385	3180	4770
5	3	0.067	0.50	2.00	2010	3015	4020	6030
6	3	0.080	0.60	2.40	2400	3600	4800	7200
8	3	0.107	0.80	3.20	3210	4815	6420	9630
10	3	0.133	1.00	4.00	3990	5985	7980	11970
12	3	0.160	1.20	4.80	4800	7200	9600	14400

Application

**F = Finishing**

Material

Graphite

**B**

d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
2	3	0.027	4.0	0.30	810	1215	1620	2430
3	3	0.040	6.0	0.45	1200	1800	2400	3600
4	3	0.053	8.0	0.60	1590	2385	3180	4770
5	3	0.067	10.0	0.75	2010	3015	4020	6030
6	3	0.080	12.0	0.90	2400	3600	4800	7200
8	3	0.107	16.0	1.20	3210	4815	6420	9630
10	3	0.133	20.0	1.50	3990	5985	7980	11970
12	3	0.160	24.0	1.80	4800	7200	9600	14400

# Corner radius end mills

Normal version



HM  
XA    λ 40°  
         γ 15°

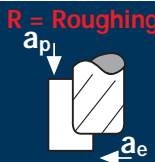



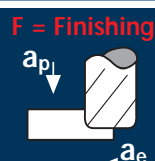

C Graphite      CF/GF Fiber Reinforced Plastics

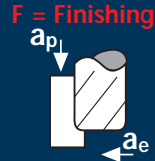

Example: Order-N°.								DIAMANT	IV
		Coating <b>B</b>	Article-N°. <b>5640</b>	α-Code <b>.140</b>				<b>B5640</b>	
Ø Code	d1 e8	d2 h6	l1	l2	r 0/+0.03	α	Z		
.140	2	3	40	6	0.15	3.8°	3	●	
.180	3	3	40	12	0.15	0.0°	3	●	
.220	4	4	50	14	0.20	0.0°	3	●	
.260	5	5	50	16	0.30	0.0°	3	●	
.300	6	6	65	20	0.30	0.0°	3	●	
.391	8	8	65	20	0.50	0.0°	3	●	
.450	10	10	75	25	0.50	0.0°	3	●	
.501	12	12	75	25	0.50	0.0°	3	●	

CNC Diameter D					
d1	Tolerance e8		Diameter		D
			Minimum	Maximum	
2	-0.028	-0.014	1.972	1.986	1.979
3			2.972	2.986	2.979
4	-0.038	-0.020	3.962	3.980	3.971
5			4.962	4.980	4.971
6			5.962	5.980	5.971
8	-0.047	-0.025	7.953	7.975	7.964
10			9.953	9.975	9.964
12	-0.059	-0.032	11.941	11.968	11.955

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	
<b>R = Roughing</b> 	Graphite  	2	3	0.019	6.0	0.40	570	855	1140	1710	
		3	3	0.028	9.0	0.60	840	1260	1680	2520	
		4	3	0.038	12.0	0.80	1140	1710	2280	3420	
		5	3	0.047	15.0	1.00	1410	2115	2820	4230	
		6	3	0.056	18.0	1.20	1680	2520	3360	5040	
		8	3	0.075	24.0	1.60	2250	3375	4500	6750	
		10	3	0.094	30.0	2.00	2820	4230	5640	8460	
		12	3	0.113	36.0	2.40	3390	5085	6780	10170	

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	
<b>F = Finishing</b> 	Graphite  	2	3	0.021	0.20	0.70	630	945	1260	1890	
		3	3	0.032	0.30	1.05	960	1440	1920	2880	
		4	3	0.043	0.40	1.40	1290	1935	2580	3870	
		5	3	0.053	0.50	1.75	1590	2385	3180	4770	
		6	3	0.064	0.60	2.10	1920	2880	3840	5760	
		8	3	0.085	0.80	2.80	2550	3825	5100	7650	
		10	3	0.107	1.00	3.50	3210	4815	6420	9630	
		12	3	0.128	1.20	4.20	3840	5760	7680	11520	

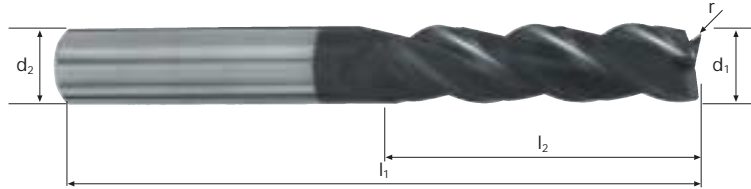
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]	
<b>F = Finishing</b> 	Graphite  	2	3	0.021	6.0	0.30	630	945	1260	1890	
		3	3	0.032	9.0	0.45	960	1440	1920	2880	
		4	3	0.043	12.0	0.60	1290	1935	2580	3870	
		5	3	0.053	15.0	0.75	1590	2385	3180	4770	
		6	3	0.064	18.0	0.90	1920	2880	3840	5760	
		8	3	0.085	24.0	1.20	2550	3825	5100	7650	
		10	3	0.107	30.0	1.50	3210	4815	6420	9630	
		12	3	0.128	36.0	1.80	3840	5760	7680	11520	

# Corner radius end mills

Long version

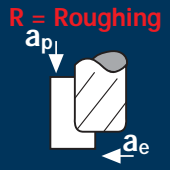



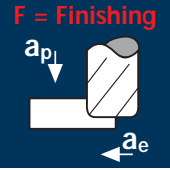

HM  
XA  $\lambda$  40°  
 $\gamma$  15°

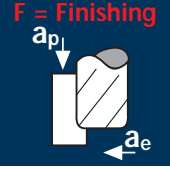



C Graphite CF/GF Fiber Reinforced Plastics

Example: Order-N°.								DIAMANT	
			Coating <b>B</b>	Article-N°. <b>5645</b>	$\alpha$ -Code <b>.140</b>			<b>B5645</b>	IV
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	r 0/+0.03	$\alpha$	Z		
.140	2	3	60	9	0.15	2.7°	3	●	
.180	3	3	60	30	0.15	0.0°	3	●	
.220	4	4	60	30	0.20	0.0°	3	●	
.260	5	5	70	35	0.30	0.0°	3	●	
.300	6	6	100	40	0.30	0.0°	3	●	
.391	8	8	100	40	0.50	0.0°	3	●	
.450	10	10	100	40	0.50	0.0°	3	●	
.501	12	12	100	45	0.50	0.0°	3	●	
<b>CNC Diameter D</b>									
	d1	Tolerance e8		Diameter		<b>D</b>			
				Minimum	Maximum				
	2	-0.028	-0.014	1.972	1.986	1.979			
	3			2.972	2.986	2.979			
	4	-0.038	-0.020	3.962	3.980	3.971			
	5			4.962	4.980	4.971			
	6			5.962	5.980	5.971			
	8	-0.047	-0.025	7.953	7.975	7.964			
	10			9.953	9.975	9.964			
	12	-0.059	-0.032	11.941	11.968	11.955			

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>R = Roughing</b> 	Graphite	10	3	0.071	40	1.5	2130	3195	4260	6390
		12	3	0.085	48	1.8	2550	3825	5100	7650
	 <b>B</b>									

Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite	10	3	0.080	1.0	3.0	2400	3600	4800	7200
		12	3	0.096	1.2	3.6	2880	4320	5760	8640
	 <b>B</b>									

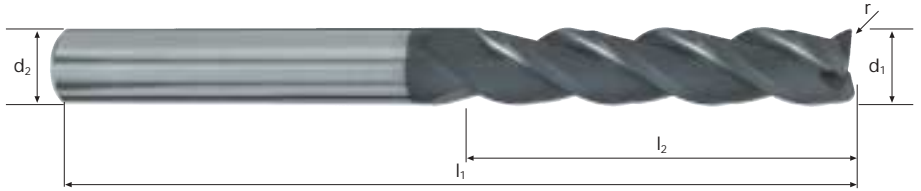
Application	Material	d1 [mm]	z	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n=10000 min <sup>-1</sup> vf [mm/min]	n=15000 min <sup>-1</sup> vf [mm/min]	n=20000 min <sup>-1</sup> vf [mm/min]	n=30000 min <sup>-1</sup> vf [mm/min]
<b>F = Finishing</b> 	Graphite	10	3	0.080	40	1.0	2400	3600	4800	7200
		12	3	0.096	48	1.2	2880	4320	5760	8640
	 <b>B</b>									

# Corner radius end mills

Extra-long version



<b>HM</b>	$\lambda$ 40°
<b>XA</b>	$\gamma$ 15°









				<b>C</b> Graphite						<b>CF/GF</b> Fiber Reinforced Plastics
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Example: Order-N°.							DIAMANT	
							B5650	
$\emptyset$ Code	d1 e8	d2 h6	l1	l2	r 0/+0.03	Z		
.450	10	10	125	55	0.5	3	●	
.501	12	12	125	55	0.5	3	●	

CNC Diameter D					
d1	Tolerance e8		Diameter		D
	Minimum	Maximum	Minimum	Maximum	
10	-0.047	-0.025	9.953	9.975	9.964
12	-0.059	-0.032	11.941	11.968	11.955

# End milling tools with special forms

Forming end mills							
N° 7920		Base-X <b>B</b>	HM MG10		<b>Rm</b> <850-1300		579
N° 0920		<b>HSS</b>	HSS-E Co8		<b>Rm</b> <850-1100		581
N° 0915		<b>HSS</b>	HSS-E Co8		<b>Rm</b> <850-1100		583
N° 0910		<b>HSS</b>	HSS-E Co8		<b>Rm</b> <850-1100		585
N° 0905		<b>HSS</b>	HSS-E Co8		<b>Rm</b> <850-1100		587
N° 0890		<b>HSS</b>	HSS-E Co8		<b>Rm</b> <850-1100		591



# End milling tools with special forms

## Deburring end mills

N° 7930



Base-X	<b>B</b>	HM		<b>Rm</b> <850-1100			593
	<b>B</b>	HM		<b>Rm</b> <850-1100			595

N° 7940



## Universal end mills

N° 7960



Base-X	<b>B</b>	HM		<b>Rm</b> <850-1100			597
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## Shell end mills

N° 3490



HSS	HSS-E Co8	45°	<b>Rm</b> <850-1100			599
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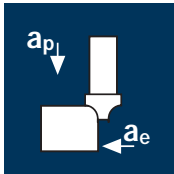
N° 3209



HSS	HSS-E Co8	90°	<b>Rm</b> 850-1300			601
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V

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	120	0.025	0.50	0.50	6365	635
6	4	120	0.025	0.75	0.75	6365	635
8	4	120	0.030	1.00	1.00	4775	575
8	4	120	0.030	1.25	1.25	4775	575
8	4	120	0.030	1.50	1.50	4775	575
10	4	120	0.040	2.00	2.00	3820	610
10	4	120	0.040	2.50	2.50	3820	610
12	4	120	0.050	3.00	3.00	3185	635

Steel  
850 - 1100 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	100	0.020	0.50	0.50	5305	425
6	4	100	0.020	0.75	0.75	5305	425
8	4	100	0.025	1.00	1.00	3980	400
8	4	100	0.025	1.25	1.25	3980	400
8	4	100	0.025	1.50	1.50	3980	400
10	4	100	0.035	2.00	2.00	3185	445
10	4	100	0.035	2.50	2.50	3185	445
12	4	100	0.040	3.00	3.00	2655	425

Steel  
1100 - 1300 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	60	0.015	0.50	0.50	3185	190
6	4	60	0.015	0.75	0.75	3185	190
8	4	60	0.025	1.00	1.00	2385	240
8	4	60	0.025	1.25	1.25	2385	240
8	4	60	0.025	1.50	1.50	2385	240
10	4	60	0.030	2.00	2.00	1910	230
10	4	60	0.030	2.50	2.50	1910	230
12	4	60	0.035	3.00	3.00	1590	225

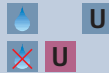
Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	50	0.015	0.50	0.50	2655	160
6	4	50	0.015	0.75	0.75	2655	160
8	4	50	0.025	1.00	1.00	1990	200
8	4	50	0.025	1.25	1.25	1990	200
8	4	50	0.025	1.50	1.50	1990	200
10	4	50	0.030	2.00	2.00	1590	190
10	4	50	0.030	2.50	2.50	1590	190
12	4	50	0.035	3.00	3.00	1325	185

## Material

Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	140	0.025	0.50	0.50	7425	745
6	4	140	0.025	0.75	0.75	7425	745
8	4	140	0.030	1.00	1.00	5570	670
8	4	140	0.030	1.25	1.25	5570	670
8	4	140	0.030	1.50	1.50	5570	670
10	4	140	0.040	2.00	2.00	4455	715
10	4	140	0.040	2.50	2.50	4455	715
12	4	140	0.050	3.00	3.00	3715	745

Unalloyed copper



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	160	0.020	0.50	0.50	8490	680
6	4	160	0.020	0.75	0.75	8490	680
8	4	160	0.025	1.00	1.00	6365	635
8	4	160	0.025	1.25	1.25	6365	635
8	4	160	0.025	1.50	1.50	6365	635
10	4	160	0.035	2.00	2.00	5095	715
10	4	160	0.035	2.50	2.50	5095	715
12	4	160	0.040	3.00	3.00	4245	680

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	60	0.015	0.50	0.50	3185	190
6	4	60	0.015	0.75	0.75	3185	190
8	4	60	0.025	1.00	1.00	2385	240
8	4	60	0.025	1.25	1.25	2385	240
8	4	60	0.025	1.50	1.50	2385	240
10	4	60	0.030	2.00	2.00	1910	230
10	4	60	0.030	2.50	2.50	1910	230
12	4	60	0.035	3.00	3.00	1590	225

Wrought aluminium  
alloys Si < 6%



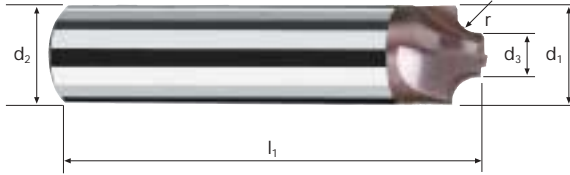
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	180	0.005	0.50	0.50	9550	190
6	4	180	0.005	0.75	0.75	9550	190
8	4	180	0.005	1.00	1.00	7160	145
8	4	180	0.005	1.25	1.25	7160	145
8	4	180	0.005	1.50	1.50	7160	145
10	4	180	0.010	2.00	2.00	5730	230
10	4	180	0.010	2.50	2.50	5730	230
12	4	180	0.010	3.00	3.00	4775	190

# Quarter radius end mills



HM  
MG10

$\lambda$  0°  
 $\gamma$  0°

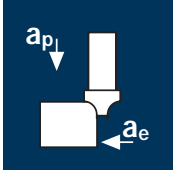


Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.								UNICUT-4X	
								U7920	
$\emptyset$ Code	d1	d2 h6	d3 $\pm 0.1$	l1		r JS10	Z		
.300	6	6	4.5	57		0.50	4	●	
.303	6	6	4.0	57		0.75	4	●	
.391	8	8	5.5	63		1.00	4	●	
.394	8	8	5.0	63		1.25	4	●	
.397	8	8	4.5	63		1.50	4	●	
.450	10	10	5.0	72		2.00	4	●	
.453	10	10	4.5	72		2.50	4	●	
.501	12	12	5.0	83		3.00	4	●	

V

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
10	4	55	0.010	2.0	2.0	1750	70
12	4	55	0.010	2.5	2.5	1460	60
16	4	55	0.025	4.0	4.0	1095	110
20	4	55	0.030	5.0	5.0	875	105
22	4	55	0.035	6.0	6.0	795	110
24	5	55	0.040	7.0	7.0	730	145
28	5	55	0.045	8.0	8.0	625	140
32	5	55	0.050	10.0	10.0	545	135
38	6	55	0.060	12.0	12.0	460	165

Steel  
850 - 1100 N/mm<sup>2</sup>



10	4	45	0.010	2.0	2.0	1430	55
12	4	45	0.010	2.5	2.5	1195	50
16	4	45	0.025	4.0	4.0	895	90
20	4	45	0.030	5.0	5.0	715	85
22	4	45	0.035	6.0	6.0	650	90
24	5	45	0.040	7.0	7.0	595	120
28	5	45	0.045	8.0	8.0	510	115
32	5	45	0.050	10.0	10.0	450	115
38	6	45	0.060	12.0	12.0	375	135

Steel  
1100 - 1300 N/mm<sup>2</sup>



10	4	34	0.010	2.0	2.0	1080	45
12	4	34	0.010	2.5	2.5	900	35
16	4	34	0.025	4.0	4.0	675	70
20	4	34	0.030	5.0	5.0	540	65
22	4	34	0.035	6.0	6.0	490	70
24	5	34	0.040	7.0	7.0	450	90
28	5	34	0.045	8.0	8.0	385	85
32	5	34	0.050	10.0	10.0	340	85
38	6	34	0.060	12.0	12.0	285	105

Stainless steel  
[Cr-Ni/1.4301]



10	4	21	0.010	2.0	2.0	670	25
12	4	21	0.010	2.5	2.5	555	20
16	4	21	0.025	4.0	4.0	420	40
20	4	21	0.030	5.0	5.0	335	40
22	4	21	0.035	6.0	6.0	305	45
24	5	21	0.040	7.0	7.0	280	55
28	5	21	0.045	8.0	8.0	240	55
32	5	21	0.050	10.0	10.0	210	55
38	6	21	0.060	12.0	12.0	175	65

## Material

Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
10	4	42	0.010	2.0	2.0	1335	55
12	4	42	0.010	2.5	2.5	1115	45
16	4	42	0.025	4.0	4.0	835	85
20	4	42	0.030	5.0	5.0	670	80
22	4	42	0.035	6.0	6.0	610	85
24	5	42	0.040	7.0	7.0	555	110
28	5	42	0.045	8.0	8.0	475	105
32	5	42	0.050	10.0	10.0	420	105
38	6	42	0.060	12.0	12.0	350	125

Unalloyed copper



10	4	65	0.010	2.0	2.0	2070	85
12	4	65	0.010	2.5	2.5	1725	70
16	4	65	0.025	4.0	4.0	1295	130
20	4	65	0.030	5.0	5.0	1035	125
22	4	65	0.035	6.0	6.0	940	130
24	5	65	0.040	7.0	7.0	860	170
28	5	65	0.045	8.0	8.0	740	165
32	5	65	0.050	10.0	10.0	645	160
38	6	65	0.060	12.0	12.0	545	195

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



10	4	23	0.010	2.0	2.0	730	30
12	4	23	0.010	2.5	2.5	610	25
16	4	23	0.025	4.0	4.0	460	45
20	4	23	0.030	5.0	5.0	365	45
22	4	23	0.035	6.0	6.0	335	45
24	5	23	0.040	7.0	7.0	305	60
28	5	23	0.045	8.0	8.0	260	60
32	5	23	0.050	10.0	10.0	230	60
38	6	23	0.060	12.0	12.0	195	70

Wrought aluminium  
alloys Si < 6%

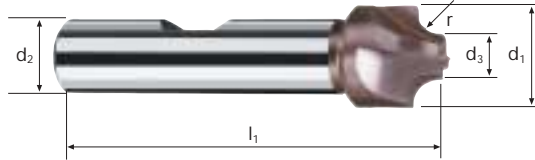


10	4	80	0.010	2.0	2.0	2545	100
12	4	80	0.010	2.5	2.5	2120	85
16	4	80	0.025	4.0	4.0	1590	160
20	4	80	0.030	5.0	5.0	1275	155
22	4	80	0.035	6.0	6.0	1160	160
24	5	80	0.040	7.0	7.0	1060	210
28	5	80	0.045	8.0	8.0	910	205
32	5	80	0.050	10.0	10.0	795	200
38	6	80	0.060	12.0	12.0	670	240

# Quarter radius end mills



HSS-E	$\lambda$ 8°
Co8	$\gamma$ 0°

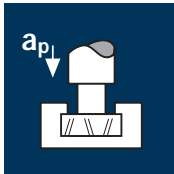


Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.								UNICUT-4X	
		Coating	Article-N°.	α-Code				U0920	
		U	0920	.080					
Ø Code	d1	d2 h6	d3 0/+0.1	l1	r H11	Z			
.080	8	10	5.3	56	1.0	4	●		
.090	9	10	5.3	56	1.5	4	●		
.100	10	10	5.1	56	2.0	4	●		
.120	12	12	6.1	63	2.5	4	●		
.140	14	12	7.1	63	3.0	4	●		
.160	16	12	7.1	63	4.0	4	●		
.200	20	16	8.7	70	5.0	4	●		
.220	22	16	8.7	70	6.0	4	●		
.240	24	16	8.7	70	7.0	5	●		
.280	28	16	10.2	70	8.0	5	●		
.320	32	16	10.2	75	10.0	5	●		
.380	38	20	11.7	80	12.0	6	●		
.460	46	25	14.0	94	15.0	6	●		
.580	58	25	15.0	100	20.0	6	●		



## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
16	6	55	0.020	8	16	1095	130
18	6	55	0.020	8	18	975	115
21	6	55	0.030	9	21	835	150
25	6	55	0.040	11	25	700	170
28	6	55	0.040	12	28	625	150
32	6	55	0.050	14	32	545	165
40	8	55	0.060	18	40	440	210

Steel  
850 - 1100 N/mm<sup>2</sup>



16	6	45	0.020	8	16	895	105
18	6	45	0.020	8	18	795	95
21	6	45	0.030	9	21	680	120
25	6	45	0.040	11	25	575	140
28	6	45	0.040	12	28	510	120
32	6	45	0.050	14	32	450	135
40	8	45	0.060	18	40	360	175

Steel  
1100 - 1300 N/mm<sup>2</sup>



16	6	34	0.020	8	16	675	80
18	6	34	0.020	8	18	600	70
21	6	34	0.030	9	21	515	95
25	6	34	0.040	11	25	435	105
28	6	34	0.040	12	28	385	90
32	6	34	0.050	14	32	340	100
40	8	34	0.060	18	40	270	130

Stainless steel  
[Cr-Ni/1.4301]



16	6	21	0.020	8	16	420	50
18	6	21	0.020	8	18	370	45
21	6	21	0.030	9	21	320	60
25	6	21	0.040	11	25	265	65
28	6	21	0.040	12	28	240	60
32	6	21	0.050	14	32	210	65
40	8	21	0.060	18	40	165	80

## Material

Cast iron  
(lamellar / spheroidal)



16	6	42	0.020	8	16	835	100
18	6	42	0.020	8	18	745	90
21	6	42	0.030	9	21	635	115
25	6	42	0.040	11	25	535	130
28	6	42	0.040	12	28	475	115
32	6	42	0.050	14	32	420	125
40	8	42	0.060	18	40	335	160

Unalloyed copper



16	6	65	0.020	8	16	1295	155
18	6	65	0.020	8	18	1150	140
21	6	65	0.030	9	21	985	175
25	6	65	0.040	11	25	830	200
28	6	65	0.040	12	28	740	180
32	6	65	0.050	14	32	645	195
40	8	65	0.060	18	40	515	245

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



16	6	23	0.020	8	16	460	55
18	6	23	0.020	8	18	405	50
21	6	23	0.030	9	21	350	65
25	6	23	0.040	11	25	295	70
28	6	23	0.040	12	28	260	60
32	6	23	0.050	14	32	230	70
40	8	23	0.060	18	40	185	90

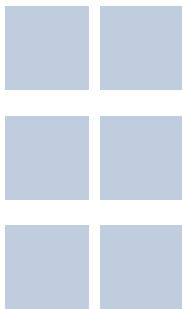
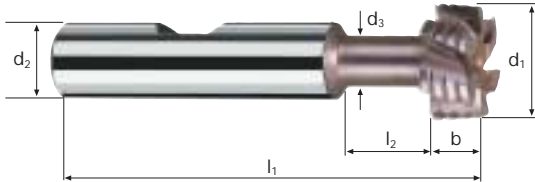
Wrought aluminium  
alloys Si < 6%



16	6	80	0.020	8	16	1590	190
18	6	80	0.020	8	18	1415	170
21	6	80	0.030	9	21	1215	220
25	6	80	0.040	11	25	1020	245
28	6	80	0.040	12	28	910	220
32	6	80	0.050	14	32	795	240
40	8	80	0.060	18	40	635	305

# T-groove end mills

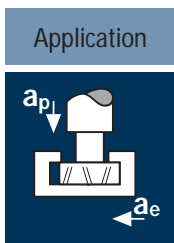
HSS-E  
Co8 λ 7°  
γ 10°



<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300					<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b> Aluminium Copper
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Example: Order-N°.								UNICUT-4X	
								U0915	
$\emptyset$ Code	$d_1$ d11	$d_2$ h6	$d_3$ h12	$l_1$	$l_2$	$b$ d11	$z$		
.140	16	10	7	62	14	8.0	6	•	
.160	18	12	8	70	17	8.0	6	•	
.180	21	12	10	74	20	9.0	6	•	
.200	25	16	12	82	23	11.0	6	•	
.220	28	16	12	83	25	12.0	6	•	
.240	32	16	15	90	28	14.0	6	•	
.260	40	25	19	108	34	18.0	8	•	







Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
11.0	4	55	0.010	4	1.1	1590	65
12.5	4	55	0.010	6	1.3	1400	55
16.0	4	55	0.025	8	1.6	1095	110
18.0	6	55	0.025	8	1.8	975	145
21.0	6	55	0.040	9	2.1	835	200
25.0	6	55	0.045	11	2.5	700	190
32.0	6	55	0.060	14	3.2	545	195
40.0	8	55	0.070	18	4.0	440	245
50.0	8	55	0.090	22	5.0	350	250

Steel  
850 - 1100 N/mm<sup>2</sup>



11.0	4	45	0.010	4	1.1	1300	50
12.5	4	45	0.010	6	1.3	1145	45
16.0	4	45	0.025	8	1.6	895	90
18.0	6	45	0.025	8	1.8	795	120
21.0	6	45	0.040	9	2.1	680	165
25.0	6	45	0.045	11	2.5	575	155
32.0	6	45	0.060	14	3.2	450	160
40.0	8	45	0.070	18	4.0	360	200
50.0	8	45	0.090	22	5.0	285	205

Steel  
1100 - 1300 N/mm<sup>2</sup>

11.0	4	34	0.010	4	1.1	985	40
12.5	4	34	0.010	6	1.3	865	35
16.0	4	34	0.025	8	1.6	675	70
18.0	6	34	0.025	8	1.8	600	90
21.0	6	34	0.040	9	2.1	515	125
25.0	6	34	0.045	11	2.5	435	115
32.0	6	34	0.060	14	3.2	340	120
40.0	8	34	0.070	18	4.0	270	150
50.0	8	34	0.090	22	5.0	215	155

Stainless steel  
[Cr-Ni/1.4301]

11.0	4	21	0.010	4	1.1	610	25
12.5	4	21	0.010	6	1.3	535	20
16.0	4	21	0.025	8	1.6	420	40
18.0	6	21	0.025	8	1.8	370	55
21.0	6	21	0.040	9	2.1	320	75
25.0	6	21	0.045	11	2.5	265	70
32.0	6	21	0.060	14	3.2	210	75
40.0	8	21	0.070	18	4.0	165	90
50.0	8	21	0.090	22	5.0	135	95

Material



Cast iron  
(lamellar / spheroidal)




d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
11.0	4	42	0.010	4	1.1	1215	50
12.5	4	42	0.010	6	1.3	1070	45
16.0	4	42	0.025	8	1.6	835	85
18.0	6	42	0.025	8	1.8	745	110
21.0	6	42	0.040	9	2.1	635	150
25.0	6	42	0.045	11	2.5	535	145
32.0	6	42	0.060	14	3.2	420	150
40.0	8	42	0.070	18	4.0	335	190
50.0	8	42	0.090	22	5.0	265	190

Material



Unalloyed copper

11.0	4	65	0.010	4	1.1	1880	75
12.5	4	65	0.010	6	1.3	1655	65
16.0	4	65	0.025	8	1.6	1295	130
18.0	6	65	0.025	8	1.8	1150	175
21.0	6	65	0.040	9	2.1	985	235
25.0	6	65	0.045	11	2.5	830	225
32.0	6	65	0.060	14	3.2	645	230
40.0	8	65	0.070	18	4.0	515	290
50.0	8	65	0.090	22	5.0	415	300

Material



Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

11.0	4	23	0.010	4	1.1	665	25
12.5	4	23	0.010	6	1.3	585	25
16.0	4	23	0.025	8	1.6	460	45
18.0	6	23	0.025	8	1.8	405	60
21.0	6	23	0.040	9	2.1	350	85
25.0	6	23	0.045	11	2.5	295	80
32.0	6	23	0.060	14	3.2	230	85
40.0	8	23	0.070	18	4.0	185	105
50.0	8	23	0.090	22	5.0	145	105

Material

Wrought aluminium  
alloys Si < 6%

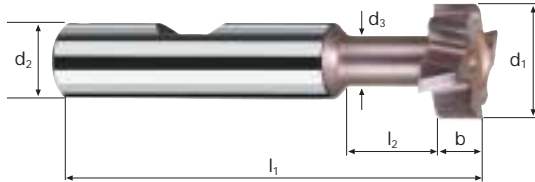
11.0	4	80	0.010	4	1.1	2315	95
12.5	4	80	0.010	6	1.3	2035	80
16.0	4	80	0.025	8	1.6	1590	160
18.0	6	80	0.025	8	1.8	1415	210
21.0	6	80	0.040	9	2.1	1215	290
25.0	6	80	0.045	11	2.5	1020	275
32.0	6	80	0.060	14	3.2	795	285
40.0	8	80	0.070	18	4.0	635	355
50.0	8	80	0.090	22	5.0	510	365



# T-groove end mills



HSS-E	$\lambda$ 12°
Co8	$\gamma$ 12°

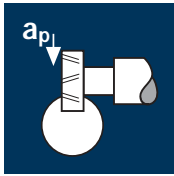


Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.									UNICUT-4X
Coating: <b>U</b> Article-N°: <b>0910</b> α-Code: <b>.100</b>									<b>U0910</b>
Ø Code	d1 d11	d2 h6	d3 h12	l1	l2	b d11	z		
.100	11.0	10	4	53.5	10	4.0	4		●
.120	12.5	10	5	57.0	10	6.0	4		●
.140	16.0	10	7	62.0	14	8.0	4		●
.160	18.0	12	8	70.0	17	8.0	6		●
.180	21.0	12	10	74.0	20	9.0	6		●
.200	25.0	16	12	82.0	23	11.0	6		●
.220	32.0	16	15	90.0	28	14.0	6		●
.240	40.0	25	19	108.0	34	18.0	8		●
.260	50.0	32	25	124.0	42	22.0	8		●
b									
k11									
.500	12.0	8	5	54.0	15	2.5	8		●
.520	16.0	8	6	56.0	17	3.0	8		●
.540	20.0	10	8	62.0	18	4.0	8		●
.560	25.0	10	9	65.0	20	5.0	10		●
.580	32.0	12	10	73.0	22	6.0	12		●
.600	40.0	12	11	77.0	24	8.0	12		●
.620	50.0	16	14	84.0	26	10.0	14		●
GG(G)									
Copper									

V

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Stainless steel  
[Cr-Ni/1.4301]



## Material

Cast iron  
(lamellar / spheroidal)



Unalloyed copper



Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



Wrought aluminium  
alloys Si < 6%



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
7.5	8	55	0.005	2.0	2.0	2335	95
10.5	8	55	0.010	2.9	2.5	1665	135
13.5	8	55	0.010	3.8	3.0	1295	105
16.5	8	55	0.025	5.0	4.0	1060	210
19.5	10	55	0.035	5.5	5.0	900	315
22.5	10	55	0.040	6.6	6.0	780	310
25.5	12	55	0.045	7.5	6.0	685	370

7.5	8	45	0.005	2.0	2.0	1910	75
10.5	8	45	0.010	2.9	2.5	1365	110
13.5	8	45	0.010	3.8	3.0	1060	85
16.5	8	45	0.025	5.0	4.0	870	175
19.5	10	45	0.035	5.5	5.0	735	255
22.5	10	45	0.040	6.6	6.0	635	255
25.5	12	45	0.045	7.5	6.0	560	300

7.5	8	34	0.005	2.0	2.0	1445	60
10.5	8	34	0.010	2.9	2.5	1030	80
13.5	8	34	0.010	3.8	3.0	800	65
16.5	8	34	0.025	5.0	4.0	655	130
19.5	10	34	0.035	5.5	5.0	555	195
22.5	10	34	0.040	6.6	6.0	480	190
25.5	12	34	0.045	7.5	6.0	425	230

7.5	8	21	0.005	2.0	2.0	890	35
10.5	8	21	0.010	2.9	2.5	635	50
13.5	8	21	0.010	3.8	3.0	495	40
16.5	8	21	0.025	5.0	4.0	405	80
19.5	10	21	0.035	5.5	5.0	345	120
22.5	10	21	0.040	6.6	6.0	295	120
25.5	12	21	0.045	7.5	6.0	260	140

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
7.5	8	42	0.005	2.0	2.0	1785	70
10.5	8	42	0.010	2.9	2.5	1275	100
13.5	8	42	0.010	3.8	3.0	990	80
16.5	8	42	0.025	5.0	4.0	810	160
19.5	10	42	0.035	5.5	5.0	685	240
22.5	10	42	0.040	6.6	6.0	595	240
25.5	12	42	0.045	7.5	6.0	525	285

7.5	8	65	0.005	2.0	2.0	2760	110
10.5	8	65	0.010	2.9	2.5	1970	160
13.5	8	65	0.010	3.8	3.0	1535	125
16.5	8	65	0.025	5.0	4.0	1255	250
19.5	10	65	0.035	5.5	5.0	1060	370
22.5	10	65	0.040	6.6	6.0	920	370
25.5	12	65	0.045	7.5	6.0	810	435

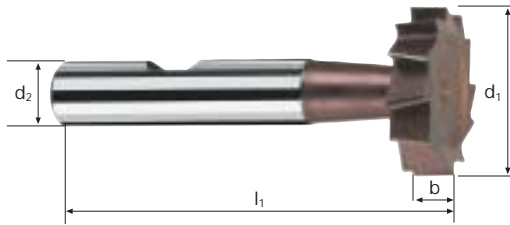
7.5	8	23	0.005	2.0	2.0	975	40
10.5	8	23	0.010	2.9	2.5	695	55
13.5	8	23	0.010	3.8	3.0	540	45
16.5	8	23	0.025	5.0	4.0	445	90
19.5	10	23	0.035	5.5	5.0	375	130
22.5	10	23	0.040	6.6	6.0	325	130
25.5	12	23	0.045	7.5	6.0	285	155

7.5	8	80	0.005	2.0	2.0	3395	135
10.5	8	80	0.010	2.9	2.5	2425	195
13.5	8	80	0.010	3.8	3.0	1885	150
16.5	8	80	0.025	5.0	4.0	1545	310
19.5	10	80	0.035	5.5	5.0	1305	455
22.5	10	80	0.040	6.6	6.0	1130	450
25.5	12	80	0.045	7.5	6.0	1000	540

# Slotting end mills



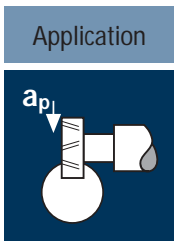
HSS-E Co8	$\lambda$ 10° $\gamma$ 8°



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
							U0905	
$\emptyset$ Code	d1 h11	d2 h6	l1	b e8	z			
.100	4.5	6	50	1.0	8	●		
.150	7.5	6	50	1.5	8	●		
.160	7.5	6	50	2.0	8	●		
.200	10.5	6	50	2.0	8	●		
.210	10.5	6	50	2.5	8	●		
.220	10.5	6	50	3.0	8	●		
.310	13.5	10	56	2.5	8	●		
.320	13.5	10	56	3.0	8	●		
.330	13.5	10	56	4.0	8	●		
.360	16.5	10	56	3.0	8	●		
.370	16.5	10	56	4.0	8	●		
.380	16.5	10	56	5.0	8	●		
.410	19.5	10	63	3.0	10	●		
.420	19.5	10	63	4.0	10	●		
.430	19.5	10	63	5.0	10	●		
.440	19.5	10	63	6.0	10	●		
.500	22.5	10	63	4.0	10	●		
.510	22.5	10	63	5.0	10	●		
.520	22.5	10	63	6.0	10	●		
.540	22.5	10	63	8.0	10	●		
.600	25.5	10	63	5.0	12	●		
.610	25.5	10	63	6.0	12	●		

V



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
28.5	12	55	0.050	8.2	8.0	615	370
32.5	12	55	0.060	9.8	10.0	540	390
45.5	14	55	0.080	12.0	10.0	385	430

Steel  
850 - 1100 N/mm<sup>2</sup>

28.5	12	45	0.050	8.2	8.0	505	305
32.5	12	45	0.060	9.8	10.0	440	315
45.5	14	45	0.080	12.0	10.0	315	355

Steel  
1100 - 1300 N/mm<sup>2</sup>

28.5	12	34	0.050	8.2	8.0	380	230
32.5	12	34	0.060	9.8	10.0	335	240
45.5	14	34	0.080	12.0	10.0	240	270

Stainless steel  
[Cr-Ni/1.4301]

28.5	12	21	0.050	8.2	8.0	235	140
32.5	12	21	0.060	9.8	10.0	205	150
45.5	14	21	0.080	12.0	10.0	145	160

Material

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
28.5	12	42	0.050	8.2	8.0	470	280
32.5	12	42	0.060	9.8	10.0	410	295
45.5	14	42	0.080	12.0	10.0	295	330

Unalloyed copper

28.5	12	65	0.050	8.2	8.0	725	435
32.5	12	65	0.060	9.8	10.0	635	455
45.5	14	65	0.080	12.0	10.0	455	510

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

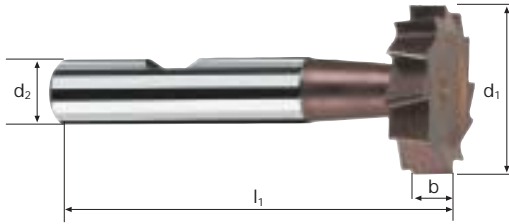
28.5	12	23	0.050	8.2	8.0	255	155
32.5	12	23	0.060	9.8	10.0	225	160
45.5	14	23	0.080	12.0	10.0	160	180

Wrought aluminium  
alloys Si < 6%

28.5	12	80	0.050	8.2	8.0	895	535
32.5	12	80	0.060	9.8	10.0	785	565
45.5	14	80	0.080	12.0	10.0	560	625

# Slotting end mills

HSS-E Co8	λ 10° γ 8°

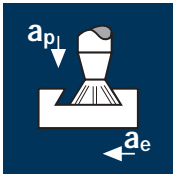


Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.		Coating U	Article-N°. 0905	α-Code .650		UNICUT-4X	
						U0905	
Ø Code	d1 h11	d2 h6	l1	b e8	z		
.650	28.5	10	63	6.0	12	•	
.660	28.5	10	63	8.0	12	•	
.700	28.5	12	71	10.0	12	•	
.750	32.5	12	71	6.0	12	•	
.760	32.5	12	71	7.0	12	•	
.770	32.5	12	71	8.0	12	•	
.800	32.5	12	71	10.0	12	•	
.900	45.5	12	71	10.0	14	•	

V

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
8	7	55	0.005	1.6	1.6	2190	75
12	8	55	0.010	2.4	2.4	1460	115
16	10	55	0.025	3.2	3.2	1095	275
20	12	55	0.035	4.0	4.0	875	370
25	14	55	0.045	5.0	5.0	700	440
32	16	55	0.060	6.4	6.4	545	525

Steel  
850 - 1100 N/mm<sup>2</sup>



8	7	45	0.005	1.6	1.6	1790	65
12	8	45	0.010	2.4	2.4	1195	95
16	10	45	0.025	3.2	3.2	895	225
20	12	45	0.035	4.0	4.0	715	300
25	14	45	0.045	5.0	5.0	575	360
32	16	45	0.060	6.4	6.4	450	430

Steel  
1100 - 1300 N/mm<sup>2</sup>



8	7	34	0.005	1.6	1.6	1355	45
12	8	34	0.010	2.4	2.4	900	70
16	10	34	0.025	3.2	3.2	675	170
20	12	34	0.035	4.0	4.0	540	225
25	14	34	0.045	5.0	5.0	435	275
32	16	34	0.060	6.4	6.4	340	325

Stainless steel  
[Cr-Ni/1.4301]



8	7	21	0.005	1.6	1.6	835	30
12	8	21	0.010	2.4	2.4	555	45
16	10	21	0.025	3.2	3.2	420	105
20	12	21	0.035	4.0	4.0	335	140
25	14	21	0.045	5.0	5.0	265	165
32	16	21	0.060	6.4	6.4	210	200

## Material

Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
8	7	42	0.005	1.6	1.6	1670	60
12	8	42	0.010	2.4	2.4	1115	90
16	10	42	0.025	3.2	3.2	835	210
20	12	42	0.035	4.0	4.0	670	280
25	14	42	0.045	5.0	5.0	535	335
32	16	42	0.060	6.4	6.4	420	405

Unalloyed copper



8	7	65	0.005	1.6	1.6	2585	90
12	8	65	0.010	2.4	2.4	1725	140
16	10	65	0.025	3.2	3.2	1295	325
20	12	65	0.035	4.0	4.0	1035	435
25	14	65	0.045	5.0	5.0	830	525
32	16	65	0.060	6.4	6.4	645	620

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



8	7	23	0.005	1.6	1.6	915	30
12	8	23	0.010	2.4	2.4	610	50
16	10	23	0.025	3.2	3.2	460	115
20	12	23	0.035	4.0	4.0	365	155
25	14	23	0.045	5.0	5.0	295	185
32	16	23	0.060	6.4	6.4	230	220

Wrought aluminium  
alloys Si < 6%

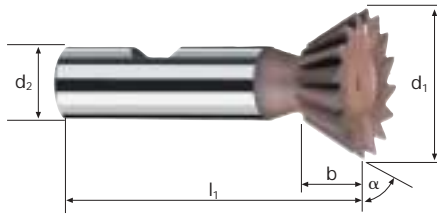


8	7	80	0.005	1.6	1.6	3185	110
12	8	80	0.010	2.4	2.4	2120	170
16	10	80	0.025	3.2	3.2	1590	400
20	12	80	0.035	4.0	4.0	1275	535
25	14	80	0.045	5.0	5.0	1020	645
32	16	80	0.060	6.4	6.4	795	765

# Angular end mills



HSS-E Co8	$\lambda$ 0° $\gamma$ 0°

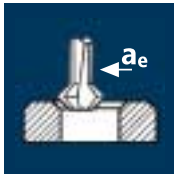


Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
							U0890	
$\emptyset$ Code	d1 js12	d2 h6	l1	b	$\alpha$ ( $\pm 20'$ )	z		
.100	12	10	54	3.0	45°	8	●	
.120	16	12	60	4.0	45°	10	●	
.140	20	12	63	5.0	45°	12	●	
.160	25	12	67	6.3	45°	14	●	
.180	32	16	71	8.0	45°	16	●	
.300	8	6	49	3.0	60°	7	●	
.320	12	10	54	4.0	60°	8	●	
.340	16	12	60	6.3	60°	10	●	
.360	20	12	63	8.0	60°	12	●	
.380	25	12	67	10.0	60°	14	●	
.400	32	16	71	12.5	60°	16	●	

V

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



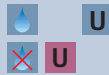
Steel  
850 - 1100 N/mm<sup>2</sup>



Stainless steel  
[Cr-Ni/1.4301]



Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	150	0.008	0.15	15915	510
4	4	150	0.012	0.20	11935	575
5	4	150	0.014	0.25	9550	535
6	4	150	0.018	0.25	7960	575
8	4	150	0.022	0.30	5970	525
10	4	150	0.028	0.40	4775	535
12	4	150	0.034	0.50	3980	540

3	4	120	0.008	0.15	12735	410
4	4	120	0.012	0.20	9550	460
5	4	120	0.014	0.25	7640	430
6	4	120	0.018	0.25	6365	460
8	4	120	0.022	0.30	4775	420
10	4	120	0.028	0.40	3820	430
12	4	120	0.034	0.50	3185	435

3	4	50	0.008	0.15	5305	170
4	4	50	0.012	0.20	3980	190
5	4	50	0.014	0.25	3185	180
6	4	50	0.018	0.25	2655	190
8	4	50	0.022	0.30	1990	175
10	4	50	0.028	0.40	1590	180
12	4	50	0.034	0.50	1325	180

3	4	180	0.008	0.15	19100	610
4	4	180	0.012	0.20	14325	690
5	4	180	0.014	0.25	11460	640
6	4	180	0.018	0.25	9550	690
8	4	180	0.022	0.30	7160	630
10	4	180	0.028	0.40	5730	640
12	4	180	0.034	0.50	4775	650

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



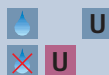
Steel  
850 - 1100 N/mm<sup>2</sup>



Stainless steel  
[Cr-Ni/1.4301]



Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	4	150	0.008	0.15	15915	510
4	4	150	0.012	0.20	11935	575
5	4	150	0.014	0.25	9550	535
6	4	150	0.018	0.25	7960	575
8	4	150	0.022	0.30	5970	525
10	4	150	0.028	0.40	4775	535
12	4	150	0.034	0.50	3980	540

3	4	120	0.008	0.15	12735	410
4	4	120	0.012	0.20	9550	460
5	4	120	0.014	0.25	7640	430
6	4	120	0.018	0.25	6365	460
8	4	120	0.022	0.30	4775	420
10	4	120	0.028	0.40	3820	430
12	4	120	0.034	0.50	3185	435

3	4	50	0.008	0.15	5305	170
4	4	50	0.012	0.20	3980	190
5	4	50	0.014	0.25	3185	180
6	4	50	0.018	0.25	2655	190
8	4	50	0.022	0.30	1990	175
10	4	50	0.028	0.40	1590	180
12	4	50	0.034	0.50	1325	180

3	4	180	0.008	0.15	19100	610
4	4	180	0.012	0.20	14325	690
5	4	180	0.014	0.25	11460	640
6	4	180	0.018	0.25	9550	690
8	4	180	0.022	0.30	7160	630
10	4	180	0.028	0.40	5730	640
12	4	180	0.034	0.50	4775	650

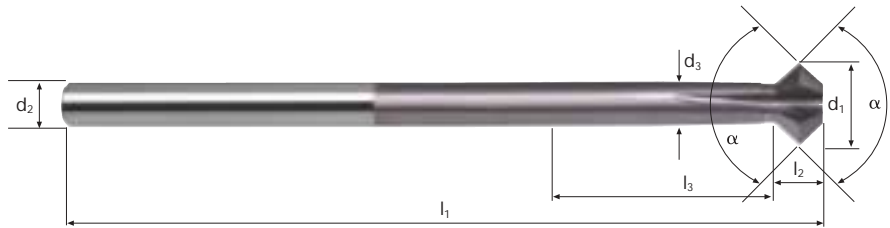


# Forward and reverse deburring end mills

45° - Chamfer



HM	$\lambda$ 0°
	$\gamma$ 8°



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.									UNICUT-4X	
									U7930	
∅ Code	d1 *	d2 h6	d3	l1	l2	l3	α	Z		
.180	3	6	2.2	100	1.30	10	90°	4	●	
.220	4	6	2.9	100	1.75	12	90°	4	●	
.260	5	6	3.4	100	2.30	15	90°	4	●	
.300	6	6	3.8	100	2.90	18	90°	4	●	
.391	8	6	4.9	100	3.10	35	90°	4	●	
.450	10	6	5.9	100	4.10	35	90°	4	●	
.501	12	6	5.9	100	6.10	35	90°	4	●	
* Tolerance of the cutting diameter										
d1 Tolerance										
< 6 0/-0.05										
≥ 6 0/-0.15										

V



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	150	0.020	0.20	0.20	7960	635
8	4	150	0.025	0.25	0.25	5970	595
10	4	150	0.030	0.30	0.30	4775	575
12	4	150	0.035	0.40	0.40	3980	555

Steel  
850 - 1100 N/mm<sup>2</sup>

6	4	120	0.020	0.20	0.20	6365	510
8	4	120	0.025	0.25	0.25	4775	480
10	4	120	0.030	0.30	0.30	3820	460
12	4	120	0.035	0.40	0.40	3185	445

Steel  
1100 - 1300 N/mm<sup>2</sup>

6	4	70	0.020	0.20	0.20	3715	295
8	4	70	0.025	0.25	0.25	2785	280
10	4	70	0.030	0.30	0.30	2230	270
12	4	70	0.035	0.40	0.40	1855	260

Stainless steel  
[Cr-Ni/1.4301]

6	4	60	0.020	0.20	0.20	3185	255
8	4	60	0.025	0.25	0.25	2385	240
10	4	60	0.030	0.30	0.30	1910	230
12	4	60	0.035	0.40	0.40	1590	225

Material

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
6	4	160	0.020	0.20	0.20	8490	680
8	4	160	0.025	0.25	0.25	6365	635
10	4	160	0.030	0.30	0.30	5095	610
12	4	160	0.035	0.40	0.40	4245	595

Unalloyed copper

6	4	180	0.020	0.20	0.20	9550	765
8	4	180	0.025	0.25	0.25	7160	715
10	4	180	0.030	0.30	0.30	5730	690
12	4	180	0.035	0.40	0.40	4775	670

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

6	4	70	0.020	0.20	0.20	3715	295
8	4	70	0.025	0.25	0.25	2785	280
10	4	70	0.030	0.30	0.30	2230	270
12	4	70	0.035	0.40	0.40	1855	260

Wrought aluminium  
alloys Si < 6%

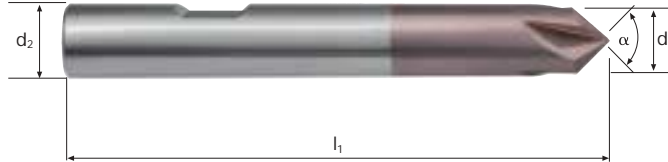
6	4	200	0.020	0.20	0.20	10610	850
8	4	200	0.025	0.25	0.25	7960	795
10	4	200	0.030	0.30	0.30	6365	765
12	4	200	0.035	0.40	0.40	5305	745

# Deburring end mills

45° - Chamfer



HM	$\lambda$ 0°
	$\gamma$ 0°



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.						UNICUT-4X	
						U7940	
$\emptyset$ Code	d1 h6	d2 h6	l1	$\alpha$	Z		
.300	6	6	57	90°	4	●	
.391	8	8	63	90°	4	●	
.450	10	10	72	90°	4	●	
.501	12	12	83	90°	4	●	

V

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

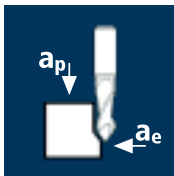
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	2	120	0.008	0.10	0.10	12735	205
4	2	120	0.012	0.15	0.15	9550	230
5	2	120	0.014	0.20	0.20	7640	215
6	2	120	0.018	0.20	0.20	6365	230
8	2	120	0.022	0.25	0.25	4775	210
10	2	120	0.028	0.35	0.35	3820	215
12	2	120	0.034	0.45	0.45	3185	215

3	2	100	0.008	0.10	0.10	10610	170
4	2	100	0.012	0.15	0.15	7960	190
5	2	100	0.014	0.20	0.20	6365	180
6	2	100	0.018	0.20	0.20	5305	190
8	2	100	0.022	0.25	0.25	3980	175
10	2	100	0.028	0.35	0.35	3185	180
12	2	100	0.034	0.45	0.45	2655	180

3	2	50	0.008	0.10	0.10	5305	85
4	2	50	0.012	0.15	0.15	3980	95
5	2	50	0.014	0.20	0.20	3185	90
6	2	50	0.018	0.20	0.20	2655	95
8	2	50	0.022	0.25	0.25	1990	90
10	2	50	0.028	0.35	0.35	1590	90
12	2	50	0.034	0.45	0.45	1325	90

3	2	140	0.008	0.10	0.10	14855	240
4	2	140	0.012	0.15	0.15	11140	265
5	2	140	0.014	0.20	0.20	8915	250
6	2	140	0.018	0.20	0.20	7425	265
8	2	140	0.022	0.25	0.25	5570	245
10	2	140	0.028	0.35	0.35	4455	250
12	2	140	0.034	0.45	0.45	3715	255

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Stainless steel  
[Cr-Ni/1.4301]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
3	2	100	0.008	3	0.15	10610	170
4	2	100	0.012	4	0.15	7960	190
5	2	100	0.014	5	0.20	6365	180
6	2	100	0.018	6	0.20	5305	190
8	2	100	0.022	8	0.25	3980	175
10	2	100	0.028	10	0.25	3185	180
12	2	100	0.034	12	0.30	2655	180

3	2	80	0.008	3	0.15	8490	135
4	2	80	0.012	4	0.15	6365	155
5	2	80	0.014	5	0.20	5095	145
6	2	80	0.018	6	0.20	4245	155
8	2	80	0.022	8	0.25	3185	140
10	2	80	0.028	10	0.25	2545	145
12	2	80	0.034	12	0.30	2120	145

3	2	45	0.008	3	0.15	4775	75
4	2	45	0.012	4	0.15	3580	85
5	2	45	0.014	5	0.20	2865	80
6	2	45	0.018	6	0.20	2385	85
8	2	45	0.022	8	0.25	1790	80
10	2	45	0.028	10	0.25	1430	80
12	2	45	0.034	12	0.30	1195	80

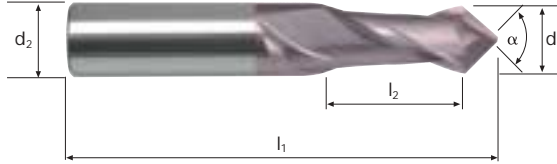
3	2	120	0.008	3	0.15	12735	205
4	2	120	0.012	4	0.15	9550	230
5	2	120	0.014	5	0.20	7640	215
6	2	120	0.018	6	0.20	6365	230
8	2	120	0.022	8	0.25	4775	210
10	2	120	0.028	10	0.25	3820	215
12	2	120	0.034	12	0.30	3185	215

# Universal end mills

Milling, chamfering, centering, drilling



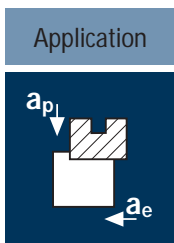
HM	$\lambda$ 30° $\gamma$ 12°



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
		Coating <b>U</b>	Article-N°. <b>7960</b>	α-Code <b>.180</b>			<b>U7960</b>	
∅ Code	d1 *	d2 h6	l1	l2	α	Z		
.180	3	4	50	6	90°	2	●	
.220	4	5	50	8	90°	2	●	
.260	5	6	50	10	90°	2	●	
.300	6	8	60	12	90°	2	●	
.391	8	10	70	16	90°	2	●	
.450	10	12	70	18	90°	2	●	
.501	12	12	70	20	90°	2	●	
* Tolerance of the cutting diameter								
d1 Tolerance								
< 12 h9								
≥ 12 h11								

V



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
32	6	65	0.060	6.4	24.0	645	230	35.5
40	8	65	0.080	8.0	30.0	515	330	79.0
50	8	65	0.100	10.0	37.5	415	330	124.0
63	10	65	0.120	12.6	47.3	330	395	235.0
80	10	65	0.120	16.0	60.0	260	310	297.5

Steel  
850 - 1100 N/mm<sup>2</sup>

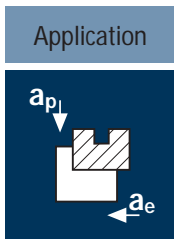
32	6	48	0.060	6.4	24.0	475	170	26.0
40	8	48	0.080	8.0	30.0	380	245	59.0
50	8	48	0.100	10.0	37.5	305	245	92.0
63	10	48	0.120	12.6	47.3	245	295	175.5
80	10	48	0.120	16.0	60.0	190	230	221.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

32	6	35	0.060	6.4	24.0	350	125	19.0
40	8	35	0.080	8.0	30.0	280	180	43.0
50	8	35	0.100	10.0	37.5	225	180	67.5
63	10	35	0.120	12.6	47.3	175	210	125.0
80	10	35	0.120	16.0	60.0	140	170	163.0

Stainless steel  
[Cr-Ni/1.4301]

32	6	26	0.060	6.4	24.0	260	95	14.5
40	8	26	0.080	8.0	30.0	205	130	31.0
50	8	26	0.100	10.0	37.5	165	130	49.0
63	10	26	0.120	12.6	47.3	130	155	92.5
80	10	26	0.120	16.0	60.0	105	125	120.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
32	6	68	0.070	6.4	9.6	675	285	17.5
40	8	68	0.090	8.0	12.0	540	390	37.5
50	8	68	0.110	10.0	15.0	435	385	58.0
63	10	68	0.125	12.6	18.9	345	430	102.5
80	10	68	0.145	16.0	24.0	270	390	150.0

Steel  
850 - 1100 N/mm<sup>2</sup>

32	6	55	0.070	6.4	9.6	545	230	14.0
40	8	55	0.090	8.0	12.0	440	315	30.0
50	8	55	0.110	10.0	15.0	350	310	46.5
63	10	55	0.125	12.6	18.9	280	350	83.5
80	10	55	0.145	16.0	24.0	220	320	123.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

32	6	40	0.070	6.4	9.6	400	170	10.5
40	8	40	0.090	8.0	12.0	320	230	22.0
50	8	40	0.110	10.0	15.0	255	225	34.0
63	10	40	0.125	12.6	18.9	200	250	59.5
80	10	40	0.145	16.0	24.0	160	230	88.5

Stainless steel  
[Cr-Ni/1.4301]

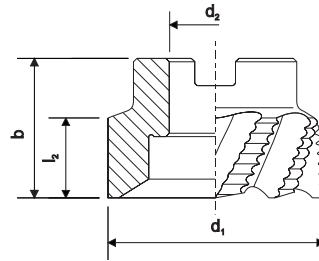
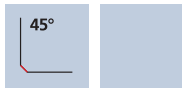
32	6	29	0.070	6.4	9.6	290	120	7.5
40	8	29	0.090	8.0	12.0	230	165	16.0
50	8	29	0.110	10.0	15.0	185	165	25.0
63	10	29	0.125	12.6	18.9	145	180	43.0
80	10	29	0.145	16.0	24.0	115	165	63.5

# Cylindrical end mills

Profiled



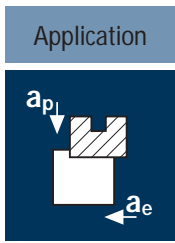
HSS-E  
Co8  $\lambda$  25°  
 $\gamma$  10°



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Example: Order-N°.							UNICUT-4X	
							U3490	
		Coating	Article-N°	α-Code				
		U	3490	.100				
∅ Code	d1 k9	d2 H7		l2	b k13	45°	z	
.100	32	13		15	28	0.7	6	●
.110	40	16		18	32	0.9	8	●
.130	50	22		20	36	0.9	8	●
.160	63	27		22	40	1.2	10	●
.180	80	27		25	45	1.2	10	●





Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	8	45	0.065	2.0	30.0	360	185	11.0
50	8	45	0.080	2.5	37.5	285	180	17.0
63	10	45	0.080	3.2	47.3	225	180	27.0
80	12	45	0.100	4.0	60.0	180	215	51.5

Steel  
1100 - 1300 N/mm<sup>2</sup>

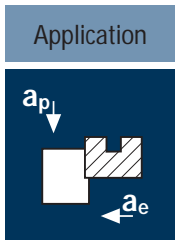
40	8	30	0.065	2.0	30.0	240	125	7.5
50	8	30	0.080	2.5	37.5	190	120	11.5
63	10	30	0.080	3.2	47.3	150	120	18.0
80	12	30	0.100	4.0	60.0	120	145	35.0

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

40	8	20	0.065	2.0	30.0	160	85	5.0
50	8	20	0.080	2.5	37.5	125	80	7.5
63	10	20	0.080	3.2	47.3	100	80	12.0
80	12	20	0.100	4.0	60.0	80	95	23.0

Cast iron  
(lamellar / spheroidal)

40	8	42	0.065	2.0	30.0	335	175	10.5
50	8	42	0.080	2.5	37.5	265	170	16.0
63	10	42	0.080	3.2	47.3	210	170	25.5
80	12	42	0.100	4.0	60.0	165	200	48.0



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	8	50	0.065	20.0	1.0	400	210	4.0
50	8	50	0.080	25.0	1.3	320	205	6.5
63	10	50	0.080	31.5	1.6	255	205	10.0
80	12	50	0.100	40.0	2.0	200	240	19.0

Steel  
1100 - 1300 N/mm<sup>2</sup>

40	8	35	0.065	20.0	1.0	280	145	3.0
50	8	35	0.080	25.0	1.3	225	145	4.5
63	10	35	0.080	31.5	1.6	175	140	7.0
80	12	35	0.100	40.0	2.0	140	170	13.5

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

40	8	25	0.065	20.0	1.0	200	105	2.0
50	8	25	0.080	25.0	1.3	160	100	3.0
63	10	25	0.080	31.5	1.6	125	100	5.0
80	12	25	0.100	40.0	2.0	100	120	9.5

Cast iron  
(lamellar / spheroidal)

40	8	45	0.065	20.0	1.0	360	185	3.5
50	8	45	0.080	25.0	1.3	285	180	5.5
63	10	45	0.080	31.5	1.6	225	180	9.0
80	12	45	0.100	40.0	2.0	180	215	17.0







NovoSys X<sup>®</sup> milling heads for steel,  
stainless steel and titanium 605 – 615

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NovoSys X<sup>®</sup> milling heads for 3D machining 617 – 643

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NovoSys X<sup>®</sup> special forms 645 – 653

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NovoSys X<sup>®</sup> special tools 654 – 655

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Accessories and information on NovoSys X<sup>®</sup>  
Assembly instructions 656 – 660

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# NovoSys X<sup>®</sup> milling heads for steel, stainless steel and titanium

## Smooth-edged, cylindrical

N° NV-10-01-04-02-10



HM UT	45° 	<b>Rm</b> <850-1300			607
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N° NV-11-01-04-02-10



HM UT	45° 	<b>Rm</b> <850-1300			609
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N° N-10-01-04-01-10



HM UT	45° 	<b>Rm</b> <850-1300			611
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N° N-10-01-03-01-10



HM UT	45° 	<b>Rm</b> <850-1300			613
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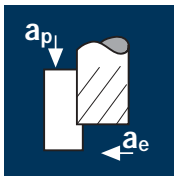
## Profiled, cylindrical

N° NR-10-01-04-03-10



HM UT	45° 	<b>Rm</b> <850-1100			615
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## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

 **A**


 **A**


Steel  
850 - 1100 N/mm<sup>2</sup>

 **A**


 **A**


Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

 **A**

 **A**

Cast iron  
(lamellar / spheroidal)

 **A**

 **A**

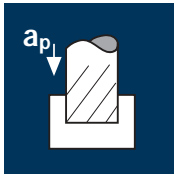
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	220	0.180	6.0	1.0	7005	5045	L-Type: M 0.80	L-Type: L •
12	4	220	0.200	8.0	1.2	5835	4670	1.00	•
16	4	220	0.240	12.0	1.6	4375	4200	1.30	•
20	4	220	0.280	14.0	2.0	3500	3920	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	220	0.180	6.0	1.2	7005	5045	L-Type: M 1.00	L-Type: L •
12	4	220	0.200	8.0	1.4	5835	4670	1.10	•
16	4	220	0.240	12.0	1.9	4375	4200	1.50	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	180	0.180	6.0	1.0	5730	4125	L-Type: M 0.80	L-Type: L •
12	4	180	0.200	8.0	1.2	4775	3820	1.00	•
16	4	180	0.240	12.0	1.6	3580	3435	1.30	•
20	4	180	0.280	14.0	2.0	2865	3210	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	180	0.180	6.0	1.2	5730	4125	L-Type: M 1.00	L-Type: L •
12	4	180	0.200	8.0	1.4	4775	3820	1.10	•
16	4	180	0.240	12.0	1.9	3580	3435	1.50	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	80	0.160	6.0	1.0	2545	1630	L-Type: M 0.80	L-Type: L •
12	4	80	0.180	8.0	1.2	2120	1525	1.00	•
16	4	80	0.215	12.0	1.6	1590	1365	1.30	•
20	4	80	0.250	14.0	2.0	1275	1275	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	80	0.160	6.0	1.2	2545	1630	L-Type: M 1.00	L-Type: L •
12	4	80	0.180	8.0	1.4	2120	1525	1.10	•
16	4	80	0.215	12.0	1.9	1590	1365	1.50	•


d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	180	0.180	6.0	1.0	5730	4125	L-Type: M 0.80	L-Type: L •
12	4	180	0.200	8.0	1.2	4775	3820	1.00	•
16	4	180	0.240	12.0	1.6	3580	3435	1.30	•
20	4	180	0.280	14.0	2.0	2865	3210	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	180	0.180	6.0	1.2	5730	4125	L-Type: M 1.00	L-Type: L •
12	4	180	0.200	8.0	1.4	4775	3820	1.10	•
16	4	180	0.240	12.0	1.9	3580	3435	1.50	•

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

 **A**


 **A**


Steel  
850 - 1100 N/mm<sup>2</sup>

 **A**


 **A**


Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

 **A**

 **A**

Cast iron  
(lamellar / spheroidal)

 **A**

 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	200	0.080	2.0	10.0	6365	2035	L-Type: M 1.80	L-Type: L •
12	4	200	0.100	2.4	12.0	5305	2120	2.20	•
16	4	200	0.140	3.2	16.0	3980	2230	2.90	•
20	4	200	0.180	4.0	20.0	3185	2295	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	200	0.080	2.5	10.0	6365	2035	L-Type: M 2.00	L-Type: L •
12	4	200	0.100	3.0	12.0	5305	2120	2.40	•
16	4	200	0.140	4.0	16.0	3980	2230	3.20	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	160	0.080	2.0	10.0	5095	1630	L-Type: M 1.80	L-Type: L •
12	4	160	0.100	2.4	12.0	4245	1700	2.20	•
16	4	160	0.140	3.2	16.0	3185	1785	2.90	•
20	4	160	0.180	4.0	20.0	2545	1830	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	160	0.080	2.5	10.0	5095	1630	L-Type: M 2.00	L-Type: L •
12	4	160	0.100	3.0	12.0	4245	1700	2.40	•
16	4	160	0.140	4.0	16.0	3185	1785	3.20	•



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	60	0.070	2.0	10.0	1910	535	L-Type: M 1.80	L-Type: L •
12	4	60	0.090	2.4	12.0	1590	570	2.20	•
16	4	60	0.125	3.2	16.0	1195	600	2.90	•
20	4	60	0.160	4.0	20.0	955	610	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	60	0.070	2.5	10.0	1910	535	L-Type: M 2.00	L-Type: L •
12	4	60	0.090	3.0	12.0	1590	570	2.40	•
16	4	60	0.125	4.0	16.0	1195	600	3.20	•

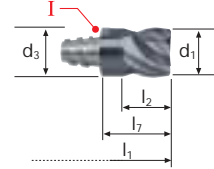
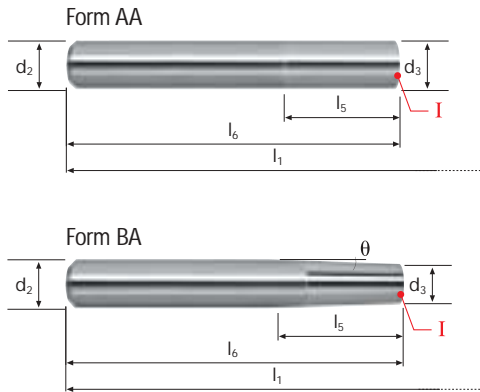
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	160	0.080	2.0	10.0	5095	1630	L-Type: M 1.80	L-Type: L •
12	4	160	0.100	2.4	12.0	4245	1700	2.20	•
16	4	160	0.140	3.2	16.0	3185	1785	2.90	•
20	4	160	0.180	4.0	20.0	2545	1830	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	160	0.080	2.5	10.0	5095	1630	L-Type: M 2.00	L-Type: L •
12	4	160	0.100	3.0	12.0	4245	1700	2.40	•
16	4	160	0.140	4.0	16.0	3185	1785	3.20	•

# Cylindrical end mills

Smooth-edged


**NovoSys X<sup>®</sup>**

<b>HM</b> <b>UT</b>	$\lambda$ 40° $\gamma$ 0°
45°	
<b>Vario</b>	



I = Interface

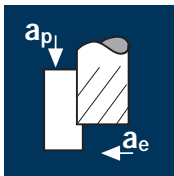
<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500			<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>GG(G)</b>
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	45°	z	 i	I		
NV-10-01-04-02-10	10	9.8	7	13.0	0.2	4	8	10	●	
NV-12-01-04-02-12	12	11.8	9	16.5	0.2	4	10	12	●	
NV-16-01-04-02-16	16	15.8	13	20.5	0.2	4	13	16	●	
NV-20-01-04-02-20	20	19.8	15	25.5	0.2	4	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		78.0		65		N	10	●	
AA-10-080-040-10	10	9.8	93.0	40	80		M	10	●	
AA-10-120-080-10	10	9.8	133.0	80	120		L	10	●	
AA-12-070-000-12	12		86.5		70		N	12	●	
AA-12-085-040-12	12	11.8	101.5	40	85		M	12	●	
AA-12-120-075-12	12	11.8	136.5	75	120		L	12	●	
AA-16-080-032-16	16	15.8	100.5	32	80		N	16	●	
AA-16-110-062-16	16	15.8	130.5	62	110		M	16	●	
AA-20-090-040-20	20	19.8	115.5	40	90		N	20	●	
AA-20-150-100-20	20	19.8	175.5	100	150		L	20	●	
BA-12-080-032-10	12	9.8	93.0	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	133.0	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	136.5	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	156.5	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	140.5	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	180.5	80	160	1.5°	L	16	●	

VI

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**

**A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**

**A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**A**

**A**

Cast iron  
(lamellar / spheroidal)

**A**

**A**

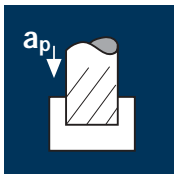
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	220	0.180	6.0	1.0	6365	4585	0.80	•
13	4	220	0.200	8.0	1.2	5385	4310	1.00	•
18	4	220	0.240	12.0	1.6	3890	3735	1.30	•
22	4	220	0.280	14.0	2.0	3185	3565	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	220	0.180	6.0	1.2	6365	4585	1.00	•
13	4	220	0.200	8.0	1.4	5385	4310	1.10	•
18	4	220	0.240	12.0	1.9	3890	3735	1.50	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	180	0.180	6.0	1.0	5210	3750	0.80	•
13	4	180	0.200	8.0	1.2	4405	3525	1.00	•
18	4	180	0.240	12.0	1.6	3185	3060	1.30	•
22	4	180	0.280	14.0	2.0	2605	2920	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	180	0.180	6.0	1.2	5210	3750	1.00	•
13	4	180	0.200	8.0	1.4	4405	3525	1.10	•
18	4	180	0.240	12.0	1.9	3185	3060	1.50	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	80	0.160	6.0	1.0	2315	1480	0.80	•
13	4	80	0.180	8.0	1.2	1960	1410	1.00	•
18	4	80	0.215	12.0	1.6	1415	1215	1.30	•
22	4	80	0.250	14.0	2.0	1155	1155	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	80	0.160	6.0	1.2	2315	1480	1.00	•
13	4	80	0.180	8.0	1.4	1960	1410	1.10	•
18	4	80	0.215	12.0	1.9	1415	1215	1.50	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	180	0.180	6.0	1.0	5210	3750	0.80	•
13	4	180	0.200	8.0	1.2	4405	3525	1.00	•
18	4	180	0.240	12.0	1.6	3185	3060	1.30	•
22	4	180	0.280	14.0	2.0	2605	2920	1.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	180	0.180	6.0	1.2	5210	3750	1.00	•
13	4	180	0.200	8.0	1.4	4405	3525	1.10	•
18	4	180	0.240	12.0	1.9	3185	3060	1.50	•

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**

**A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**

**A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**A**

**A**

Cast iron  
(lamellar / spheroidal)

**A**

**A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	200	0.080	2.0	11.0	5785	1850	1.80	•
13	4	200	0.100	2.4	13.0	4895	1960	2.20	•
18	4	200	0.140	3.2	18.0	3535	1980	2.90	•
22	4	200	0.180	4.0	22.0	2895	2085	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	200	0.080	2.5	11.0	5785	1850	2.00	•
13	4	200	0.100	3.0	13.0	4895	1960	2.40	•
18	4	200	0.140	4.0	18.0	3535	1980	3.20	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	160	0.080	2.0	11.0	4630	1480	1.80	•
13	4	160	0.100	2.4	13.0	3920	1570	2.20	•
18	4	160	0.140	3.2	18.0	2830	1585	2.90	•
22	4	160	0.180	4.0	22.0	2315	1665	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	160	0.080	2.5	11.0	4630	1480	2.00	•
13	4	160	0.100	3.0	13.0	3920	1570	2.40	•
18	4	160	0.140	4.0	18.0	2830	1585	3.20	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	60	0.070	2.0	11.0	1735	485	1.80	•
13	4	60	0.090	2.4	13.0	1470	530	2.20	•
18	4	60	0.125	3.2	18.0	1060	530	2.90	•
22	4	60	0.160	4.0	22.0	870	555	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	60	0.070	2.5	11.0	1735	485	2.00	•
13	4	60	0.090	3.0	13.0	1470	530	2.40	•
18	4	60	0.125	4.0	18.0	1060	530	3.20	•

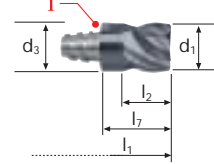
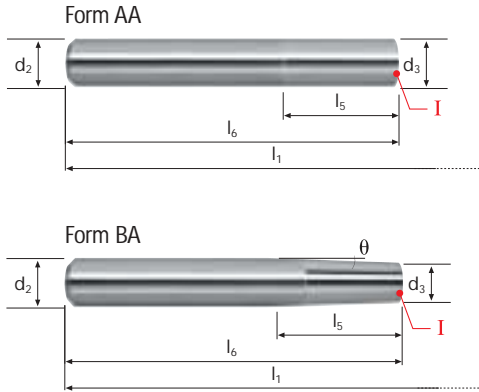
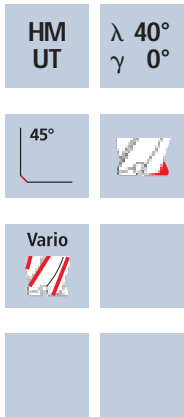
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
11	4	160	0.080	2.0	11.0	4630	1480	1.80	•
13	4	160	0.100	2.4	13.0	3920	1570	2.20	•
18	4	160	0.140	3.2	18.0	2830	1585	2.90	•
22	4	160	0.180	4.0	22.0	2315	1665	3.60	•
<b>Carbide shanks, conical, L-Type: N</b>									
11	4	160	0.080	2.5	11.0	4630	1480	2.00	•
13	4	160	0.100	3.0	13.0	3920	1570	2.40	•
18	4	160	0.140	4.0	18.0	2830	1585	3.20	•



# Cylindrical end mills

Smooth-edged, d1 cutting diameter with excess

**NovoSys X<sup>®</sup>**



I = Interface

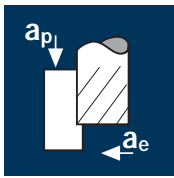
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	45°	z		I		
NV-11-01-04-02-10	11	9.8	8	18	0.20	4	8	10	●	
NV-13-01-04-02-12	13	11.8	10	20	0.20	4	10	12	●	
NV-18-01-04-02-16	18	15.8	14	32	0.20	4	13	16	●	
NV-22-01-04-02-20	22	19.8	16	36	0.25	4	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**

**A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**

**A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**A**

**A**

Cast iron  
(lamellar / spheroidal)

**A**

**A**

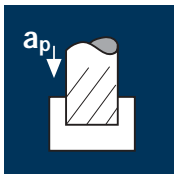
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	220	0.130	6.0	0.8	7005	3645	L-Type: M 0.60	L-Type: L •
12	4	220	0.150	8.0	1.0	5835	3500	0.80	•
16	4	220	0.200	12.0	1.2	4375	3500	1.00	•
20	4	220	0.230	14.0	1.6	3500	3220	1.30	•
Carbide shanks, conical, L-Type: N									
10	4	220	0.130	6.0	1.0	7005	3645	L-Type: M 0.80	L-Type: L •
12	4	220	0.150	8.0	1.2	5835	3500	1.00	•
16	4	220	0.200	12.0	1.6	4375	3500	1.30	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	180	0.130	6.0	0.8	5730	2980	L-Type: M 0.60	L-Type: L •
12	4	180	0.150	8.0	1.0	4775	2865	0.80	•
16	4	180	0.200	12.0	1.2	3580	2865	1.00	•
20	4	180	0.230	14.0	1.6	2865	2635	1.30	•
Carbide shanks, conical, L-Type: N									
10	4	180	0.130	6.0	1.0	5730	2980	L-Type: M 0.80	L-Type: L •
12	4	180	0.150	8.0	1.2	4775	2865	1.00	•
16	4	180	0.200	12.0	1.6	3580	2865	1.30	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	80	0.110	6.0	0.8	2545	1120	L-Type: M 0.60	L-Type: L •
12	4	80	0.130	8.0	1.0	2120	1100	0.80	•
16	4	80	0.180	12.0	1.2	1590	1145	1.00	•
20	4	80	0.200	14.0	1.6	1275	1020	1.30	•
Carbide shanks, conical, L-Type: N									
10	4	80	0.110	6.0	1.0	2545	1120	L-Type: M 0.80	L-Type: L •
12	4	80	0.130	8.0	1.2	2120	1100	1.00	•
16	4	80	0.180	12.0	1.6	1590	1145	1.30	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	180	0.130	6.0	0.8	5730	2980	L-Type: M 0.60	L-Type: L •
12	4	180	0.150	8.0	1.0	4775	2865	0.80	•
16	4	180	0.200	12.0	1.2	3580	2865	1.00	•
20	4	180	0.230	14.0	1.6	2865	2635	1.30	•
Carbide shanks, conical, L-Type: N									
10	4	180	0.130	6.0	1.0	5730	2980	L-Type: M 0.80	L-Type: L •
12	4	180	0.150	8.0	1.2	4775	2865	1.00	•
16	4	180	0.200	12.0	1.6	3580	2865	1.30	•

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**

**A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**

**A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**A**

**A**

Cast iron  
(lamellar / spheroidal)

**A**

**A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	200	0.065	1.5	10.0	6365	1655	L-Type: M 1.30	L-Type: L •
12	4	200	0.080	2.0	12.0	5305	1700	1.80	•
16	4	200	0.110	2.6	16.0	3980	1750	2.40	•
20	4	200	0.150	3.5	20.0	3185	1910	3.20	•
Carbide shanks, conical, L-Type: N									
10	4	200	0.065	1.8	10.0	6365	1655	L-Type: M 1.60	L-Type: L •
12	4	200	0.080	2.4	12.0	5305	1700	2.20	•
16	4	200	0.110	3.0	16.0	3980	1750	2.70	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	160	0.065	1.5	10.0	5095	1325	L-Type: M 1.30	L-Type: L •
12	4	160	0.080	2.0	12.0	4245	1360	1.80	•
16	4	160	0.110	2.6	16.0	3185	1400	2.40	•
20	4	160	0.150	3.5	20.0	2545	1525	3.20	•
Carbide shanks, conical, L-Type: N									
10	4	160	0.065	1.8	10.0	5095	1325	L-Type: M 1.60	L-Type: L •
12	4	160	0.080	2.4	12.0	4245	1360	2.20	•
16	4	160	0.110	3.0	16.0	3185	1400	2.70	•

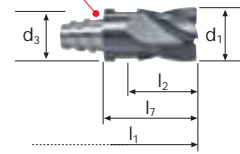
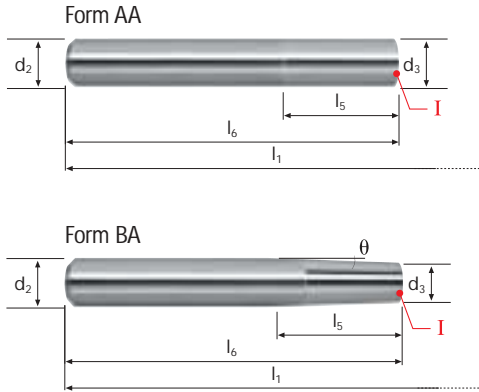
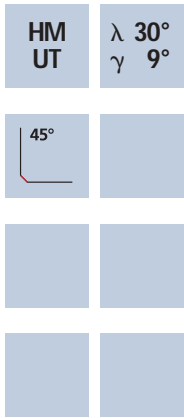
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	60	0.055	1.5	10.0	1910	420	L-Type: M 1.30	L-Type: L •
12	4	60	0.070	2.0	12.0	1590	445	1.80	•
16	4	60	0.090	2.6	16.0	1195	430	2.40	•
20	4	60	0.140	3.5	20.0	955	535	3.20	•
Carbide shanks, conical, L-Type: N									
10	4	60	0.055	1.8	10.0	1910	420	L-Type: M 1.60	L-Type: L •
12	4	60	0.070	2.4	12.0	1590	445	2.20	•
16	4	60	0.090	3.0	16.0	1195	430	2.70	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	160	0.065	1.5	10.0	5095	1325	L-Type: M 1.30	L-Type: L •
12	4	160	0.080	2.0	12.0	4245	1360	1.80	•
16	4	160	0.110	2.6	16.0	3185	1400	2.40	•
20	4	160	0.150	3.5	20.0	2545	1525	3.20	•
Carbide shanks, conical, L-Type: N									
10	4	160	0.065	1.8	10.0	5095	1325	L-Type: M 1.60	L-Type: L •
12	4	160	0.080	2.4	12.0	4245	1360	2.20	•
16	4	160	0.110	3.0	16.0	3185	1400	2.70	•

# Cylindrical end mills

Smooth-edged

**NovoSys X<sup>®</sup>**



I = Interface

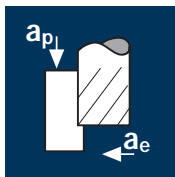
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	45°	z		I		
N-10-01-04-01-10	10	9.8	8	18	0.15	4	8	10	●	
N-12-01-04-01-12	12	11.8	10	20	0.15	4	10	12	●	
N-16-01-04-01-16	16	15.8	14	32	0.15	4	13	16	●	
N-20-01-04-01-20	20	19.8	16	36	0.15	4	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

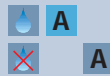
VI

## Application

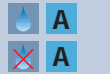


## Material

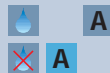
Steel  
< 850 N/mm<sup>2</sup>



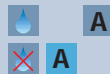
Steel  
850 - 1100 N/mm<sup>2</sup>



Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

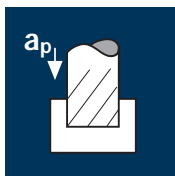


Cast iron  
(lamellar / spheroidal)



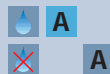
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	220	0.130	6.0	0.8	7005	2730	L-Type: M	L-Type: L
12	3	220	0.150	8.0	1.0	5835	2625	0.80	•
16	3	220	0.200	12.0	1.2	4375	2625	1.00	•
20	3	220	0.230	14.0	1.6	3500	2415	1.30	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	220	0.130	6.0	1.0	7005	2730	0.80	•
12	3	220	0.150	8.0	1.2	5835	2625	1.00	•
16	3	220	0.200	12.0	1.6	4375	2625	1.30	•
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	180	0.130	6.0	0.8	5730	2235	0.60	•
12	3	180	0.150	8.0	1.0	4775	2150	0.80	•
16	3	180	0.200	12.0	1.2	3580	2150	1.00	•
20	3	180	0.230	14.0	1.6	2865	1975	1.30	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	180	0.130	6.0	1.0	5730	2235	0.80	•
12	3	180	0.150	8.0	1.2	4775	2150	1.00	•
16	3	180	0.200	12.0	1.6	3580	2150	1.30	•
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	80	0.110	6.0	0.8	2545	840	0.60	•
12	3	80	0.130	8.0	1.0	2120	825	0.80	•
16	3	80	0.180	12.0	1.2	1590	860	1.00	•
20	3	80	0.200	14.0	1.6	1275	765	1.30	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	80	0.110	6.0	1.0	2545	840	0.80	•
12	3	80	0.130	8.0	1.2	2120	825	1.00	•
16	3	80	0.180	12.0	1.6	1590	860	1.30	•
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	180	0.130	6.0	0.8	5730	2235	0.60	•
12	3	180	0.150	8.0	1.0	4775	2150	0.80	•
16	3	180	0.200	12.0	1.2	3580	2150	1.00	•
20	3	180	0.230	14.0	1.6	2865	1975	1.30	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	180	0.130	6.0	1.0	5730	2235	0.80	•
12	3	180	0.150	8.0	1.2	4775	2150	1.00	•
16	3	180	0.200	12.0	1.6	3580	2150	1.30	•

## Application

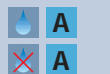


## Material

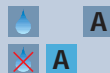
Steel  
< 850 N/mm<sup>2</sup>



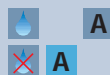
Steel  
850 - 1100 N/mm<sup>2</sup>



Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



Cast iron  
(lamellar / spheroidal)

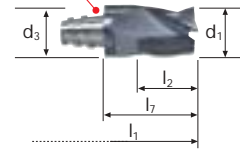
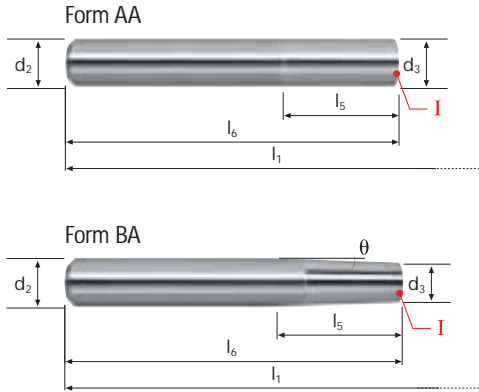
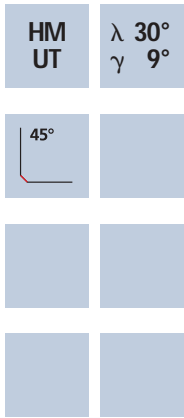


d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	200	0.065	1.5	10.0	6365	1240	1.30	•
12	3	200	0.080	2.0	12.0	5305	1275	1.80	•
16	3	200	0.110	2.6	16.0	3980	1315	2.40	•
20	3	200	0.150	3.5	20.0	3185	1435	3.20	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	200	0.065	1.8	10.0	6365	1240	1.60	•
12	3	200	0.080	2.4	12.0	5305	1275	2.20	•
16	3	200	0.110	3.0	16.0	3980	1315	2.70	•
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	160	0.065	1.5	10.0	5095	995	1.30	•
12	3	160	0.080	2.0	12.0	4245	1020	1.80	•
16	3	160	0.110	2.6	16.0	3185	1050	2.40	•
20	3	160	0.150	3.5	20.0	2545	1145	3.20	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	160	0.065	1.8	10.0	5095	995	1.60	•
12	3	160	0.080	2.4	12.0	4245	1020	2.20	•
16	3	160	0.110	3.0	16.0	3185	1050	2.70	•
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	60	0.055	1.5	10.0	1910	315	1.30	•
12	3	60	0.070	2.0	12.0	1590	335	1.80	•
16	3	60	0.090	2.6	16.0	1195	325	2.40	•
20	3	60	0.140	3.5	20.0	955	400	3.20	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	60	0.055	1.8	10.0	1910	315	1.60	•
12	3	60	0.070	2.4	12.0	1590	335	2.20	•
16	3	60	0.090	3.0	16.0	1195	325	2.70	•
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	3	160	0.065	1.5	10.0	5095	995	1.30	•
12	3	160	0.080	2.0	12.0	4245	1020	1.80	•
16	3	160	0.110	2.6	16.0	3185	1050	2.40	•
20	3	160	0.150	3.5	20.0	2545	1145	3.20	•
<b>Carbide shanks, conical, L-Type: N</b>									
10	3	160	0.065	1.8	10.0	5095	995	1.60	•
12	3	160	0.080	2.4	12.0	4245	1020	2.20	•
16	3	160	0.110	3.0	16.0	3185	1050	2.70	•

# Cylindrical end mills

Smooth-edged

**NovoSys X<sup>®</sup>**



I = Interface

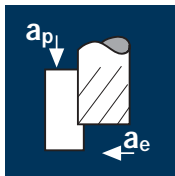
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	45°	z	i	I		
N-10-01-03-01-10	10	9.8	8	18	0.15	3	8	10	●	
N-12-01-03-01-12	12	11.8	10	20	0.15	3	10	12	●	
N-16-01-03-01-16	16	15.8	14	32	0.15	3	13	16	●	
N-20-01-03-01-20	20	19.8	16	36	0.15	3	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

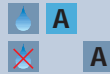
VI

## Application

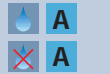


## Material

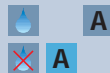
Steel  
< 850 N/mm<sup>2</sup>



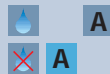
Steel  
850 - 1100 N/mm<sup>2</sup>



Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



Cast iron  
(lamellar / spheroidal)



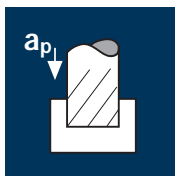
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	200	0.040	6.0	4.0	6365	1020	L-Type: M 3.20	L-Type: L •
12	4	200	0.050	8.0	4.8	5305	1060	3.80	•
16	5	200	0.070	12.0	6.4	3980	1395	5.10	•
20	6	200	0.090	14.0	8.0	3185	1720	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	200	0.040	6.0	4.4	6365	1020	L-Type: M 3.50	L-Type: L •
12	4	200	0.050	8.0	5.3	5305	1060	4.20	•
16	5	200	0.070	12.0	7.0	3980	1395	5.60	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	160	0.030	6.0	4.0	5095	610	L-Type: M 3.20	L-Type: L •
12	4	160	0.040	8.0	4.8	4245	680	3.80	•
16	5	160	0.055	12.0	6.4	3185	875	5.10	•
20	6	160	0.070	14.0	8.0	2545	1070	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	160	0.030	6.0	4.4	5095	610	L-Type: M 3.50	L-Type: L •
12	4	160	0.040	8.0	5.3	4245	680	4.20	•
16	5	160	0.055	12.0	7.0	3185	875	5.60	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	60	0.030	6.0	4.0	1910	230	L-Type: M 3.20	L-Type: L •
12	4	60	0.040	8.0	4.8	1590	255	3.80	•
16	5	60	0.055	12.0	6.4	1195	330	5.10	•
20	6	60	0.070	14.0	8.0	955	400	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	60	0.030	6.0	4.4	1910	230	L-Type: M 3.50	L-Type: L •
12	4	60	0.040	8.0	5.3	1590	255	4.20	•
16	5	60	0.055	12.0	7.0	1195	330	5.60	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	160	0.040	6.0	4.0	5095	815	L-Type: M 3.20	L-Type: L •
12	4	160	0.050	8.0	4.8	4245	850	3.80	•
16	5	160	0.070	12.0	6.4	3185	1115	5.10	•
20	6	160	0.090	14.0	8.0	2545	1375	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	160	0.040	6.0	4.4	5095	815	L-Type: M 3.50	L-Type: L •
12	4	160	0.050	8.0	5.3	4245	850	4.20	•
16	5	160	0.070	12.0	7.0	3185	1115	5.60	•

## Application



## Material

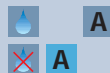
Steel  
< 850 N/mm<sup>2</sup>



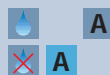
Steel  
850 - 1100 N/mm<sup>2</sup>



Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]



Cast iron  
(lamellar / spheroidal)



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	180	0.040	4.0	10.0	5730	915	L-Type: M 3.20	L-Type: L •
12	4	180	0.050	4.8	12.0	4775	955	3.80	•
16	5	180	0.065	6.4	16.0	3580	1165	5.10	•
20	6	180	0.080	8.0	20.0	2865	1375	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	180	0.040	4.4	10.0	5730	915	L-Type: M 3.50	L-Type: L •
12	4	180	0.050	5.3	12.0	4775	955	4.20	•
16	5	180	0.065	7.0	16.0	3580	1165	5.60	•

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	140	0.030	4.0	10.0	4455	535	L-Type: M 3.20	L-Type: L •
12	4	140	0.040	4.8	12.0	3715	595	3.80	•
16	5	140	0.050	6.4	16.0	2785	695	5.10	•
20	6	140	0.065	8.0	20.0	2230	870	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	140	0.030	4.4	10.0	4455	535	L-Type: M 3.50	L-Type: L •
12	4	140	0.040	5.3	12.0	3715	595	4.20	•
16	5	140	0.050	7.0	16.0	2785	695	5.60	•


d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	50	0.030	4.0	10.0	1590	190	L-Type: M 3.20	L-Type: L •
12	4	50	0.040	4.8	12.0	1325	210	3.80	•
16	5	50	0.050	6.4	16.0	995	250	5.10	•
20	6	50	0.065	8.0	20.0	795	310	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	50	0.030	4.4	10.0	1590	190	L-Type: M 3.50	L-Type: L •
12	4	50	0.040	5.3	12.0	1325	210	4.20	•
16	5	50	0.050	7.0	16.0	995	250	5.60	•

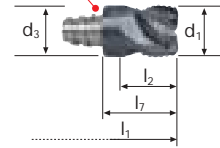
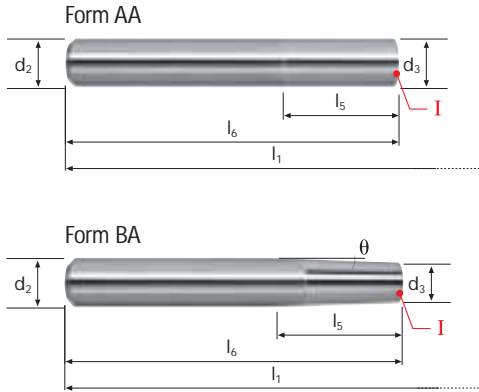
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>p</sub> [mm]	a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N									
10	4	140	0.040	4.0	10.0	4455	715	L-Type: M 3.20	L-Type: L •
12	4	140	0.050	4.8	12.0	3715	745	3.80	•
16	5	140	0.065	6.4	16.0	2785	905	5.10	•
20	6	140	0.080	8.0	20.0	2230	1070	6.40	•
Carbide shanks, conical, L-Type: N									
10	4	140	0.040	4.4	10.0	4455	715	L-Type: M 3.50	L-Type: L •
12	4	140	0.050	5.3	12.0	3715	745	4.20	•
16	5	140	0.065	7.0	16.0	2785	905	5.60	•

# Cylindrical end mills

Profiled


**NovoSys X<sup>®</sup>**

<b>HM</b>	$\lambda$ 45°
<b>UT</b>	$\gamma$ 8°
	



I = Interface

<b>Rm</b> < 850	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300						<b>Ti</b> Titanium	<b>GG(G)</b>
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	45°	z		I		
NR-10-01-04-03-10	10	9.8	7	13.0	0.35	4	8	10	●	
NR-12-01-04-03-12	12	11.8	9	16.5	0.35	4	10	12	●	
NR-16-01-05-04-16	16	15.8	13	20.5	0.45	5	13	16	●	
NR-20-01-06-04-20	20	19.8	15	25.5	0.45	6	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		78.0		65		N	10	●	
AA-10-080-040-10	10	9.8	93.0	40	80		M	10	●	
AA-10-120-080-10	10	9.8	133.0	80	120		L	10	●	
AA-12-070-000-12	12		86.5		70		N	12	●	
AA-12-085-040-12	12	11.8	101.5	40	85		M	12	●	
AA-12-120-075-12	12	11.8	136.5	75	120		L	12	●	
AA-16-080-032-16	16	15.8	100.5	32	80		N	16	●	
AA-16-110-062-16	16	15.8	130.5	62	110		M	16	●	
AA-20-090-040-20	20	19.8	115.5	40	90		N	20	●	
AA-20-150-100-20	20	19.8	175.5	100	150		L	20	●	
BA-12-080-032-10	12	9.8	93.0	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	133.0	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	136.5	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	156.5	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	140.5	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	180.5	80	160	1.5°	L	16	●	

VI





# NovoSys X<sup>®</sup> milling heads for 3D machining

## Ball nose, Tolerance $r \pm 0.01$

N° X-10-200-02-50-10



HM XT		<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		619
HM XT		<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		621
HM XA		<b>Rm</b> 1100-1500	<b>HRC</b> 48- > 60		623
HM UT		<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		625
HM UT		<b>Rm</b> 850-1500			627

N° X-11-201-02-55-10



N° X-10-202-02-50-10



N° H-10-03-02-50-10



N° N-10-03-02-50-10



## Corner radius

N° X-10-100-06-05-10



r 0.5

N° X-10-101-06-10-10



r 1.0

N° H-10-02-04-05-10



r 0.5

N° H-10-02-04-10-10



r 1.0

N° N-10-02-04-05-10



r 0.5

N° N-10-02-04-10-10



r 1.0

N° N-10-02-04-15-10



r 1.5

HM XT		<b>Rm</b> 1100-1500	<b>HRC</b> 48- > 60		629
HM XT		<b>Rm</b> 1100-1500	<b>HRC</b> 48- > 60		631
HM UT		<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		633
HM UT		<b>Rm</b> 1100-1500	<b>HRC</b> 48-60		635
HM UT		<b>Rm</b> <850-1300			637
HM UT		<b>Rm</b> <850-1300			639
HM UT		<b>Rm</b> <850-1300			641

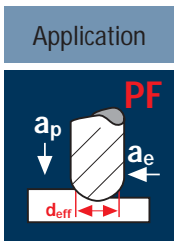
VI

## High Feed Cutting (HFC)

N° X-10-300-04-09-10



HM XT		<b>Rm</b> 850-1500	<b>HRC</b> 48- > 60		643
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### Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	160	0.145	0.80	1.20	5.43	9380	2720	0.48	11910
12	2	160	0.150	0.96	1.44	6.51	7825	2350	0.58	9895
16	2	160	0.160	1.28	1.92	8.68	5865	1875	0.77	7435
20	2	160	0.170	1.60	2.40	10.85	4695	1595	0.96	5955
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	160	0.150	0.80	1.20	5.43	9380	2815	0.48	11910
12	2	160	0.160	0.96	1.44	6.51	7825	2505	0.58	9895
16	2	160	0.170	1.28	1.92	8.68	5865	1995	0.77	7435

Hardened tool steel  
48 - 52 HRC

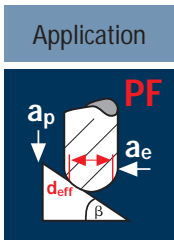
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	130	0.135	0.80	1.20	5.43	7620	2055	0.48	9680
12	2	130	0.140	0.96	1.44	6.51	6355	1780	0.58	8040
16	2	130	0.145	1.28	1.92	8.68	4765	1380	0.77	6040
20	2	130	0.155	1.60	2.40	10.85	3815	1185	0.96	4840
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	130	0.140	0.80	1.20	5.43	7620	2135	0.48	9680
12	2	130	0.145	0.96	1.44	6.51	6355	1845	0.58	8040
16	2	130	0.155	1.28	1.92	8.68	4765	1475	0.77	6040

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	110	0.125	0.80	1.20	5.43	6450	1615	0.48	8190
12	2	110	0.130	0.96	1.44	6.51	5380	1400	0.58	6800
16	2	110	0.135	1.28	1.92	8.68	4035	1090	0.77	5110
20	2	110	0.145	1.60	2.40	10.85	3225	935	0.96	4095
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	110	0.130	0.80	1.20	5.43	6450	1675	0.48	8190
12	2	110	0.135	0.96	1.44	6.51	5380	1455	0.58	6800
16	2	110	0.145	1.28	1.92	8.68	4035	1170	0.77	5110

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	50	0.085	0.24	0.72	3.06	5200	885	0.14	6775
12	2	50	0.090	0.29	0.86	3.69	4315	775	0.17	5610
16	2	50	0.095	0.38	1.15	4.87	3270	620	0.23	4180
20	2	50	0.100	0.48	1.44	6.12	2600	520	0.29	3330
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	50	0.090	0.24	0.72	3.06	5200	935	0.14	6775
12	2	50	0.095	0.29	0.86	3.69	4315	820	0.17	5610
16	2	50	0.100	0.38	1.15	4.87	3270	655	0.23	4180



### Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	180	0.145	0.80	0.80	9.78	5860	1700	0.56	6010
12	2	180	0.150	0.96	0.96	11.73	4885	1465	0.67	5010
16	2	180	0.160	1.28	1.28	15.64	3665	1175	0.90	3755
20	2	180	0.170	1.60	1.60	19.55	2930	995	1.12	3005
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	180	0.150	0.80	0.80	9.78	5860	1760	0.56	6010
12	2	180	0.160	0.96	0.96	11.73	4885	1565	0.67	5010
16	2	180	0.170	1.28	1.28	15.64	3665	1245	0.90	3755

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	150	0.135	0.80	0.80	9.78	4880	1320	0.56	5010
12	2	150	0.140	0.96	0.96	11.73	4070	1140	0.67	4175
16	2	150	0.145	1.28	1.28	15.64	3055	885	0.90	3130
20	2	150	0.155	1.60	1.60	19.55	2440	755	1.12	2505
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	150	0.140	0.80	0.80	9.78	4880	1365	0.56	5010
12	2	150	0.145	0.96	0.96	11.73	4070	1180	0.67	4175
16	2	150	0.155	1.28	1.28	15.64	3055	945	0.90	3130

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	120	0.125	0.80	0.80	9.78	3905	975	0.56	4010
12	2	120	0.130	0.96	0.96	11.73	3255	845	0.67	3340
16	2	120	0.135	1.28	1.28	15.64	2440	660	0.90	2505
20	2	120	0.145	1.60	1.60	19.55	1955	565	1.12	2005
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	120	0.130	0.80	0.80	9.78	3905	1015	0.56	4010
12	2	120	0.135	0.96	0.96	11.73	3255	880	0.67	3340
16	2	120	0.145	1.28	1.28	15.64	2440	710	0.90	2505

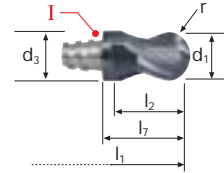
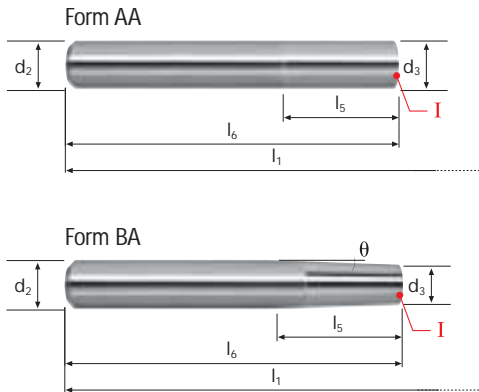
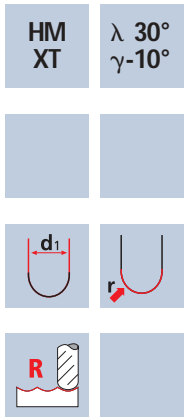
Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
10	2	60	0.100	0.40	0.40	9.28	2060	410	0.28	2120
12	2	60	0.105	0.48	0.48	11.13	1715	360	0.34	1765
16	2	60	0.110	0.64	0.64	14.84	1285	285	0.45	1325
20	2	60	0.120	0.80	0.80	18.55	1030	245	0.56	1060
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
10	2	60	0.105	0.40	0.40	9.28	2060	435	0.28	2120
12	2	60	0.110	0.48	0.48	11.13	1715	375	0.34	1765
16	2	60	0.120	0.64	0.64	14.84	1285	310	0.45	1325

# Ball nose end mills Sphero-XR

Tolerance  $r \pm 0.01$

**NovoSys X<sup>®</sup>**



I = Interface

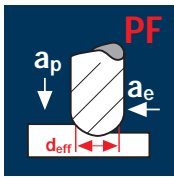
Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60			
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Milling heads									X-AI
Order-N°.	d1 0/-0.02	d3	l2	l7	r ±0.01	z	i	I	
X-10-200-02-50-10	10	9.8	8	18	5.0	2	8	10	●
X-12-200-02-60-12	12	11.8	10	20	6.0	2	10	12	●
X-16-200-02-80-16	16	15.8	14	32	8.0	2	13	16	●
X-20-200-02-100-20	20	19.8	16	36	10.0	2	17	20	●

Carbide shanks, Form AA / BA									
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I	
AA-10-065-000-10	10		83		65		N	10	●
AA-10-080-040-10	10	9.8	98	40	80		M	10	●
AA-10-120-080-10	10	9.8	138	80	120		L	10	●
AA-12-070-000-12	12		90		70		N	12	●
AA-12-085-040-12	12	11.8	105	40	85		M	12	●
AA-12-120-075-12	12	11.8	140	75	120		L	12	●
AA-16-080-032-16	16	15.8	112	32	80		N	16	●
AA-16-110-062-16	16	15.8	142	62	110		M	16	●
AA-20-090-040-20	20	19.8	126	40	90		N	20	●
AA-20-150-100-20	20	19.8	186	100	150		L	20	●
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●

VI

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



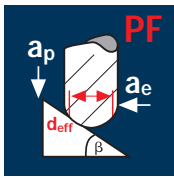
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	160	0.145	0.88	1.32	5.97	8530	2475	0.53	10810
13	2	160	0.150	1.04	1.56	7.05	7225	2170	0.62	9190
18	2	160	0.160	1.44	2.16	9.77	5215	1670	0.86	6635
22	2	160	0.170	1.76	2.64	11.94	4265	1450	1.06	5405
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	160	0.150	0.88	1.32	5.97	8530	2560	0.53	10810
13	2	160	0.160	1.04	1.56	7.05	7225	2310	0.62	9190
18	2	160	0.170	1.44	2.16	9.77	5215	1775	0.86	6635

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	130	0.135	0.88	1.32	5.97	6930	1870	0.53	8785
13	2	130	0.140	1.04	1.56	7.05	5870	1645	0.62	7470
18	2	130	0.145	1.44	2.16	9.77	4235	1230	0.86	5390
22	2	130	0.155	1.76	2.64	11.94	3465	1075	1.06	4390
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	130	0.140	0.88	1.32	5.97	6930	1940	0.53	8785
13	2	130	0.145	1.04	1.56	7.05	5870	1700	0.62	7470
18	2	130	0.155	1.44	2.16	9.77	4235	1315	0.86	5390

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	110	0.125	0.88	1.32	5.97	5865	1465	0.53	7430
13	2	110	0.130	1.04	1.56	7.05	4965	1290	0.62	6320
18	2	110	0.135	1.44	2.16	9.77	3585	970	0.86	4560
22	2	110	0.145	1.76	2.64	11.94	2935	850	1.06	3715
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	110	0.130	0.88	1.32	5.97	5865	1525	0.53	7430
13	2	110	0.135	1.04	1.56	7.05	4965	1340	0.62	6320
18	2	110	0.145	1.44	2.16	9.77	3585	1040	0.86	4560

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	50	0.085	0.26	0.79	3.34	4765	810	0.16	6040
13	2	50	0.090	0.31	0.94	3.97	4010	720	0.19	5100
18	2	50	0.095	0.43	1.30	5.50	2895	550	0.26	3705
22	2	50	0.100	0.53	1.58	6.75	2360	470	0.32	3020
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	50	0.090	0.26	0.79	3.34	4765	860	0.16	6040
13	2	50	0.095	0.31	0.94	3.97	4010	760	0.19	5100
18	2	50	0.100	0.43	1.30	5.50	2895	580	0.26	3705

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	180	0.145	0.88	0.88	10.75	5330	1545	0.62	5460
13	2	180	0.150	1.04	1.04	12.71	4510	1355	0.73	4625
18	2	180	0.160	1.44	1.44	17.60	3255	1040	1.01	3340
22	2	180	0.170	1.76	1.76	21.51	2665	905	1.23	2735
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	180	0.150	0.88	0.88	10.75	5330	1600	0.62	5460
13	2	180	0.160	1.04	1.04	12.71	4510	1445	0.73	4625
18	2	180	0.170	1.44	1.44	17.60	3255	1105	1.01	3340

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	150	0.135	0.88	0.88	10.75	4440	1200	0.62	4550
13	2	150	0.140	1.04	1.04	12.71	3755	1050	0.73	3855
18	2	150	0.145	1.44	1.44	17.60	2715	785	1.01	2785
22	2	150	0.155	1.76	1.76	21.51	2220	690	1.23	2275
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	150	0.140	0.88	0.88	10.75	4440	1245	0.62	4550
13	2	150	0.145	1.04	1.04	12.71	3755	1090	0.73	3855
18	2	150	0.155	1.44	1.44	17.60	2715	840	1.01	2785

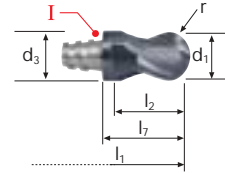
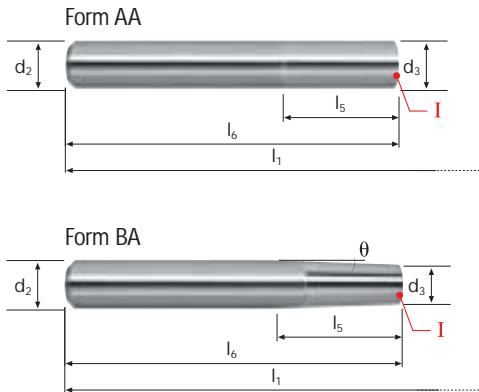
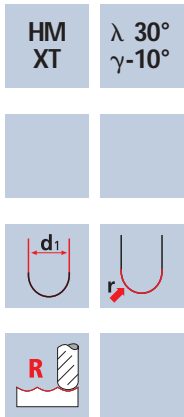
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	120	0.125	0.88	0.88	10.75	3555	890	0.62	3640
13	2	120	0.130	1.04	1.04	12.71	3005	780	0.73	3080
18	2	120	0.135	1.44	1.44	17.60	2170	585	1.01	2225
22	2	120	0.145	1.76	1.76	21.51	1775	515	1.23	1820
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	120	0.130	0.88	0.88	10.75	3555	925	0.62	3640
13	2	120	0.135	1.04	1.04	12.71	3005	810	0.73	3080
18	2	120	0.145	1.44	1.44	17.60	2170	630	1.01	2225

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>
11	2	60	0.100	0.44	0.44	10.20	1870	375	0.31	1925
13	2	60	0.105	0.52	0.52	12.06	1585	335	0.36	1630
18	2	60	0.110	0.72	0.72	16.70	1145	250	0.50	1180
22	2	60	0.120	0.88	0.88	20.41	935	225	0.62	965
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>
11	2	60	0.105	0.44	0.44	10.20	1870	395	0.31	1925
13	2	60	0.110	0.52	0.52	12.06	1585	350	0.36	1630
18	2	60	0.120	0.72	0.72	16.70	1145	275	0.50	1180

# Ball nose end mills Sphero-XR

Tolerance  $r \pm 0.01$ ,  $d_1$  cutting diameter with excess

**NovoSys X<sup>®</sup>**



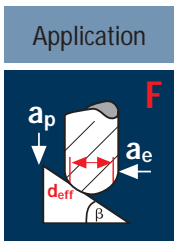
I = Interface

Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60			
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Milling heads									X-AI
Order-N°.	$d_1$ 0/-0.02	$d_3$	$l_2$	$l_7$	$r$ $\pm 0.01$	$z$		I	
X-11-201-02-55-10	11	9.8	8	18	5.5	2	8	10	●
X-13-201-02-65-12	13	11.8	10	20	6.5	2	10	12	●
X-18-201-02-90-16	18	15.8	14	32	9.0	2	13	16	●
X-22-201-02-110-20	22	19.8	16	36	11.0	2	17	20	●

Carbide shanks, Form AA / BA									
Order-N°.	$d_2$ $h_6$	$d_3$	$l_1$	$l_5$	$l_6$	$\theta$	L-Type	I	
AA-10-065-000-10	10		83		65		N	10	●
AA-10-080-040-10	10	9.8	98	40	80		M	10	●
AA-10-120-080-10	10	9.8	138	80	120		L	10	●
AA-12-070-000-12	12		90		70		N	12	●
AA-12-085-040-12	12	11.8	105	40	85		M	12	●
AA-12-120-075-12	12	11.8	140	75	120		L	12	●
AA-16-080-032-16	16	15.8	112	32	80		N	16	●
AA-16-110-062-16	16	15.8	142	62	110		M	16	●
AA-20-090-040-20	20	19.8	126	40	90		N	20	●
AA-20-150-100-20	20	19.8	186	100	150		L	20	●
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●

VI



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	300	0.100	0.20	0.20	8.77	10890	2180	0.18	0.12	
12	2	300	0.105	0.25	0.25	10.56	9045	1900	0.23	0.15	
16	2	300	0.110	0.30	0.30	13.96	6840	1505	0.27	0.18	
20	2	300	0.120	0.35	0.35	17.36	5500	1320	0.32	0.21	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	300	0.105	0.20	0.20	8.77	10890	2285	0.18	0.12	
12	2	300	0.110	0.25	0.25	10.56	9045	1990	0.23	0.15	
16	2	300	0.120	0.30	0.30	13.96	6840	1640	0.27	0.18	

Hardened tool steel  
48 - 52 HRC

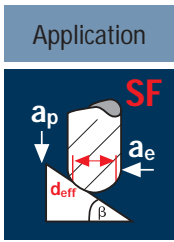
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	250	0.095	0.20	0.20	8.77	9075	1725	0.18	0.12	
12	2	250	0.100	0.25	0.25	10.56	7535	1505	0.23	0.15	
16	2	250	0.105	0.30	0.30	13.96	5700	1195	0.27	0.18	
20	2	250	0.115	0.35	0.35	17.36	4585	1055	0.32	0.21	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	250	0.100	0.20	0.20	8.77	9075	1815	0.18	0.12	
12	2	250	0.105	0.25	0.25	10.56	7535	1580	0.23	0.15	
16	2	250	0.115	0.30	0.30	13.96	5700	1310	0.27	0.18	

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	200	0.090	0.20	0.20	8.77	7260	1305	0.18	0.12	
12	2	200	0.095	0.25	0.25	10.56	6030	1145	0.23	0.15	
16	2	200	0.100	0.30	0.30	13.96	4560	910	0.27	0.18	
20	2	200	0.110	0.35	0.35	17.36	3665	805	0.32	0.21	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	200	0.095	0.20	0.20	8.77	7260	1380	0.18	0.12	
12	2	200	0.100	0.25	0.25	10.56	6030	1205	0.23	0.15	
16	2	200	0.110	0.30	0.30	13.96	4560	1005	0.27	0.18	

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	150	0.085	0.20	0.20	8.77	5445	925	0.18	0.12	
12	2	150	0.090	0.25	0.25	10.56	4520	815	0.23	0.15	
16	2	150	0.095	0.30	0.30	13.96	3420	650	0.27	0.18	
20	2	150	0.100	0.35	0.35	17.36	2750	550	0.32	0.21	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	150	0.090	0.20	0.20	8.77	5445	980	0.18	0.12	
12	2	150	0.095	0.25	0.25	10.56	4520	860	0.23	0.15	
16	2	150	0.100	0.30	0.30	13.96	3420	685	0.27	0.18	



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	400	0.070	0.04	0.04	7.91	16095	2255	0.04	0.03	
12	2	400	0.075	0.04	0.04	9.41	13530	2030	0.04	0.03	
16	2	400	0.080	0.05	0.05	12.51	10180	1630	0.05	0.04	
20	2	400	0.085	0.05	0.05	15.48	8225	1400	0.05	0.04	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	400	0.070	0.04	0.04	7.91	16095	2255	0.04	0.03	
12	2	400	0.075	0.04	0.04	9.41	13530	2030	0.04	0.03	
16	2	400	0.080	0.05	0.05	12.51	10180	1630	0.05	0.04	

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	350	0.065	0.04	0.04	7.91	14085	1830	0.04	0.03	
12	2	350	0.070	0.04	0.04	9.41	11840	1660	0.04	0.03	
16	2	350	0.075	0.05	0.05	12.51	8905	1335	0.05	0.04	
20	2	350	0.080	0.05	0.05	15.48	7195	1150	0.05	0.04	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	350	0.065	0.04	0.04	7.91	14085	1830	0.04	0.03	
12	2	350	0.070	0.04	0.04	9.41	11840	1660	0.04	0.03	
16	2	350	0.075	0.05	0.05	12.51	8905	1335	0.05	0.04	

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	280	0.060	0.04	0.04	7.91	11270	1350	0.04	0.03	
12	2	280	0.065	0.04	0.04	9.41	9470	1230	0.04	0.03	
16	2	280	0.070	0.05	0.05	12.51	7125	1000	0.05	0.04	
20	2	280	0.070	0.05	0.05	15.48	5760	805	0.05	0.04	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	280	0.060	0.04	0.04	7.91	11270	1350	0.04	0.03	
12	2	280	0.065	0.04	0.04	9.41	9470	1230	0.04	0.03	
16	2	280	0.070	0.05	0.05	12.51	7125	1000	0.05	0.04	

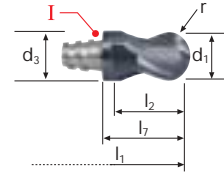
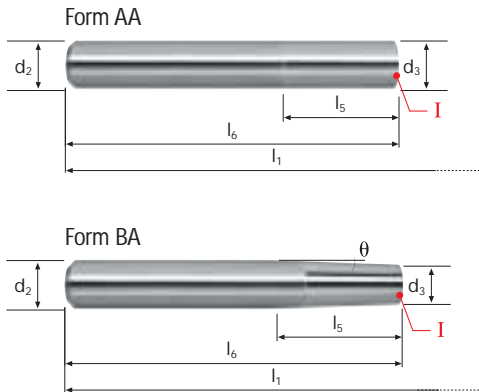
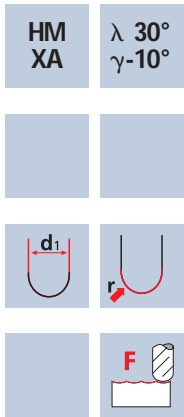
Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	180	0.055	0.04	0.04	7.91	7245	795	0.04	0.03	
12	2	180	0.055	0.04	0.04	9.41	6090	670	0.04	0.03	
16	2	180	0.060	0.05	0.05	12.51	4580	550	0.05	0.04	
20	2	180	0.065	0.05	0.05	15.48	3700	480	0.05	0.04	
<b>Carbide shanks, conical, L-Type: N</b>										L-Type: M	L-Type: L
10	2	180	0.055	0.04	0.04	7.91	7245	795	0.04	0.03	
12	2	180	0.055	0.04	0.04	9.41	6090	670	0.04	0.03	
16	2	180	0.060	0.05	0.05	12.51	4580	550	0.05	0.04	

# Ball nose end mills Sphero-XF

Tolerance  $r \pm 0.01$

**NovoSys X<sup>®</sup>**



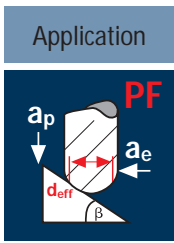
I = Interface

Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	Copper
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Milling heads									X-Al
Order-N°.	d1 0/-0.02	d3	l2	l7	r ±0.01	z	i	I	
X-10-202-02-50-10	10	9.8	8	18	5.0	2	8	10	●
X-12-202-02-60-12	12	11.8	10	20	6.0	2	10	12	●
X-16-202-02-80-16	16	15.8	14	32	8.0	2	13	16	●
X-20-202-02-100-20	20	19.8	16	36	10.0	2	17	20	●

Carbide shanks, Form AA / BA									
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I	
AA-10-065-000-10	10		83		65		N	10	●
AA-10-080-040-10	10	9.8	98	40	80		M	10	●
AA-10-120-080-10	10	9.8	138	80	120		L	10	●
AA-12-070-000-12	12		90		70		N	12	●
AA-12-085-040-12	12	11.8	105	40	85		M	12	●
AA-12-120-075-12	12	11.8	140	75	120		L	12	●
AA-16-080-032-16	16	15.8	112	32	80		N	16	●
AA-16-110-062-16	16	15.8	142	62	110		M	16	●
AA-20-090-040-20	20	19.8	126	40	90		N	20	●
AA-20-150-100-20	20	19.8	186	100	150		L	20	●
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●

VI



### Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	160	0.125	0.40	0.50	9.28	5490	1375	0.28	5655
12	2	160	0.130	0.48	0.60	11.13	4575	1190	0.34	4705
16	2	160	0.140	0.64	0.80	14.84	3430	960	0.45	3530
20	2	160	0.150	0.80	1.00	18.55	2745	825	0.56	2825
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	160	0.130	0.40	0.50	9.28	5490	1425	0.28	5655
12	2	160	0.140	0.48	0.60	11.13	4575	1280	0.34	4705
16	2	160	0.150	0.64	0.80	14.84	3430	1030	0.45	3530

Hardened tool steel  
48 - 52 HRC

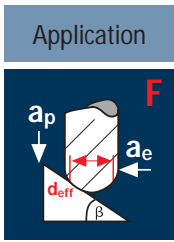
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	120	0.115	0.40	0.50	9.28	4115	945	0.28	4240
12	2	120	0.120	0.48	0.60	11.13	3430	825	0.34	3530
16	2	120	0.130	0.64	0.80	14.84	2575	670	0.45	2650
20	2	120	0.140	0.80	1.00	18.55	2060	575	0.56	2120
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	120	0.120	0.40	0.50	9.28	4115	990	0.28	4240
12	2	120	0.130	0.48	0.60	11.13	3430	890	0.34	3530
16	2	120	0.140	0.64	0.80	14.84	2575	720	0.45	2650

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	100	0.105	0.40	0.50	9.28	3430	720	0.28	3535
12	2	100	0.110	0.48	0.60	11.13	2860	630	0.34	2940
16	2	100	0.120	0.64	0.80	14.84	2145	515	0.45	2210
20	2	100	0.130	0.80	1.00	18.55	1715	445	0.56	1765
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	100	0.110	0.40	0.50	9.28	3430	755	0.28	3535
12	2	100	0.120	0.48	0.60	11.13	2860	685	0.34	2940
16	2	100	0.130	0.64	0.80	14.84	2145	560	0.45	2210

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	50	0.090	0.20	0.25	8.77	1815	325	0.14	1865
12	2	50	0.090	0.24	0.30	10.52	1515	275	0.17	1555
16	2	50	0.100	0.32	0.40	14.03	1135	225	0.22	1165
20	2	50	0.105	0.40	0.50	17.54	905	190	0.28	930
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	50	0.090	0.20	0.25	8.77	1815	325	0.14	1865
12	2	50	0.100	0.24	0.30	10.52	1515	305	0.17	1555
16	2	50	0.105	0.32	0.40	14.03	1135	240	0.22	1165



### Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	250	0.080	0.20	0.20	8.77	9075	1450	0.18	0.10
12	2	250	0.095	0.25	0.25	10.56	7535	1430	0.23	0.13
16	2	250	0.105	0.30	0.30	13.96	5700	1195	0.27	0.15
20	2	250	0.100	0.35	0.35	17.36	4585	915	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	250	0.105	0.20	0.20	8.77	9075	1905	0.18	0.10
12	2	250	0.110	0.25	0.25	10.56	7535	1660	0.23	0.13
16	2	250	0.120	0.30	0.30	13.96	5700	1370	0.27	0.15

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	200	0.075	0.20	0.20	8.77	7260	1090	0.18	0.10
12	2	200	0.090	0.25	0.25	10.56	6030	1085	0.23	0.13
16	2	200	0.100	0.30	0.30	13.96	4560	910	0.27	0.15
20	2	200	0.095	0.35	0.35	17.36	3665	695	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	200	0.100	0.20	0.20	8.77	7260	1450	0.18	0.10
12	2	200	0.105	0.25	0.25	10.56	6030	1265	0.23	0.13
16	2	200	0.115	0.30	0.30	13.96	4560	1050	0.27	0.15

Hardened tool steel  
52 - 56 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	180	0.070	0.20	0.20	8.77	6535	915	0.18	0.10
12	2	180	0.080	0.25	0.25	10.56	5425	870	0.23	0.13
16	2	180	0.095	0.30	0.30	13.96	4105	780	0.27	0.15
20	2	180	0.090	0.35	0.35	17.36	3300	595	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	180	0.095	0.20	0.20	8.77	6535	1240	0.18	0.10
12	2	180	0.100	0.25	0.25	10.56	5425	1085	0.23	0.13
16	2	180	0.110	0.30	0.30	13.96	4105	905	0.27	0.15

Hardened tool steel  
56 - 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	120	0.070	0.20	0.20	8.77	4355	610	0.18	0.10
12	2	120	0.070	0.25	0.25	10.56	3615	505	0.23	0.13
16	2	120	0.090	0.30	0.30	13.96	2735	490	0.27	0.15
20	2	120	0.085	0.35	0.35	17.36	2200	375	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	120	0.090	0.20	0.20	8.77	4355	785	0.18	0.10
12	2	120	0.095	0.25	0.25	10.56	3615	685	0.23	0.13
16	2	120	0.100	0.30	0.30	13.96	2735	545	0.27	0.15

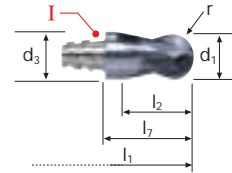
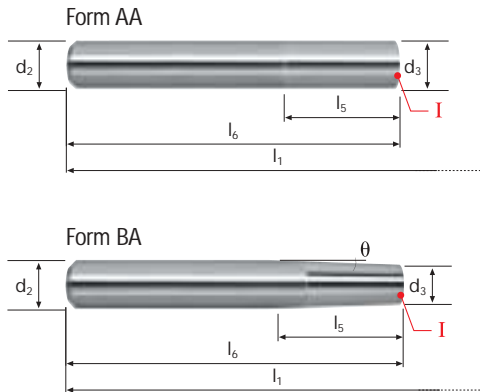


# Ball nose end mills

Tolerance  $r \pm 0.01$

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 30° $\gamma$ 0°



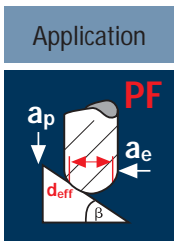
I = Interface

	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60			
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Milling heads									POLYCUT-A	
Order-N°.	$d_1$ $\pm 0.02$	$d_3$	$l_2$	$l_7$	$r$ $\pm 0.01$	$z$	<b>i</b>	<b>I</b>		
H-10-03-02-50-10	10	9.8	8	18	5.0	2	8	10	●	
H-12-03-02-60-12	12	11.8	10	20	6.0	2	10	12	●	
H-16-03-02-80-16	16	15.8	12	32	8.0	2	13	16	●	
H-20-03-02-100-20	20	19.8	14	36	10.0	2	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	$d_2$ $h_6$	$d_3$	$l_1$	$l_5$	$l_6$	$\theta$	L-Type	<b>I</b>		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**  
 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	200	0.135	0.40	0.50	9.28	6860	1850	<b>L-Type: M</b>	
12	2	200	0.140	0.48	0.60	11.13	5720	1600	0.34	5885
16	2	200	0.150	0.64	0.80	14.84	4290	1285	0.45	4415
20	2	200	0.160	0.80	1.00	18.55	3430	1100	0.56	3535
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	200	0.140	0.40	0.50	9.28	6860	1920	<b>L-Type: M</b>	
12	2	200	0.150	0.48	0.60	11.13	5720	1715	0.34	5885
16	2	200	0.155	0.64	0.80	14.84	4290	1330	0.45	4415

### Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

**A**  
 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	180	0.125	0.40	0.50	9.28	6175	1545	0.28	6360
12	2	180	0.130	0.48	0.60	11.13	5150	1340	0.34	5295
16	2	180	0.140	0.64	0.80	14.84	3860	1080	0.45	3975
20	2	180	0.145	0.80	1.00	18.55	3090	895	0.56	3180
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	180	0.130	0.40	0.50	9.28	6175	1605	<b>L-Type: M</b>	
12	2	180	0.140	0.48	0.60	11.13	5150	1440	0.34	5295
16	2	180	0.145	0.64	0.80	14.84	3860	1120	0.45	3975

### Material

Steel  
1300 - 1500 N/mm<sup>2</sup>

**A**  
 **A**

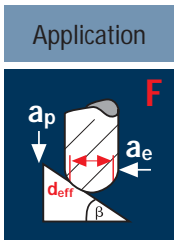
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	150	0.115	0.40	0.50	9.28	5145	1185	0.28	5300
12	2	150	0.120	0.48	0.60	11.13	4290	1030	0.34	4415
16	2	150	0.130	0.64	0.80	14.84	3215	835	0.45	3310
20	2	150	0.135	0.80	1.00	18.55	2575	695	0.56	2650
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	150	0.120	0.40	0.50	9.28	5145	1235	<b>L-Type: M</b>	
12	2	150	0.130	0.48	0.60	11.13	4290	1115	0.34	4415
16	2	150	0.130	0.64	0.80	14.84	3215	835	0.45	3310

### Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

**A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	n [min <sup>-1</sup> ]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	60	0.095	0.20	0.25	8.77	2180	415	0.14	2240
12	2	60	0.100	0.24	0.30	10.52	1815	365	0.17	1865
16	2	60	0.105	0.32	0.40	14.03	1360	285	0.22	1400
20	2	60	0.110	0.40	0.50	17.54	1090	240	0.28	1120
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	60	0.100	0.20	0.25	8.77	2180	435	<b>L-Type: M</b>	
12	2	60	0.105	0.24	0.30	10.52	1815	380	0.17	1865
16	2	60	0.110	0.32	0.40	14.03	1360	300	0.22	1400



### Material

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**  
 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	350	0.080	0.20	0.20	8.77	12705	2035	0.18	0.10
12	2	350	0.095	0.25	0.25	10.56	10550	2005	0.23	0.13
16	2	350	0.105	0.30	0.30	13.96	7980	1675	0.27	0.15
20	2	350	0.100	0.35	0.35	17.36	6420	1285	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	350	0.105	0.20	0.20	8.77	12705	2670	<b>L-Type: M</b>	
12	2	350	0.110	0.25	0.25	10.56	10550	2320	0.23	0.13
16	2	350	0.120	0.30	0.30	13.96	7980	1915	0.27	0.15

### Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

**A**  
 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	280	0.075	0.20	0.20	8.77	10165	1525	0.18	0.10
12	2	280	0.090	0.25	0.25	10.56	8440	1520	0.23	0.13
16	2	280	0.100	0.30	0.30	13.96	6385	1275	0.27	0.15
20	2	280	0.095	0.35	0.35	17.36	5135	975	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	280	0.100	0.20	0.20	8.77	10165	2035	<b>L-Type: M</b>	
12	2	280	0.105	0.25	0.25	10.56	8440	1770	0.23	0.13
16	2	280	0.115	0.30	0.30	13.96	6385	1470	0.27	0.15

### Material

Steel  
1300 - 1500 N/mm<sup>2</sup>

**A**  
 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	200	0.070	0.20	0.20	8.77	7260	1015	0.18	0.10
12	2	200	0.080	0.25	0.25	10.56	6030	965	0.23	0.13
16	2	200	0.095	0.30	0.30	13.96	4560	865	0.27	0.15
20	2	200	0.090	0.35	0.35	17.36	3665	660	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	200	0.095	0.20	0.20	8.77	7260	1380	<b>L-Type: M</b>	
12	2	200	0.100	0.25	0.25	10.56	6030	1205	0.23	0.13
16	2	200	0.110	0.30	0.30	13.96	4560	1005	0.27	0.15

### Material

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

**A**

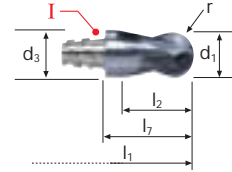
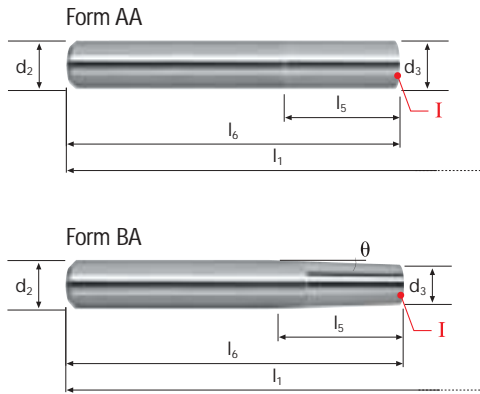
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm] β = 45°	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	2	100	0.065	0.20	0.20	8.77	3630	470	0.18	0.10
12	2	100	0.065	0.25	0.25	10.56	3015	390	0.23	0.13
16	2	100	0.085	0.30	0.30	13.96	2280	390	0.27	0.15
20	2	100	0.080	0.35	0.35	17.36	1835	295	0.32	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	2	100	0.085	0.20	0.20	8.77	3630	615	<b>L-Type: M</b>	
12	2	100	0.090	0.25	0.25	10.56	3015	545	0.23	0.13
16	2	100	0.095	0.30	0.30	13.96	2280	435	0.27	0.15

# Ball nose end mills

Tolerance  $r \pm 0.01$

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 30° $\gamma$ 9°



I = Interface

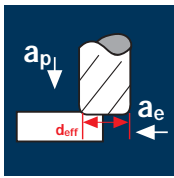
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless		GG(G)
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Milling heads									POLYCUT-A	
Order-N°.	d1 $\pm 0.02$	d3	l2	l7	r $\pm 0.01$	z	i	I		
N-10-03-02-50-10	10	9.8	8	18	5.0	2	8	10	●	
N-12-03-02-60-12	12	11.8	10	20	6.0	2	10	12	●	
N-16-03-02-80-16	16	15.8	12	32	8.0	2	13	16	●	
N-20-03-02-100-20	20	19.8	14	36	10.0	2	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	$\theta$	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI

## Application



## Material

Hardened tool steel  
48 - 52 HRC

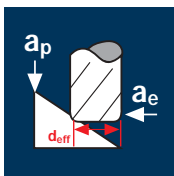
Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

Hardened tool steel  
> 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	150	0.095	0.24	3.50	9.85	4845	2760	L-Type: M	L-Type: L
12	6	150	0.115	0.25	4.20	11.87	4020	2775	3.00	1.80
16	6	150	0.130	0.28	5.60	15.90	3005	2345	4.00	2.40
20	8	150	0.145	0.30	7.00	19.92	2395	2780	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	150	0.105	0.24	3.50	9.85	4845	3050	L-Type: M	L-Type: L
12	6	150	0.125	0.25	4.20	11.87	4020	3015	3.00	1.80
16	6	150	0.140	0.28	5.60	15.90	3005	2525	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	120	0.085	0.24	3.50	9.85	3880	1980	L-Type: M	L-Type: L
12	6	120	0.105	0.25	4.20	11.87	3220	2030	3.00	1.80
16	6	120	0.115	0.28	5.60	15.90	2400	1655	4.00	2.40
20	8	120	0.130	0.30	7.00	19.92	1920	1995	175.00	105.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	120	0.095	0.24	3.50	9.85	3880	2210	L-Type: M	L-Type: L
12	6	120	0.115	0.25	4.20	11.87	3220	2220	3.00	1.80
16	6	120	0.125	0.28	5.60	15.90	2400	1800	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	80	0.080	0.24	3.50	9.85	2585	1240	L-Type: M	L-Type: L
12	6	80	0.095	0.25	4.20	11.87	2145	1225	2.50	1.50
16	6	80	0.105	0.28	5.60	15.90	1600	1010	3.00	1.80
20	8	80	0.120	0.30	7.00	19.92	1280	1230	4.00	2.40
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	80	0.085	0.24	3.50	9.85	2585	1320	L-Type: M	L-Type: L
12	6	80	0.105	0.25	4.20	11.87	2145	1350	2.50	1.50
16	6	80	0.115	0.28	5.60	15.90	1600	1105	3.00	1.80
20	8	80	0.125	0.28	5.60	15.90	1600	1105	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	40	0.055	0.24	3.50	9.85	1295	425	L-Type: M	L-Type: L
12	6	40	0.065	0.25	4.20	11.87	1075	420	2.50	1.50
16	6	40	0.075	0.28	5.60	15.90	800	360	3.00	1.80
20	8	40	0.085	0.30	7.00	19.92	640	435	4.00	2.40
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	40	0.060	0.24	3.50	9.85	1295	465	L-Type: M	L-Type: L
12	6	40	0.075	0.25	4.20	11.87	1075	485	2.50	1.50
16	6	40	0.080	0.28	5.60	15.90	800	385	3.00	1.80
20	8	40	0.085	0.30	7.00	19.92	640	435	4.00	2.40

## Application



## Material

Hardened tool steel  
48 - 52 HRC

Hardened tool steel  
52 - 56 HRC

Hardened tool steel  
56 - 60 HRC

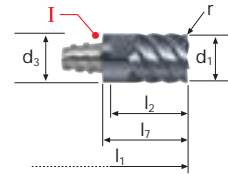
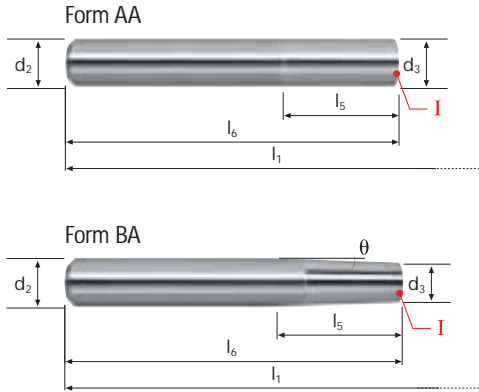
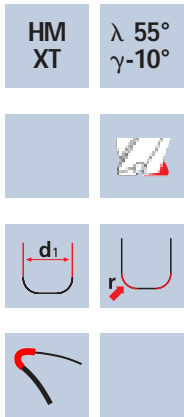
Hardened tool steel  
> 60 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub>	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	360	0.185	0.15	0.15	10.00	11460	12720	0.14	0.11
12	6	360	0.225	0.18	0.18	12.00	9550	12895	0.16	0.14
16	6	360	0.250	0.24	0.24	15.97	7175	10765	0.22	0.18
20	8	360	0.285	0.30	0.30	19.93	5750	13110	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	360	0.185	0.15	0.15	10.00	11460	12720	0.14	0.11
12	6	360	0.225	0.18	0.18	12.00	9550	12895	0.16	0.14
16	6	360	0.250	0.24	0.24	15.97	7175	10765	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	250	0.175	0.15	0.15	10.00	7960	8360	L-Type: M	L-Type: L
12	6	250	0.215	0.18	0.18	12.00	6630	8555	0.14	0.11
16	6	250	0.240	0.24	0.24	15.97	4985	7180	0.16	0.14
20	8	250	0.270	0.30	0.30	19.93	3995	8630	0.22	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	250	0.175	0.15	0.15	10.00	7960	8360	L-Type: M	L-Type: L
12	6	250	0.215	0.18	0.18	12.00	6630	8555	0.14	0.11
16	6	250	0.240	0.24	0.24	15.97	4985	7180	0.16	0.14
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	180	0.160	0.15	0.15	10.00	5730	5500	L-Type: M	L-Type: L
12	6	180	0.195	0.18	0.18	12.00	4775	5585	0.14	0.11
16	6	180	0.215	0.24	0.24	15.97	3590	4630	0.16	0.14
20	8	180	0.245	0.30	0.30	19.93	2875	5635	0.22	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	180	0.160	0.15	0.15	10.00	5730	5500	L-Type: M	L-Type: L
12	6	180	0.195	0.18	0.18	12.00	4775	5585	0.14	0.11
16	6	180	0.215	0.24	0.24	15.97	3590	4630	0.16	0.14
20	8	180	0.245	0.30	0.30	19.93	2875	5635	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	6	100	0.095	0.15	0.15	10.00	3185	1815	L-Type: M	L-Type: L
12	6	100	0.115	0.18	0.18	12.00	2655	1830	0.14	0.11
16	6	100	0.125	0.24	0.24	15.97	1995	1495	0.16	0.14
20	8	100	0.145	0.30	0.30	19.93	1595	1850	0.22	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	6	100	0.095	0.15	0.15	10.00	3185	1815	L-Type: M	L-Type: L
12	6	100	0.115	0.18	0.18	12.00	2655	1830	0.14	0.11
16	6	100	0.125	0.24	0.24	15.97	1995	1495	0.16	0.14
20	8	100	0.145	0.30	0.30	19.93	1595	1850	0.22	0.18

# Corner radius end mills XSpeed

Tolerance r 0/+0.02

**NovoSys X<sup>®</sup>**



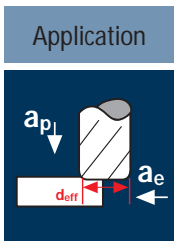
I = Interface

	<b>Rm</b> 850-1100	<b>Rm</b> 1100-1300	<b>Rm</b> 1300-1500	<b>HRC</b> 48-56	<b>HRC</b> 56-60	<b>HRC</b> > 60		<b>Ti</b> Titanium	<b>HSS</b>
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Milling heads									X-AI	
Order-N°.	d1 0/-0.02	d3	l2	l7	r 0/+0.02	z	i	I		
X-10-100-06-05-10	10	9.8	8	18	0.5	6	8	10	●	
X-12-100-06-05-12	12	11.8	10	20	0.5	6	10	12	●	
X-16-100-06-05-16	16	15.8	14	32	0.5	6	13	16	●	
X-20-100-08-05-20	20	19.8	16	36	0.5	8	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI



**Material**

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	150	0.095	0.24	3.50	9.30	5135	2925	2.50	1.50	
12	6	150	0.115	0.25	4.20	11.32	4220	2910	3.00	1.80	
16	6	150	0.130	0.28	5.60	15.39	3100	2420	4.00	2.40	
20	8	150	0.145	0.30	7.00	19.43	2455	2850	5.00	3.00	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	150	0.105	0.24	3.50	9.30	5135	3235	2.50	1.50	
12	6	150	0.125	0.25	4.20	11.32	4220	3165	3.00	1.80	
16	6	150	0.140	0.28	5.60	15.39	3100	2605	4.00	2.40	

Hardened tool steel  
52 - 56 HRC

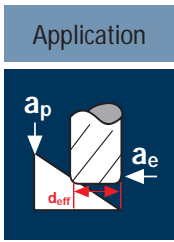
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	120	0.085	0.24	3.50	9.30	4105	2095	2.50	1.50	
12	6	120	0.105	0.25	4.20	11.32	3375	2125	3.00	1.80	
16	6	120	0.115	0.28	5.60	15.39	2480	1710	4.00	2.40	
20	8	120	0.130	0.30	7.00	19.43	1965	2045	175.00	105.00	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	120	0.095	0.24	3.50	9.30	4105	2340	2.50	1.50	
12	6	120	0.115	0.25	4.20	11.32	3375	2330	3.00	1.80	
16	6	120	0.125	0.28	5.60	15.39	2480	1860	4.00	2.40	

Hardened tool steel  
56 - 60 HRC

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	80	0.080	0.24	3.50	9.30	2740	1315	2.50	1.50	
12	6	80	0.095	0.25	4.20	11.32	2250	1285	3.00	1.80	
16	6	80	0.105	0.28	5.60	15.39	1655	1045	4.00	2.40	
20	8	80	0.120	0.30	7.00	19.43	1310	1260	5.00	3.00	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	80	0.085	0.24	3.50	9.30	2740	1395	2.50	1.50	
12	6	80	0.105	0.25	4.20	11.32	2250	1420	3.00	1.80	
16	6	80	0.115	0.28	5.60	15.39	1655	1140	4.00	2.40	

Hardened tool steel  
> 60 HRC

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	40	0.055	0.24	3.50	9.30	1370	450	2.50	1.50	
12	6	40	0.065	0.25	4.20	11.32	1125	440	3.00	1.80	
16	6	40	0.075	0.28	5.60	15.39	825	370	4.00	2.40	
20	8	40	0.085	0.30	7.00	19.43	655	445	5.00	3.00	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	40	0.060	0.24	3.50	9.30	1370	495	2.50	1.50	
12	6	40	0.075	0.25	4.20	11.32	1125	505	3.00	1.80	
16	6	40	0.080	0.28	5.60	15.39	825	395	4.00	2.40	



**Material**

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub>	a <sub>e</sub> / a <sub>p</sub> [mm]	
<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	360	0.185	0.15	0.15	9.95	11515	12780	0.14	0.11	
12	6	360	0.225	0.18	0.18	11.97	9575	12925	0.16	0.14	
16	6	360	0.250	0.24	0.24	15.99	7165	10750	0.22	0.18	
20	8	360	0.285	0.30	0.30	20.00	5730	13065	0.27	0.23	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	360	0.185	0.15	0.15	9.95	11515	12780	0.14	0.11	
12	6	360	0.225	0.18	0.18	11.97	9575	12925	0.16	0.14	
16	6	360	0.250	0.24	0.24	15.99	7165	10750	0.22	0.18	

Hardened tool steel  
52 - 56 HRC

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	250	0.175	0.15	0.15	9.95	8000	8400	0.14	0.11	
12	6	250	0.215	0.18	0.18	11.97	6650	8580	0.16	0.14	
16	6	250	0.240	0.24	0.24	15.99	4975	7165	0.22	0.18	
20	8	250	0.270	0.30	0.30	20.00	3980	8595	0.27	0.23	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	250	0.175	0.15	0.15	9.95	8000	8400	0.14	0.11	
12	6	250	0.215	0.18	0.18	11.97	6650	8580	0.16	0.14	
16	6	250	0.240	0.24	0.24	15.99	4975	7165	0.22	0.18	

Hardened tool steel  
56 - 60 HRC

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	180	0.160	0.15	0.15	9.95	5760	5530	0.14	0.11	
12	6	180	0.195	0.18	0.18	11.97	4785	5600	0.16	0.14	
16	6	180	0.215	0.24	0.24	15.99	3585	4625	0.22	0.18	
20	8	180	0.245	0.30	0.30	20.00	2865	5615	0.27	0.23	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	180	0.160	0.15	0.15	9.95	5760	5530	0.14	0.11	
12	6	180	0.195	0.18	0.18	11.97	4785	5600	0.16	0.14	
16	6	180	0.215	0.24	0.24	15.99	3585	4625	0.22	0.18	

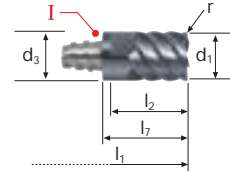
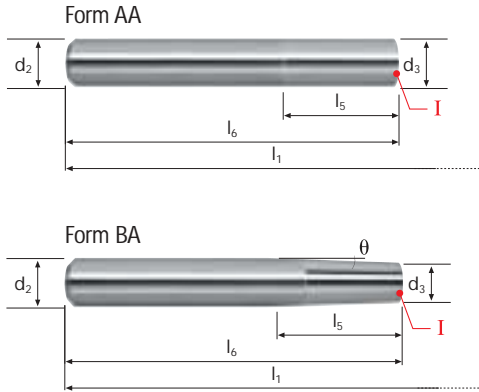
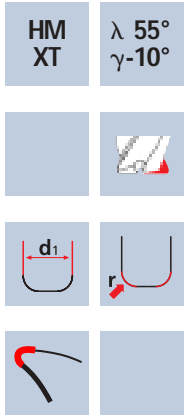
Hardened tool steel  
> 60 HRC

<b>Carbide shanks, cylindrical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	100	0.095	0.15	0.15	9.95	3200	1825	0.14	0.11	
12	6	100	0.115	0.18	0.18	11.97	2660	1835	0.16	0.14	
16	6	100	0.125	0.24	0.24	15.99	1990	1495	0.22	0.18	
20	8	100	0.145	0.30	0.30	20.00	1590	1845	0.27	0.23	
<b>Carbide shanks, conical, L-Type: N</b>										<b>L-Type: M</b>	<b>L-Type: L</b>
10	6	100	0.095	0.15	0.15	9.95	3200	1825	0.14	0.11	
12	6	100	0.115	0.18	0.18	11.97	2660	1835	0.16	0.14	
16	6	100	0.125	0.24	0.24	15.99	1990	1495	0.22	0.18	

# Corner radius end mills XSpeed

Tolerance r 0/+0.02

**NovoSys X<sup>®</sup>**



I = Interface

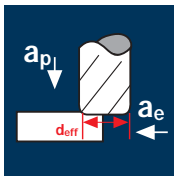
Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	HSS
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Milling heads									X-AI
Order-N°.	d1 0/-0.02	d3	l2	l7	r 0/+0.02	z	i	I	
X-10-101-06-10-10	10	9.8	8	18	1.0	6	8	10	●
X-12-101-06-10-12	12	11.8	10	20	1.0	6	10	12	●
X-16-101-06-10-16	16	15.8	14	32	1.0	6	13	16	●
X-20-101-08-10-20	20	19.8	16	36	1.0	8	17	20	●

Carbide shanks, Form AA / BA									
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I	
AA-10-065-000-10	10		83		65		N	10	●
AA-10-080-040-10	10	9.8	98	40	80		M	10	●
AA-10-120-080-10	10	9.8	138	80	120		L	10	●
AA-12-070-000-12	12		90		70		N	12	●
AA-12-085-040-12	12	11.8	105	40	85		M	12	●
AA-12-120-075-12	12	11.8	140	75	120		L	12	●
AA-16-080-032-16	16	15.8	112	32	80		N	16	●
AA-16-110-062-16	16	15.8	142	62	110		M	16	●
AA-20-090-040-20	20	19.8	126	40	90		N	20	●
AA-20-150-100-20	20	19.8	186	100	150		L	20	●
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●

VI

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC

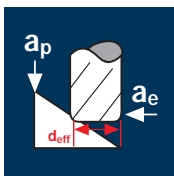


Hardened tool steel  
56 - 60 HRC



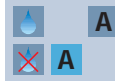
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	180	0.105	0.24	3.50	9.85	5815	2440	L-Type: M	L-Type: L
12	4	180	0.125	0.25	4.20	11.87	4825	2415	3.00	1.80
16	4	180	0.145	0.28	5.60	15.90	3605	2090	4.00	2.40
20	4	180	0.160	0.30	7.00	19.92	2875	1840	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	180	0.115	0.24	3.50	9.85	5815	2675	L-Type: M	L-Type: L
12	4	180	0.135	0.25	4.20	11.87	4825	2605	3.00	1.80
16	4	180	0.155	0.28	5.60	15.90	3605	2235	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	140	0.095	0.24	3.50	9.85	4525	1720	L-Type: M	L-Type: L
12	4	140	0.115	0.25	4.20	11.87	3755	1725	3.00	1.80
16	4	140	0.130	0.28	5.60	15.90	2805	1460	4.00	2.40
20	4	140	0.145	0.30	7.00	19.92	2235	1295	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	140	0.105	0.24	3.50	9.85	4525	1900	L-Type: M	L-Type: L
12	4	140	0.120	0.25	4.20	11.87	3755	1800	3.00	1.80
16	4	140	0.140	0.28	5.60	15.90	2805	1570	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	110	0.085	0.24	3.50	9.85	3555	1210	L-Type: M	L-Type: L
12	4	110	0.105	0.25	4.20	11.87	2950	1240	3.00	1.80
16	4	110	0.120	0.28	5.60	15.90	2200	1055	4.00	2.40
20	4	110	0.130	0.30	7.00	19.92	1760	915	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	110	0.095	0.24	3.50	9.85	3555	1350	L-Type: M	L-Type: L
12	4	110	0.110	0.25	4.20	11.87	2950	1300	3.00	1.80
16	4	110	0.125	0.28	5.60	15.90	2200	1100	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	70	0.075	0.24	3.50	9.85	2260	680	L-Type: M	L-Type: L
12	4	70	0.090	0.25	4.20	11.87	1875	675	3.00	1.80
16	4	70	0.105	0.28	5.60	15.90	1400	590	4.00	2.40
20	4	70	0.115	0.30	7.00	19.92	1120	515	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	70	0.085	0.24	3.50	9.85	2260	770	L-Type: M	L-Type: L
12	4	70	0.095	0.25	4.20	11.87	1875	715	3.00	1.80
16	4	70	0.110	0.28	5.60	15.90	1400	615	4.00	2.40

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub>	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	360	0.195	0.15	0.15	10.00	11460	8940	0.14	0.11
12	4	360	0.230	0.18	0.18	12.00	9550	8785	0.16	0.14
16	4	360	0.265	0.24	0.24	15.97	7175	7605	0.22	0.18
20	4	360	0.300	0.30	0.30	19.93	5750	6900	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	360	0.195	0.15	0.15	10.00	11460	8940	0.14	0.11
12	4	360	0.230	0.18	0.18	12.00	9550	8785	0.16	0.14
16	4	360	0.265	0.24	0.24	15.97	7175	7605	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	300	0.185	0.15	0.15	10.00	9550	7065	0.14	0.11
12	4	300	0.220	0.18	0.18	12.00	7960	7005	0.16	0.14
16	4	300	0.250	0.24	0.24	15.97	5980	5980	0.22	0.18
20	4	300	0.285	0.30	0.30	19.93	4790	5460	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	300	0.185	0.15	0.15	10.00	9550	7065	0.14	0.11
12	4	300	0.220	0.18	0.18	12.00	7960	7005	0.16	0.14
16	4	300	0.250	0.24	0.24	15.97	5980	5980	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	220	0.175	0.15	0.15	10.00	7005	4905	0.14	0.11
12	4	220	0.205	0.18	0.18	12.00	5835	4785	0.16	0.14
16	4	220	0.240	0.24	0.24	15.97	4385	4210	0.22	0.18
20	4	220	0.270	0.30	0.30	19.93	3515	3795	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	220	0.175	0.15	0.15	10.00	7005	4905	0.14	0.11
12	4	220	0.205	0.18	0.18	12.00	5835	4785	0.16	0.14
16	4	220	0.240	0.24	0.24	15.97	4385	4210	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	160	0.155	0.15	0.15	10.00	5095	3160	0.14	0.11
12	4	160	0.185	0.18	0.18	12.00	4245	3140	0.16	0.14
16	4	160	0.210	0.24	0.24	15.97	3190	2680	0.22	0.18
20	4	160	0.240	0.30	0.30	19.93	2555	2455	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	160	0.155	0.15	0.15	10.00	5095	3160	0.14	0.11
12	4	160	0.185	0.18	0.18	12.00	4245	3140	0.16	0.14
16	4	160	0.210	0.24	0.24	15.97	3190	2680	0.22	0.18

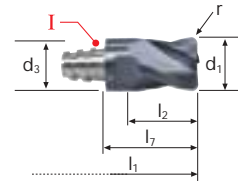
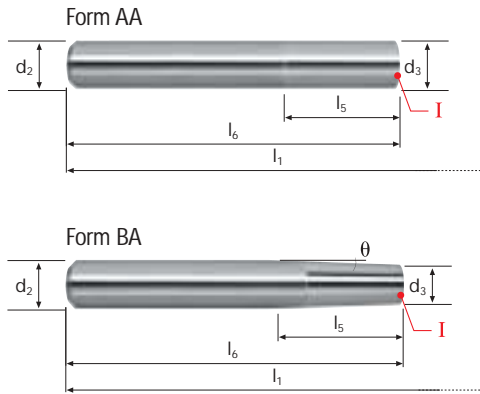


# Corner radius end mills

Tolerance r 0/+0.03

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 30° $\gamma$ 0°



I = Interface

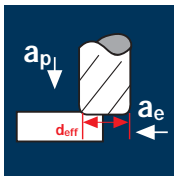
Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A
Order-N°.	d1 e8	d3	l2	l7	r 0/+0.03	z	i	I	
H-10-02-04-05-10	10	9.8	8	18	0.5	4	8	10	●
H-12-02-04-05-12	12	11.8	10	20	0.5	4	10	12	●
H-16-02-04-05-16	16	15.8	14	32	0.5	4	13	16	●
H-20-02-04-05-20	20	19.8	16	36	0.5	4	17	20	●

Carbide shanks, Form AA / BA									
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I	
AA-10-065-000-10	10		83		65		N	10	●
AA-10-080-040-10	10	9.8	98	40	80		M	10	●
AA-10-120-080-10	10	9.8	138	80	120		L	10	●
AA-12-070-000-12	12		90		70		N	12	●
AA-12-085-040-12	12	11.8	105	40	85		M	12	●
AA-12-120-075-12	12	11.8	140	75	120		L	12	●
AA-16-080-032-16	16	15.8	112	32	80		N	16	●
AA-16-110-062-16	16	15.8	142	62	110		M	16	●
AA-20-090-040-20	20	19.8	126	40	90		N	20	●
AA-20-150-100-20	20	19.8	186	100	150		L	20	●
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●

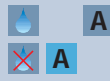
VI

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



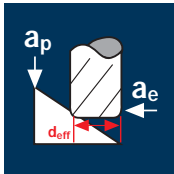
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
Carbide shanks, cylindrical, L-Type: N										
10	4	180	0.105	0.24	3.50	9.30	6160	2585	L-Type: M	L-Type: L
12	4	180	0.125	0.25	4.20	11.32	5060	2530	3.00	1.80
16	4	180	0.145	0.28	5.60	15.39	3725	2160	4.00	2.40
20	4	180	0.160	0.30	7.00	19.43	2950	1890	5.00	3.00
Carbide shanks, conical, L-Type: N										
10	4	180	0.115	0.24	3.50	9.30	6160	2835	L-Type: M	L-Type: L
12	4	180	0.135	0.25	4.20	11.32	5060	2730	3.00	1.80
16	4	180	0.155	0.28	5.60	15.39	3725	2310	4.00	2.40

Carbide shanks, cylindrical, L-Type: N										
10	4	140	0.095	0.24	3.50	9.30	4790	1820	L-Type: M	L-Type: L
12	4	140	0.115	0.25	4.20	11.32	3935	1810	3.00	1.80
16	4	140	0.130	0.28	5.60	15.39	2895	1505	4.00	2.40
20	4	140	0.145	0.30	7.00	19.43	2295	1330	5.00	3.00
Carbide shanks, conical, L-Type: N										
10	4	140	0.105	0.24	3.50	9.30	4790	2010	L-Type: M	L-Type: L
12	4	140	0.120	0.25	4.20	11.32	3935	1890	3.00	1.80
16	4	140	0.140	0.28	5.60	15.39	2895	1620	4.00	2.40

Carbide shanks, cylindrical, L-Type: N										
10	4	110	0.085	0.24	3.50	9.30	3765	1280	L-Type: M	L-Type: L
12	4	110	0.105	0.25	4.20	11.32	3095	1300	3.00	1.80
16	4	110	0.120	0.28	5.60	15.39	2275	1090	4.00	2.40
20	4	110	0.130	0.30	7.00	19.43	1800	935	5.00	3.00
Carbide shanks, conical, L-Type: N										
10	4	110	0.095	0.24	3.50	9.30	3765	1430	L-Type: M	L-Type: L
12	4	110	0.110	0.25	4.20	11.32	3095	1360	3.00	1.80
16	4	110	0.125	0.28	5.60	15.39	2275	1140	4.00	2.40

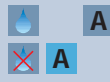
Carbide shanks, cylindrical, L-Type: N										
10	4	70	0.075	0.24	3.50	9.30	2395	720	L-Type: M	L-Type: L
12	4	70	0.090	0.25	4.20	11.32	1970	710	3.00	1.80
16	4	70	0.105	0.28	5.60	15.39	1450	610	4.00	2.40
20	4	70	0.115	0.30	7.00	19.43	1145	525	5.00	3.00
Carbide shanks, conical, L-Type: N										
10	4	70	0.085	0.24	3.50	9.30	2395	815	L-Type: M	L-Type: L
12	4	70	0.095	0.25	4.20	11.32	1970	750	3.00	1.80
16	4	70	0.110	0.28	5.60	15.39	1450	640	4.00	2.40

## Application



## Material

Hardened tool steel  
42 - 48 HRC



Hardened tool steel  
48 - 52 HRC



Hardened tool steel  
52 - 56 HRC



Hardened tool steel  
56 - 60 HRC



d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub>	a <sub>e</sub> / a <sub>p</sub> [mm]
Carbide shanks, cylindrical, L-Type: N										
10	4	360	0.195	0.15	0.15	9.95	11515	8980	0.14	0.11
12	4	360	0.230	0.18	0.18	11.97	9575	8810	0.16	0.14
16	4	360	0.265	0.24	0.24	15.99	7165	7595	0.22	0.18
20	4	360	0.300	0.30	0.30	20.00	5730	6875	0.27	0.23
Carbide shanks, conical, L-Type: N										
10	4	360	0.195	0.15	0.15	9.95	11515	8980	0.14	0.11
12	4	360	0.230	0.18	0.18	11.97	9575	8810	0.16	0.14
16	4	360	0.265	0.24	0.24	15.99	7165	7595	0.22	0.18

Carbide shanks, cylindrical, L-Type: N										
10	4	300	0.185	0.15	0.15	9.95	9595	7100	L-Type: M	L-Type: L
12	4	300	0.220	0.18	0.18	11.97	7980	7020	0.14	0.11
16	4	300	0.250	0.24	0.24	15.99	5970	5970	0.22	0.18
20	4	300	0.285	0.30	0.30	20.00	4775	5445	0.27	0.23
Carbide shanks, conical, L-Type: N										
10	4	300	0.185	0.15	0.15	9.95	9595	7100	L-Type: M	L-Type: L
12	4	300	0.220	0.18	0.18	11.97	7980	7020	0.14	0.11
16	4	300	0.250	0.24	0.24	15.99	5970	5970	0.22	0.18

Carbide shanks, cylindrical, L-Type: N										
10	4	220	0.175	0.15	0.15	9.95	7040	4930	L-Type: M	L-Type: L
12	4	220	0.205	0.18	0.18	11.97	5850	4795	0.14	0.11
16	4	220	0.240	0.24	0.24	15.99	4380	4205	0.22	0.18
20	4	220	0.270	0.30	0.30	20.00	3500	3780	0.27	0.23
Carbide shanks, conical, L-Type: N										
10	4	220	0.175	0.15	0.15	9.95	7040	4930	L-Type: M	L-Type: L
12	4	220	0.205	0.18	0.18	11.97	5850	4795	0.14	0.11
16	4	220	0.240	0.24	0.24	15.99	4380	4205	0.22	0.18

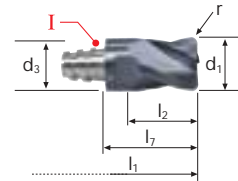
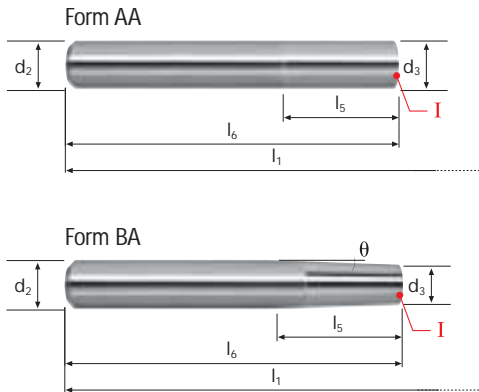
Carbide shanks, cylindrical, L-Type: N										
10	4	160	0.155	0.15	0.15	9.95	5120	3175	L-Type: M	L-Type: L
12	4	160	0.185	0.18	0.18	11.97	4255	3150	0.14	0.11
16	4	160	0.210	0.24	0.24	15.99	3185	2675	0.22	0.18
20	4	160	0.240	0.30	0.30	20.00	2545	2445	0.27	0.23
Carbide shanks, conical, L-Type: N										
10	4	160	0.155	0.15	0.15	9.95	5120	3175	L-Type: M	L-Type: L
12	4	160	0.185	0.18	0.18	11.97	4255	3150	0.14	0.11
16	4	160	0.210	0.24	0.24	15.99	3185	2675	0.22	0.18

# Corner radius end mills

Tolerance r 0/+0.03

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 30° $\gamma$ 0°



I = Interface

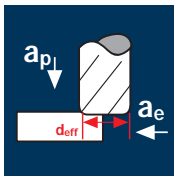
Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A
Order-N°.	d1 e8	d3	l2	l7	r 0/+0.03	z		I	
H-10-02-04-10-10	10	9.8	8	18	1.0	4	8	10	●
H-12-02-04-10-12	12	11.8	10	20	1.0	4	10	12	●
H-16-02-04-10-16	16	15.8	14	32	1.0	4	13	16	●
H-20-02-04-10-20	20	19.8	16	36	1.0	4	17	20	●

Carbide shanks, Form AA / BA									
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I	
AA-10-065-000-10	10		83		65		N	10	●
AA-10-080-040-10	10	9.8	98	40	80		M	10	●
AA-10-120-080-10	10	9.8	138	80	120		L	10	●
AA-12-070-000-12	12		90		70		N	12	●
AA-12-085-040-12	12	11.8	105	40	85		M	12	●
AA-12-120-075-12	12	11.8	140	75	120		L	12	●
AA-16-080-032-16	16	15.8	112	32	80		N	16	●
AA-16-110-062-16	16	15.8	142	62	110		M	16	●
AA-20-090-040-20	20	19.8	126	40	90		N	20	●
AA-20-150-100-20	20	19.8	186	100	150		L	20	●
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●

VI

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

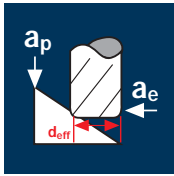
Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	ae [mm]	ae [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	280	0.105	0.24	3.50	9.85	9050	3800	L-Type: M	L-Type: L
12	4	280	0.125	0.25	4.20	11.87	7510	3755	2.50	1.50
16	4	280	0.145	0.28	5.60	15.90	5605	3250	3.00	1.80
20	4	280	0.160	0.30	7.00	19.92	4475	2865	4.00	2.40
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	280	0.115	0.24	3.50	9.85	9050	4165	5.00	3.00
12	4	280	0.135	0.25	4.20	11.87	7510	4055	2.50	1.50
16	4	280	0.155	0.28	5.60	15.90	5605	3475	3.00	1.80
20	4	280	0.170	0.30	7.00	19.92	4475	2865	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	220	0.095	0.24	3.50	9.85	7110	2700	L-Type: M	L-Type: L
12	4	220	0.115	0.25	4.20	11.87	5900	2715	2.50	1.50
16	4	220	0.130	0.28	5.60	15.90	4405	2290	3.00	1.80
20	4	220	0.145	0.30	7.00	19.92	3515	2040	4.00	2.40
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	220	0.105	0.24	3.50	9.85	7110	2985	L-Type: M	L-Type: L
12	4	220	0.120	0.25	4.20	11.87	5900	2830	2.50	1.50
16	4	220	0.140	0.28	5.60	15.90	4405	2465	3.00	1.80
20	4	220	0.155	0.30	7.00	19.92	3515	2040	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	80	0.080	0.24	3.50	9.85	2585	825	L-Type: M	L-Type: L
12	4	80	0.095	0.25	4.20	11.87	2145	815	2.50	1.50
16	4	80	0.110	0.28	5.60	15.90	1600	705	3.00	1.80
20	4	80	0.120	0.30	7.00	19.92	1280	615	4.00	2.40
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	80	0.085	0.24	3.50	9.85	2585	880	L-Type: M	L-Type: L
12	4	80	0.100	0.25	4.20	11.87	2145	860	2.50	1.50
16	4	80	0.115	0.28	5.60	15.90	1600	735	3.00	1.80
20	4	80	0.125	0.30	7.00	19.92	1280	615	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	260	0.105	0.24	3.50	9.85	8400	3530	L-Type: M	L-Type: L
12	4	260	0.125	0.25	4.20	11.87	6970	3485	2.50	1.50
16	4	260	0.145	0.28	5.60	15.90	5205	3020	3.00	1.80
20	4	260	0.160	0.30	7.00	19.92	4155	2660	4.00	2.40
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	260	0.115	0.24	3.50	9.85	8400	3865	L-Type: M	L-Type: L
12	4	260	0.135	0.25	4.20	11.87	6970	3765	2.50	1.50
16	4	260	0.155	0.28	5.60	15.90	5205	3225	3.00	1.80
20	4	260	0.170	0.30	7.00	19.92	4155	2660	4.00	2.40

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Cast iron  
(lamellar / spheroidal)

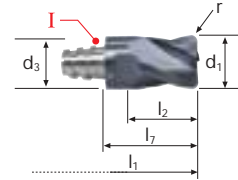
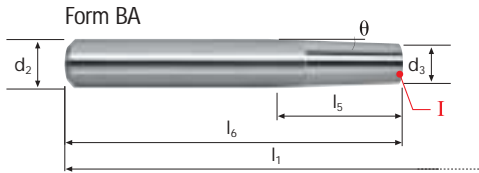
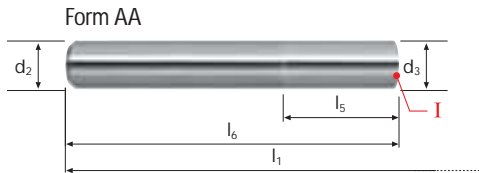
d1 [mm]	z	vc [m/min]	fz [mm]	ap [mm]	ae [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	vf [mm/min]	ae / ap	ae / ap
$\beta = 45^\circ$										
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	420	0.155	0.15	0.15	10.00	13370	8290	L-Type: M	L-Type: L
12	4	420	0.185	0.18	0.18	12.00	11140	8245	0.14	0.11
16	4	420	0.210	0.24	0.24	15.97	8370	7030	0.16	0.14
20	4	420	0.240	0.30	0.30	19.93	6710	6440	0.22	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	420	0.155	0.15	0.15	10.00	13370	8290	L-Type: M	L-Type: L
12	4	420	0.185	0.18	0.18	12.00	11140	8245	0.14	0.11
16	4	420	0.210	0.24	0.24	15.97	8370	7030	0.16	0.14
20	4	420	0.240	0.30	0.30	19.93	6710	6440	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	350	0.145	0.15	0.15	10.00	11140	6460	L-Type: M	L-Type: L
12	4	350	0.175	0.18	0.18	12.00	9285	6500	0.14	0.11
16	4	350	0.200	0.24	0.24	15.97	6975	5580	0.16	0.14
20	4	350	0.230	0.30	0.30	19.93	5590	5145	0.22	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	350	0.145	0.15	0.15	10.00	11140	6460	L-Type: M	L-Type: L
12	4	350	0.175	0.18	0.18	12.00	9285	6500	0.14	0.11
16	4	350	0.200	0.24	0.24	15.97	6975	5580	0.16	0.14
20	4	350	0.230	0.30	0.30	19.93	5590	5145	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	220	0.115	0.15	0.15	10.00	7005	3220	L-Type: M	L-Type: L
12	4	220	0.140	0.18	0.18	12.00	5835	3270	0.14	0.11
16	4	220	0.160	0.24	0.24	15.97	4385	2805	0.16	0.14
20	4	220	0.180	0.30	0.30	19.93	3515	2530	0.22	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	220	0.115	0.15	0.15	10.00	7005	3220	L-Type: M	L-Type: L
12	4	220	0.140	0.18	0.18	12.00	5835	3270	0.14	0.11
16	4	220	0.160	0.24	0.24	15.97	4385	2805	0.16	0.14
20	4	220	0.180	0.30	0.30	19.93	3515	2530	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	400	0.155	0.15	0.15	10.00	12730	7895	L-Type: M	L-Type: L
12	4	400	0.185	0.18	0.18	12.00	10610	7850	0.14	0.11
16	4	400	0.210	0.24	0.24	15.97	7975	6700	0.16	0.14
20	4	400	0.240	0.30	0.30	19.93	6390	6135	0.22	0.18
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	400	0.155	0.15	0.15	10.00	12730	7895	L-Type: M	L-Type: L
12	4	400	0.185	0.18	0.18	12.00	10610	7850	0.14	0.11
16	4	400	0.210	0.24	0.24	15.97	7975	6700	0.16	0.14
20	4	400	0.240	0.30	0.30	19.93	6390	6135	0.22	0.18

# Corner radius end mills

Tolerance r 0/+0.03

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 30° $\gamma$ 9°



I = Interface

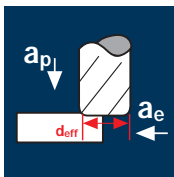
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	r 0/+0.03	z		I		
N-10-02-04-05-10	10	9.8	8	18	0.5	4	8	10	●	
N-12-02-04-05-12	12	11.8	10	20	0.5	4	10	12	●	
N-16-02-04-05-16	16	15.8	14	32	0.5	4	13	16	●	
N-20-02-04-05-20	20	19.8	16	36	0.5	4	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

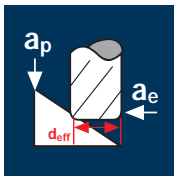
Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	280	0.105	0.24	3.50	9.30	9585	4025	L-Type: M 2.50	L-Type: L 1.50
12	4	280	0.125	0.25	4.20	11.32	7875	3940	3.00	1.80
16	4	280	0.145	0.28	5.60	15.39	5790	3360	4.00	2.40
20	4	280	0.160	0.30	7.00	19.43	4585	2935	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	280	0.115	0.24	3.50	9.30	9585	4410	L-Type: M 2.50	L-Type: L 1.50
12	4	280	0.135	0.25	4.20	11.32	7875	4255	3.00	1.80
16	4	280	0.155	0.28	5.60	15.39	5790	3590	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	220	0.095	0.24	3.50	9.30	7530	2860	L-Type: M 2.50	L-Type: L 1.50
12	4	220	0.115	0.25	4.20	11.32	6185	2845	3.00	1.80
16	4	220	0.130	0.28	5.60	15.39	4550	2365	4.00	2.40
20	4	220	0.145	0.30	7.00	19.43	3605	2090	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	220	0.105	0.24	3.50	9.30	7530	3165	L-Type: M 2.50	L-Type: L 1.50
12	4	220	0.120	0.25	4.20	11.32	6185	2970	3.00	1.80
16	4	220	0.140	0.28	5.60	15.39	4550	2550	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	80	0.080	0.24	3.50	9.30	2740	875	L-Type: M 2.50	L-Type: L 1.50
12	4	80	0.095	0.25	4.20	11.32	2250	855	3.00	1.80
16	4	80	0.110	0.28	5.60	15.39	1655	730	4.00	2.40
20	4	80	0.120	0.30	7.00	19.43	1310	630	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	80	0.085	0.24	3.50	9.30	2740	930	L-Type: M 2.50	L-Type: L 1.50
12	4	80	0.100	0.25	4.20	11.32	2250	900	3.00	1.80
16	4	80	0.115	0.28	5.60	15.39	1655	760	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	260	0.105	0.24	3.50	9.30	8900	3740	L-Type: M 2.50	L-Type: L 1.50
12	4	260	0.125	0.25	4.20	11.32	7310	3655	3.00	1.80
16	4	260	0.145	0.28	5.60	15.39	5380	3120	4.00	2.40
20	4	260	0.160	0.30	7.00	19.43	4260	2725	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	260	0.115	0.24	3.50	9.30	8900	4095	L-Type: M 2.50	L-Type: L 1.50
12	4	260	0.135	0.25	4.20	11.32	7310	3945	3.00	1.80
16	4	260	0.155	0.28	5.60	15.39	5380	3335	4.00	2.40

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

Steel  
850 - 1100 N/mm<sup>2</sup>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

Cast iron  
(lamellar / spheroidal)

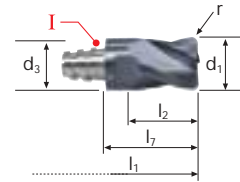
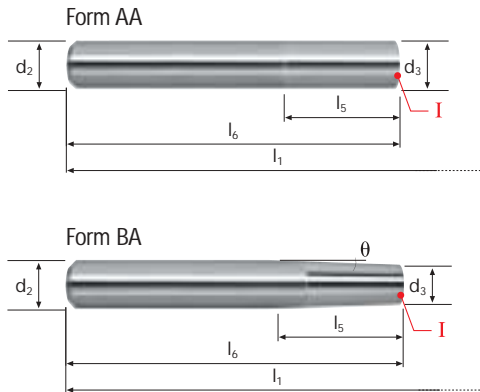
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub>	a <sub>e</sub> / a <sub>p</sub>
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	420	0.155	0.15	0.15	9.95	13435	8330	0.14	0.11
12	4	420	0.185	0.18	0.18	11.97	11170	8265	0.16	0.14
16	4	420	0.210	0.24	0.24	15.99	8360	7020	0.22	0.18
20	4	420	0.240	0.30	0.30	20.00	6685	6420	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	420	0.155	0.15	0.15	9.95	13435	8330	0.14	0.11
12	4	420	0.185	0.18	0.18	11.97	11170	8265	0.16	0.14
16	4	420	0.210	0.24	0.24	15.99	8360	7020	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	350	0.145	0.15	0.15	9.95	11195	6495	L-Type: M 0.14	L-Type: L 0.11
12	4	350	0.175	0.18	0.18	11.97	9305	6515	0.16	0.14
16	4	350	0.200	0.24	0.24	15.99	6965	5570	0.22	0.18
20	4	350	0.230	0.30	0.30	20.00	5570	5125	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	350	0.145	0.15	0.15	9.95	11195	6495	L-Type: M 0.14	L-Type: L 0.11
12	4	350	0.175	0.18	0.18	11.97	9305	6515	0.16	0.14
16	4	350	0.200	0.24	0.24	15.99	6965	5570	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	220	0.115	0.15	0.15	9.95	7040	3240	L-Type: M 0.14	L-Type: L 0.11
12	4	220	0.140	0.18	0.18	11.97	5850	3275	0.16	0.14
16	4	220	0.160	0.24	0.24	15.99	4380	2805	0.22	0.18
20	4	220	0.180	0.30	0.30	20.00	3500	2520	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	220	0.115	0.15	0.15	9.95	7040	3240	L-Type: M 0.14	L-Type: L 0.11
12	4	220	0.140	0.18	0.18	11.97	5850	3275	0.16	0.14
16	4	220	0.160	0.24	0.24	15.99	4380	2805	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	400	0.155	0.15	0.15	9.95	12795	7935	L-Type: M 0.14	L-Type: L 0.11
12	4	400	0.185	0.18	0.18	11.97	10635	7870	0.16	0.14
16	4	400	0.210	0.24	0.24	15.99	7965	6690	0.22	0.18
20	4	400	0.240	0.30	0.30	20.00	6365	6110	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	400	0.155	0.15	0.15	9.95	12795	7935	L-Type: M 0.14	L-Type: L 0.11
12	4	400	0.185	0.18	0.18	11.97	10635	7870	0.16	0.14
16	4	400	0.210	0.24	0.24	15.99	7965	6690	0.22	0.18

# Corner radius end mills

Tolerance r 0/+0.03

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 30° $\gamma$ 9°



I = Interface

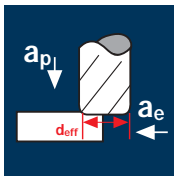
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	r 0/+0.03	z		I		
N-10-02-04-10-10	10	9.8	8	18	1.0	4	8	10	●	
N-12-02-04-10-12	12	11.8	10	20	1.0	4	10	12	●	
N-16-02-04-10-16	16	15.8	14	32	1.0	4	13	16	●	
N-20-02-04-10-20	20	19.8	16	36	1.0	4	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**  
 **A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**  
 **A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

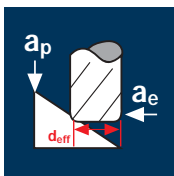
**A**  
 **A**

Cast iron  
(lamellar / spheroidal)

**A**  
 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	280	0.105	0.24	3.50	8.63	10330	4340	L-Type: M 2.50	L-Type: L 1.50
12	4	280	0.125	0.25	4.20	10.66	8360	4180	3.00	1.80
16	4	280	0.145	0.28	5.60	14.75	6040	3505	4.00	2.40
20	4	280	0.160	0.30	7.00	18.80	4740	3035	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	280	0.115	0.24	3.50	8.63	10330	4750	L-Type: M 2.50	L-Type: L 1.50
12	4	280	0.135	0.25	4.20	10.66	8360	4515	3.00	1.80
16	4	280	0.155	0.28	5.60	14.75	6040	3745	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	220	0.095	0.24	3.50	8.63	8115	3085	L-Type: M 2.50	L-Type: L 1.50
12	4	220	0.115	0.25	4.20	10.66	6570	3020	3.00	1.80
16	4	220	0.130	0.28	5.60	14.75	4750	2470	4.00	2.40
20	4	220	0.145	0.30	7.00	18.80	3725	2160	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	220	0.105	0.24	3.50	8.63	8115	3410	L-Type: M 2.50	L-Type: L 1.50
12	4	220	0.120	0.25	4.20	10.66	6570	3155	3.00	1.80
16	4	220	0.140	0.28	5.60	14.75	4750	2660	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	80	0.080	0.24	3.50	8.63	2950	945	L-Type: M 2.50	L-Type: L 1.50
12	4	80	0.095	0.25	4.20	10.66	2390	910	3.00	1.80
16	4	80	0.110	0.28	5.60	14.75	1725	760	4.00	2.40
20	4	80	0.120	0.30	7.00	18.80	1355	650	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	80	0.085	0.24	3.50	8.63	2950	1005	L-Type: M 2.50	L-Type: L 1.50
12	4	80	0.100	0.25	4.20	10.66	2390	955	3.00	1.80
16	4	80	0.115	0.28	5.60	14.75	1725	795	4.00	2.40
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	260	0.105	0.24	3.50	8.63	9590	4030	L-Type: M 2.50	L-Type: L 1.50
12	4	260	0.125	0.25	4.20	10.66	7765	3885	3.00	1.80
16	4	260	0.145	0.28	5.60	14.75	5610	3255	4.00	2.40
20	4	260	0.160	0.30	7.00	18.80	4400	2815	5.00	3.00
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	260	0.115	0.24	3.50	8.63	9590	4410	L-Type: M 2.50	L-Type: L 1.50
12	4	260	0.135	0.25	4.20	10.66	7765	4195	3.00	1.80
16	4	260	0.155	0.28	5.60	14.75	5610	3480	4.00	2.40

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**  
 **A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**  
 **A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**A**  
 **A**

Cast iron  
(lamellar / spheroidal)

**A**  
 **A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	d <sub>eff</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub>	a <sub>e</sub> / a <sub>p</sub>
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	420	0.155	0.15	0.15	9.83	13600	8430	0.14	0.11
12	4	420	0.185	0.18	0.18	11.87	11265	8335	0.16	0.14
16	4	420	0.210	0.24	0.24	15.93	8390	7050	0.22	0.18
20	4	420	0.240	0.30	0.30	19.97	6695	6425	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	420	0.155	0.15	0.15	9.83	13600	8430	0.14	0.11
12	4	420	0.185	0.18	0.18	11.87	11265	8335	0.16	0.14
16	4	420	0.210	0.24	0.24	15.93	8390	7050	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	350	0.145	0.15	0.15	9.83	11335	6575	L-Type: M 0.14	L-Type: L 0.11
12	4	350	0.175	0.18	0.18	11.87	9385	6570	0.16	0.14
16	4	350	0.200	0.24	0.24	15.93	6995	5595	0.22	0.18
20	4	350	0.230	0.30	0.30	19.97	5580	5135	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	350	0.145	0.15	0.15	9.83	11335	6575	L-Type: M 0.14	L-Type: L 0.11
12	4	350	0.175	0.18	0.18	11.87	9385	6570	0.16	0.14
16	4	350	0.200	0.24	0.24	15.93	6995	5595	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	220	0.115	0.15	0.15	9.83	7125	3280	L-Type: M 0.14	L-Type: L 0.11
12	4	220	0.140	0.18	0.18	11.87	5900	3305	0.16	0.14
16	4	220	0.160	0.24	0.24	15.93	4395	2815	0.22	0.18
20	4	220	0.180	0.30	0.30	19.97	3505	2525	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	220	0.115	0.15	0.15	9.83	7125	3280	L-Type: M 0.14	L-Type: L 0.11
12	4	220	0.140	0.18	0.18	11.87	5900	3305	0.16	0.14
16	4	220	0.160	0.24	0.24	15.93	4395	2815	0.22	0.18
<b>Carbide shanks, cylindrical, L-Type: N</b>										
10	4	400	0.155	0.15	0.15	9.83	12955	8030	L-Type: M 0.14	L-Type: L 0.11
12	4	400	0.185	0.18	0.18	11.87	10725	7935	0.16	0.14
16	4	400	0.210	0.24	0.24	15.93	7995	6715	0.22	0.18
20	4	400	0.240	0.30	0.30	19.97	6375	6120	0.27	0.23
<b>Carbide shanks, conical, L-Type: N</b>										
10	4	400	0.155	0.15	0.15	9.83	12955	8030	L-Type: M 0.14	L-Type: L 0.11
12	4	400	0.185	0.18	0.18	11.87	10725	7935	0.16	0.14
16	4	400	0.210	0.24	0.24	15.93	7995	6715	0.22	0.18

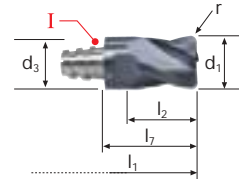
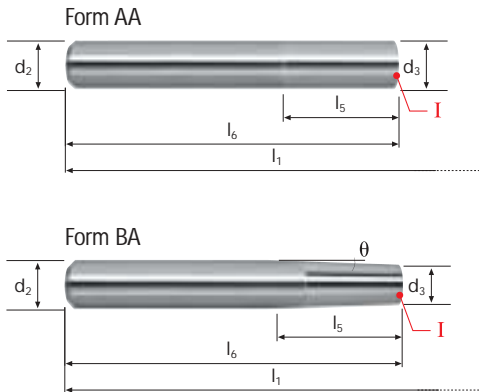


# Corner radius end mills

Tolerance r 0/+0.03

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 30° $\gamma$ 9°



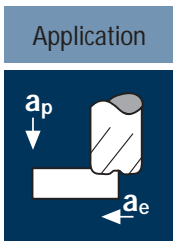
I = Interface

Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500				Inox Stainless	Ti Titanium	GG(G)
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	l2	l7	r 0/+0.03	z		I		
N-10-02-04-15-10	10	9.8	8	18	1.5	4	8	10	●	
N-12-02-04-15-12	12	11.8	10	20	1.5	4	10	12	●	
N-16-02-04-15-16	16	15.8	14	32	1.5	4	13	16	●	
N-20-02-04-15-20	20	19.8	16	36	1.5	4	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI



Material

Steel  
850 - 1100 N/mm<sup>2</sup>

Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

Material

Steel  
1300 - 1500 N/mm<sup>2</sup>

Material

Hardened tool steel  
48 - 52 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	250	0.665	0.32	6.00	7960	21175	L-Type: M 4.00	L-Type: L 2.00
12	4	250	0.800	0.40	7.20	6630	21215	4.80	2.40
16	4	250	1.065	0.48	9.60	4975	21195	6.40	3.20
20	4	250	1.110	0.56	12.00	3980	17670	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	250	0.665	0.32	6.00	7960	21175	L-Type: M 4.00	L-Type: L 2.00
12	4	250	0.800	0.40	7.20	6630	21215	4.80	2.40
16	4	250	1.065	0.48	9.60	4975	21195	6.40	3.20

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	220	0.565	0.32	6.00	7005	15830	L-Type: M 4.00	L-Type: L 2.00
12	4	220	0.680	0.40	7.20	5835	15870	4.80	2.40
16	4	220	0.905	0.48	9.60	4375	15840	6.40	3.20
20	4	220	0.945	0.56	12.00	3500	13230	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	220	0.565	0.32	6.00	7005	15830	L-Type: M 4.00	L-Type: L 2.00
12	4	220	0.680	0.40	7.20	5835	15870	4.80	2.40
16	4	220	0.905	0.48	9.60	4375	15840	6.40	3.20

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	200	0.520	0.29	6.00	6365	13240	L-Type: M 4.00	L-Type: L 2.00
12	4	200	0.625	0.36	7.20	5305	13265	4.80	2.40
16	4	200	0.830	0.43	9.60	3980	13215	6.40	3.20
20	4	200	0.865	0.50	12.00	3185	11020	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	200	0.520	0.29	6.00	6365	13240	L-Type: M 4.00	L-Type: L 2.00
12	4	200	0.625	0.36	7.20	5305	13265	4.80	2.40
16	4	200	0.830	0.43	9.60	3980	13215	6.40	3.20

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	180	0.400	0.26	6.00	5730	9170	L-Type: M 4.00	L-Type: L 2.00
12	4	180	0.480	0.32	7.20	4775	9170	4.80	2.40
16	4	180	0.640	0.38	9.60	3580	9165	6.40	3.20
20	4	180	0.665	0.45	12.00	2865	7620	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	180	0.400	0.26	6.00	5730	9170	L-Type: M 4.00	L-Type: L 2.00
12	4	180	0.480	0.32	7.20	4775	9170	4.80	2.40
16	4	180	0.640	0.38	9.60	3580	9165	6.40	3.20

Material

Hardened tool steel  
52 - 56 HRC

Material

Hardened tool steel  
56 - 60 HRC

Material

Hardened tool steel  
> 60 HRC

Material

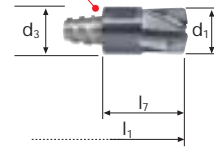
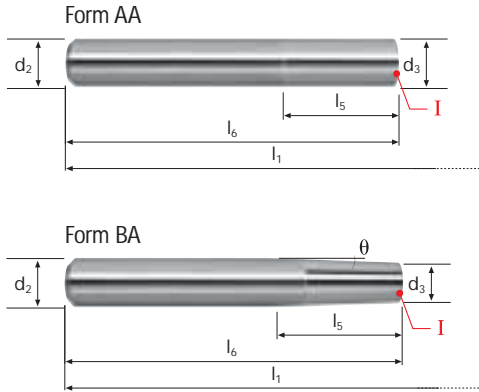
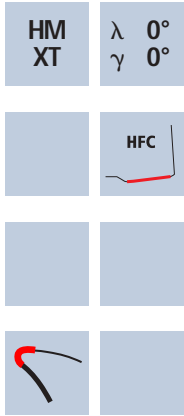
Cast iron  
(lamellar / spheroidal)

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	160	0.300	0.22	6.00	5095	6115	L-Type: M 4.00	L-Type: L 2.00
12	4	160	0.360	0.28	7.20	4245	6115	4.80	2.40
16	4	160	0.480	0.34	9.60	3185	6115	6.40	3.20
20	4	160	0.500	0.39	12.00	2545	5090	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	160	0.300	0.22	6.00	5095	6115	L-Type: M 4.00	L-Type: L 2.00
12	4	160	0.360	0.28	7.20	4245	6115	4.80	2.40
16	4	160	0.480	0.34	9.60	3185	6115	6.40	3.20

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	140	0.185	0.21	6.00	4455	3295	L-Type: M 4.00	L-Type: L 2.00
12	4	140	0.225	0.26	7.20	3715	3345	4.80	2.40
16	4	140	0.300	0.31	9.60	2785	3340	6.40	3.20
20	4	140	0.310	0.36	12.00	2230	2765	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	140	0.185	0.21	6.00	4455	3295	L-Type: M 4.00	L-Type: L 2.00
12	4	140	0.225	0.26	7.20	3715	3345	4.80	2.40
16	4	140	0.300	0.31	9.60	2785	3340	6.40	3.20

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	80	0.145	0.19	6.00	2545	1475	L-Type: M 4.00	L-Type: L 2.00
12	4	80	0.175	0.24	7.20	2120	1485	4.80	2.40
16	4	80	0.235	0.29	9.60	1590	1495	6.40	3.20
20	4	80	0.245	0.34	12.00	1275	1250	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	80	0.145	0.19	6.00	2545	1475	L-Type: M 4.00	L-Type: L 2.00
12	4	80	0.175	0.24	7.20	2120	1485	4.80	2.40
16	4	80	0.235	0.29	9.60	1590	1495	6.40	3.20

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	250	0.665	0.32	6.00	7960	21175	L-Type: M 4.00	L-Type: L 2.00
12	4	250	0.800	0.40	7.20	6630	21215	4.80	2.40
16	4	250	1.065	0.48	9.60	4975	21195	6.40	3.20
20	4	250	1.110	0.56	12.00	3980	17670	8.00	4.00
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	250	0.665	0.32	6.00	7960	21175	L-Type: M 4.00	L-Type: L 2.00
12	4	250	0.800	0.40	7.20	6630	21215	4.80	2.40
16	4	250	1.065	0.48	9.60	4975	21195	6.40	3.20



I = Interface

Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60		Ti Titanium	HSS GG(G)
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Milling heads									X-AI	
Order-N°.	d1 0/-0.025	d3	l7	ap <sub>max.</sub>	R <sub>theo.</sub>	z	i	I		
X-10-300-04-09-10	10	9.8	18	0.41	0.90	4	8	10	●	
X-12-300-04-11-12	12	11.8	20	0.50	1.08	4	10	12	●	
X-16-300-04-15-16	16	15.8	32	0.69	1.44	4	13	16	●	
X-20-300-04-18-20	20	19.8	36	0.82	1.80	4	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	θ	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	



# NovoSys X® special forms

## Chamfering

N° NX-12-04-04-90-10



HM  
UT

Rm  
<850-1100

647

N° NF-10-04-04-90-10



HM  
UT

Rm  
<850-1100

649

N° NF-10-04-02-90-10



HM  
UT

Rm  
<850-1100

651

## Drilling

N° NA-10-04-02-60-10

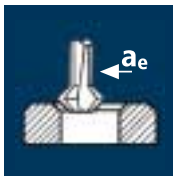


HM  
UT

Rm  
<850-1100

653

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**

**A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**

**A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**A**

**A**

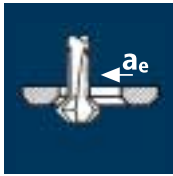
Cast iron  
(lamellar / spheroidal)

**A**

**A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	150	0.035	0.4	3980	555	L-Type: M 0.30	L-Type: L 0.20
16	6	150	0.045	0.5	2985	805	0.40	0.30
20	6	150	0.055	0.8	2385	785	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	150	0.040	0.4	3980	635	L-Type: M 0.30	L-Type: L 0.20
16	6	150	0.050	0.5	2985	895	0.40	0.30
20	6	150	0.060	0.8	2385	860	0.60	0.40
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	120	0.035	0.4	3185	445	L-Type: M 0.30	L-Type: L 0.20
16	6	120	0.045	0.5	2385	645	0.40	0.30
20	6	120	0.055	0.8	1910	630	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	120	0.040	0.4	3185	510	L-Type: M 0.30	L-Type: L 0.20
16	6	120	0.050	0.5	2385	715	0.40	0.30
20	6	120	0.060	0.8	1910	690	0.60	0.40
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	60	0.030	0.4	1590	190	L-Type: M 0.30	L-Type: L 0.20
16	6	60	0.040	0.5	1195	285	0.40	0.30
20	6	60	0.050	0.8	955	285	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	60	0.035	0.4	1590	225	L-Type: M 0.30	L-Type: L 0.20
16	6	60	0.045	0.5	1195	325	0.40	0.30
20	6	60	0.055	0.8	955	315	0.60	0.40
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	180	0.035	0.4	4775	670	L-Type: M 0.30	L-Type: L 0.20
16	6	180	0.045	0.5	3580	965	0.40	0.30
20	6	180	0.055	0.8	2865	945	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	180	0.040	0.4	4775	765	L-Type: M 0.30	L-Type: L 0.20
16	6	180	0.050	0.5	3580	1075	0.40	0.30
20	6	180	0.060	0.8	2865	1030	0.60	0.40

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**

**A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**

**A**

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

**A**

**A**

Cast iron  
(lamellar / spheroidal)

**A**

**A**

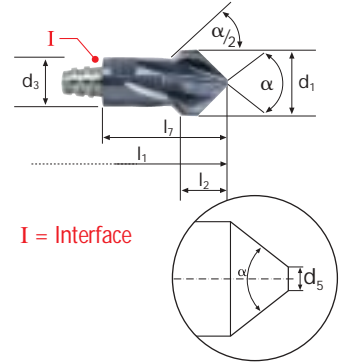
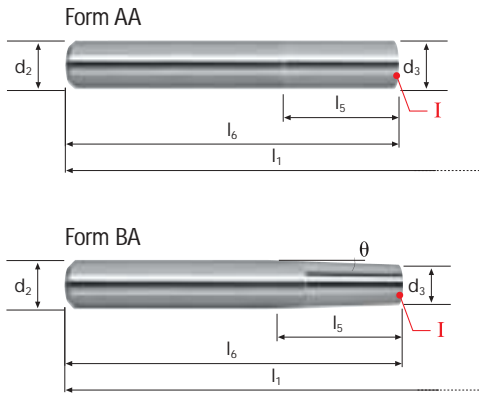
d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> [mm]	a <sub>e</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	150	0.035	0.4	3980	555	L-Type: M 0.30	L-Type: L 0.20
16	6	150	0.045	0.5	2985	805	0.40	0.30
20	6	150	0.055	0.8	2385	785	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	150	0.040	0.4	3980	635	L-Type: M 0.30	L-Type: L 0.20
16	6	150	0.050	0.5	2985	895	0.40	0.30
20	6	150	0.060	0.8	2385	860	0.60	0.40
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	120	0.035	0.4	3185	445	L-Type: M 0.30	L-Type: L 0.20
16	6	120	0.045	0.5	2385	645	0.40	0.30
20	6	120	0.055	0.8	1910	630	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	120	0.040	0.4	3185	510	L-Type: M 0.30	L-Type: L 0.20
16	6	120	0.050	0.5	2385	715	0.40	0.30
20	6	120	0.060	0.8	1910	690	0.60	0.40
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	60	0.030	0.4	1590	190	L-Type: M 0.30	L-Type: L 0.20
16	6	60	0.040	0.5	1195	285	0.40	0.30
20	6	60	0.050	0.8	955	285	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	60	0.035	0.4	1590	225	L-Type: M 0.30	L-Type: L 0.20
16	6	60	0.045	0.5	1195	325	0.40	0.30
20	6	60	0.055	0.8	955	315	0.60	0.40
<b>Carbide shanks, cylindrical, L-Type: N</b>								
12	4	160	0.035	0.4	4245	595	L-Type: M 0.30	L-Type: L 0.20
16	6	160	0.045	0.5	3185	860	0.40	0.30
20	6	160	0.055	0.8	2545	840	0.60	0.40
<b>Carbide shanks, conical, L-Type: N</b>								
12	4	160	0.040	0.4	4245	680	L-Type: M 0.30	L-Type: L 0.20
16	6	160	0.050	0.5	3185	955	0.40	0.30
20	6	160	0.060	0.8	2545	915	0.60	0.40

# Forward and reverse deburring end mills

45° - Chamfer

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 10° $\gamma$ 8°



I = Interface

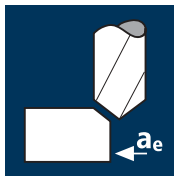
Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Milling heads										POLYCUT-A	
Order-N°.	d1 e8	d3	d5	l2	l7	$\alpha$ 0°/-1°	z	i	I		
NX-12-04-04-90-10	12	9.8	1.0	9.50	19.75	90°	4	8	10	●	
NX-16-04-06-90-12	16	11.8	1.5	11.25	29.50	90°	6	10	12	●	
NX-20-04-06-90-16	20	15.8	1.5	13.25	33.50	90°	6	13	16	●	

Carbide shanks, Form AA / BA											
Order-N°.	d2 h6	d3	l1	l5	l6	$\theta$	L-Type	I			
AA-10-065-000-10	10		84.75		65		N	10	●		
AA-10-080-040-10	10	9.8	99.75	40	80		M	10	●		
AA-10-120-080-10	10	9.8	139.75	80	120		L	10	●		
AA-12-070-000-12	12		99.50		70		N	12	●		
AA-12-085-040-12	12	11.8	114.50	40	85		M	12	●		
AA-12-120-075-12	12	11.8	149.50	75	120		L	12	●		
AA-16-080-032-16	16	15.8	113.50	32	80		N	16	●		
AA-16-110-062-16	16	15.8	143.50	62	110		M	16	●		
BA-12-080-032-10	12	9.8	99.75	32	80	2.0°	M	10	●		
BA-12-120-042-10	12	9.8	139.75	42	120	1.5°	L	10	●		
BA-16-120-060-12	16	11.8	149.50	60	120	2.0°	M	12	●		
BA-16-140-080-12	16	11.8	169.50	80	140	1.5°	L	12	●		
BA-20-120-062-16	20	15.8	153.50	62	120	2.0°	M	16	●		
BA-20-160-080-16	20	15.8	193.50	80	160	1.5°	L	16	●		

VI

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

**A**

**A**

Steel  
850 - 1100 N/mm<sup>2</sup>

**A**

**A**

Steel  
1100 - 1300 N/mm<sup>2</sup>

**A**

**A**

Stainless steel  
[Cr-Ni/1.4301]

**A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	150	0.030	0.3	0.3	4775	575	L-Type: M 0.25	L-Type: L 0.20
12	4	150	0.040	0.4	0.4	3980	635	0.30	0.25
16	6	150	0.050	0.5	0.5	2985	895	0.40	0.30
20	6	150	0.060	0.8	0.8	2385	860	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	150	0.035	0.3	0.3	4775	670	L-Type: M 0.25	L-Type: L 0.20
12	4	150	0.045	0.4	0.4	3980	715	0.30	0.25
16	6	150	0.055	0.5	0.5	2985	985	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	120	0.030	0.3	0.3	3820	460	L-Type: M 0.25	L-Type: L 0.20
12	4	120	0.040	0.4	0.4	3185	510	0.30	0.25
16	6	120	0.050	0.5	0.5	2385	715	0.40	0.30
20	6	120	0.060	0.8	0.8	1910	690	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	120	0.035	0.3	0.3	3820	535	L-Type: M 0.25	L-Type: L 0.20
12	4	120	0.045	0.4	0.4	3185	575	0.30	0.25
16	6	120	0.055	0.5	0.5	2385	785	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	70	0.030	0.3	0.3	2230	270	L-Type: M 0.25	L-Type: L 0.20
12	4	70	0.040	0.4	0.4	1855	295	0.30	0.25
16	6	70	0.050	0.5	0.5	1395	420	0.40	0.30
20	6	70	0.060	0.8	0.8	1115	400	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	70	0.035	0.3	0.3	2230	310	L-Type: M 0.25	L-Type: L 0.20
12	4	70	0.045	0.4	0.4	1855	335	0.30	0.25
16	6	70	0.055	0.5	0.5	1395	460	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	60	0.030	0.3	0.3	1910	230	L-Type: M 0.25	L-Type: L 0.20
12	4	60	0.040	0.4	0.4	1590	255	0.30	0.25
16	6	60	0.050	0.5	0.5	1195	360	0.40	0.30
20	6	60	0.060	0.8	0.8	955	345	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	60	0.035	0.3	0.3	1910	265	L-Type: M 0.25	L-Type: L 0.20
12	4	60	0.045	0.4	0.4	1590	285	0.30	0.25
16	6	60	0.055	0.5	0.5	1195	395	0.40	0.30

## Material

Cast iron  
(lamellar / spheroidal)

**A**

**A**

Unalloyed copper

**A**

Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]

**A**

Wrought aluminium  
alloys Si < 6%

**A**

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	160	0.030	0.3	0.3	5095	610	L-Type: M 0.25	L-Type: L 0.20
12	4	160	0.040	0.4	0.4	4245	680	0.30	0.25
16	6	160	0.050	0.5	0.5	3185	955	0.40	0.30
20	6	160	0.060	0.8	0.8	2545	915	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	160	0.035	0.3	0.3	5095	715	L-Type: M 0.25	L-Type: L 0.20
12	4	160	0.045	0.4	0.4	4245	765	0.30	0.25
16	6	160	0.055	0.5	0.5	3185	1050	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	180	0.030	0.3	0.3	5730	690	L-Type: M 0.25	L-Type: L 0.20
12	4	180	0.040	0.4	0.4	4775	765	0.30	0.25
16	6	180	0.050	0.5	0.5	3580	1075	0.40	0.30
20	6	180	0.060	0.8	0.8	2865	1030	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	180	0.035	0.3	0.3	5730	800	L-Type: M 0.25	L-Type: L 0.20
12	4	180	0.045	0.4	0.4	4775	860	0.30	0.25
16	6	180	0.055	0.5	0.5	3580	1180	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	70	0.030	0.3	0.3	2230	270	L-Type: M 0.25	L-Type: L 0.20
12	4	70	0.040	0.4	0.4	1855	295	0.30	0.25
16	6	70	0.050	0.5	0.5	1395	420	0.40	0.30
20	6	70	0.060	0.8	0.8	1115	400	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	70	0.035	0.3	0.3	2230	310	L-Type: M 0.25	L-Type: L 0.20
12	4	70	0.045	0.4	0.4	1855	335	0.30	0.25
16	6	70	0.055	0.5	0.5	1395	460	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	4	200	0.030	0.3	0.3	6365	765	L-Type: M 0.25	L-Type: L 0.20
12	4	200	0.040	0.4	0.4	5305	850	0.30	0.25
16	6	200	0.050	0.5	0.5	3980	1195	0.40	0.30
20	6	200	0.060	0.8	0.8	3185	1145	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	4	200	0.035	0.3	0.3	6365	890	L-Type: M 0.25	L-Type: L 0.20
12	4	200	0.045	0.4	0.4	5305	955	0.30	0.25
16	6	200	0.055	0.5	0.5	3980	1315	0.40	0.30

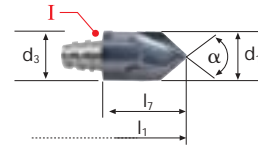
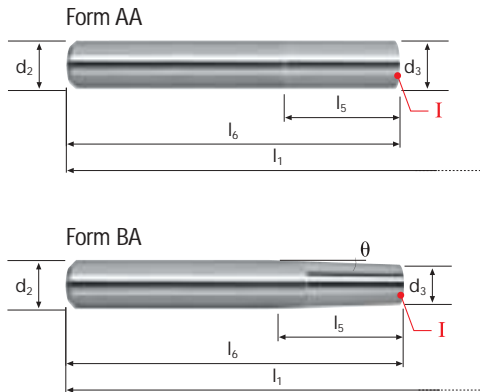


# Deburring end mills

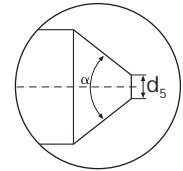
45° - Chamfer

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 10° $\gamma$ 8°



I = Interface



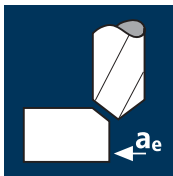
Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	d5	l7	$\alpha$ 0°/-1°	z	i	I		
NF-10-04-04-90-10	10	9.8	1.0	18	90°	4	8	10	●	
NF-12-04-04-90-12	12	11.8	1.0	20	90°	4	10	12	●	
NF-16-04-06-90-16	16	15.8	1.5	32	90°	6	13	16	●	
NF-20-04-06-90-20	20	19.8	1.5	36	90°	6	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	$\theta$	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

	<b>A</b>
	<b>A</b>

Steel  
850 - 1100 N/mm<sup>2</sup>

	<b>A</b>
	<b>A</b>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

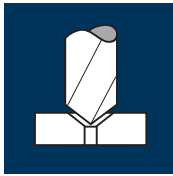
	<b>A</b>
	<b>A</b>

Cast iron  
(lamellar / spheroidal)

	<b>A</b>
	<b>A</b>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	a <sub>e</sub> / a <sub>p</sub> [mm]	a <sub>e</sub> / a <sub>p</sub> [mm]
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	2	150	0.030	0.3	0.3	4775	285	L-Type: M 0.25	L-Type: L 0.20
12	2	150	0.040	0.4	0.4	3980	320	0.30	0.25
16	2	150	0.050	0.5	0.5	2985	300	0.40	0.30
20	2	150	0.060	0.8	0.8	2385	285	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	2	150	0.035	0.3	0.3	4775	335	0.25	0.20
12	2	150	0.045	0.4	0.4	3980	360	0.30	0.25
16	2	150	0.055	0.5	0.5	2985	330	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	2	120	0.030	0.3	0.3	3820	230	0.25	0.20
12	2	120	0.040	0.4	0.4	3185	255	0.30	0.25
16	2	120	0.050	0.5	0.5	2385	240	0.40	0.30
20	2	120	0.060	0.8	0.8	1910	230	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	2	120	0.035	0.3	0.3	3820	265	0.25	0.20
12	2	120	0.045	0.4	0.4	3185	285	0.30	0.25
16	2	120	0.055	0.5	0.5	2385	260	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	2	60	0.030	0.3	0.3	1910	115	0.25	0.20
12	2	60	0.040	0.4	0.4	1590	125	0.30	0.25
16	2	60	0.050	0.5	0.5	1195	120	0.40	0.30
20	2	60	0.060	0.8	0.8	955	115	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	2	60	0.035	0.3	0.3	1910	135	0.25	0.20
12	2	60	0.045	0.4	0.4	1590	145	0.30	0.25
16	2	60	0.055	0.5	0.5	1195	130	0.40	0.30
<b>Carbide shanks, cylindrical, L-Type: N</b>									
10	2	160	0.030	0.3	0.3	5095	305	0.25	0.20
12	2	160	0.040	0.4	0.4	4245	340	0.30	0.25
16	2	160	0.050	0.5	0.5	3185	320	0.40	0.30
20	2	160	0.060	0.8	0.8	2545	305	0.60	0.50
<b>Carbide shanks, conical, L-Type: N</b>									
10	2	160	0.035	0.3	0.3	5095	355	0.25	0.20
12	2	160	0.045	0.4	0.4	4245	380	0.30	0.25
16	2	160	0.055	0.5	0.5	3185	350	0.40	0.30

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>

	<b>A</b>
	<b>A</b>

Steel  
850 - 1100 N/mm<sup>2</sup>

	<b>A</b>
	<b>A</b>

Cold work tool steel  
(12% Cr),  
high alloyed  
[1.2379]

	<b>A</b>
	<b>A</b>

Cast iron  
(lamellar / spheroidal)

	<b>A</b>
	<b>A</b>

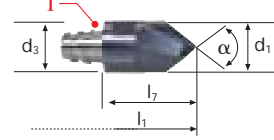
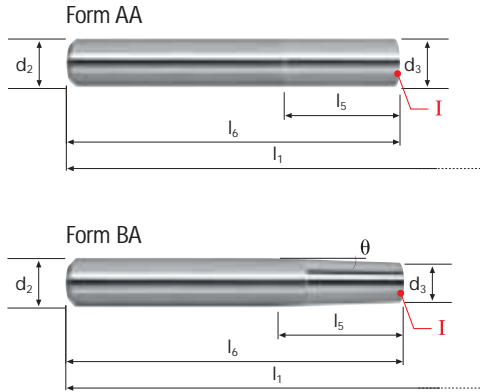
d1 [mm]	v <sub>c</sub> [m/min]	f [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	v <sub>f</sub> [mm/min]	v <sub>f</sub> [mm/min]
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	150	0.200	4775	955	765	575
12	150	0.240	3980	955	765	575
16	150	0.280	2985	835	670	500
20	150	0.300	2385	715	570	430
<b>Carbide shanks, conical, L-Type: N</b>						
10	150	0.200	4775	955	765	575
12	150	0.240	3980	955	765	575
16	150	0.280	2985	835	670	500
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	120	0.200	3820	765	610	460
12	120	0.240	3185	765	610	460
16	120	0.280	2385	670	535	400
20	120	0.300	1910	575	460	345
<b>Carbide shanks, conical, L-Type: N</b>						
10	120	0.200	3820	765	610	460
12	120	0.240	3185	765	610	460
16	120	0.280	2385	670	535	400
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	60	0.180	1910	345	275	205
12	60	0.220	1590	350	280	210
16	60	0.250	1195	300	240	180
20	60	0.280	955	265	210	160
<b>Carbide shanks, conical, L-Type: N</b>						
10	60	0.180	1910	345	275	205
12	60	0.220	1590	350	280	210
16	60	0.250	1195	300	240	180
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	160	0.200	5095	1020	815	610
12	160	0.240	4245	1020	815	610
16	160	0.280	3185	890	710	535
20	160	0.300	2545	765	610	460
<b>Carbide shanks, conical, L-Type: N</b>						
10	160	0.200	5095	1020	815	610
12	160	0.240	4245	1020	815	610
16	160	0.280	3185	890	710	535

# Deburring end mills

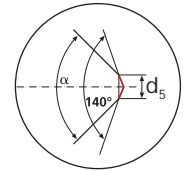
45° - Chamfer

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 7° $\gamma$ 8°



I = Interface



Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Milling heads									POLYCUT-A	
Order-N°.	d1 e8	d3	d5	l7	$\alpha$ 0°/-1°	z	i	I		
NF-10-04-02-90-10	10	9.8	1.5	18	90°	2	8	10	●	
NF-12-04-02-90-12	12	11.8	1.8	20	90°	2	10	12	●	
NF-16-04-02-90-16	16	15.8	2.4	32	90°	2	13	16	●	
NF-20-04-02-90-20	20	19.8	3.0	36	90°	2	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	$\theta$	L-Type	I		
AA-10-065-000-10	10		83		65		N	10	●	
AA-10-080-040-10	10	9.8	98	40	80		M	10	●	
AA-10-120-080-10	10	9.8	138	80	120		L	10	●	
AA-12-070-000-12	12		90		70		N	12	●	
AA-12-085-040-12	12	11.8	105	40	85		M	12	●	
AA-12-120-075-12	12	11.8	140	75	120		L	12	●	
AA-16-080-032-16	16	15.8	112	32	80		N	16	●	
AA-16-110-062-16	16	15.8	142	62	110		M	16	●	
AA-20-090-040-20	20	19.8	126	40	90		N	20	●	
AA-20-150-100-20	20	19.8	186	100	150		L	20	●	
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	152	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	192	80	160	1.5°	L	16	●	

VI

## Application



## Material

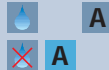
Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Stainless steel  
[Cr-Ni/1.4301]



d1 [mm]	v <sub>c</sub> [m/min]	f [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	v <sub>f</sub> [mm/min]	v <sub>f</sub> [mm/min]
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	150	0.200	4775	955	765	575
12	150	0.240	3980	955	765	575
16	150	0.280	2985	835	670	500
20	150	0.320	2385	765	610	460
<b>Carbide shanks, conical, L-Type: N</b>						
10	150	0.220	4775	1050	840	630
12	150	0.260	3980	1035	830	620
16	150	0.300	2985	895	715	535
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	120	0.200	3820	765	610	460
12	120	0.240	3185	765	610	460
16	120	0.280	2385	670	535	400
20	120	0.320	1910	610	490	365
<b>Carbide shanks, conical, L-Type: N</b>						
10	120	0.220	3820	840	670	505
12	120	0.260	3185	830	665	500
16	120	0.300	2385	715	570	430
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	70	0.180	2230	400	320	240
12	70	0.220	1855	410	330	245
16	70	0.250	1395	350	280	210
20	70	0.280	1115	310	250	185
<b>Carbide shanks, conical, L-Type: N</b>						
10	70	0.180	2230	400	320	240
12	70	0.220	1855	410	330	245
16	70	0.250	1395	350	280	210
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	60	0.180	1910	345	275	205
12	60	0.220	1590	350	280	210
16	60	0.250	1195	300	240	180
20	60	0.280	955	265	210	160
<b>Carbide shanks, conical, L-Type: N</b>						
10	60	0.180	1910	345	275	205
12	60	0.220	1590	350	280	210
16	60	0.250	1195	300	240	180

## Material

Cast iron  
(lamellar / spheroidal)



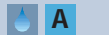
Unalloyed copper



Titanium alloys  
up to 300 HB  
[Ti5Al2.5Sn]



Wrought aluminium  
alloys Si < 6%



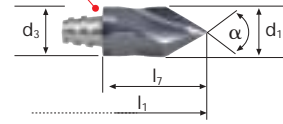
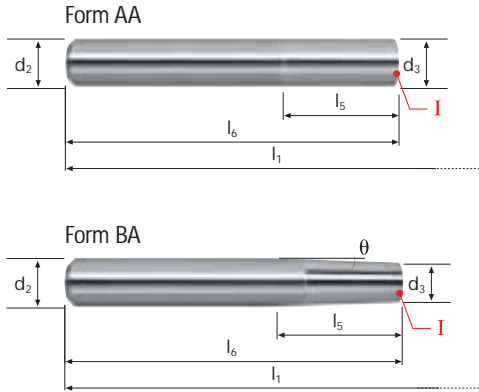
d1 [mm]	v <sub>c</sub> [m/min]	f [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	v <sub>f</sub> [mm/min]	v <sub>f</sub> [mm/min]
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	160	0.200	5095	1020	815	610
12	160	0.240	4245	1020	815	610
16	160	0.280	3185	890	710	535
20	160	0.320	2545	815	650	490
<b>Carbide shanks, conical, L-Type: N</b>						
10	160	0.220	5095	1120	895	670
12	160	0.260	4245	1105	885	665
16	160	0.300	3185	955	765	575
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	180	0.200	5730	1145	915	685
12	180	0.240	4775	1145	915	685
16	180	0.280	3580	1000	800	600
20	180	0.320	2865	915	730	550
<b>Carbide shanks, conical, L-Type: N</b>						
10	180	0.220	5730	1260	1010	755
12	180	0.260	4775	1240	990	745
16	180	0.300	3580	1075	860	645
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	70	0.180	2230	400	320	240
12	70	0.220	1855	410	330	245
16	70	0.250	1395	350	280	210
20	70	0.280	1115	310	250	185
<b>Carbide shanks, conical, L-Type: N</b>						
10	70	0.180	2230	400	320	240
12	70	0.220	1855	410	330	245
16	70	0.250	1395	350	280	210
<b>Carbide shanks, cylindrical, L-Type: N</b>						
10	200	0.200	6365	1275	1020	765
12	200	0.240	5305	1275	1020	765
16	200	0.280	3980	1115	890	670
20	200	0.320	3185	1020	815	610
<b>Carbide shanks, conical, L-Type: N</b>						
10	200	0.220	6365	1400	1120	840
12	200	0.260	5305	1380	1105	830
16	200	0.300	3980	1195	955	715

# Centering drill

60° - Drilling

**NovoSys X<sup>®</sup>**

HM UT	$\lambda$ 25°



I = Interface

Rm < 850	Rm 850-1100	Rm 1100-1300					Inox Stainless	Ti Titanium	GG(G) Aluminium Copper
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Milling heads								POLYCUT-A	
Order-N°.	d1 h6	d3	l7	$\alpha$ 0°/-1°	z		I		
NA-10-04-02-60-10	10	9.8	22.5	60°	2	8	10	●	
NA-12-04-02-60-12	12	11.8	25.0	60°	2	10	12	●	
NA-16-04-02-60-16	16	15.8	35.0	60°	2	13	16	●	
NA-20-04-02-60-20	20	19.8	40.0	60°	2	17	20	●	

Carbide shanks, Form AA / BA										
Order-N°.	d2 h6	d3	l1	l5	l6	$\theta$	L-Type	I		
AA-10-065-000-10	10		87.5		65		N	10	●	
AA-10-080-040-10	10	9.8	102.5	40	80		M	10	●	
AA-10-120-080-10	10	9.8	142.5	80	120		L	10	●	
AA-12-070-000-12	12		95.0		70		N	12	●	
AA-12-085-040-12	12	11.8	110.0	40	85		M	12	●	
AA-12-120-075-12	12	11.8	145.0	75	120		L	12	●	
AA-16-080-032-16	16	15.8	115.0	32	80		N	16	●	
AA-16-110-062-16	16	15.8	145.0	62	110		M	16	●	
AA-20-090-040-20	20	19.8	130.0	40	90		N	20	●	
AA-20-150-100-20	20	19.8	190.0	100	150		L	20	●	
BA-12-080-032-10	12	9.8	102.5	32	80	2.0°	M	10	●	
BA-12-120-042-10	12	9.8	142.5	42	120	1.5°	L	10	●	
BA-16-120-060-12	16	11.8	145.0	60	120	2.0°	M	12	●	
BA-16-140-080-12	16	11.8	165.0	80	140	1.5°	L	12	●	
BA-20-120-062-16	20	15.8	155.0	62	120	2.0°	M	16	●	
BA-20-160-080-16	20	15.8	195.0	80	160	1.5°	L	16	●	

VI

# NovoSys X<sup>®</sup> special tools

Heads, carbide shanks

NovoSys X<sup>®</sup>

## You want it, we'll make it!

Custom tools are tools that are made to measure. Custom products that match your specific needs, in accordance with the current market requirements. At Fraisa, the best machines and materials, the latest technology and the wealth of expertise of the technology leader are all put to use. Our goal is to support your optimisation processes and to minimise your costs. Fraisa custom tools help you deliver custom services. To put it plainly: Concep-Tool optimises processes, increases performance and boosts productivity. This is often achieved simply by combining several standard tools to create one exceptionally productive custom tool.



## Heads made to measure

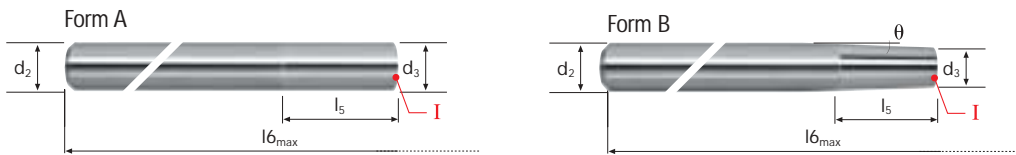
Specially adapted for your processes, the most versatile range of custom heads can be produced on the 10, 12, 16, 20 interface holding fixture (now also available in 25 as well).

Processes: milling, chamfering, drilling, counter-boring, grinding, individually or in combination.

## HM shanks made to measure

The made-to-measure HM shanks are produced as basis shanks ( $l_{6max}$  = maximum length).

The shape, the total length  $l_{6max}$ , the neck length  $l_5$  and the angle  $\theta$  are matched to your processes in line with your specifications (●).



Carbide shanks, Form A / B								
Order-N°.	$d_2$ h6	$d_3$	$l_5$	$l_{6max}$	$\theta$	I		
99991399AA10	10	9.8	●	240	–	10		
99991399AA12	12	11.8	●	240	–	12		
99991399AA16	16	15.8	●	300	–	16		
99991399AA20	20	19.8	●	300	–	20		
99991399BA10	12	9.8	●	240	●	10		
99991399BA12	16	11.8	●	300	●	12		
99991399BA16	20	15.8	●	300	●	16		

VI

## Other carbide shanks

Carbide shanks, Form BA									
Order-N°.	$d_2$ h6	$d_3$	$l_5$	$l_6$	$\theta$	L-Type	I		
BA-12-140-042-10	12	9.8	42	140	1.5°	L	10	●	
BA-16-160-080-12	16	11.8	80	160	1.5°	L	12	●	
BA-20-180-080-16	20	15.8	80	180	1.5°	L	16	●	

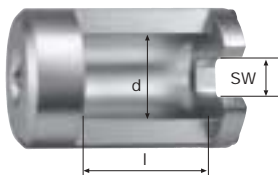
### Torque limiter with connector 3/8"

Torque is pre-set according to table



Order-N°.	<b>l</b>	Torque	
Y-042-10	10 + 12	10 Nm	●
Y-042-16	16 + 20	18 Nm	●

### Adapter with connector 3/8"



Order-N°.	SW	d	l	<b>l</b>	Torque	
Y-040-10	8	18	17	10	10 Nm	●
Y-040-12	10	18	25	12	10 Nm	●
Y-040-16	13	28	35	16	18 Nm	●
Y-040-20	17	28	35	20	18 Nm	●

### T-handle with connector 3/8"



Order-N°.		
Y-044-00		●



# Accessories

Assembly with short wrench

**NovoSys X<sup>®</sup>**

## Short wrench



Order-N°.	SW	1	
Y-030-10	8	10	•
Y-030-12	10	12	•
Y-030-16	13	16	•
Y-030-20	17	20	•

# Assembly instructions with torque limiter



## Attaching the milling head

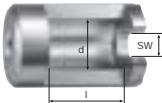
The thread of the head, the shank and the flat surface must be free of dirt. Dirt can affect the positive lock. As a result of this, the tool may break.



## Using the adapter

The table below (Accessories, page 656) shows which adapter is required for which interface.

**Adapter with connector 3/8"**



Order-N°.	SW	d	l	l	Torque
Y-040-10	8	18	17	10	10 Nm
Y-040-12	10	18	25	12	10 Nm
Y-040-16	13	28	35	16	18 Nm
Y-040-20	17	28	35	20	18 Nm




## Tightening the milling head

Screw on the head evenly with a T-handle and both hands. Using the torque limiter (table below / Accessories, page 656) ensures that the milling head is mounted with the correct torque.

The head is securely screwed on when no light gap can be seen on the flat surface. If a light gap remains visible after screwing on, the head is to be disconnected and cleaned.

**Torque limiter with connector 3/8"**  
Torque is pre-set according to table



Order-N°.	l	Torque
Y-042-10	10 + 12	10 Nm
Y-042-16	16 + 20	18 Nm

# Assembly instructions with short wrench



## Holding the shank

In a chuck that satisfies the machining requirements.



## Attaching the milling head

The thread of the head, the shank and the flat surface must be free of dirt. Dirt can affect the positive lock. As a result of this, the tool may break.



## Tightening the milling head

Carefully screw on the head using a short wrench. Important: because hard metals have virtually no elasticity, care must be taken that the head is not screwed on any further once it comes into contact with the flat surface of the shank.

The head is securely screwed on when no light gap can be seen on the flat surface. If a light gap remains visible after screwing on, the head is to be disconnected and cleaned.

VI

Short wrench		
Order-N°.	SW	1
Y-030-10	8	10
Y-030-12	10	12
Y-030-16	13	16
Y-030-20	17	20

# Ordering example

## 1. Select milling head

d1	z	vc	fz	ap	ae	d <sub>eff</sub>	n	vr	ae / ap	ae / a <sub>e</sub>
[mm]		[m/min]	[mm]	[mm]	[mm]	[mm]	[min <sup>-1</sup> ]	[mm/min]	[mm]	[mm]
Carbide shanks, conical, L-Type: N										
10	2	60	0.100	0.20	0.25	8.77	2180	435	0.14	2240
12	2	60	0.105	0.24	0.30	10.52	1815	380	0.17	1865
16	2	60	0.110	0.32	0.40	14.03	1360	300	0.22	1400

Application	Material	d1	z	vc	fz	ap	ae	d <sub>eff</sub>	n	vr	ae / ap	ae / a <sub>e</sub>
		[mm]		[m/min]	[mm]	[mm]	[mm]	[mm]	[min <sup>-1</sup> ]	[mm/min]	[mm]	[mm]
Carbide shanks, cylindrical, L-Type: N												
	Steel 850 - 1100 N/mm <sup>2</sup>	10	2	350	0.080	0.20	0.20	8.77	12705	235	0.18	0.10
		12	2	350	0.095	0.25	0.25	10.56	10550	205	0.23	0.13
		16	2	350	0.105	0.30	0.30	13.96	7980	1475	0.27	0.15

## 2. Select milling shank with corresponding interface

Order-N°	d <sub>2</sub> h6	d3	l1	l5	l6	θ	L-Type	l
AA-10-065-000-10	10		83		65		N	10
AA-10-080-040-10	10	9.8	98	40	80		M	10
AA-10-120-080-10	10	9.8	138	80	120		L	10
AA-12-070-000-12	12		90		70		N	12
AA-12-085-040-12	12	11.8	105	40	85		M	12
AA-12-120-075-12	12	11.8	140	75	120		L	12
AA-16-080-032-16	16	15.8	112	32	80		N	16
AA-16-110-062-16	16	15.8	142	62	110		M	16
AA-20-090-040-20	20	19.8	126	40	90		N	20
AA-20-150-100-20	20	19.8	186	100	150		L	20
BA-12-080-032-10	12	9.8	98	32	80	2.0°	M	10
BA-12-120-042-10	12	9.8	138	42	120	1.5°	L	10
BA-16-120-060-12	16	11.8	140	60	120	2.0°	M	12
BA-16-140-080-12	16	11.8	160	80	140	1.5°	L	12

## 3. Determine cutting data according to cutter diameter and shank type

Application	Material	d1	z	vc	fz	ap	ae	d <sub>eff</sub>	n	vr	ae / ap	n
		[mm]		[m/min]	[mm]	[mm]	[mm]	[mm]	[min <sup>-1</sup> ]	[mm/min]	[mm]	[min <sup>-1</sup> ]
	Steel 850 - 1100 N/mm <sup>2</sup>	Carbide shanks, cylindrical, L-Type: N										
		10	2	200	0.125	0.40	0.50	0.28	6860	1850	0.28	7065
		12	2	200	0.140	0.48	0.60	11.13	5720	1600	0.34	5885
		16	2	200	0.150	0.64	0.80	14.84	4290	1285	0.45	4415
		20	2	200	0.160	0.80	1.00	18.55	3430	1100	0.56	3535
		Carbide shanks, conical, L-Type: N										
		10	2	200	0.140	0.40	0.50	9.28	6860	1920	0.28	7065
		12	2	200	0.150	0.48	0.60	11.13	5720	1715	0.34	5885
		16	2	200	0.155	0.64	0.80	14.84	4290	1330	0.45	4415
		Carbide shanks, cylindrical, L-Type: M										
		10	2	180	0.125	0.40	0.50	9.28	6175	1545	0.28	6360
		12	2	180	0.130	0.48	0.60	11.13	5150	1340	0.34	5295
16	2	180	0.140	0.64	0.80	14.84	3860	1080	0.45	3975		
20	2	180	0.145	0.80	1.00	18.55	3090	895	0.56	3180		
Carbide shanks, conical, L-Type: N												
10	2	180	0.130	0.40	0.50	9.28	6175	1605	0.28	6360		
12	2	180	0.140	0.48	0.60	11.13	5150	1440	0.34	5295		
16	2	180	0.145	0.64	0.80	14.84	3860	1120	0.45	3975		
Carbide shanks, cylindrical, L-Type: M												
10	2	150	0.115	0.40	0.50	9.28	5145	1185	0.28	5300		
12	2	150	0.120	0.48	0.60	11.13	4290	1030	0.34	4415		
16	2	150	0.130	0.64	0.80	14.84	3215	835	0.45	3310		
20	2	150	0.135	0.80	1.00	18.55	2575	695	0.56	2650		
Carbide shanks, conical, L-Type: N												
10	2	150	0.120	0.40	0.50	9.28	5145	1235	0.28	5300		
12	2	150	0.130	0.48	0.60	11.13	4290	1115	0.34	4415		
16	2	150	0.130	0.64	0.80	14.84	3215	835	0.45	3310		
Carbide shanks, cylindrical, L-Type: N												
10	2	60	0.095	0.20	0.25	8.77	2180	415	0.14	2240		
12	2	60	0.100	0.24	0.30	10.52	1815	365	0.17	1865		
16	2	60	0.105	0.32	0.40	14.03	1360	285	0.22	1400		
20	2	60	0.110	0.40	0.50	17.54	1090	240	0.28	1120		
Carbide shanks, conical, L-Type: N												
10	2	60	0.100	0.20	0.25	8.77	2180	435	0.14	2240		
12	2	60	0.105	0.24	0.30	10.52	1815	380	0.17	1865		
16	2	60	0.110	0.32	0.40	14.03	1360	300	0.22	1400		

Indexable insert milling tools for steel,  
stainless steel and titanium

663 – 709

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Indexable insert milling tools HFC

710 – 735

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Accessories

736 – 737

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# Indexable insert milling tools for steel, stainless steel and titanium

## Corner/Slot end mills 90° for inserts 8mm

N° W00100



NX	$\lambda$ 8° $\gamma$ 0°		<b>Rm</b> 850-1300			667
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N° W00140



HX	$\lambda$ 8° $\gamma$ -8°		<b>Rm</b> 1300-1500	<b>HRC</b> 48-60		669
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N° W00180



SX	$\lambda$ 8° $\gamma$ 0°		<b>Inox</b> Stainless	<b>Rm</b> <850		671
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ZX	$\lambda$ 8° $\gamma$ 0°		<b>Ni-/Mn-</b> Alloys	<b>Inox</b> Stainless	<b>Rm</b> <850	673
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## Corner/Slot end mills 90° for inserts 13mm

N° W00110



NX	$\lambda$ 8° $\gamma$ 6°		<b>Rm</b> 850-1300			675
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N° W00150



HX	$\lambda$ 8° $\gamma$ -10°		<b>Rm</b> 1300-1500	<b>HRC</b> 48-60		677
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N° W00190



SX	$\lambda$ 8° $\gamma$ 6°		<b>Inox</b> Stainless	<b>Rm</b> <850		679
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ZX	$\lambda$ 8° $\gamma$ 6°		<b>Ni-/Mn-</b> Alloys	<b>Inox</b> Stainless	<b>Rm</b> <850	681
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# Indexable insert milling tools for steel, stainless steel and titanium

## Corner end mills 90° for inserts 8mm

N° W00400



NX	$\lambda$ 8° $\gamma$ 0°		Rm 850-1300			683
HX	$\lambda$ 8° $\gamma$ -8°		Rm 1300-1500	HRC 48-60		685
SX	$\lambda$ 8° $\gamma$ 0°		Inox Stainless	Rm <850		687
ZX	$\lambda$ 8° $\gamma$ 0°		Ni-/Mn- Alloys	Inox Stainless	Rm <850	689

## Corner end mills 90° for inserts 13mm

N° W00410



NX	$\lambda$ 8° $\gamma$ 6°		Rm 850-1300			691
HX	$\lambda$ 8° $\gamma$ -10°		Rm 1300-1500	HRC 48-60		693
SX	$\lambda$ 8° $\gamma$ 6°		Inox Stainless	Rm <850		695
ZX	$\lambda$ 8° $\gamma$ 6°		Ni-/Mn- Alloys	Inox Stainless	Rm <850	697



# Indexable insert milling tools for steel, stainless steel and titanium

## Face milling cutter for inserts 9mm

N° W01400



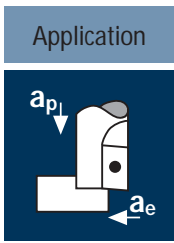
NX	$\lambda$ 12° $\gamma$ -6°		<b>Rm</b> 850-1300			699
SX	$\lambda$ 12° $\gamma$ -6°		<b>Inox</b> Stainless	<b>Rm</b> <850		701
ZX	$\lambda$ 12° $\gamma$ -6°		<b>Ni-/Mn-</b> Alloys	<b>Inox</b> Stainless	<b>Rm</b> <850	703

## Face milling cutter for inserts 13mm

N° W01410



NX	$\lambda$ 13° $\gamma$ -6°		<b>Rm</b> 850-1300			705
SX	$\lambda$ 13° $\gamma$ -6°		<b>Inox</b> Stainless	<b>Rm</b> <850		707
ZX	$\lambda$ 13° $\gamma$ -6°		<b>Ni-/Mn-</b> Alloys	<b>Inox</b> Stainless	<b>Rm</b> <850	709



Material
Steel < 850 N/mm <sup>2</sup>
✘

Material
Steel 850 - 1100 N/mm <sup>2</sup>
✘

Material
Steel 1100 - 1300 N/mm <sup>2</sup>
✘

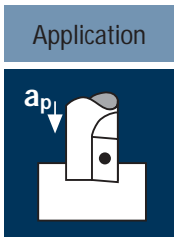
Material
Steel 1300 - 1500 N/mm <sup>2</sup>
✘

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	16	2	250	0.100	3.0	12.8	4975	995	38.0
	20	3	250	0.100	3.0	16.0	3980	1195	57.5
	25	4	250	0.100	3.0	20.0	3185	1275	76.5
	32	5	250	0.100	3.0	25.6	2485	1245	95.5
M	16	2	220	0.100	3.0	12.8	4375	875	33.5
	20	3	220	0.100	3.0	16.0	3500	1050	50.5
	25	4	220	0.100	3.0	20.0	2800	1120	67.0
	32	5	220	0.100	3.0	25.6	2190	1095	84.0
L	16	2	220	0.100	3.0	6.4	4375	875	17.0
	20	3	220	0.100	3.0	8.0	3500	1050	25.0
	25	4	220	0.100	3.0	10.0	2800	1120	33.5
	32	5	220	0.100	3.0	12.8	2190	1095	42.0

K	16	2	220	0.100	3.0	12.8	4375	875	33.5
	20	3	220	0.100	3.0	16.0	3500	1050	50.5
	25	4	220	0.100	3.0	20.0	2800	1120	67.0
	32	5	220	0.100	3.0	25.6	2190	1095	84.0
M	16	2	180	0.100	3.0	12.8	3580	715	27.5
	20	3	180	0.100	3.0	16.0	2865	860	41.5
	25	4	180	0.100	3.0	20.0	2290	915	55.0
	32	5	180	0.100	3.0	25.6	1790	895	68.5
L	16	2	180	0.100	3.0	6.4	3580	715	13.5
	20	3	180	0.100	3.0	8.0	2865	860	20.5
	25	4	180	0.100	3.0	10.0	2290	915	27.5
	32	5	180	0.100	3.0	12.8	1790	895	34.5

K	16	2	180	0.080	3.0	12.8	3580	575	22.0
	20	3	180	0.080	3.0	16.0	2865	690	33.0
	25	4	180	0.080	3.0	20.0	2290	735	44.0
	32	5	180	0.080	3.0	25.6	1790	715	55.0
M	16	2	150	0.080	3.0	12.8	2985	480	18.5
	20	3	150	0.080	3.0	16.0	2385	570	27.5
	25	4	150	0.080	3.0	20.0	1910	610	36.5
	32	5	150	0.080	3.0	25.6	1490	595	45.5
L	16	2	140	0.080	3.0	6.4	2785	445	8.5
	20	3	140	0.080	3.0	8.0	2230	535	13.0
	25	4	140	0.080	3.0	10.0	1785	570	17.0
	32	5	140	0.080	3.0	12.8	1395	560	21.5

K	16	2	150	0.050	3.0	12.8	2985	300	11.5
	20	3	150	0.050	3.0	16.0	2385	360	17.5
	25	4	150	0.050	3.0	20.0	1910	380	23.0
	32	5	150	0.050	3.0	25.6	1490	375	29.0
M	16	2	120	0.050	3.0	12.8	2385	240	9.0
	20	3	120	0.050	3.0	16.0	1910	285	13.5
	25	4	120	0.050	3.0	20.0	1530	305	18.5
	32	5	120	0.050	3.0	25.6	1195	300	23.0
L	16	2	100	0.050	3.0	6.4	1990	200	4.0
	20	3	100	0.050	3.0	8.0	1590	240	6.0
	25	4	100	0.050	3.0	10.0	1275	255	7.5
	32	5	100	0.050	3.0	12.8	995	250	9.5



Material
Steel 850 - 1100 N/mm <sup>2</sup>
✘

Material
Steel 1100 - 1300 N/mm <sup>2</sup>
✘

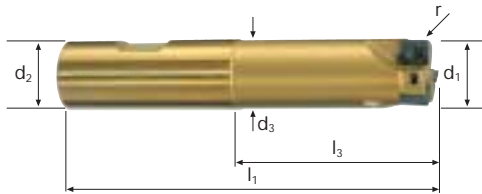
L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	16	2	180	0.100	2.4	16.0	3580	715	27.5
	20	3	180	0.100	2.4	20.0	2865	860	41.5
	25	4	180	0.100	2.4	25.0	2290	915	55.0
	32	5	180	0.100	2.4	32.0	1790	895	68.5
M	16	2	160	0.100	2.4	16.0	3185	635	24.5
	20	3	160	0.100	2.4	20.0	2545	765	36.5
	25	4	160	0.100	2.4	25.0	2035	815	49.0
	32	5	160	0.100	2.4	32.0	1590	795	61.0

K	16	2	150	0.080	2.4	16.0	2985	480	18.5
	20	3	150	0.080	2.4	20.0	2385	570	27.5
	25	4	150	0.080	2.4	25.0	1910	610	36.5
	32	5	150	0.080	2.4	32.0	1490	595	45.5
M	16	2	120	0.080	2.4	16.0	2385	380	14.5
	20	3	120	0.080	2.4	20.0	1910	460	22.0
	25	4	120	0.080	2.4	25.0	1530	490	29.5
	32	5	120	0.080	2.4	32.0	1195	480	37.0

# Corner/Slot end mills 90° NX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ 0°



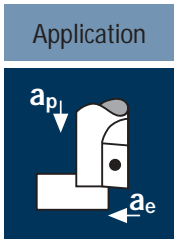
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500							GG(G)
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Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type	
W00100.162	16	16	15.4	75	25	7.5	2	K	●
W00140.162	16	16	15.0	102	51	7.5	2	M	●
W00180.162	16	16	15.0	129	78	7.5	2	L	●
W00100.203	20	20	19.4	77	25	7.5	3	K	●
W00140.203	20	20	19.4	110	57	7.5	3	M	●
W00180.203	20	20	19.4	140	87	7.5	3	L	●
W00100.254	25	25	24.0	90	32	7.5	4	K	●
W00140.254	25	25	24.0	124	65	7.5	4	M	●
W00180.254	25	25	24.0	158	99	7.5	4	L	●
W00100.325	32	32	31.0	102	40	7.5	5	K	●
W00140.325	32	32	31.0	144	81	7.5	5	M	●
W00180.325	32	32	31.0	186	123	7.5	5	L	●

Inserts NX 8mm					Delivery range: Packaging unit 10 pieces
Order-N°.	H	B	D	r	
W50110.008	8.4	6.4	3.4	0.6	●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces
Order-N°.		
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08	●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08	●
W90100.008	Screwdriver Torx TX 08	●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0	●

VII



Material

Hardened tool steel  
42 - 48 HRC

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	16	2	150	0.050	3.0	12.8	2985	300	11.5
	20	3	150	0.050	3.0	16.0	2385	360	17.5
	25	4	150	0.050	3.0	20.0	1910	380	23.0
	32	5	150	0.050	3.0	25.6	1490	375	29.0
M	16	2	120	0.070	3.0	9.6	2385	335	9.5
	20	3	120	0.070	3.0	12.0	1910	400	14.5
	25	4	120	0.070	3.0	15.0	1530	430	19.5
	32	5	120	0.070	3.0	19.2	1195	420	24.0
L	16	2	120	0.070	3.0	3.2	2385	335	3.0
	20	3	120	0.070	3.0	4.0	1910	400	5.0
	25	4	120	0.070	3.0	5.0	1530	430	6.5
32	5	120	0.070	3.0	6.4	1195	420	8.0	

Material

Hardened tool steel  
48 - 52 HRC

K	16	2	120	0.050	3.0	12.8	2385	240	9.0
	20	3	120	0.050	3.0	16.0	1910	285	13.5
	25	4	120	0.050	3.0	20.0	1530	305	18.5
	32	5	120	0.050	3.0	25.6	1195	300	23.0
M	16	2	100	0.070	3.0	9.6	1990	280	8.0
	20	3	100	0.070	3.0	12.0	1590	335	12.0
	25	4	100	0.070	3.0	15.0	1275	355	16.0
	32	5	100	0.070	3.0	19.2	995	350	20.0
L	16	2	100	0.070	3.0	3.2	1990	280	2.5
	20	3	100	0.070	3.0	4.0	1590	335	4.0
	25	4	100	0.070	3.0	5.0	1275	355	5.5
32	5	100	0.070	3.0	6.4	995	350	6.5	

Material

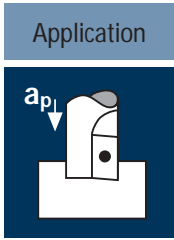
Hardened tool steel  
52 - 56 HRC

K	16	2	100	0.050	3.0	12.8	1990	200	7.5
	20	3	100	0.050	3.0	16.0	1590	240	11.5
	25	4	100	0.050	3.0	20.0	1275	255	15.5
	32	5	100	0.050	3.0	25.6	995	250	19.0
M	16	2	80	0.070	3.0	9.6	1590	225	6.5
	20	3	80	0.070	3.0	12.0	1275	270	9.5
	25	4	80	0.070	3.0	15.0	1020	285	13.0
	32	5	80	0.070	3.0	19.2	795	280	16.0
L	16	2	80	0.070	3.0	3.2	1590	225	2.0
	20	3	80	0.070	3.0	4.0	1275	270	3.0
	25	4	80	0.070	3.0	5.0	1020	285	4.5
32	5	80	0.070	3.0	6.4	795	280	5.5	

Material

Hardened tool steel  
56 - 60 HRC

K	16	2	40	0.020	3.0	4.8	795	30	0.5
	20	3	40	0.020	3.0	6.0	635	40	0.5
	25	4	40	0.020	3.0	7.5	510	40	1.0
	32	5	40	0.020	3.0	9.6	400	40	1.0
M	16	2	25	0.020	3.0	1.6	495	20	0.1
	20	3	25	0.020	3.0	2.0	400	25	0.2
	25	4	25	0.020	3.0	2.5	320	25	0.2
	32	5	25	0.020	3.0	3.2	250	25	0.2
L									



Material

Hardened tool steel  
48 - 52 HRC

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	16	2	100	0.050	2.4	16.0	1990	200	7.5
	20	3	100	0.050	2.4	20.0	1590	240	11.5
	25	4	100	0.050	2.4	25.0	1275	255	15.5
	32	5	100	0.050	2.4	32.0	995	250	19.0
M	16	2	80	0.070	1.5	16.0	1590	225	5.5
	20	3	80	0.070	1.5	20.0	1275	270	8.0
	25	4	80	0.070	1.5	25.0	1020	285	10.5
	32	5	80	0.070	1.5	32.0	795	280	13.5
L									

Material

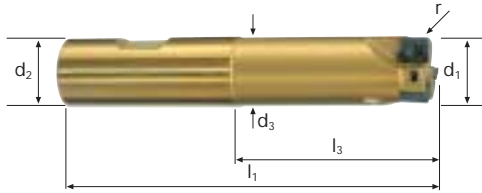
Hardened tool steel  
52 - 56 HRC

K	16	2	80	0.050	2.4	16.0	1590	160	6.0
	20	3	80	0.050	2.4	20.0	1275	190	9.0
	25	4	80	0.050	2.4	25.0	1020	205	12.5
	32	5	80	0.050	2.4	32.0	795	200	15.5
M	16	2	60	0.070	1.5	16.0	1195	165	4.0
	20	3	60	0.070	1.5	20.0	955	200	6.0
	25	4	60	0.070	1.5	25.0	765	215	8.0
	32	5	60	0.070	1.5	32.0	595	210	10.0
L									

# Corner/Slot end mills 90° HX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ -8°



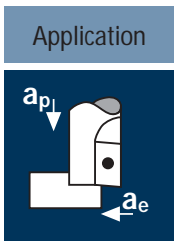
		Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60		Ti Titanium	GG(G)
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Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type	
W00100.162	16	16	15.4	75	25	7.5	2	K	●
W00140.162	16	16	15.0	102	51	7.5	2	M	●
W00180.162	16	16	15.0	129	78	7.5	2	L	●
W00100.203	20	20	19.4	77	25	7.5	3	K	●
W00140.203	20	20	19.4	110	57	7.5	3	M	●
W00180.203	20	20	19.4	140	87	7.5	3	L	●
W00100.254	25	25	24.0	90	32	7.5	4	K	●
W00140.254	25	25	24.0	124	65	7.5	4	M	●
W00180.254	25	25	24.0	158	99	7.5	4	L	●
W00100.325	32	32	31.0	102	40	7.5	5	K	●
W00140.325	32	32	31.0	144	81	7.5	5	M	●
W00180.325	32	32	31.0	186	123	7.5	5	L	●

Inserts HX 8mm					Delivery range: Packaging unit 10 pieces
Order-N°.	H	B	D	r	
W50210.008	8.5	6.4	3.5	0.6	●

Accessories			Delivery range clamping screws for inserts: Packaging unit 10 pieces
Order-N°.			
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08		●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08		●
W90100.008	Screwdriver Torx TX 08		●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0		●

VII



Material
Stainless steel [Cr-Ni/1.4301]

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	16	2	150	0.050	3.0	12.8	2985	300	11.5
	20	3	150	0.050	3.0	16.0	2385	360	17.5
	25	4	150	0.050	3.0	20.0	1910	380	23.0
	32	5	150	0.050	3.0	25.6	1490	375	29.0
M	16	2	150	0.040	3.0	9.6	2985	240	7.0
	20	3	150	0.040	3.0	12.0	2385	285	10.5
	25	4	150	0.040	3.0	15.0	1910	305	13.5
	32	5	150	0.040	3.0	19.2	1490	300	17.5
L	16	2	150	0.050	3.0	6.4	2985	300	6.0
	20	3	150	0.050	3.0	8.0	2385	360	8.5
	25	4	150	0.050	3.0	10.0	1910	380	11.5
	32	5	150	0.050	3.0	12.8	1490	375	14.5

Material
Stainless steel [Cr-Ni-Mo-.../1.4571]

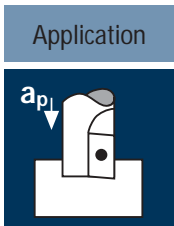
K	16	2	250	0.050	3.0	12.8	4975	500	19.0
	20	3	250	0.050	3.0	16.0	3980	595	28.5
	25	4	250	0.050	3.0	20.0	3185	635	38.0
	32	5	250	0.050	3.0	25.6	2485	620	47.5
M	16	2	250	0.040	3.0	9.6	4975	400	11.5
	20	3	250	0.040	3.0	12.0	3980	480	17.5
	25	4	250	0.040	3.0	15.0	3185	510	23.0
	32	5	250	0.040	3.0	19.2	2485	495	28.5
L	16	2	220	0.040	3.0	6.4	4375	350	6.5
	20	3	220	0.040	3.0	8.0	3500	420	10.0
	25	4	220	0.040	3.0	10.0	2800	450	13.5
	32	5	220	0.040	3.0	12.8	2190	440	17.0

Material
Heat resistant steel [17-4 PH]

K	16	2	120	0.050	3.0	12.8	2385	240	9.0
	20	3	120	0.050	3.0	16.0	1910	285	13.5
	25	4	120	0.050	3.0	20.0	1530	305	18.5
	32	5	120	0.050	3.0	25.6	1195	300	23.0
M	16	2	120	0.040	3.0	9.6	2385	190	5.5
	20	3	120	0.040	3.0	12.0	1910	230	8.5
	25	4	120	0.040	3.0	15.0	1530	245	11.0
	32	5	120	0.040	3.0	19.2	1195	240	14.0
L	16	2	120	0.040	3.0	6.4	2385	190	3.5
	20	3	120	0.040	3.0	8.0	1910	230	5.5
	25	4	120	0.040	3.0	10.0	1530	245	7.5
	32	5	120	0.040	3.0	12.8	1195	240	9.0

Material
Nickel base alloys prec.-hard. [Inconel 718]

K	16	2	20	0.030	3.0	4.8	400	25	0.5
	20	3	20	0.030	3.0	6.0	320	30	0.5
	25	4	20	0.030	3.0	7.5	255	30	0.5
	32	5	20	0.030	3.0	9.6	200	30	1.0
M	16	2	20	0.020	3.0	1.6	400	15	0.1
	20	3	20	0.020	3.0	2.0	320	20	0.1
	25	4	20	0.020	3.0	2.5	255	20	0.2
	32	5	20	0.020	3.0	3.2	200	20	0.2
L									



Material
Stainless steel [Cr-Ni/1.4301]

K	16	2	120	0.050	2.4	16.0	2385	240	9.0
	20	3	120	0.050	2.4	20.0	1910	285	13.5
	25	4	120	0.050	2.4	25.0	1530	305	18.5
	32	5	120	0.050	2.4	32.0	1195	300	23.0
M	16	2	120	0.070	1.5	16.0	2385	335	8.0
	20	3	120	0.070	1.5	20.0	1910	400	12.0
	25	4	120	0.070	1.5	25.0	1530	430	16.0
	32	5	120	0.070	1.5	32.0	1195	420	20.0
L									

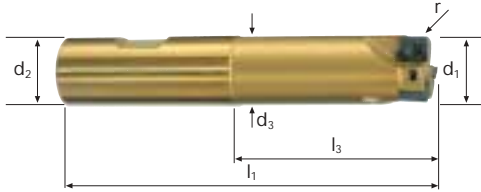
Material
Heat resistant steel [17-4 PH]

K	16	2	100	0.050	2.4	16.0	1990	200	7.5
	20	3	100	0.050	2.4	20.0	1590	240	11.5
	25	4	100	0.050	2.4	25.0	1275	255	15.5
	32	5	100	0.050	2.4	32.0	995	250	19.0
M	16	2	100	0.070	1.5	16.0	1990	280	6.5
	20	3	100	0.070	1.5	20.0	1590	335	10.0
	25	4	100	0.070	1.5	25.0	1275	355	13.5
	32	5	100	0.070	1.5	32.0	995	350	17.0
L									

# Corner/Slot end mills 90° SX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8°
	$\gamma$ 0°

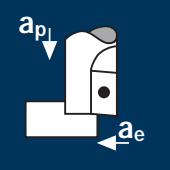








Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Tool Steel
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Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type	
W00100.162	16	16	15.4	75	25	7.5	2	K	●
W00140.162	16	16	15.0	102	51	7.5	2	M	●
W00180.162	16	16	15.0	129	78	7.5	2	L	●
W00100.203	20	20	19.4	77	25	7.5	3	K	●
W00140.203	20	20	19.4	110	57	7.5	3	M	●
W00180.203	20	20	19.4	140	87	7.5	3	L	●
W00100.254	25	25	24.0	90	32	7.5	4	K	●
W00140.254	25	25	24.0	124	65	7.5	4	M	●
W00180.254	25	25	24.0	158	99	7.5	4	L	●
W00100.325	32	32	31.0	102	40	7.5	5	K	●
W00140.325	32	32	31.0	144	81	7.5	5	M	●
W00180.325	32	32	31.0	186	123	7.5	5	L	●

Inserts SX 8mm					Delivery range: Packaging unit 10 pieces
Order-N°.	H	B	D	r	
W50310.008	8.4	6.4	3.4	0.6	●

Accessories			Delivery range clamping screws for inserts: Packaging unit 10 pieces
Order-N°.			
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08		●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08		●
W90100.008	Screwdriver Torx TX 08		●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0		●

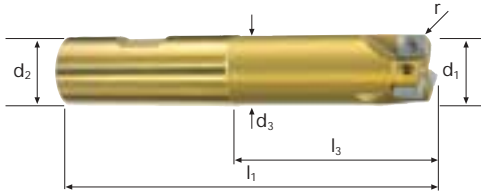
Application	Material	L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]			
	Nickel base alloys [Inconel 718] [Hastelloy B-3] [Nimonic 90]	K	16	2	40	0.040	3.0	4.8	795	65	1.0			
			20	3	40	0.040	3.0	6.0	635	75	1.5			
			25	4	40	0.040	3.0	7.5	510	80	2.0			
			32	5	40	0.040	3.0	9.6	400	80	2.5			
		M	16	2	30	0.030	3.0	2.4	595	35	0.5			
			20	3	30	0.030	3.0	3.0	475	45	0.5			
			25	4	30	0.030	3.0	3.8	380	45	0.5			
			32	5	30	0.030	3.0	4.8	300	45	0.5			
		L	16	2	20	0.020	3.0	2.4	400	15	0.1			
			20	3	20	0.020	3.0	3.0	320	20	0.2			
			25	4	20	0.020	3.0	3.8	255	20	0.2			
			32	5	20	0.020	3.0	4.8	200	20	0.3			
	Manganese steel Mn > 5 % [1.3964 / Nitronic] [1.3401 / X120Mn12]	K	16	2	100	0.040	3.0	5.6	1990	160	2.5			
			20	3	100	0.040	3.0	7.0	1590	190	4.0			
			25	4	100	0.040	3.0	8.8	1275	205	5.5			
			32	5	100	0.040	3.0	11.2	995	200	6.5			
		M	16	2	90	0.030	3.0	4.0	1790	105	1.5			
			20	3	90	0.030	3.0	5.0	1430	130	2.0			
			25	4	90	0.030	3.0	6.3	1145	135	2.5			
			32	5	90	0.030	3.0	8.0	895	135	3.0			
		L	16	2	80	0.020	3.0	2.4	1590	65	0.5			
			20	3	80	0.020	3.0	3.0	1275	75	0.5			
			25	4	80	0.020	3.0	3.8	1020	80	1.0			
			32	5	80	0.020	3.0	4.8	795	80	1.0			
	Heat resistant steel [17-4 PH] [Duplex]	K	16	2	150	0.050	3.0	12.8	2985	300	11.5			
			20	3	150	0.050	3.0	16.0	2385	360	17.5			
			25	4	150	0.050	3.0	20.0	1910	380	23.0			
			32	5	150	0.050	3.0	25.6	1490	375	29.0			
		M	16	2	140	0.040	3.0	9.6	2785	225	6.5			
			20	3	140	0.040	3.0	12.0	2230	270	9.5			
			25	4	140	0.040	3.0	15.0	1785	285	13.0			
			32	5	140	0.040	3.0	19.2	1395	280	16.0			
		L	16	2	120	0.040	3.0	6.4	2385	190	3.5			
			20	3	120	0.040	3.0	8.0	1910	230	5.5			
			25	4	120	0.040	3.0	10.0	1530	245	7.5			
			32	5	120	0.040	3.0	12.8	1195	240	9.0			
	PM high-speed steel annealed [Bohler S390] [ASP 2023]	K	16	2	120	0.050	3.0	5.6	2385	240	4.0			
			20	3	120	0.050	3.0	7.0	1910	285	6.0			
			25	4	120	0.050	3.0	8.8	1530	305	8.0			
			32	5	120	0.050	3.0	11.2	1195	300	10.0			
		M	16	2	100	0.050	3.0	4.0	1990	200	2.4			
			20	3	100	0.050	3.0	5.0	1590	240	3.6			
			25	4	100	0.050	3.0	6.3	1275	255	4.8			
			32	5	100	0.050	3.0	8.0	995	250	6.0			
		L	16	2	80	0.040	3.0	2.4	1590	125	1.0			
			20	3	80	0.040	3.0	3.0	1275	155	1.5			
			25	4	80	0.040	3.0	3.8	1020	165	2.0			
			32	5	80	0.040	3.0	4.8	795	160	2.5			
	Application	Material	K	16	2	80	0.040	1.0	16.0	1590	125	2.0		
				20	3	80	0.040	1.0	20.0	1275	155	3.0		
				25	4	80	0.040	1.0	25.0	1020	165	4.0		
				32	5	80	0.040	1.0	32.0	795	160	5.0		
			M	16	2	60	0.030	1.0	16.0	1195	70	1.0		
				20	3	60	0.030	1.0	20.0	955	85	1.5		
				25	4	60	0.030	1.0	25.0	765	90	2.5		
				32	5	60	0.030	1.0	32.0	595	90	3.0		
				PM high-speed steel annealed [Bohler S390] [ASP 2023]	K	16	2	100	0.050	1.5	16.0	1990	200	5.0
						20	3	100	0.050	1.5	20.0	1590	240	7.0
						25	4	100	0.050	1.5	25.0	1275	255	9.5
						32	5	100	0.050	1.5	32.0	995	250	12.0
M	16	2			80	0.040	1.0	16.0	1590	125	2.0			
	20	3			80	0.040	1.0	20.0	1275	155	3.0			
	25	4			80	0.040	1.0	25.0	1020	165	4.0			
	32	5			80	0.040	1.0	32.0	795	160	5.0			
	Application	Material			K	16	2	80	0.040	1.0	16.0	1590	125	2.0
						20	3	80	0.040	1.0	20.0	1275	155	3.0
						25	4	80	0.040	1.0	25.0	1020	165	4.0
						32	5	80	0.040	1.0	32.0	795	160	5.0
			M	16	2	60	0.030	1.0	16.0	1195	70	1.0		
				20	3	60	0.030	1.0	20.0	955	85	1.5		
				25	4	60	0.030	1.0	25.0	765	90	2.5		
				32	5	60	0.030	1.0	32.0	595	90	3.0		



# Corner/Slot end mills 90° ZX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ 0°



**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Mangan-Steels HSS
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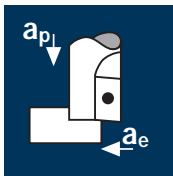
Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type	
W00100.162	16	16	15.4	75	25	7.5	2	K	●
W00140.162	16	16	15.0	102	51	7.5	2	M	●
W00180.162	16	16	15.0	129	78	7.5	2	L	●
W00100.203	20	20	19.4	77	25	7.5	3	K	●
W00140.203	20	20	19.4	110	57	7.5	3	M	●
W00180.203	20	20	19.4	140	87	7.5	3	L	●
W00100.254	25	25	24.0	90	32	7.5	4	K	●
W00140.254	25	25	24.0	124	65	7.5	4	M	●
W00180.254	25	25	24.0	158	99	7.5	4	L	●
W00100.325	32	32	31.0	102	40	7.5	5	K	●
W00140.325	32	32	31.0	144	81	7.5	5	M	●
W00180.325	32	32	31.0	186	123	7.5	5	L	●

Inserts ZX 8mm					Delivery range: Packaging unit 10 pieces
Order-N°.	H	B	D	r	
W50410.008	8.4	6.4	3.4	0.6	●

Accessories			Delivery range clamping screws for inserts: Packaging unit 10 pieces
Order-N°.			
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08		●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08		●
W90100.008	Screwdriver Torx TX 08		●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0		●


**VII**

## Application




## Material


Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Steel  
1300 - 1500 N/mm<sup>2</sup>



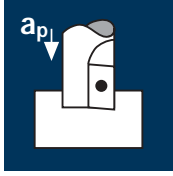
L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	250	0.100	4.5	20.0	3185	955	86.0
	32	4	250	0.100	4.5	25.6	2485	995	114.5
M	25	3	220	0.100	4.5	20.0	2800	840	75.5
	32	4	220	0.100	4.5	25.6	2190	875	101.0
L	25	3	220	0.100	4.0	10.0	2800	840	33.5
	32	4	220	0.100	4.0	12.8	2190	875	45.0

K	25	3	220	0.100	4.5	20.0	2800	840	75.5
	32	4	220	0.100	4.5	25.6	2190	875	101.0
M	25	3	180	0.100	4.5	20.0	2290	685	61.5
	32	4	180	0.100	4.5	25.6	1790	715	82.5
L	25	3	180	0.100	4.0	10.0	2290	685	27.5
	32	4	180	0.100	4.0	12.8	1790	715	36.5

K	25	3	180	0.080	4.5	20.0	2290	550	49.5
	32	4	180	0.080	4.5	25.6	1790	575	66.0
M	25	3	150	0.080	4.5	20.0	1910	460	41.5
	32	4	150	0.080	4.5	25.6	1490	475	54.5
L	25	3	140	0.080	4.0	10.0	1785	430	17.0
	32	4	140	0.080	4.0	12.8	1395	445	23.0


K	25	3	150	0.050	4.5	7.5	1910	285	9.5
	32	4	150	0.050	4.5	9.6	1490	300	13.0
M	25	3	120	0.050	4.5	7.5	1530	230	8.0
	32	4	120	0.050	4.5	9.6	1195	240	10.5
L	25	3	100	0.050	4.0	10.0	1275	190	7.5
	32	4	100	0.050	4.0	12.8	995	200	10.0

## Application




## Material

Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



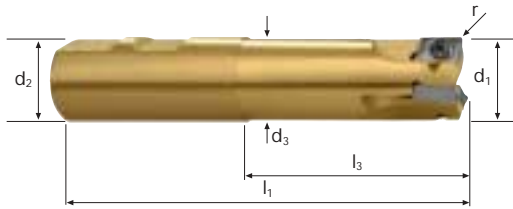
L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	180	0.100	3.6	25.0	2290	685	61.5
	32	4	180	0.100	3.6	32.0	1790	715	82.5
M	25	3	160	0.100	3.6	25.0	2035	610	55.0
	32	4	160	0.100	3.6	32.0	1590	635	73.0

K	25	3	150	0.080	3.6	25.0	1910	460	41.5
	32	4	150	0.080	3.6	32.0	1490	475	54.5
M	25	3	120	0.080	3.6	25.0	1530	365	33.0
	32	4	120	0.080	3.6	32.0	1195	380	44.0

# Corner/Slot end mills 90° NX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ 6°

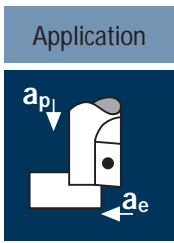


Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500							GG(G)
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Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts	
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type		
W00110.253	25	25	24.0	90	32	12.5	3	K	●	
W00150.253	25	25	24.0	124	65	12.5	3	M	●	
W00190.253	25	25	24.0	158	99	12.5	3	L	●	
W00110.324	32	32	31.0	102	40	12.5	4	K	●	
W00150.324	32	32	31.0	144	81	12.5	4	M	●	
W00190.324	32	32	31.0	186	123	12.5	4	L	●	

Inserts NX 13mm					Delivery range: Packaging unit 10 pieces	
Order-N°.	H	B	D	r		
W50110.013	14.8	8.1	4.7	0.8	●	

Accessories			Delivery range clamping screws for inserts: Packaging unit 10 pieces	
Order-N°.				
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15		●	
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15		●	
W90100.013	Screwdriver Torx TX 15		●	
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2		●	



Material

Hardened tool steel  
42 - 48 HRC

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	150	0.050	4.5	20.0	1910	285	25.5
	32	4	150	0.050	4.5	25.6	1490	300	34.5
M	25	3	120	0.070	4.5	15.0	1530	320	21.5
	32	4	120	0.070	4.5	19.2	1195	335	29.0
L	25	3	120	0.070	4.0	5.0	1530	320	6.5
	32	4	120	0.070	4.0	6.4	1195	335	8.5

Material

Hardened tool steel  
42 - 48 HRC

K	25	3	120	0.050	4.5	20.0	1530	230	20.5
	32	4	120	0.050	4.5	25.6	1195	240	27.5
M	25	3	100	0.070	4.5	15.0	1275	270	18.0
	32	4	100	0.070	4.5	19.2	995	280	24.0
L	25	3	100	0.070	4.0	5.0	1275	270	5.5
	32	4	100	0.070	4.0	6.4	995	280	7.0

Material

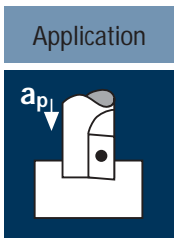
Hardened tool steel  
48 - 52 HRC

K	25	3	100	0.050	4.5	20.0	1275	190	17.0
	32	4	100	0.050	4.5	25.6	995	200	23.0
M	25	3	80	0.070	4.5	15.0	1020	215	14.5
	32	4	80	0.070	4.5	19.2	795	225	19.5
L	25	3	80	0.070	4.0	5.0	1020	215	4.5
	32	4	80	0.070	4.0	6.4	795	225	6.0

Material

Hardened tool steel  
52 - 56 HRC

K	25	3	40	0.020	4.5	7.5	510	30	1.0
	32	4	40	0.020	4.5	9.6	400	30	1.5
M	25	3	25	0.020	4.5	2.5	320	20	0.0
	32	4	25	0.020	4.5	3.2	250	20	0.5
L									



Material

Hardened tool steel  
48 - 52 HRC

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	100	0.050	3.6	25.0	1275	190	17.0
	32	4	100	0.050	3.6	32.0	995	200	23.0
M	25	3	80	0.070	3.0	25.0	1020	215	16.0
	32	4	80	0.070	3.0	32.0	795	225	21.5
L									

Material

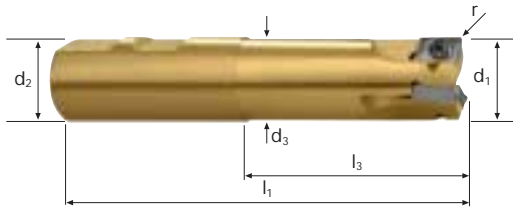
Hardened tool steel  
52 - 56 HRC

K	25	3	80	0.050	3.6	25.0	1020	155	14.0
	32	4	80	0.050	3.6	32.0	795	160	18.5
M	25	3	60	0.070	3.0	25.0	765	160	12.0
	32	4	60	0.070	3.0	32.0	595	165	16.0
L									

# Corner/Slot end mills 90° HX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ -10°



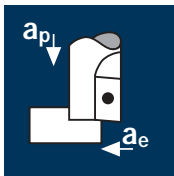
		Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60		Ti Titanium	GG(G)
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Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type	
W00110.253	25	25	24.0	90	32	12.5	3	K	●
W00150.253	25	25	24.0	124	65	12.5	3	M	●
W00190.253	25	25	24.0	158	99	12.5	3	L	●
W00110.324	32	32	31.0	102	40	12.5	4	K	●
W00150.324	32	32	31.0	144	81	12.5	4	M	●
W00190.324	32	32	31.0	186	123	12.5	4	L	●

Inserts HX 13mm					Delivery range: Packaging unit 10 pieces
Order-N°.	H	B	D	r	
W50210.013	14.7	8.1	4.7	0.8	●


Accessories			Delivery range clamping screws for inserts: Packaging unit 10 pieces
Order-N°.			
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15		●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15		●
W90100.013	Screwdriver Torx TX 15		●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2		●

## Application




## Material


Stainless steel  
[Cr-Ni/1.4301]




Stainless steel  
[Cr-Ni-Mo-.../1.4571]



Heat resistant steel  
[17-4 PH]



Nickel base  
alloys prec.-hard.  
[Inconel 718]



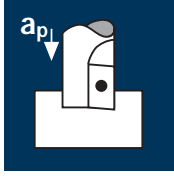
L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	150	0.050	4.5	20.0	1910	285	25.5
	32	4	150	0.050	4.5	25.6	1490	300	34.5
M	25	3	150	0.040	4.5	15.0	1910	230	15.5
	32	4	150	0.040	4.5	19.2	1490	240	20.5
L	25	3	150	0.050	4.0	10.0	1910	285	11.5
	32	4	150	0.050	4.0	12.8	1490	300	15.5

K	25	3	250	0.050	4.5	20.0	3185	480	43.0
	32	4	250	0.050	4.5	25.6	2485	495	57.0
M	25	3	250	0.040	4.5	15.0	3185	380	25.5
	32	4	250	0.040	4.5	19.2	2485	400	34.5
L	25	3	220	0.040	4.0	10.0	2800	335	13.5
	32	4	220	0.040	4.0	12.8	2190	350	18.0

K	25	3	120	0.050	4.5	20.0	1530	230	20.5
	32	4	120	0.050	4.5	25.6	1195	240	27.5
M	25	3	120	0.040	4.5	15.0	1530	185	12.5
	32	4	120	0.040	4.5	19.2	1195	190	16.5
L	25	3	120	0.040	4.0	10.0	1530	185	7.5
	32	4	120	0.040	4.0	12.8	1195	190	9.5

K	25	3	20	0.030	4.5	7.5	255	25	1.0
	32	4	20	0.030	4.5	9.6	200	25	1.0
M	25	3	20	0.020	4.5	2.5	255	15	0.2
	32	4	20	0.020	4.5	3.2	200	15	0.2
L									

## Application




## Material

Stainless steel  
[Cr-Ni/1.4301]



Heat resistant steel  
[17-4 PH]



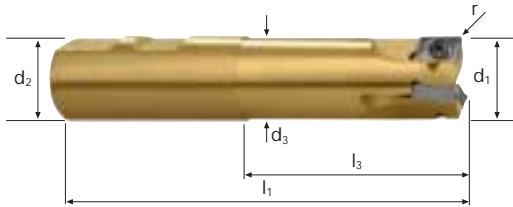
L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	120	0.050	3.6	25.0	1530	230	20.5
	32	4	120	0.050	3.6	32.0	1195	240	27.5
M	25	3	120	0.070	2.5	25.0	1530	320	20.0
	32	4	120	0.070	2.5	32.0	1195	335	27.0

K	25	3	100	0.050	3.6	25.0	1275	190	17.0
	32	4	100	0.050	3.6	32.0	995	200	23.0
M	25	3	100	0.070	2.5	25.0	1275	270	17.0
	32	4	100	0.070	2.5	32.0	995	280	22.5

# Corner/Slot end mills 90° SX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ 6°



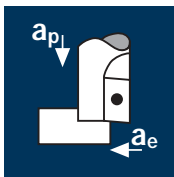
Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Tool Steel
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Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type	
W00110.253	25	25	24.0	90	32	12.5	3	K	●
W00150.253	25	25	24.0	124	65	12.5	3	M	●
W00190.253	25	25	24.0	158	99	12.5	3	L	●
W00110.324	32	32	31.0	102	40	12.5	4	K	●
W00150.324	32	32	31.0	144	81	12.5	4	M	●
W00190.324	32	32	31.0	186	123	12.5	4	L	●

Inserts SX 13mm					Delivery range: Packaging unit 10 pieces
Order-N°.	H	B	D	r	
W50310.013	14.8	8.1	4.7	0.8	●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces
Order-N°.		
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15	●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15	●
W90100.013	Screwdriver Torx TX 15	●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2	●

## Application



## Material

Nickel base alloys  
[Inconel 718]  
[Hastelloy B-3]  
[Nimonic 90]



Manganese steel  
Mn > 5 %  
[1.3964 / Nitronic]  
[1.3401 / X120Mn12]



Heat resistant steel  
[17-4 PH]  
[Duplex]



PM high-speed steel  
annealed  
[Bohler S390]  
[ASP 2023]



L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	40	0.040	4.5	7.5	510	60	2.0
	32	4	40	0.040	4.5	9.6	400	65	3.0
M	25	3	30	0.030	4.5	5.0	380	35	1.0
	32	4	30	0.030	4.5	6.4	300	35	1.0
L	25	3	20	0.020	4.5	3.8	255	15	0.5
	32	4	20	0.020	4.5	4.8	200	15	0.5

K	25	3	100	0.040	4.5	7.5	1275	155	5.0
	32	4	100	0.040	4.5	9.6	995	160	7.0
M	25	3	90	0.030	4.5	5.0	1145	105	2.5
	32	4	90	0.030	4.5	6.4	895	105	3.0
L	25	3	80	0.020	4.5	3.8	1020	60	1.0
	32	4	80	0.020	4.5	4.8	795	65	1.5

K	25	3	150	0.050	4.5	20.0	1910	285	25.5
	32	4	150	0.050	4.5	25.6	1490	300	34.5
M	25	3	140	0.040	4.5	15.0	1785	215	14.5
	32	4	140	0.040	4.5	19.2	1395	225	19.5
L	25	3	120	0.040	4.0	10.0	1530	185	7.5
	32	4	120	0.040	4.0	12.8	1195	190	9.5

K	25	3	120	0.050	4.5	7.5	1530	230	8.0
	32	4	120	0.050	4.5	9.6	1195	240	10.5
M	25	3	100	0.050	4.5	5.0	1275	190	4.5
	32	4	100	0.050	4.5	6.4	995	200	6.0
L	25	3	80	0.040	4.5	3.8	1020	120	2.0
	32	4	80	0.040	4.5	4.8	795	125	2.5

## Application



## Material

Manganese steel  
Mn > 5 %  
[1.3964 / Nitronic]  
[1.3401 / X120Mn12]



PM high-speed steel  
annealed  
[Bohler S390]  
[ASP 2023]



L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
K	25	3	80	0.040	1.5	25.0	1020	120	4.5
	32	4	80	0.040	1.5	32.0	795	125	6.0
M	25	3	60	0.030	1.0	25.0	765	70	2.0
	32	4	60	0.030	1.0	32.0	595	70	2.0

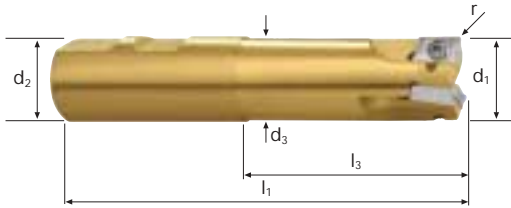
K	25	3	100	0.050	2.0	25.0	1275	190	9.5
	32	4	100	0.050	2.0	32.0	995	200	13.0
M	25	3	80	0.040	1.5	25.0	1020	120	4.5
	32	4	80	0.040	1.5	32.0	795	125	6.0



# Corner/Slot end mills 90° ZX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ 6°



**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Mangan-Steels HSS
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Corner/Slot end mills 90°									Delivery range: Cutter body incl. clamping screws for inserts
Order-N°.	d1	d2 h6	d3	l1	l3	ap <sub>max.</sub>	z	L-Type	
W00110.253	25	25	24.0	90	32	12.5	3	K	●
W00150.253	25	25	24.0	124	65	12.5	3	M	●
W00190.253	25	25	24.0	158	99	12.5	3	L	●
W00110.324	32	32	31.0	102	40	12.5	4	K	●
W00150.324	32	32	31.0	144	81	12.5	4	M	●
W00190.324	32	32	31.0	186	123	12.5	4	L	●

Inserts ZX 13mm					Delivery range: Packaging unit 10 pieces
Order-N°.	H	B	D	r	
W50410.013	14.8	8.1	4.7	0.8	●

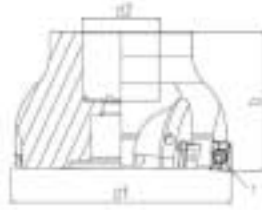
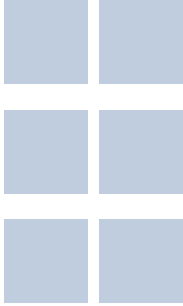
Accessories			Delivery range clamping screws for inserts: Packaging unit 10 pieces
Order-N°.			
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15		●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15		●
W90100.013	Screwdriver Torx TX 15		●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2		●



# Corner end mills 90° NX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8°
	$\gamma$ 0°



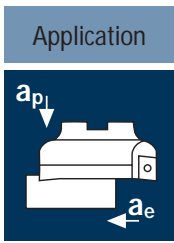
Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500							GG(G)
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Corner end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00400.405	40	16	40	7.5	5	●	
W00400.506	50	22	40	7.5	6	●	
W00400.637	63	22	40	7.5	7	●	
W00400.801	80	27	50	7.5	10	●	

Inserts NX 8mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50110.008	8.4	6.4	3.4	0.6	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08			●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08			●
W90100.008	Screwdriver Torx TX 08			●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0			●

VII



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	5	160	0.050	1.5	30.0	1275	320	14.5
50	6	160	0.050	1.5	37.5	1020	305	17.0
63	7	130	0.050	1.5	47.3	655	230	16.5
80	10	130	0.050	1.5	60.0	515	260	23.5

Hardened tool steel  
48 - 52 HRC

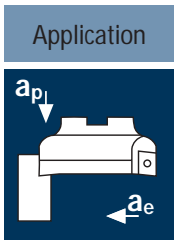
40	5	120	0.050	1.5	30.0	955	240	11.0
50	6	120	0.050	1.5	37.5	765	230	13.0
63	7	100	0.050	1.5	47.3	505	175	12.5
80	10	100	0.050	1.5	60.0	400	200	18.0

Hardened tool steel  
52 - 56 HRC

40	5	80	0.050	1.5	30.0	635	160	7.0
50	6	80	0.050	1.5	37.5	510	155	8.5
63	7	60	0.050	1.5	47.3	305	105	7.5
80	10	60	0.050	1.5	60.0	240	120	11.0

Hardened tool steel  
56 - 60 HRC

40	5	40	0.020	1.0	30.0	320	30	1.0
50	6	40	0.020	1.0	37.5	255	30	1.0
63	7	30	0.020	1.0	47.3	150	20	1.0
80	10	30	0.020	1.0	60.0	120	25	1.5



Material

Hardened tool steel  
42 - 48 HRC

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	5	160	0.050	5	6	1275	320	9.5
50	6	160	0.050	5	6	1020	305	9.0
63	7	130	0.050	5	6	655	230	7.0
80	10	130	0.050	5	6	515	260	8.0

Hardened tool steel  
48 - 52 HRC

40	5	120	0.050	5	6	955	240	7.0
50	6	120	0.050	5	6	765	230	7.0
63	7	100	0.050	5	6	505	175	5.5
80	10	100	0.050	5	6	400	200	6.0

Hardened tool steel  
52 - 56 HRC

40	5	100	0.050	5	6	795	200	6.0
50	6	100	0.050	5	6	635	190	5.5
63	7	80	0.050	5	6	405	140	4.0
80	10	80	0.050	5	6	320	160	5.0

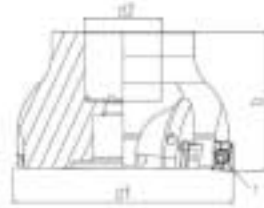
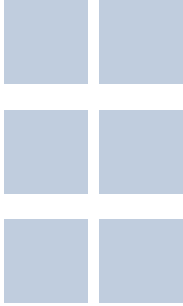
Hardened tool steel  
56 - 60 HRC

40	5	40	0.020	5	6	320	30	1.0
50	6	40	0.020	5	6	255	30	1.0
63	7	30	0.020	5	6	150	20	0.5
80	10	30	0.020	5	6	120	25	1.0

# Corner end mills 90° HX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ -8°
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		Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	GG(G)
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Corner end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00400.405	40	16	40	7.5	5	●	
W00400.506	50	22	40	7.5	6	●	
W00400.637	63	22	40	7.5	7	●	
W00400.801	80	27	50	7.5	10	●	

Inserts HX 8mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50210.008	8.5	6.4	3.5	0.6	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08			●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08			●
W90100.008	Screwdriver Torx TX 08			●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0			●

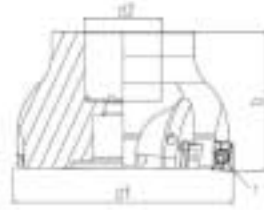
VII



# Corner end mills 90° SX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8°
	$\gamma$ 0°

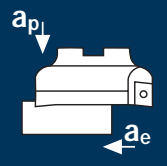






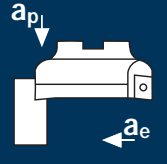




Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
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Corner/Slot end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00400.405	40	16	40	7.5	5	●	
W00400.506	50	22	40	7.5	6	●	
W00400.637	63	22	40	7.5	7	●	
W00400.801	80	27	50	7.5	10	●	

Inserts SX 8mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50310.008	8.4	6.4	3.4	0.6	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08			●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08			●
W90100.008	Screwdriver Torx TX 08			●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0			●

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Nickel base alloys [Inconel 718] [Hastelloy B-3] [Nimonic 90]	40	5	40	0.040	1.5	30.0	320	65	3.0
		50	6	40	0.040	1.5	37.5	255	60	3.5
		63	7	30	0.040	1.5	47.3	150	40	3.0
		80	10	30	0.040	1.5	50.0	120	50	4.0
	Manganese steel Mn > 5% [1.3964 / Nitronic] [1.3401 / X120Mn12]	40	5	100	0.040	1.5	30.0	795	160	7.0
		50	6	100	0.040	1.5	37.5	635	150	8.5
		63	7	80	0.040	1.5	47.3	405	115	8.0
		80	10	80	0.040	1.5	50.0	320	130	10.0
	Heat resistant steel [17-4 PH] [Duplex]	40	5	150	0.080	1.5	30.0	1195	480	21.5
		50	6	150	0.080	1.5	37.5	955	460	26.0
		63	7	120	0.080	1.5	47.3	605	340	24.0
		80	10	120	0.080	1.5	50.0	475	380	28.5
	PM high-speed steel annealed [Bohler S390] [ASP 2023]	40	5	120	0.050	1.5	30.0	955	240	11.0
		50	6	120	0.050	1.5	37.5	765	230	13.0
		63	7	100	0.050	1.5	47.3	505	175	12.5
		80	10	100	0.050	1.5	50.0	400	200	15.0
										

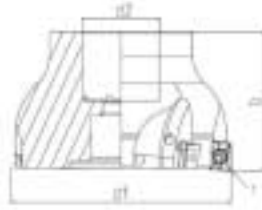
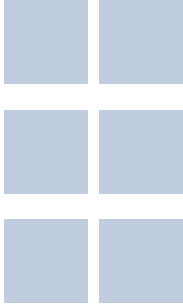
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Nickel base alloys [Inconel 718] [Hastelloy B-3] [Nimonic 90]	40	5	40	0.050	5	3	320	80	1.0
		50	6	40	0.050	5	3	255	75	1.0
		63	7	40	0.050	5	3	200	70	1.0
		80	10	40	0.050	5	3	160	80	1.0
	Manganese steel Mn > 5% [1.3964 / Nitronic] [1.3401 / X120Mn12]	40	5	100	0.060	5	6	795	240	7.0
		50	6	100	0.060	5	6	635	230	7.0
		63	7	100	0.060	5	6	505	210	6.5
		80	10	100	0.060	5	6	400	240	7.0
	Heat resistant steel [17-4 PH] [Duplex]	40	5	150	0.060	5	6	1195	360	11.0
		50	6	150	0.060	5	6	955	345	10.5
		63	7	150	0.060	5	6	760	320	9.5
		80	10	150	0.060	5	6	595	355	10.5
	PM high-speed steel annealed [Bohler S390] [ASP 2023]	40	5	120	0.060	5	6	955	285	8.5
		50	6	120	0.060	5	6	765	275	8.5
		63	7	120	0.060	5	6	605	255	7.5
		80	10	120	0.060	5	6	475	285	8.5
										



# Corner end mills 90° ZX

Inserts 8mm, with integral air / cooling channel

HM	$\lambda$ 8°
	$\gamma$ 0°



**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Mangan-Steels HSS
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Corner end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00400.405	40	16	40	7.5	5	●	
W00400.506	50	22	40	7.5	6	●	
W00400.637	63	22	40	7.5	7	●	
W00400.801	80	27	50	7.5	10	●	

Inserts ZX 8mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50410.008	8.4	6.4	3.4	0.6	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08			●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08			●
W90100.008	Screwdriver Torx TX 08			●
W90500.008	Clamping screws for inserts Torx TX 08 / M 2,5 x 5,0			●

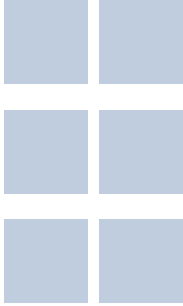
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>	40	4	220	0.100	2	30.0	1750	700	42.0
		50	5	220	0.100	2	37.5	1400	700	52.5
		63	6	200	0.100	2	47.3	1010	605	57.0
		80	8	200	0.100	2	60.0	795	635	76.0
	Steel 850 - 1100 N/mm <sup>2</sup>	40	4	200	0.100	2	30.0	1590	635	38.0
		50	5	200	0.100	2	37.5	1275	640	48.0
		63	6	180	0.100	2	47.3	910	545	51.5
		80	8	180	0.100	2	60.0	715	570	68.5
	Steel 1100 - 1300 N/mm <sup>2</sup>	40	4	180	0.080	2	30.0	1430	460	27.5
		50	5	180	0.080	2	37.5	1145	460	34.5
		63	6	150	0.080	2	47.3	760	365	34.5
		80	8	150	0.080	2	60.0	595	380	45.5
	Steel 1300 - 1500 N/mm <sup>2</sup>	40	4	150	0.050	2	30.0	1195	240	14.5
		50	5	150	0.050	2	37.5	955	240	18.0
		63	6	120	0.050	2	47.3	605	180	17.0
		80	8	120	0.050	2	60.0	475	190	23.0

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Steel < 850 N/mm <sup>2</sup>	40	4	220	0.120	10	8	1750	840	67.0
		50	5	220	0.120	10	8	1400	840	67.0
		63	6	200	0.120	10	8	1010	725	58.0
		80	8	200	0.120	10	8	795	765	61.0
	Steel 850 - 1100 N/mm <sup>2</sup>	40	4	200	0.100	10	8	1590	635	51.0
		50	5	200	0.100	10	8	1275	640	51.0
		63	6	180	0.100	10	8	910	545	43.5
		80	8	180	0.100	10	8	715	570	45.5
	Steel 1100 - 1300 N/mm <sup>2</sup>	40	4	180	0.080	10	8	1430	460	37.0
		50	5	180	0.080	10	8	1145	460	37.0
		63	6	150	0.080	10	8	760	365	29.0
		80	8	150	0.080	10	8	595	380	30.5
	Steel 1300 - 1500 N/mm <sup>2</sup>	40	4	150	0.050	10	8	1195	240	19.0
		50	5	150	0.050	10	8	955	240	19.0
		63	6	120	0.050	10	8	605	180	14.5
		80	8	120	0.050	10	8	475	190	15.0

# Corner end mills 90° NX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ 6°
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Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500							GG(G)
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Corner end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00410.404	40	16	40	12.5	4	●	
W00410.505	50	22	40	12.5	5	●	
W00410.636	63	22	40	12.5	6	●	
W00410.808	80	27	50	12.5	8	●	

Inserts NX 13mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50110.013	14.8	8.1	4.7	0.8	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15			●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15			●
W90100.013	Screwdriver Torx TX 15			●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2			●

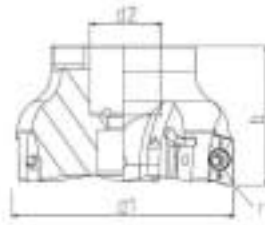
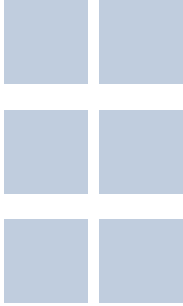
VII



# Corner end mills 90° HX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8° $\gamma$ -10°
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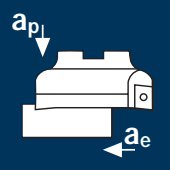
		Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Ti Titanium	GG(G)
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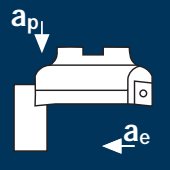
Corner end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00410.404	40	16	40	12.5	4	●	
W00410.505	50	22	40	12.5	5	●	
W00410.636	63	22	40	12.5	6	●	
W00410.808	80	27	50	12.5	8	●	

Inserts HX 13mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50210.013	14.7	8.1	4.7	0.8	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15			●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15			●
W90100.013	Screwdriver Torx TX 15			●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2			●

VII

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Stainless steel [Cr-Ni/1.4301]	40	4	120	0.080	2	30.0	955	305	18.5	
		50	5	120	0.080	2	37.5	765	305	23.0	
		63	6	100	0.080	2	47.3	505	240	22.5	
		80	8	100	0.080	2	50.0	400	255	25.5	
	Stainless steel [Cr-Ni-Mo-.../1.4571]	40	4	150	0.080	2	30.0	1195	380	23.0	
		50	5	150	0.080	2	37.5	955	380	28.5	
		63	6	120	0.080	2	47.3	605	290	27.5	
		80	8	120	0.080	2	50.0	475	305	30.5	
	Heat resistant steel [17-4 PH]	40	4	100	0.080	2	30.0	795	255	15.5	
		50	5	100	0.080	2	37.5	635	255	19.0	
		63	6	70	0.080	2	47.3	355	170	16.0	
		80	8	70	0.080	2	50.0	280	180	18.0	

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]	
	Stainless steel [Cr-Ni/1.4301]	40	4	110	0.060	10	8	875	210	17.0	
		50	5	110	0.060	10	8	700	210	17.0	
		63	6	80	0.060	10	8	405	145	11.5	
		80	8	80	0.060	10	8	320	155	12.5	
	Stainless steel [Cr-Ni-Mo-.../1.4571]	40	4	150	0.060	10	8	1195	285	23.0	
		50	5	150	0.060	10	8	955	285	23.0	
		63	6	120	0.060	10	8	605	220	17.5	
		80	8	120	0.060	10	8	475	230	18.5	
	Heat resistant steel [17-4 PH]	40	4	100	0.060	10	8	795	190	15.0	
		50	5	100	0.060	10	8	635	190	15.0	
		63	6	70	0.060	10	8	355	130	10.5	
		80	8	70	0.060	10	8	280	135	11.0	

# Corner end mills 90° SX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8°
	$\gamma$ 6°

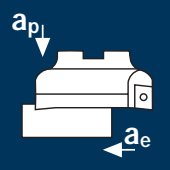





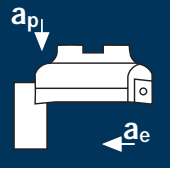



Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
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Corner end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00410.404	40	16	40	12.5	4	●	
W00410.505	50	22	40	12.5	5	●	
W00410.636	63	22	40	12.5	6	●	
W00410.808	80	27	50	12.5	8	●	

Inserts SX 13mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50310.013	14.8	8.1	4.7	0.8	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15			●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15			●
W90100.013	Screwdriver Torx TX 15			●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2			●

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Nickel base alloys [Inconel 718] [Hastelloy B-3] [Nimonic 90]	40	4	40	0.040	2	30.0	320	50	3.0
		50	5	40	0.040	2	37.5	255	50	4.0
		63	6	30	0.040	2	47.3	150	35	3.5
		80	8	30	0.040	2	50.0	120	40	4.0
	Manganese steel Mn > 5% [1.3964 / Nitronic] [1.3401 / X120Mn12]	40	4	100	0.040	2	30.0	795	125	7.5
		50	5	100	0.040	2	37.5	635	125	9.5
		63	6	80	0.040	2	47.3	405	95	9.0
		80	8	80	0.040	2	50.0	320	100	10.0
	Heat resistant steel [17-4 PH] [Duplex]	40	4	150	0.080	2	30.0	1195	380	23.0
		50	5	150	0.080	2	37.5	955	380	28.5
		63	6	120	0.080	2	47.3	605	290	27.5
		80	8	120	0.080	2	50.0	475	305	30.5
	PM high-speed steel annealed [Bohler S390] [ASP 2023]	40	4	120	0.050	2	30.0	955	190	11.5
		50	5	120	0.050	2	37.5	765	190	14.5
		63	6	100	0.050	2	47.3	505	150	14.0
		80	8	100	0.050	2	50.0	400	160	16.0

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Nickel base alloys [Inconel 718] [Hastelloy B-3] [Nimonic 90]	40	4	40	0.050	10	4	320	65	2.5
		50	5	40	0.050	10	4	255	65	2.5
		63	6	40	0.050	10	4	200	60	2.5
		80	8	40	0.050	10	4	160	65	2.5
	Manganese steel Mn > 5% [1.3964 / Nitronic] [1.3401 / X120Mn12]	40	4	100	0.060	10	8	795	190	15.0
		50	5	100	0.060	10	8	635	190	15.0
		63	6	100	0.060	10	8	505	180	14.5
		80	8	100	0.060	10	8	400	190	15.0
	Heat resistant steel [17-4 PH] [Duplex]	40	4	150	0.060	10	8	1195	285	23.0
		50	5	150	0.060	10	8	955	285	23.0
		63	6	150	0.060	10	8	760	275	22.0
		80	8	150	0.060	10	8	595	285	23.0
	PM high-speed steel annealed [Bohler S390] [ASP 2023]	40	4	120	0.060	10	8	955	230	18.5
		50	5	120	0.060	10	8	765	230	18.5
		63	6	120	0.060	10	8	605	220	17.5
		80	8	120	0.060	10	8	475	230	18.5



# Corner end mills 90° ZX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 8°
	$\gamma$ 6°



**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Mangan-Steels HSS
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Corner end mills 90°		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W00410.404	40	16	40	12.5	4	●	
W00410.505	50	22	40	12.5	5	●	
W00410.636	63	22	40	12.5	6	●	
W00410.808	80	27	50	12.5	8	●	

Inserts ZX 13mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r		
W50410.013	14.8	8.1	4.7	0.8	●	

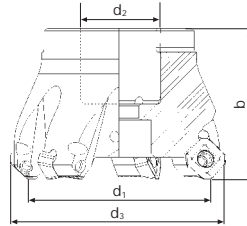
Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.013	Torque screwdriver <b>3.0 Nm</b> with blade Torx TX 15			●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15			●
W90100.013	Screwdriver Torx TX 15			●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2			●



# Face milling cutter 45° NX

Inserts 9mm, with integral air / cooling channel

HM	$\lambda$ 12° $\gamma$ -6°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500							GG(G)
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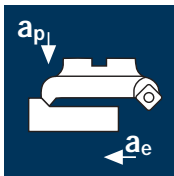
Face milling cutter 45°		Delivery range: Cutter body incl. clamping screws for inserts						
Order-N°.	d1	d2	d3	b	ap <sub>max.</sub>	z		
W01400.406	40	16	48.4	40	4.0	6	●	
W01400.507	50	22	58.4	40	4.0	7	●	
W01400.638	63	22	71.4	40	4.0	8	●	
W01400.809	80	27	88.4	50	4.0	9	●	
W01400.100	100	32	108.4	50	4.0	11	●	
W01400.125	125	40	133.4	63	4.0	12	●	

Inserts NX 9mm		Delivery range: Packaging unit 10 pieces			
Order-N°.	H	B	D		
W51110.009	9.5	9.5	4.0		●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces			
Order-N°.					
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08				●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08				●
W90100.008	Screwdriver Torx TX 08				●
W91500.009	Clamping screws for inserts Torx TX 08 / M 3,0 x 7,3				●

VII

### Application



### Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	6	130	0.120	2.5	30.0	1035	745	56.0
50	7	130	0.120	2.5	37.5	830	695	65.0
63	8	110	0.120	2.5	47.3	555	535	63.5
80	9	110	0.120	2.5	60.0	440	475	71.5
100	11	90	0.120	2.5	75.0	285	375	70.5
125	12	90	0.120	2.5	93.8	230	330	77.5

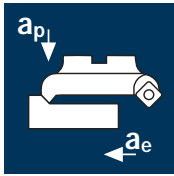
Stainless steel  
[Cr-Ni-Mo-.../1.4571]

40	6	200	0.120	2.5	30.0	1590	1145	86.0
50	7	200	0.120	2.5	37.5	1275	1070	100.5
63	8	180	0.120	2.5	47.3	910	875	103.5
80	9	180	0.120	2.5	60.0	715	770	115.5
100	11	160	0.120	2.5	75.0	510	675	126.5
125	12	160	0.120	2.5	93.8	405	585	137.0

Heat resistant steel  
[17-4 PH]

40	6	100	0.120	2.5	30.0	795	570	43.0
50	7	100	0.120	2.5	37.5	635	535	50.0
63	8	80	0.120	2.5	47.3	405	390	46.0
80	9	80	0.120	2.5	60.0	320	345	52.0
100	11	60	0.120	2.5	75.0	190	250	47.0
125	12	60	0.120	2.5	93.8	155	225	53.0

### Application



### Material

Stainless steel  
[Cr-Ni/1.4301]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	6	130	0.080	0.5	30.0	1035	495	7.5
50	7	130	0.080	0.5	37.5	830	465	8.5
63	8	110	0.080	0.5	47.3	555	355	8.5
80	9	110	0.080	0.5	60.0	440	315	9.5
100	11	90	0.080	0.5	75.0	285	250	9.5
125	12	90	0.080	0.5	93.8	230	220	10.5

Stainless steel  
[Cr-Ni-Mo-.../1.4571]

40	6	200	0.080	0.5	30.0	1590	765	11.5
50	7	200	0.080	0.5	37.5	1275	715	13.5
63	8	180	0.080	0.5	47.3	910	580	13.5
80	9	180	0.080	0.5	60.0	715	515	15.5
100	11	160	0.080	0.5	75.0	510	450	17.0
125	12	160	0.080	0.5	93.8	405	390	18.5

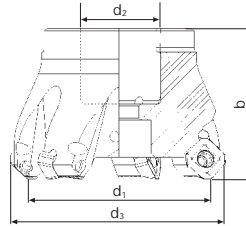
Heat resistant steel  
[17-4 PH]

40	6	100	0.080	0.5	30.0	795	380	5.5
50	7	100	0.080	0.5	37.5	635	355	6.5
63	8	80	0.080	0.5	47.3	405	260	6.0
80	9	80	0.080	0.5	60.0	320	230	7.0
100	11	60	0.080	0.5	75.0	190	165	6.0
125	12	60	0.080	0.5	93.8	155	150	7.0

# Face milling cutter 45° SX

Inserts 9mm, with integral air / cooling channel

HM	$\lambda$ 12° $\gamma$ -6°



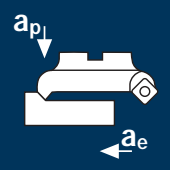




Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
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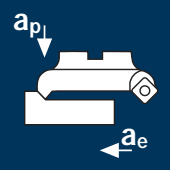




Face milling cutter 45°		Delivery range: Cutter body incl. clamping screws for inserts						
Order-N°.	d1	d2	d3	b	ap <sub>max.</sub>	z		
W01400.406	40	16	48.4	40	4.0	6	●	
W01400.507	50	22	58.4	40	4.0	7	●	
W01400.638	63	22	71.4	40	4.0	8	●	
W01400.809	80	27	88.4	50	4.0	9	●	
W01400.100	100	32	108.4	50	4.0	11	●	
W01400.125	125	40	133.4	63	4.0	12	●	

Inserts SX 9mm		Delivery range: Packaging unit 10 pieces			
Order-N°.	H	B	D		
W51310.009	9.5	9.5	4.0		●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08			●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08			●
W90100.008	Screwdriver Torx TX 08			●
W91500.009	Clamping screws for inserts Torx TX 08 / M 3,0 x 7,3			●

VII

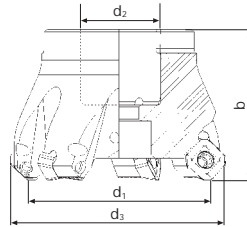
Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Nickel base alloys [Inconel 718] [Hastelloy B-3] [Nimonic 90]	40	6	40	0.060	2.0	30.0	320	115	7.0
		50	7	40	0.060	2.0	37.5	255	105	8.0
		63	8	30	0.060	2.0	47.3	150	70	6.5
		80	9	30	0.060	2.0	60.0	120	65	8.0
		100	11	20	0.060	2.0	75.0	65	45	7.0
		125	12	20	0.060	2.0	93.8	50	35	6.5
	Manganese steel Mn > 5% [1.3964 / Nitronic] [1.3401 / X120Mn12]	40	6	100	0.060	2.0	30.0	795	285	17.0
		50	7	100	0.060	2.0	37.5	635	265	20.0
		63	8	90	0.060	2.0	47.3	455	220	21.0
		80	9	90	0.060	2.0	60.0	360	195	23.5
		100	11	80	0.060	2.0	75.0	255	170	25.5
		125	12	80	0.060	2.0	93.8	205	150	28.0
	Heat resistant steel [17-4 PH] [Duplex]	40	6	140	0.120	2.5	30.0	1115	805	60.5
		50	7	140	0.120	2.5	37.5	890	750	70.5
		63	8	120	0.120	2.5	47.3	605	580	68.5
		80	9	120	0.120	2.5	60.0	475	515	77.5
		100	11	100	0.120	2.5	75.0	320	420	79.0
		125	12	100	0.120	2.5	93.8	255	365	85.5
	PM high-speed steel annealed [Bohler S390] [ASP 2023]	40	6	120	0.100	2.5	30.0	955	575	43.0
		50	7	120	0.100	2.5	37.5	765	535	50.0
		63	8	100	0.100	2.5	47.3	505	405	48.0
		80	9	100	0.100	2.5	60.0	400	360	54.0
		100	11	80	0.100	2.5	75.0	255	280	52.5
		125	12	80	0.100	2.5	93.8	205	245	57.5
										

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
	Nickel base alloys [Inconel 718] [Hastelloy B-3] [Nimonic 90]	40	6	40	0.080	0.5	30.0	320	155	2.5
		50	7	40	0.080	0.5	37.5	255	145	2.5
		63	8	30	0.080	0.5	47.3	150	95	2.0
		80	9	30	0.080	0.5	60.0	120	85	2.5
		100	11	20	0.080	0.5	75.0	65	55	2.0
		125	12	20	0.080	0.5	93.8	50	50	2.5
	Manganese steel Mn > 5% [1.3964 / Nitronic] [1.3401 / X120Mn12]	40	6	100	0.080	0.5	30.0	795	380	5.5
		50	7	100	0.080	0.5	37.5	635	355	6.5
		63	8	90	0.080	0.5	47.3	455	290	7.0
		80	9	90	0.080	0.5	60.0	360	260	8.0
		100	11	80	0.080	0.5	75.0	255	225	8.5
		125	12	80	0.080	0.5	93.8	205	195	9.0
	Heat resistant steel [17-4 PH] [Duplex]	40	6	150	0.080	0.5	30.0	1195	575	8.5
		50	7	150	0.080	0.5	37.5	955	535	10.0
		63	8	140	0.080	0.5	47.3	705	450	10.5
		80	9	140	0.080	0.5	60.0	555	400	12.0
		100	11	120	0.080	0.5	75.0	380	335	12.5
		125	12	120	0.080	0.5	93.8	305	295	14.0
	PM high-speed steel annealed [Bohler S390] [ASP 2023]	40	6	120	0.080	0.5	30.0	955	460	7.0
		50	7	120	0.080	0.5	37.5	765	430	8.0
		63	8	100	0.080	0.5	47.3	505	325	7.5
		80	9	100	0.080	0.5	60.0	400	290	8.5
		100	11	80	0.080	0.5	75.0	255	225	8.5
		125	12	80	0.080	0.5	93.8	205	195	9.0
										

# Face milling cutter 45° ZX

Inserts 9mm, with integral air / cooling channel

HM	$\lambda$ 12° $\gamma$ -6°



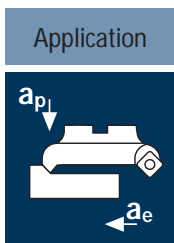
**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Mangan-Steels HSS
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Face milling cutter 45°		Delivery range: Cutter body incl. clamping screws for inserts						
Order-N°.	d1	d2	d3	b	ap <sub>max.</sub>	z		
W01400.406	40	16	48.4	40	4.0	6	●	
W01400.507	50	22	58.4	40	4.0	7	●	
W01400.638	63	22	71.4	40	4.0	8	●	
W01400.809	80	27	88.4	50	4.0	9	●	
W01400.100	100	32	108.4	50	4.0	11	●	
W01400.125	125	40	133.4	63	4.0	12	●	

Inserts ZX 9mm		Delivery range: Packaging unit 10 pieces			
Order-N°.	H	B	D		
W51410.009	9.5	9.5	4.0		●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.008	Torque screwdriver 1.2 Nm with blade Torx TX 08			●
W90111.008	Interchangeable blade for torque screwdriver Torx TX 08			●
W90100.008	Screwdriver Torx TX 08			●
W91500.009	Clamping screws for inserts Torx TX 08 / M 3,0 x 7,3			●



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	3	220	0.250	4.0	30.0	1750	1315	158.0
50	4	220	0.250	4.0	37.5	1400	1400	210.0
63	5	200	0.250	4.0	47.3	1010	1265	239.5
80	6	200	0.250	4.0	60.0	795	1195	287.0
100	7	180	0.250	4.0	75.0	575	1005	301.5
125	8	180	0.250	4.0	93.8	460	920	345.0

Material

Steel  
850 - 1100 N/mm<sup>2</sup>

40	3	200	0.250	4.0	30.0	1590	1195	143.5
50	4	200	0.250	4.0	37.5	1275	1275	191.5
63	5	180	0.250	4.0	47.3	910	1140	215.5
80	6	180	0.250	4.0	60.0	715	1075	258.0
100	7	160	0.250	4.0	75.0	510	895	268.5
125	8	160	0.250	4.0	93.8	405	810	304.0

Material

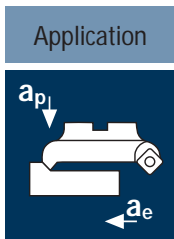
Steel  
1100 - 1300 N/mm<sup>2</sup>

40	3	160	0.220	4.0	30.0	1275	840	101.0
50	4	160	0.220	4.0	37.5	1020	900	135.0
63	5	140	0.220	4.0	47.3	705	775	146.5
80	6	140	0.220	4.0	60.0	555	735	176.5
100	7	120	0.220	4.0	75.0	380	585	175.5
125	8	120	0.220	4.0	93.8	305	535	200.5

Material

Steel  
1300 - 1500 N/mm<sup>2</sup>

40	3	120	0.200	4.0	30.0	955	575	69.0
50	4	120	0.200	4.0	37.5	765	610	91.5
63	5	100	0.200	4.0	47.3	505	505	95.5
80	6	100	0.200	4.0	60.0	400	480	115.0
100	7	80	0.200	4.0	75.0	255	355	106.5
125	8	80	0.200	4.0	93.8	205	330	124.0



Material

Steel  
< 850 N/mm<sup>2</sup>

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	3	220	0.165	0.5	30.0	1750	865	13.0
50	4	220	0.165	0.5	37.5	1400	925	17.5
63	5	200	0.165	0.5	47.3	1010	835	19.5
80	6	200	0.165	0.5	60.0	795	785	23.5
100	7	180	0.165	0.5	75.0	575	665	25.0
125	8	180	0.165	0.5	93.8	460	605	28.5

Material

Steel  
850 - 1100 N/mm<sup>2</sup>

40	3	200	0.165	0.5	30.0	1590	785	12.0
50	4	200	0.165	0.5	37.5	1275	840	16.0
63	5	180	0.165	0.5	47.3	910	750	17.5
80	6	180	0.165	0.5	60.0	715	710	21.5
100	7	160	0.165	0.5	75.0	510	590	22.0
125	8	160	0.165	0.5	93.8	405	535	25.0

Material

Steel  
1100 - 1300 N/mm<sup>2</sup>

40	3	160	0.145	0.5	30.0	1275	555	8.5
50	4	160	0.145	0.5	37.5	1020	590	11.0
63	5	140	0.145	0.5	47.3	705	510	12.0
80	6	140	0.145	0.5	60.0	555	485	14.5
100	7	120	0.145	0.5	75.0	380	385	14.5
125	8	120	0.145	0.5	93.8	305	355	16.5

Material

Steel  
1300 - 1500 N/mm<sup>2</sup>

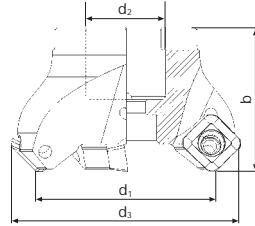
40	3	120	0.130	0.5	30.0	955	370	5.5
50	4	120	0.130	0.5	37.5	765	400	7.5
63	5	100	0.130	0.5	47.3	505	330	8.0
80	6	100	0.130	0.5	60.0	400	310	9.5
100	7	80	0.130	0.5	75.0	255	230	8.5
125	8	80	0.130	0.5	93.8	205	215	10.0



# Face milling cutter 45° NX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 13° $\gamma$ -6°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500							GG(G)
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Face milling cutter 45°		Delivery range: Cutter body incl. clamping screws for inserts						
Order-N°.	d1	d2	d3	b	ap <sub>max.</sub>	z		
W01410.403	40	16	54.0	40	6.0	3	●	
W01410.504	50	22	63.9	40	6.0	4	●	
W01410.635	63	22	76.9	40	6.0	5	●	
W01410.806	80	27	93.9	50	6.0	6	●	
W01410.100	100	32	113.9	50	6.0	7	●	
W01410.125	125	40	138.9	63	6.0	8	●	

Inserts NX 13mm		Delivery range: Packaging unit 10 pieces			
Order-N°.	H	B	D		
W51110.013	13.0	13.0	4.8		●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces			
Order-N°.					
W91110.013	Torque screwdriver 5.0 Nm with blade Torx TX 20				●
W91111.013	Interchangeable blade for torque screwdriver Torx TX 20				●
W91100.013	Screwdriver Torx TX 20				●
W91500.013	Clamping screws for inserts Torx TX 20 / M 4,5 x 10,5				●

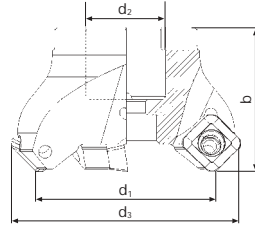
VII



# Face milling cutter 45° SX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 13° $\gamma$ -6°

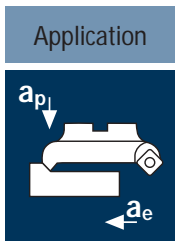


Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
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Face milling cutter 45°		Delivery range: Cutter body incl. clamping screws for inserts						
Order-N°.	d1	d2	d3	b	ap <sub>max.</sub>	z		
W01410.403	40	16	54.0	40	6.0	3	●	
W01410.504	50	22	63.9	40	6.0	4	●	
W01410.635	63	22	76.9	40	6.0	5	●	
W01410.806	80	27	93.9	50	6.0	6	●	
W01410.100	100	32	113.9	50	6.0	7	●	
W01410.125	125	40	138.9	63	6.0	8	●	

Inserts SX 13mm		Delivery range: Packaging unit 10 pieces			
Order-N°.	H	B	D		
W51310.013	13.0	13.0	4.8		●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces			
Order-N°.					
W91110.013	Torque screwdriver 5.0 Nm with blade Torx TX 20				●
W91111.013	Interchangeable blade for torque screwdriver Torx TX 20				●
W91100.013	Screwdriver Torx TX 20				●
W91500.013	Clamping screws for inserts Torx TX 20 / M 4,5 x 10,5				●



Material

Nickel base alloys  
[Inconel 718]  
[Hastelloy B-3]  
[Nimonic 90]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	3	40	0.060	3.0	30.0	320	60	5.5
50	4	40	0.060	3.0	37.5	255	60	7.0
63	5	30	0.060	3.0	47.3	150	45	6.5
80	6	30	0.060	3.0	60.0	120	45	8.0
100	7	20	0.060	3.0	75.0	65	25	5.5
125	8	20	0.060	3.0	93.8	50	25	7.0

Manganese steel  
Mn > 5%  
[1.3964 / Nitronic]  
[1.3401 / X120Mn12]

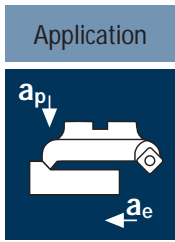
40	3	100	0.060	3.0	30.0	795	145	13.0
50	4	100	0.060	3.0	37.5	635	150	17.0
63	5	90	0.060	3.0	47.3	455	135	19.0
80	6	90	0.060	3.0	60.0	360	130	23.5
100	7	80	0.060	3.0	75.0	255	105	23.5
125	8	80	0.060	3.0	93.8	205	100	28.0

Heat resistant steel  
[17-4 PH]  
[Duplex]

40	3	150	0.120	4.0	30.0	1195	430	51.5
50	4	150	0.120	4.0	37.5	955	460	69.0
63	5	140	0.120	4.0	47.3	705	425	80.5
80	6	140	0.120	4.0	60.0	555	400	96.0
100	7	120	0.120	4.0	75.0	380	320	96.0
125	8	120	0.120	4.0	93.8	305	295	110.5

PM high-speed steel  
annealed  
[Bohler S390]  
[ASP 2023]

40	3	120	0.100	4.0	30.0	955	285	34.0
50	4	120	0.100	4.0	37.5	765	305	46.0
63	5	100	0.100	4.0	47.3	505	255	48.0
80	6	100	0.100	4.0	60.0	400	240	57.5
100	7	80	0.100	4.0	75.0	255	180	54.0
125	8	80	0.100	4.0	93.8	205	165	62.0



Material

Nickel base alloys  
[Inconel 718]  
[Hastelloy B-3]  
[Nimonic 90]

d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
40	3	40	0.080	0.5	30.0	320	75	1.0
50	4	40	0.080	0.5	37.5	255	80	1.5
63	5	30	0.080	0.5	47.3	150	60	1.5
80	6	30	0.080	0.5	60.0	120	60	2.0
100	7	20	0.080	0.5	75.0	65	35	1.5
125	8	20	0.080	0.5	93.8	50	30	1.5

Manganese steel  
Mn > 5%  
[1.3964 / Nitronic]  
[1.3401 / X120Mn12]

40	3	100	0.080	0.5	30.0	795	190	3.0
50	4	100	0.080	0.5	37.5	635	205	4.0
63	5	90	0.080	0.5	47.3	455	180	4.5
80	6	90	0.080	0.5	60.0	360	175	5.5
100	7	80	0.080	0.5	75.0	255	145	5.5
125	8	80	0.080	0.5	93.8	205	130	6.0

Heat resistant steel  
[17-4 PH]  
[Duplex]

40	3	150	0.080	0.5	30.0	1195	285	4.5
50	4	150	0.080	0.5	37.5	955	305	5.5
63	5	140	0.080	0.5	47.3	705	280	6.5
80	6	140	0.080	0.5	60.0	555	265	8.0
100	7	120	0.080	0.5	75.0	380	215	8.0
125	8	120	0.080	0.5	93.8	305	195	9.0

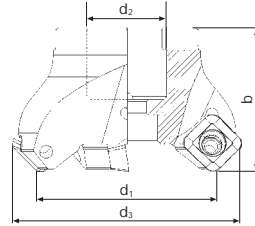
PM high-speed steel  
annealed  
[Bohler S390]  
[ASP 2023]

40	3	120	0.080	0.5	30.0	955	230	3.5
50	4	120	0.080	0.5	37.5	765	245	4.5
63	5	100	0.080	0.5	47.3	505	200	4.5
80	6	100	0.080	0.5	60.0	400	190	5.5
100	7	80	0.080	0.5	75.0	255	145	5.5
125	8	80	0.080	0.5	93.8	205	130	6.0

# Face milling cutter 45° ZX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 13° $\gamma$ -6°



**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Nickel-Alloys Mangan-Steels HSS
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Face milling cutter 45°		Delivery range: Cutter body incl. clamping screws for inserts						
Order-N°.	d1	d2	d3	b	ap <sub>max.</sub>	z		
W01410.403	40	16	54.0	40	6.0	3	●	
W01410.504	50	22	63.9	40	6.0	4	●	
W01410.635	63	22	76.9	40	6.0	5	●	
W01410.806	80	27	93.9	50	6.0	6	●	
W01410.100	100	32	113.9	50	6.0	7	●	
W01410.125	125	40	138.9	63	6.0	8	●	

Inserts ZX 13mm		Delivery range: Packaging unit 10 pieces			
Order-N°.	H	B	D		
W51410.013	13.0	13.0	4.8		●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W91110.013	Torque screwdriver 5.0 Nm with blade Torx TX 20			●
W91111.013	Interchangeable blade for torque screwdriver Torx TX 20			●
W91100.013	Screwdriver Torx TX 20			●
W91500.013	Clamping screws for inserts Torx TX 20 / M 4,5 x 10,5			●

# Indexable insert milling tools HFC

## High feed end mills for inserts 10mm



NX	$\lambda$ 2° $\gamma$ 14°	HFC	Rm 850-1500			713
SX	$\lambda$ 2° $\gamma$ 15°	HFC	Inox Stainless	Rm <850		715

## High feed end mills for inserts 13mm



NX	$\lambda$ 0° $\gamma$ 12°	HFC	Rm 850-1500			717
SX	$\lambda$ 0° $\gamma$ 13°	HFC	Inox Stainless	Rm <850		719

## High feed end mills for inserts 10mm



NX	$\lambda$ 2° $\gamma$ 14°	HFC	Rm 850-1500			721
SX	$\lambda$ 2° $\gamma$ 15°	HFC	Inox Stainless	Rm <850		723

## High feed end mills for inserts 13mm



NX	$\lambda$ 0° $\gamma$ 12°	HFC	Rm 850-1500			725
SX	$\lambda$ 0° $\gamma$ 13°	HFC	Inox Stainless	Rm <850		727

# Indexable insert milling tools HFC

## High feed end mills for inserts 10mm

N° W02400

**new!**



NX	$\lambda$ 4° $\gamma$ 16°	HFC	Rm 850-1500			729
SX	$\lambda$ 4° $\gamma$ 17°	HFC	Inox Stainless	Rm <850		731

## High feed end mills for inserts 13mm

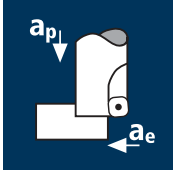
N° W02410

**new!**



NX	$\lambda$ 4° $\gamma$ 16°	HFC	Rm 850-1500			733
SX	$\lambda$ 4° $\gamma$ 17°	HFC	Inox Stainless	Rm <850		735

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Steel  
1300 - 1500 N/mm<sup>2</sup>



## Material

Steel  
1500 - 1800 N/mm<sup>2</sup>



Cast iron  
(lamellar / spheroidal)



L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	25	3	250	1.200	0.75	15.0	3185	11465	129.0
100-160	25	3	200	1.000	0.70	15.0	2545	7635	80.0
160-250	25	3	160	0.800	0.65	10.0	2035	4885	32.0

< 100	25	3	220	0.960	0.68	15.0	2800	8065	82.5
100-160	25	3	180	0.800	0.63	15.0	2290	5495	52.0
160-250	25	3	140	0.640	0.59	10.0	1785	3425	20.0

< 100	25	3	200	0.780	0.60	15.0	2545	5955	53.5
100-160	25	3	160	0.650	0.56	15.0	2035	3970	33.5
160-250	25	3	120	0.520	0.52	10.0	1530	2385	12.5

< 100	25	3	160	0.660	0.52	15.0	2035	4030	31.5
100-160	25	3	120	0.550	0.49	15.0	1530	2525	18.5
160-250	25	3	100	0.440	0.45	10.0	1275	1685	7.5

L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	25	3	140	0.420	0.49	15.0	1785	2250	16.5
100-160	25	3	100	0.350	0.45	15.0	1275	1340	9.0
160-250	25	3	80	0.280	0.42	10.0	1020	855	3.5

< 100	25	3	200	1.200	0.75	15.0	2545	9160	103.0
100-160	25	3	160	1.000	0.70	15.0	2035	6105	64.0
160-250	25	3	120	0.800	0.65	10.0	1530	3670	24.0

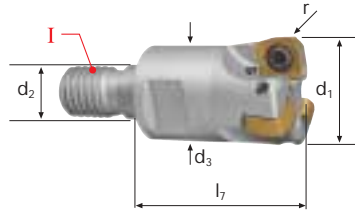


# High feed end mills NX

Inserts 10mm, with integral air / cooling channel

HM	$\lambda$ 2° $\gamma$ 14°
	HFC

**new!**



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56						GG(G)
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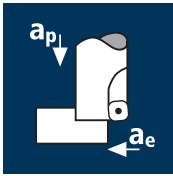
High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts								
Order-N°.	d1	d2	d3	l7	ap <sub>max.</sub>	z		I		
W02200.253	25	12.5	21	35	1.0	3	17	M12	●	

Inserts NX 10mm		Delivery range: Packaging unit 10 pieces					
Order-N°.	H	B	D	r	R <sub>theo.</sub>		
W52110.010	10.2	10.0	4.0	0.8	2.0	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15			●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15			●
W90100.013	Screwdriver Torx TX 15			●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2			●

VII

## Application



## Material

Stainless steel  
ferritic/martensitic



Stainless steel  
[Cr-Ni/1.4301]



Stainless steel  
[Cr-Ni-Mo-.../1.4571]



Heat resistant steel  
[17-4 PH]



$L_A$ [mm]	$d1$ [mm]	$z$	$v_c$ [m/min]	$f_z$ [mm]	$a_p$ [mm]	$a_e$ [mm]	$n$ [min <sup>-1</sup> ]	$v_f$ [mm/min]	$Q$ [cm <sup>3</sup> /min]
< 100	25	3	200	1.200	0.75	15.0	2545	9160	103.0
100-160	25	3	180	1.000	0.70	15.0	2290	6870	72.0
160-250	25	3	140	0.800	0.65	10.0	1785	4285	28.0

< 100	25	3	140	1.080	0.68	15.0	1785	5785	59.0
100-160	25	3	120	0.900	0.63	15.0	1530	4130	39.0
160-250	25	3	100	0.720	0.59	10.0	1275	2755	16.5

< 100	25	3	180	0.960	0.68	15.0	2290	6595	67.5
100-160	25	3	150	0.800	0.63	15.0	1910	4585	43.5
160-250	25	3	120	0.640	0.59	10.0	1530	2940	17.5

< 100	25	3	120	0.720	0.52	15.0	1530	3305	26.0
100-160	25	3	100	0.600	0.49	15.0	1275	2295	17.0
160-250	25	3	80	0.480	0.45	10.0	1020	1470	6.5

## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]



Steel  
< 850 N/mm<sup>2</sup>



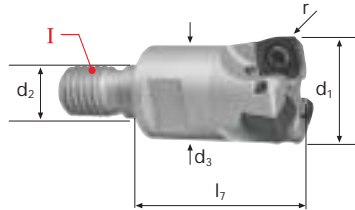
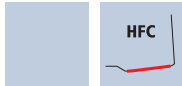
$L_A$ [mm]	$d1$ [mm]	$z$	$v_c$ [m/min]	$f_z$ [mm]	$a_p$ [mm]	$a_e$ [mm]	$n$ [min <sup>-1</sup> ]	$v_f$ [mm/min]	$Q$ [cm <sup>3</sup> /min]
< 100	25	3	120	0.840	0.52	15.0	1530	3855	30.0
100-160	25	3	100	0.700	0.49	15.0	1275	2680	19.5
160-250	25	3	80	0.560	0.45	10.0	1020	1715	7.5

< 100	25	3	220	1.200	0.75	15.0	2800	10080	113.5
100-160	25	3	180	1.000	0.70	15.0	2290	6870	72.0
160-250	25	3	140	0.800	0.65	10.0	1785	4285	28.0

# High feed end mills SX

Inserts 10mm, with integral air / cooling channel

HM	$\lambda$ 2° $\gamma$ 15°
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**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
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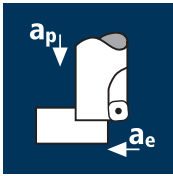
High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts							
Order-N°.	d1	d2	d3	l7	ap <sub>max.</sub>	z		I	
W02200.253	25	12.5	21	35	1.0	3	17	M12	●

Inserts SX 10mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r	R <sub>theo.</sub>	
W52310.010	10.2	10.0	4.0	0.8	2.0	●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces	
Order-N°.			
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15		●
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15		●
W90100.013	Screwdriver Torx TX 15		●
W90500.013	Clamping screws for inserts Torx TX 15 / M 3,5 x 7,2		●

VII

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	250	1.400	1.40	21.0	2275	9555	281.0
100-180	35	3	200	1.200	1.20	21.0	1820	6550	165.0
180-260	35	3	160	1.000	1.00	14.0	1455	4365	61.0

Steel  
850 - 1100 N/mm<sup>2</sup>



L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	220	1.120	1.26	21.0	2000	6720	178.0
100-180	35	3	180	0.960	1.08	21.0	1635	4710	107.0
180-260	35	3	140	0.800	0.90	14.0	1275	3060	38.5

Steel  
1100 - 1300 N/mm<sup>2</sup>



L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	200	0.910	1.12	21.0	1820	4970	117.0
100-180	35	3	160	0.780	0.96	21.0	1455	3405	68.5
180-260	35	3	120	0.650	0.80	14.0	1090	2125	24.0

Steel  
1300 - 1500 N/mm<sup>2</sup>



L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	160	0.770	0.98	21.0	1455	3360	69.0
100-180	35	3	120	0.660	0.84	21.0	1090	2160	38.0
180-260	35	3	100	0.550	0.70	14.0	910	1500	14.5

## Material

Steel  
1500 - 1800 N/mm<sup>2</sup>



L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	140	0.490	0.91	21.0	1275	1875	36.0
100-180	35	3	100	0.420	0.78	21.0	910	1145	19.0
180-260	35	3	80	0.350	0.65	14.0	730	765	7.0

Cast iron  
(lamellar / spheroidal)

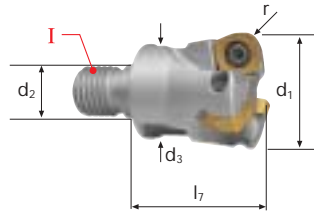
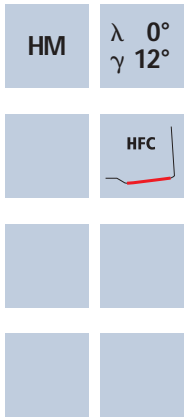


L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	200	1.400	1.40	21.0	1820	7645	225.0
100-180	35	3	160	1.200	1.20	21.0	1455	5240	132.0
180-260	35	3	120	1.000	1.00	14.0	1090	3270	46.0

# High feed end mills NX

Inserts 13mm, with integral air / cooling channel

**new!**



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56						GG(G)
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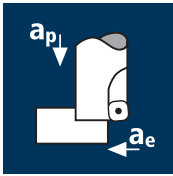
High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts								
Order-N°.	d1	d2	d3	l7	ap <sub>max.</sub>	z		I		
W02210.353	35	17	29	35	2.0	3	24	M16	●	

Inserts NX 13mm		Delivery range: Packaging unit 10 pieces					
Order-N°.	H	B	D	r	R <sub>theo.</sub>		
W52110.013	13.6	13.1	4.8	1.0	3.0	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W91110.013	Torque screwdriver 5.0 Nm with blade Torx TX 20			●
W91111.013	Interchangeable blade for torque screwdriver Torx TX 20			●
W91100.013	Screwdriver Torx TX 20			●
W91500.013	Clamping screws for inserts Torx TX 20 / M 4,5 x 10,5			●

VII

## Application



## Material

Stainless steel  
ferritic/martensitic



Stainless steel  
[Cr-Ni/1.4301]



Stainless steel  
[Cr-Ni-Mo-.../1.4571]



Heat resistant steel  
[17-4 PH]



L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	200	1.400	1.40	21.0	1820	7645	225.0
100-180	35	3	180	1.200	1.20	21.0	1635	5885	148.5
180-260	35	3	140	1.000	1.00	14.0	1275	3825	53.5

< 100	35	3	140	1.260	1.26	21.0	1275	4820	127.5
100-180	35	3	120	1.080	1.08	21.0	1090	3530	80.0
180-260	35	3	100	0.900	0.90	14.0	910	2455	31.0

< 100	35	3	180	1.120	1.26	21.0	1635	5495	145.5
100-180	35	3	150	0.960	1.08	21.0	1365	3930	89.0
180-260	35	3	120	0.800	0.90	14.0	1090	2615	33.0

< 100	35	3	120	0.840	0.98	21.0	1090	2745	56.5
100-180	35	3	100	0.720	0.84	21.0	910	1965	34.5
180-260	35	3	80	0.600	0.70	14.0	730	1315	13.0

## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]



Steel  
< 850 N/mm<sup>2</sup>



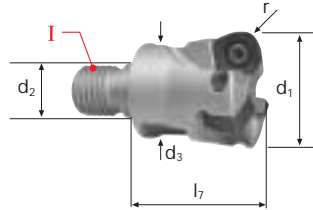
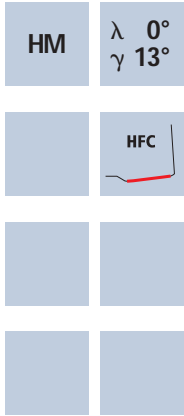
L <sub>A</sub> [mm]	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
< 100	35	3	120	0.980	0.98	21.0	1090	3205	66.0
100-180	35	3	100	0.840	0.84	21.0	910	2295	40.5
180-260	35	3	80	0.700	0.70	14.0	730	1535	15.0

< 100	35	3	220	1.400	1.40	21.0	2000	8400	247.0
100-180	35	3	180	1.200	1.20	21.0	1635	5885	148.5
180-260	35	3	140	1.000	1.00	14.0	1275	3825	53.5

# High feed end mills SX

Inserts 13mm, with integral air / cooling channel

**new!**



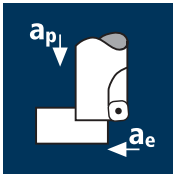
Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
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High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts							
Order-N°.	d1	d2	d3	l7	ap <sub>max.</sub>	z		I	
W02210.353	35	17	29	35	2.0	3	24	M16	●

Inserts SX 13mm		Delivery range: Packaging unit 10 pieces				
Order-N°.	H	B	D	r	R <sub>theo.</sub>	
W52310.013	13.6	13.1	4.8	1.0	3.0	●

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces	
Order-N°.			
W91110.013	Torque screwdriver 5.0 Nm with blade Torx TX 20		●
W91111.013	Interchangeable blade for torque screwdriver Torx TX 20		●
W91100.013	Screwdriver Torx TX 20		●
W91500.013	Clamping screws for inserts Torx TX 20 / M 4,5 x 10,5		●

## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Steel  
1300 - 1500 N/mm<sup>2</sup>



L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	25	3	200	1.000	0.70	15.0	2545	7635	80.0
XL	25	3	160	0.800	0.65	10.0	2035	4885	32.0

M	25	3	180	0.800	0.63	15.0	2290	5495	52.0
XL	25	3	140	0.640	0.59	10.0	1785	3425	20.0

M	25	3	160	0.650	0.56	15.0	2035	3970	33.5
XL	25	3	120	0.520	0.52	10.0	1530	2385	12.5

M	25	3	120	0.550	0.49	15.0	1530	2525	18.5
XL	25	3	100	0.440	0.45	10.0	1275	1685	7.5

## Material

Steel  
1500 - 1800 N/mm<sup>2</sup>



Cast iron  
(lamellar / spheroidal)



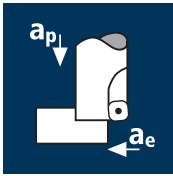
L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	25	3	100	0.350	0.45	15.0	1275	1340	9.0
XL	25	3	80	0.280	0.42	10.0	1020	855	3.5

M	25	3	160	1.000	0.70	15.0	2035	6105	64.0
XL	25	3	120	0.800	0.65	10.0	1530	3670	24.0





## Application



## Material

Stainless steel  
ferritic/martensitic



Stainless steel  
[Cr-Ni/1.4301]



Stainless steel  
[Cr-Ni-Mo-.../1.4571]



Heat resistant steel  
[17-4 PH]



## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]



Steel  
< 850 N/mm<sup>2</sup>



L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	25	3	180	1.000	0.70	15.0	2290	6870	72.0
XL	25	3	140	0.800	0.65	10.0	1785	4285	28.0

M	25	3	120	0.900	0.63	15.0	1530	4130	39.0
XL	25	3	100	0.720	0.59	10.0	1275	2755	16.5

M	25	3	150	0.800	0.63	15.0	1910	4585	43.5
XL	25	3	120	0.640	0.59	10.0	1530	2940	17.5

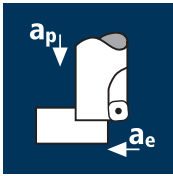
M	25	3	100	0.600	0.49	15.0	1275	2295	17.0
XL	25	3	80	0.480	0.45	10.0	1020	1470	6.5

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	25	3	100	0.700	0.49	15.0	1275	2680	19.5
XL	25	3	80	0.560	0.45	10.0	1020	1715	7.5

M	25	3	180	1.000	0.70	15.0	2290	6870	72.0
XL	25	3	140	0.800	0.65	10.0	1785	4285	28.0



## Application



## Material

Steel  
< 850 N/mm<sup>2</sup>



Steel  
850 - 1100 N/mm<sup>2</sup>



Steel  
1100 - 1300 N/mm<sup>2</sup>



Steel  
1300 - 1500 N/mm<sup>2</sup>



## Material

Steel  
1500 - 1800 N/mm<sup>2</sup>



Cast iron  
(lamellar / spheroidal)



L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	35	3	200	1.200	1.20	21.0	1820	6550	165.0
XL	35	3	160	1.000	1.00	14.0	1455	4365	61.0

M	35	3	180	0.960	1.08	21.0	1635	4710	107.0
XL	35	3	140	0.800	0.90	14.0	1275	3060	38.5

M	35	3	160	0.780	0.96	21.0	1455	3405	68.5
XL	35	3	120	0.650	0.80	14.0	1090	2125	24.0

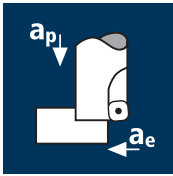
M	35	3	120	0.660	0.84	21.0	1090	2160	38.0
XL	35	3	100	0.550	0.70	14.0	910	1500	14.5

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	35	3	100	0.420	0.78	21.0	910	1145	19.0
XL	35	3	80	0.350	0.65	14.0	730	765	7.0

M	35	3	160	1.200	1.20	21.0	1455	5240	132.0
XL	35	3	120	1.000	1.00	14.0	1090	3270	46.0



## Application



## Material

Stainless steel  
ferritic/martensitic



Stainless steel  
[Cr-Ni/1.4301]



Stainless steel  
[Cr-Ni-Mo-.../1.4571]



Heat resistant steel  
[17-4 PH]



## Material

Titanium alloys  
>300 HB  
[Ti6Al4V]



Steel  
< 850 N/mm<sup>2</sup>



L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	35	3	180	1.200	1.20	21.0	1635	5885	148.5
XL	35	3	140	1.000	1.00	14.0	1275	3825	53.5

M	35	3	120	1.080	1.08	21.0	1090	3530	80.0
XL	35	3	100	0.900	0.90	14.0	910	2455	31.0

M	35	3	150	0.960	1.08	21.0	1365	3930	89.0
XL	35	3	120	0.800	0.90	14.0	1090	2615	33.0

M	35	3	100	0.720	0.84	21.0	910	1965	34.5
XL	35	3	80	0.600	0.70	14.0	730	1315	13.0

L-Type	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>z</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]	Q [cm <sup>3</sup> /min]
M	35	3	100	0.840	0.84	21.0	910	2295	40.5
XL	35	3	80	0.700	0.70	14.0	730	1535	15.0

M	35	3	180	1.200	1.20	21.0	1635	5885	148.5
XL	35	3	140	1.000	1.00	14.0	1275	3825	53.5



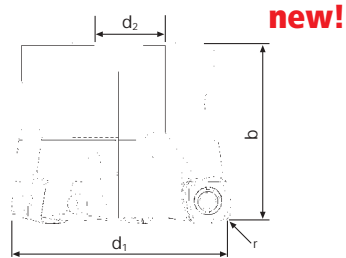




# High feed end mills NX

Inserts 10mm, with integral air / cooling channel

HM	$\lambda$ 4° $\gamma$ 16°
	HFC



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56					GG(G)
-------------	----------------	-----------------	-----------------	--------------	--	--	--	--	-------

High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W02400.404*	40	16	40	1.0	4	●	
W02400.505	50	22	40	1.0	5	●	
W02400.636	63	22	40	1.0	6	●	
W99510.010*	Powerscrew M8.0 x 30.0 (Torque 15.0 Nm)					●	
	Delivery range with Powerscrew						

Inserts NX 10mm		Delivery range: Packaging unit 10 pieces					
Order-N°.	H	B	D	r	R <sub>theo.</sub>		
W52110.010	10.2	10.0	4.0	0.8	2.0	●	

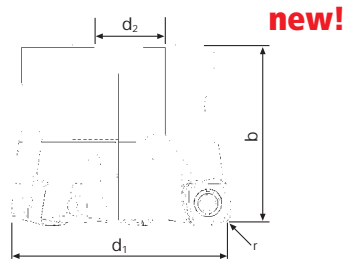
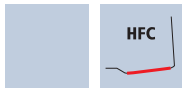
Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces					
Order-N°.							
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15					●	
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15					●	
W90100.013	Screwdriver Torx TX 15					●	
W92500.010	Clamping screws for inserts Torx TX 15 / M 3,5 x 8,6					●	



# High feed end mills SX

Inserts 10mm, with integral air / cooling channel

HM	$\lambda$ 4° $\gamma$ 17°
----	------------------------------



Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
-------------	----------------	--	--	--	--	--	-------------------	----------------	------------

High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W02400.404*	40	16	40	1.0	4	●	
W02400.505	50	22	40	1.0	5	●	
W02400.636	63	22	40	1.0	6	●	
W99510.010*	Powerscrew M8.0 x 30.0 (Torque 15.0 Nm)					●	
	Delivery range with Powerscrew						

Inserts SX 10mm		Delivery range: Packaging unit 10 pieces					
Order-N°.	H	B	D	r	R <sub>theo.</sub>		
W52310.010	10.2	10.0	4.0	0.8	2.0	●	

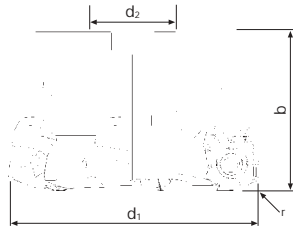
Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces					
Order-N°.							
W90110.013	Torque screwdriver 3.0 Nm with blade Torx TX 15					●	
W90111.013	Interchangeable blade for torque screwdriver Torx TX 15					●	
W90100.013	Screwdriver Torx TX 15					●	
W92500.010	Clamping screws for inserts Torx TX 15 / M 3,5 x 8,6					●	



# High feed end mills NX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 4° $\gamma$ 16°
	HFC



**new!**

Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56					GG(G)
-------------	----------------	-----------------	-----------------	--------------	--	--	--	--	-------

High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W02410.504	50	22	40	2.0	4	●	
W02410.635	63	22	40	2.0	5	●	
W02410.807	80	27	50	2.0	7	●	

Inserts NX 13mm		Delivery range: Packaging unit 10 pieces					
Order-N°.	H	B	D	r	R <sub>theo.</sub>		
W52110.013	13.6	13.1	4.8	1.0	3.0	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W91110.013	Torque screwdriver 5.0 Nm with blade Torx TX 20			●
W91111.013	Interchangeable blade for torque screwdriver Torx TX 20			●
W91100.013	Screwdriver Torx TX 20			●
W91500.013	Clamping screws for inserts Torx TX 20 / M 4,5 x 10,5			●

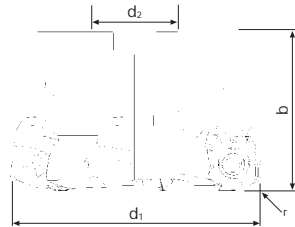
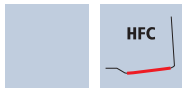
VII



# High feed end mills SX

Inserts 13mm, with integral air / cooling channel

HM	$\lambda$ 4° $\gamma$ 17°
----	------------------------------



**new!**

Rm < 850	Rm 850-1100						Inox Stainless	Ti Titanium	Tool Steel
-------------	----------------	--	--	--	--	--	-------------------	----------------	------------

High feed end mills		Delivery range: Cutter body incl. clamping screws for inserts					
Order-N°.	d1	d2	b	ap <sub>max.</sub>	z		
W02410.504	50	22	40	2.0	4	●	
W02410.635	63	22	40	2.0	5	●	
W02410.807	80	27	50	2.0	7	●	

Inserts SX 13mm		Delivery range: Packaging unit 10 pieces					
Order-N°.	H	B	D	r	R <sub>theo.</sub>		
W52310.013	13.6	13.1	4.8	1.0	3.0	●	

Accessories		Delivery range clamping screws for inserts: Packaging unit 10 pieces		
Order-N°.				
W91110.013	Torque screwdriver 5.0 Nm with blade Torx TX 20			●
W91111.013	Interchangeable blade for torque screwdriver Torx TX 20			●
W91100.013	Screwdriver Torx TX 20			●
W91500.013	Clamping screws for inserts Torx TX 20 / M 4,5 x 10,5			●

VII

# Accessories

## Torque screwdriver Torx with blade

Torque is pre-set according to table



Article-N°.	Torx-Dimension	Torque	€
W90110.008	TX 08	1.2 Nm	•
W90110.013	TX 15	3.0 Nm	•
W91110.013	TX 20	5.0 Nm	•

## Interchangeable blade for torque screwdriver



Article-N°.	Torx-Dimension	€
W90111.008	TX 08	•
W90111.013	TX 15	•
W91111.013	TX 20	•

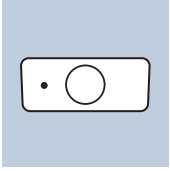
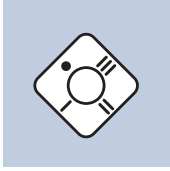
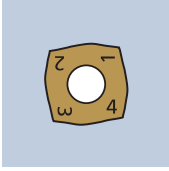
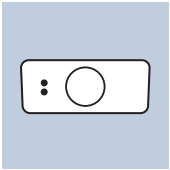
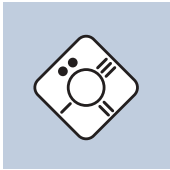
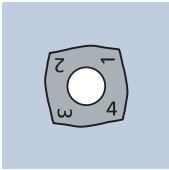
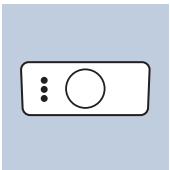
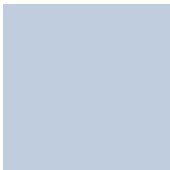
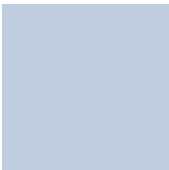
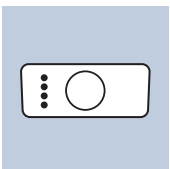
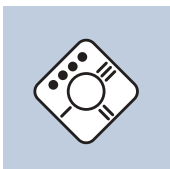
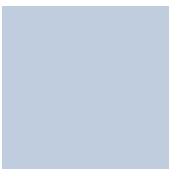
## Screwdriver Torx



Article-N°.	Torx-Dimension	€
W90100.008	TX 08	•
W90100.013	TX 15	•
W91100.013	TX 20	•



# Identification of the inserts

Type	Corner end mills	Face milling cutter	High feed end mills
NX			
SX			
HX			
ZX			





# Services

How to make optimum use of your tools

a passion for precision



## Processes

- Innovation
- Production
- Quality Management
- Client Research
- Customer Service
- ISO/EN certification

## Services

- Advice
- ToolExpert – cutting data software
- ConcepTool – customised tools
- ToolService – tool resetting service
- ReTool® – resharpening & recoating service for Fraisa tools
- ToolCare® – tool management systems
- ToolSchool – seminars

## Performance categories

- X-Generation
- Base-X
- Favora®
- HSS

## Products

- End mills carbide/HSS
- Drilling tools carbide/HSS
- Thread cutting tools carbide/HSS
- Indexable insert end mills
- Apprenticeships

## Customers

- More than 10,000 customers
- More than 1,000 ToolCare® partners

## **Service included**

Optimum products and services for maximum customer value. This is how we define our service vision. To that end, Fraisa services are playing an increasingly important role: direct individual customer service including tailor-made products and personal on-site advice, engineering, efficiency evaluation and the provision of cutting data, as well as support for streamlining a product range or selecting the optimum tool concept. Service is not only a crucial factor in establishing trust and interpersonal rapport but represents an area of expertise that secures greater productivity for our business partners, meaning long-term success in the marketplace.

ToolSchool Tool  
oolCare® Comp  
eTool® Conceptool TO  
oolExpert  
ToolCa

Service  
pany  
of Con

re®

## ToolCare®

A high-tech system of  
tool management

Page 744

## ToolService

Comprehensive tool  
resetting

Page 754

## ConcepTool

Customised tools

Page 762

## ToolSchool

Transfer of know-how by instruction  
and training

Page 772

S





# ToolCare<sup>®</sup>

A high-tech system of  
tool management

ToolCare<sup>®</sup>



S

## A high-tech system of tool management




**The tool cabinet which is always to hand**

Fraisa ToolCare® is a simple as well as practical tool management system, an individually defined, technically superb repository for customers. It is designed as a compact chest of drawers which the customer sets up and uses in the workplace. ToolCare® stores all the tools utilised in a production process on a consignment basis. This repository worth several thousand euros remains the property of Fraisa and is under its management. However, the user has open access at any time – most importantly at critical moments – to the tools needed in the production process.

**ToolCare® improves your market position**

The advantages of Fraisa's management system based on a loan agreement are striking: ToolCare® customers reduce capital commitments and costs by only paying for those tools which they actually use. In addition they have no need to deal with ordering, administration, maintenance or service, and can concentrate on their real areas of expertise. This is the perfect win-win situation. Even more so because the Fraisa application engineers are constantly on call to ensure ongoing improvement in tool use and to help streamline the product range. ToolCare® thus demonstrates that innovation by Fraisa can be an essential factor in the improvement of its customers' competitiveness.



## A high-tech system of tool management

### **Co-operation instead of confrontation**

«With ToolCare®, Fraisa eliminates the traditional conflict between sales and purchasing, replacing it with a value creation alliance in which each partner attends to the tasks they can perform best» – this statement made by Fraisa CEO Josef Maushart put it in a nutshell and convinced the industry from the outset. By now, more than 1,000 companies worldwide have come to rely on this new kind of partnership.

### **Costs reduced by 20 per cent**

Even with the substantial reduction in process costs that it enables, the advantages of ToolCare® are not just confined to its money saving potential. Another equally punchy recipe for success might be: less capital commitment plus lower administrative and storage costs resulting in greater profitability. All combined with extra service: as part of ToolService, Fraisa arranges to collect the used tools from the customer's business and returns them after resetting.

### **The performance criteria of ToolCare®**

- Availability around the clock
- Tools are always up to date
- No procurement costs
- No capital commitment
- Total clarity concerning usage
- Streamlined product range
- Workshops and training
- Tool resetting service included
- Free logistics



ToolCare®

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## A high-tech system of tool management

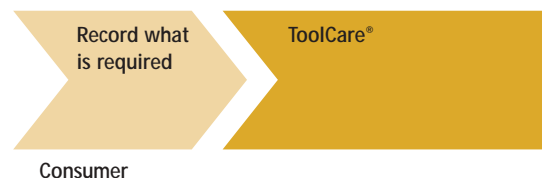
### More options thanks to electronics and software

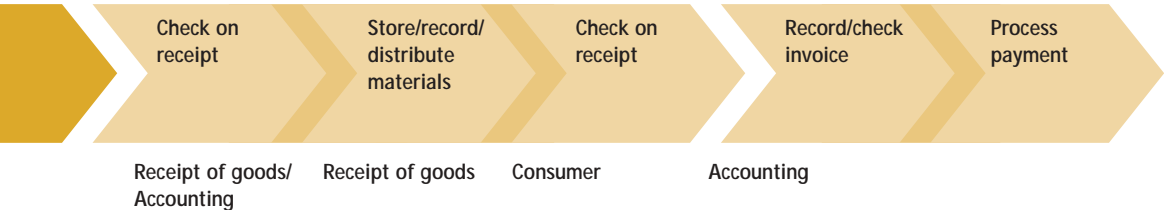
Computer-supported e-ToolCare® is the electronic progression of the tool management system. All administrative tasks, orders, statistics, etc. are recorded digitally. The program also contains an electronically generated catalogue with integrated application data. In this way it is possible to log precisely the use of tools per cabinet, per cost center and per employee. The cutting data for each tool can be called up. Fraisa is responsible for the installation of both hardware and software, having developed the relevant programs inhouse. Thanks to computer-supported inventory management, the situation where a customer with a large order suddenly does not have enough tools, or any at all, has definitely become a thing of the past.

### Standardised procurement chain without ToolCare®




### Standardised procurement chain with ToolCare®





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## A high-tech system of tool management

### ToolCare® is kind to your wallet as well!

ToolCare® is not only practical but helps you save money. And it's not a small amount either! Assuming a company's expenditure on tools to be 100,000 euros, the potential saving is at least a fifth, or a straight 20,000 euros. The ToolCare® benefit is generated from the reduction in the number of orders for tools, the elimination of capital costs for the repository of tools, and also the depreciation costs of 2,000 euros that are no longer applicable. Depreciation costs are incurred by firms which do not have any ToolCare® management because usually more tools are ordered – and paid for – than are in fact required.

### With ToolCare® you save at least a fifth of the costs of the tools

	Traditional order	With ToolCare®
Use of tools per year	100 000.–	100 000.–
Number of orders per year	100	12*
Process costs inhouse per order	200.–	100.–
Process costs per year **	<b>20 000.–</b>	<b>2 400.–</b>
Inventory	20 000.–	
Capital costs (8%)	<b>1 600.–</b>	
Depreciation costs (10%)	<b>2 000.–</b>	
<b>Total relevant costs</b>	<b>23 600.–</b>	<b>2 400.–</b>

**Potential saving: ≈ 21,200,  
or more than 20% of the volume of purchasing**

\* Residual orders for materials which are not part of the ToolCare® repository.

\*\* The data were ascertained from typical customer records.









# ToolService

Comprehensive tool  
resetting service

ToolService

ToolService  
WERKZEUGAUFBEREITUNG

S



## Comprehensive tool resetting service

### **ToolService unlimited**

The resetting service for our own tools – Fraisa ReTool®, a trade mark representing the highest quality and absolute reliability – has been very well known in the industry for some time. Fraisa can offer comparable expertise, perfection and service when resetting tools made by other producers. There is no doubt that the quality of its resharpener process is unrivaled.

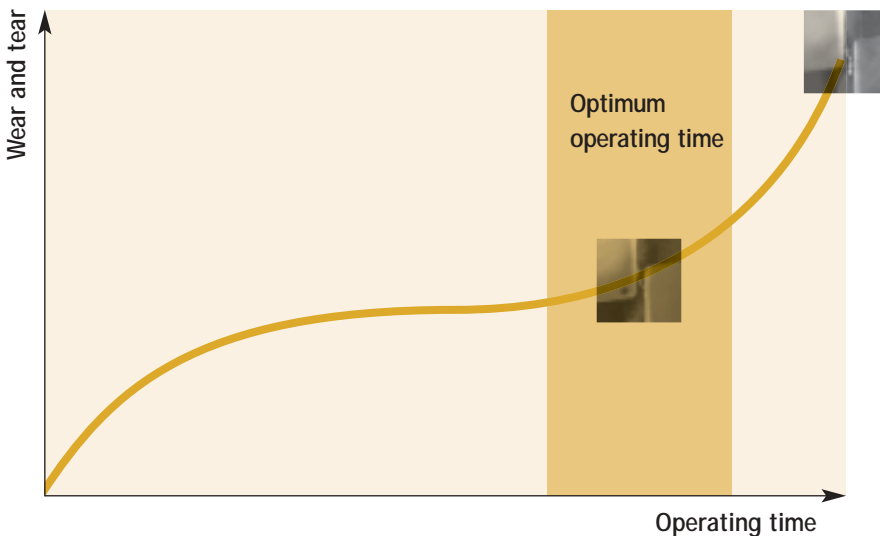


### Nothing but the best from a single supplier

Fraisa ToolService has a clear goal: to relieve customers of burdensome tasks so that they can focus on their main task of production. Resetting, that is resharpener, is in the very best hands because Fraisa boasts a wide variety of high-quality services. Beside the comprehensive resetting of end mill tools, we specialise in the polished bits of drilling tools. You will find a description of our other services in the main ToolService catalogue.

### Time is money

You will learn directly from your Fraisa application engineer how to optimise the operating time of your tools. It has been clearly established that the costs of tools are appreciably lower if tools are resharpener at the right time.





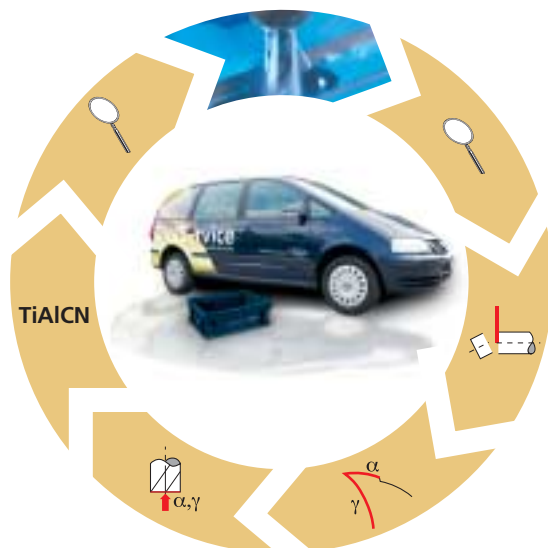
## Comprehensive tool resetting service

### **Simple, quick, straightforward: you can rely on it.**

«No resharpener service is quicker or better» – that is the motto of our global customer service. Rapid, practical, uncomplicated. Our service professionals are on the move every day. We fetch the tools, and return them perfectly ground within a few working days. In addition the Fraisa network is there for our customers, with our application engineers, ready with advice and support whenever you require it.

### **Fraisa ToolService – We make quick work of it**

Resetting at a glance: we collect, examine, renew the cutting edge geometry, coat, test and, working with our logistics partners, return the reset tools to your business.



## Quality guaranteed by expert processing

The latest multiaxial CNC-grinding machines, state-of-the-art measuring technology and the expert craftsmanship of our resetting specialists guarantee maximum performance from resharpened tools.

### Your benefits:

- Very attractive price/performance ratio
- No charge for logistics
- Flawless Fraisa quality with money back guarantee
- Short deadlines





## Comprehensive tool processing

### **ReTool®: resharpening Fraisa tools to the highest standards of competence and perfection**

The Fraisa resetting service for factory-owned tools has been a proven performer in the industry for some time. Our customers know that Fraisa ReTool® appreciably raises the value of their tools again, so that they will be able to trim expenditure considerably.



**A new tool after 480 min. operating time**



**Resharpened tool (ReTool®) after 480 min. operating time**

### **The ReTool® range includes all Fraisa products**

- End mill tools
- Drilling tools
- Thread cutting tools



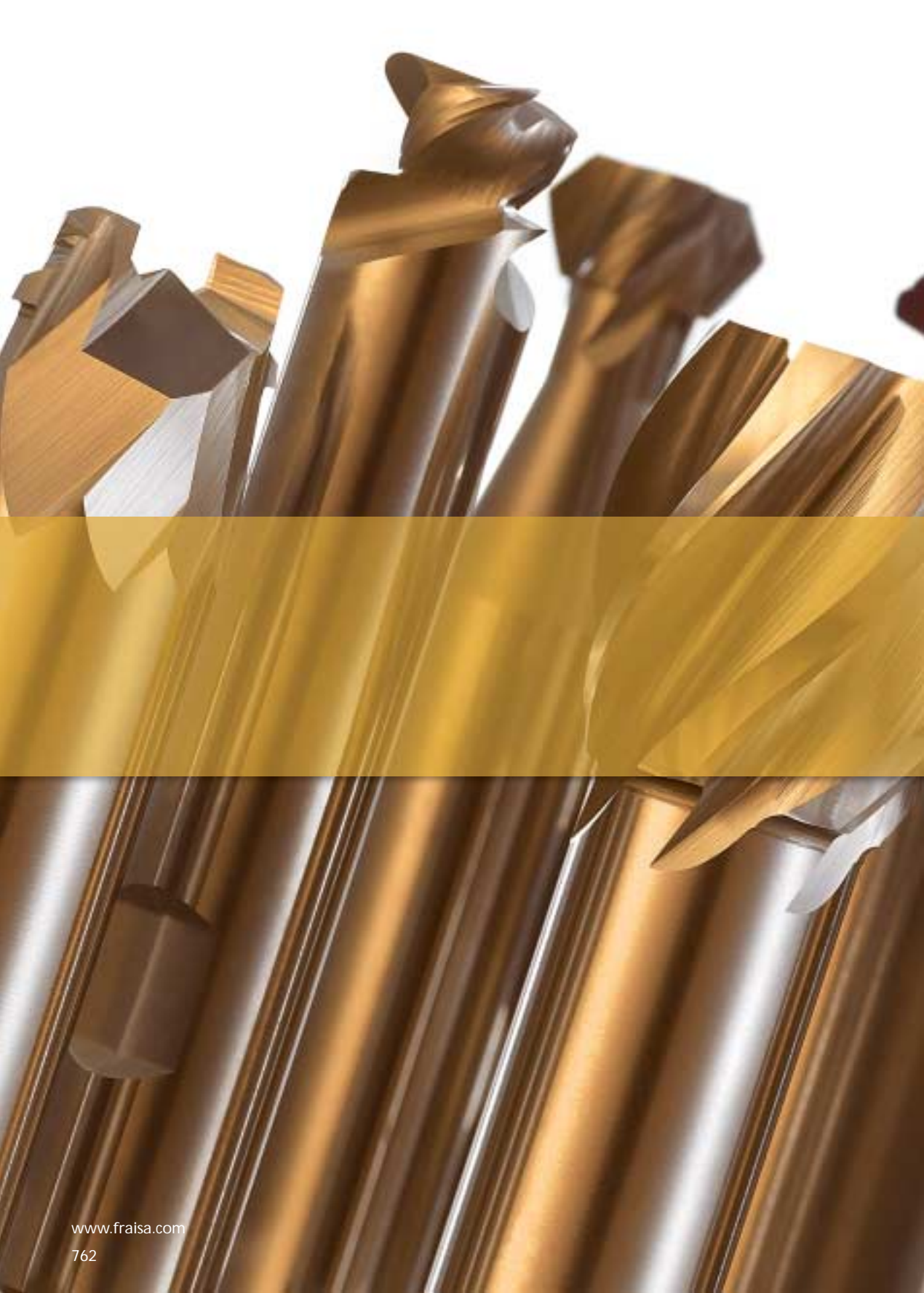
## ReTool® services and prices

You will find the complete range of resharpening and repair services with detailed prices in our resharpening service catalogue or on our homepage [www.fraisa.com](http://www.fraisa.com).



### Guaranteed reduction in cost!

- Continuous high- performance by machine tools throughout their entire service life
- Massive reduction in the costs of tools
- Significantly lower production costs
- High degree of process reliability even after first use
- Durability equal to that of new tools





# ConcepTool

Customised tools

ConcepTool

S



## Customised tools

### **You voice your wishes, we make them come true!**

Customised tools are tools made to your specification. Specially manufactured and adapted to your specific requirements, fine-tuned to current market standards. To this end, Fraisa deploys the best machines and materials, the latest technology and the entire know-how of the technological leader. We aim to support you in optimising your processes and minimising your costs. Fraisa customised tools are designed to deliver exceptional performance. Simply stated: ConcepTool optimises processes, boosts performance and raises productivity. In fact this is often achieved by combining several standard tools into a particularly productive customised tool.

One tool instead of three saves time and money.



## Any new, complex challenges? Let us address them!

There are many ways to achieve your goal. It is crucial to recognise the right one – and to make the right choice. Therefore, we don't just make new tools but also perform specific engineering tasks for you. This means that Fraisa works with you on site, in your workplace, to find the optimum solution. We evaluate cutting data, monitor performance and efficiency and also support you in running-in your processes. The following account gives an overview of the platform offered by Fraisa for customized tools.



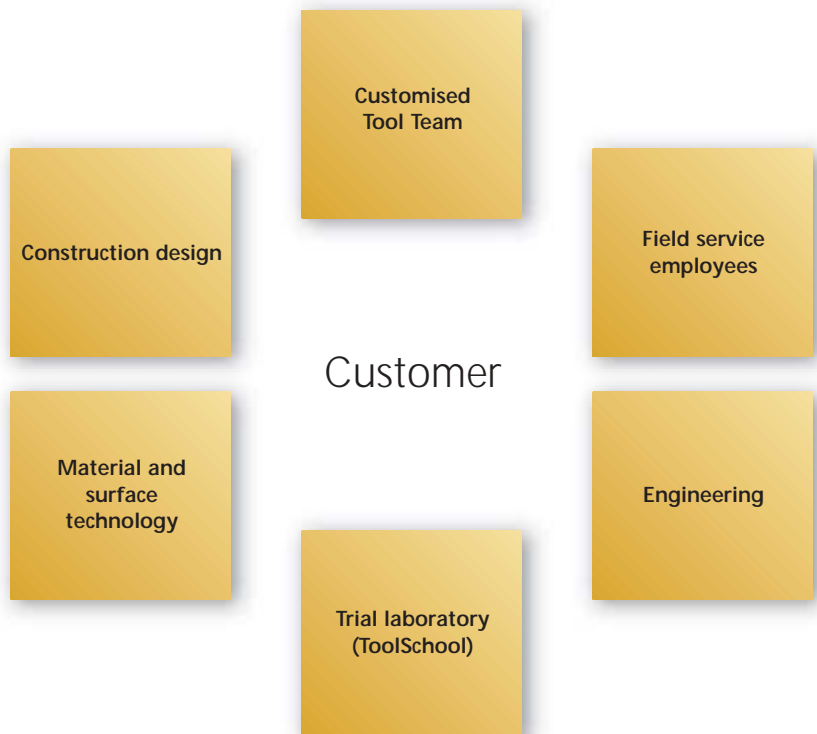


## Our service network, your customised tool

### Our service network, your customised tool

We develop the optimum tool for your specific operation. Our service network offers a wide range of possibilities for overcoming complex challenges. To this end we draw from a pool of partners to ensure that we meet your requirements with the latest know-how.

### Fraisa service network



## **Application consultants**

Our field service employees will advise you on site. They are highly qualified and always able to recognise requirements, develop strategies, initiate solutions and implement improvements. You only need to phone and your machine tool professional is on hand.

## **Customised Tool Team**

The Customised Tool Team is the hub and first point of contact. Fraisa technicians assess your specific operation and make a feasibility test. They clarify all the details, suggest solutions, calculate and offer you a specific price and schedule.

## **Engineering**

We set up a project team to mobilise our engineering know-how for complex tasks. Working with you and, if necessary, with the support of our own laboratory, the project is analysed on site and, carrying out a number of tests, the best solution is identified.

## **Trial laboratory (ToolSchool)**

Customer-specific materials whose chemical composition is not entirely known are tested and analysed in Fraisa's own laboratory. This enables the optimum operational data to be determined.

## **Material and surface technology**

We select the correct substrates, as well as the surface treatment and coating appropriate to the particular application. Our inhouse capacity for development in the area of treating materials and surfaces guarantees the very best results.

## **Construction design**

Our construction design offers you the visual support you need. We will be pleased to supply you with sketches of structural dimensions or 3D representations on request.



Four ways to achieve the goal.  
The aim is to ensure your success.

### 1 We adapt

You know exactly what you want: to adapt an existing standard tool from the Fraisa catalogue. From your precise specifications detailing a new length or a different diameter, we will produce a top quality solution, sensitive to cost and performance and in accordance with your needs.

The smallest details, **can have the greatest effect!**

### 2 We implement

You have a concrete suggestion and a detailed idea of the customised tool which you need. We define the optimum cutting edge geometry for your operation and develop, together with you, the perfect tool, producing it tailor-made and ready-to-use. Featuring, of course, the familiar Fraisa quality.

We develop a product based **on your idea!**

### 3 We develop something new

You know in principle which component is to be processed, but you don't yet know which tool is to be used. Based on your sketch of the component, and bearing in mind your machinery, we develop, together with you, a customised tool which is suitable for the specific process in question and features the optimum performance data. Thereby improving your performance!

**You know what, we know how!**





#### 4 We recreate

You own a sample tool which you need in similar format, but in new, top quality. Our modern measuring equipment gives us the capacity to determine precisely the measurements of existing tools, to analyse them in detail and to streamline their production. As a result, you are once more abreast of the latest trends.

## Old tool **but new quality!**



## ConcepTool range of services

**Much is possible. All will be well.**

If Fraisa doesn't stock it, it will get it. Simply put: we develop and produce what you request and need, even tool concepts and applications which are not in our catalogues. With our coating plants we can produce standard coatings for all kinds of customised tools. In conjunction with our partners we are producing new high-tech surfaces for this purpose. The challenge is to define the optimum tool geometry and the very best coating for each specific application.



## **Milling technology**

What we have to offer in end mill tools goes way beyond the standard range. We develop and produce every type of end mill cutter and milling drill. In addition we have tools with cutting inserts or with soldered carbide plates.

## **Drilling technology**

Our range includes drilling, counterboring and frictional tools, full carbide and HSS cutting inserts, or soldered carbide plates. Progressive dies and combination tools for complex processes are a typical Fraisa specialty.

## **Thread cutting technology**

Fraisa produces thread cutting tools for processing stud holes and through borings, as well as thread formers and thread cutting tools for internal and external threads. These are produced exclusively in full carbide.

## **Monitoring technology**

Our range: thread gauges made from high-quality gauge steel for monitoring internal and external threads of every kind and tolerance. In addition cylindrical gauges for monitoring drilling or shafts and setting gauges for measuring equipment.





# ToolSchool

Transfer of know-how by  
instruction and training

ToolSchool





## Transfer of know-how by instruction and training

### **ToolSchool – Transfer of know-how by instruction and training**

No-one is born a master of his trade, even in the high-tech industry: new knowledge has to be acquired, new technologies have to be learned and new tools tested out. Once and many times over. Therefore, Fraisa not only produces new tools, but informs future operators, in the inhouse ToolSchool, how to use them most effectively in practice, what the latest technologies are and what measures can be taken to improve customers' production processes and trim costs. Because it is absolutely key in an increasingly competitive market to be faster, better and cheaper.

### **A service from us. A tool for you.**

More than 1,500 customers worldwide attend the Fraisa ToolSchool every year. These are not only end-consumers, that is customers who use our tools in their business on a daily basis; we also pass on our knowledge to the Fraisa sales partners, who individually receive information and instruction about the latest techniques and tools so that they in turn can relay this know-how to their customers. Courses are held in German, French, English and Italian.



## **Profit for professionals. Passed on by professionals.**

Times are changing at a furious pace, and so are materials, machines and methods. This makes continuous professional development a pressing need. Exchanges with professional colleagues are essential. Progress requires us to relate theory to practice. In the Fraisa technology seminars, engineers with top qualifications train the specialists and managerial staff of specific areas of industry. Watchmakers, for example, learn about the latest developments in micro-milling technology and how to handle them; representatives of the aviation industry, on the other hand, learn all about hard material surfaces and how to incorporate them.

## **First work. Then pleasure.**

When you are learning a great deal you need an alert mind. Recreation and diversion are therefore particularly important after the exertions of the Tool-School. We cater for your needs. We organise travel and accommodation, plan a leisure programme on request, show you the town and surrounding area, and ensure that you generally feel well looked after. You will receive an individual certificate as confirmation of attendance at the end of the course or seminar.

Details of the training and dates, visit  
**[www. fraisa.com](http://www.fraisa.com)**.



# Legend to the product page

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## Performance rating



High performance end milling tools in the X-Generation class  
Highest performance and precision



Universal end milling tools in the Base-X class  
Universal application



End milling tools in the Favora® class  
Favourable and technically perfect



End milling tools in the HSS class  
Cost-effective alternative

## Performance

Roughing



Finishing








This index describes the performance of the tool in comparison to other products in the respective chapter. The more boxes that are filled, the better it is suited for each operation. There is always an index for the roughing and finishing applications.



# Legend to the product page

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## Tool technologies

-  **Vario** Milling tool with a variable helix angle
- Minimisation of oscillation and vibrations
  - Increase in material removal rates and tool life
-  Milling tool with a partially polished blade
- Reinforcement of the exposed cutting corner
  - Absorption of high cutting forces
-  Milling tool with scaled slot
- Extension of swarf space
  - Optimised chip removal
  - Highest possible axial and radial infeeds
-  Milling tool with a special protective chamfer
- Reinforcement of the main cutting edge against chipping
  - High tooth feed rates are possible in the case of smooth-edged tools
  - High axial and radial infeeds are possible in the case of profiled tools
-  Milling tool with special edge conditioning
- Conditioning of the main cutting edge for increased stability
  - Increase the mechanical and thermal load on the cutting edge
  - General increase in the tool life
-  Front chamfer and circular grinding chamfer
- Tool is supported in radial and axial directions
  - Reduced vibrations
  - Better surface quality from both side and end faces
-  Milling tool with a special groove geometry
- Optimised swarf/groove geometry for improved swarf removal
  - Optimised relationship between core diameter and swarf space for a high level of tool stability
-  **90°** Milling tool with a sharp cutting edge
- Special 90° version - sharp edged for special customer requirements
-  **h5** Milling tool with shank of h5 tolerance
- High concentric and eccentric precision
  - Optimal for modern precision chucks
-  **R** Ball nose end mill with special edge conditioning for rough machining
- Conditioning of the main cutting edge for increased stability
  - Significant increase in material removal rates compared to conventional ball nose mills
  - General increase in the tool life
-  **F** Ball nose end mill with special edge conditioning for finish machining
- Conditioning and smoothening of the main cutter profile
  - Long term contour precision and surface quality
  - General increase in the tool life

# Legend to the product page

## Tool technologies



- Ball nose end mill with a highly precise diameter tolerance
- Specially designed bearing tolerances simplify the programming and the secure finish of the end contour
  - Highly precise tolerance field for high dimensional accuracy



- Ball nose end mill with a highly precise radius tolerance
- Specially designed bearing tolerances simplify the programming and the secure finish of the end contour
  - Highly precise tolerance field for high dimensional accuracy



- Corner radius end mill with a highly precise diameter tolerance
- Specially designed bearing tolerances simplify the programming and the secure finish of the end contour
  - Highly precise tolerance field for high dimensional accuracy

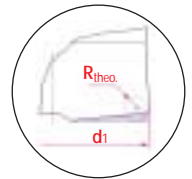


- Corner radius end mill with a highly precise radius tolerance
- Specially designed tolerances simplify the programming and the secure finish of the end contour
  - Highly precise tolerance field for high dimensional accuracy



- High feed cutting (HFC) tool
- Tool with a special cutting geometry for high feed cutting
  - High feeds are possible due to a defined swarf cross section distribution
  - Large swarf space for quick and trouble-free removal of the swarf
  - High removal volume with good contour convergency as well

The HFC tool has a theoretical programming radius ( $R_{theo.}$ ). This value is stated for each diameter in the data table on the catalogue page and, for the CNC/CAM programming, it is stated as a tool radius. However as a result of the  $R_{theo.}$  difference to the effective tool contour, residual material arises in the machining.



## Radial depth of cut $a_e$ for flat surfaces with HFC indexable insert tools

$d_1$ [mm]	Insert [mm]	$a_e$ [mm]
25	10	13.6
35	13	18.8
40	10	28.6
50	10	38.6
63	10	51.6
40	13	23.8
50	13	33.8
63	13	46.8

# Legend to the product page

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## Cutting tool substrate material

**HM  
XT**

Fine grain carbide. Hardness 1900 HV. Co content 9%.  
Characterised by a particularly high level of toughness.

**HM  
XA**

Fine grain carbide. Hardness 1950 HV. Co content 8%.  
Characterised by a particularly high level of abrasion resistance.

**HM  
XR**

Fine grain carbide. Hardness 1590 HV. Co content 10%.  
Characterised by a particularly high level of toughness.

**HM  
UT**

Fine grain carbide. Hardness 1680 HV. Co content 12%.  
Characterised by a particularly high level of toughness.

**HM  
MG10**

Fine grain carbide. Hardness 1600 HV. Co content 10%.

**HM  
Plus**

Ultrafine-grain carbide. Hardness 1800 HV. Co content 12%.

**HM  
Micro**

Ultrafine-grain carbide. Hardness 1680 HV. Co content 10%.

**HM**

Universal fine-grain carbide.

**CBN**

Cubic crystallized boron nitride (CBN). Hardness 4700 HV. Characterised by a particularly high level of abrasion resistance.

**HSS  
PM/F**

High-performance substrate material, powder metallurgically produced HSS alloys.

**HSS-E  
Co8**

High-performance high speed steel.

# Legend to the product page

## Form of the corner of the cutting edges



The corner between the front side blade and the circumference blade has a protective chamfer of 45°. The size of the protective chamfer is stated for each diameter in the data table on the catalogue page.



The tool is furnished with a corner radius. For every diameter the size of the radius is listed in the corresponding data table of the catalogue.



Ball nose tool.



The corner between front cutting edge and circumferential cutting edge is executed sharp-edged.



High feed cutting (HFC) tool. Tool with a special cutting geometry for high feed milling.

## Application suitability



A blue background means that the tool is particularly suitable for this material.



A light blue background means that the tool has good to adequate suitability for this material.

Chapter: Steel, stainless steel and titanium / 3D machining of steel / special forms

Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	
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Chapter: Aluminium and copper

Rm < 850			Al Aluminium > 99%	Al Aluminium Alloy	Al Aluminium Cast		Cu Copper	Plastic Thermoplast	
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Additional material which can be machined is stated in the additional field



# Legend to the product page

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## Shape of the shank / shank versions



Full carbide tools with a cylindrical shank: shank version in accordance with DIN 6535 HA



Full carbide tools with a cylindrical shank and a side clamping surface. Shank version in accordance with DIN 6535 HB



Short shank tools: In the diameter graduation and diameter tolerance, the shank corresponds to the DIN 6535 HB standard. The section behind the clamping surface is shortened.



HSS tools with a cylindrical shank and a side clamping surface: Shank version in accordance with DIN 1835 B

## NovoSys-X®



Full carbide shank, cylindrical, tolerance h6  
Form AA: cylindrical throughout or with neck  
Form BA: cylindrical shank and conical neck

## Indexable insert milling tools

shank version in accordance with DIN 1835 B



Bore receptacle with crosswise slot adherent to DIN 138

## Helix angle and rake angle

$\lambda$  45°  
 $\gamma$  5°

Helix and rake angles are particularly important characteristics of milling tools. Due to this fact, helix angle  $\lambda$  and rake angle  $\gamma$  are specified for each tool. The exact values can vary with the tool diameter.

## Crash angle $\alpha$




Tools with a smaller cutting diameter than the shank diameter need specific attention during machining. A crash can surely be avoided when the limiting side surfaces are sloped with at least a minimum angle, the crash angle  $\alpha$ , against the vertical.

The angle of collision is stated for each diameter in the data table on the catalogue page.

# Legend to the product page

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## Abbreviations

<b>d<sub>1</sub></b>	Diameter of the cutting edge [mm]
<b>d<sub>2</sub></b>	Shank diameter or bore diameter [mm]
<b>d<sub>3</sub></b>	Neck diameter or external diameter (face milling cutter) [mm]
<b>d<sub>4</sub></b>	Diameter of the neck before the neck-shank intersection [mm]
<b>d<sub>5</sub></b>	End face diameter [mm]
<b>l<sub>1</sub></b>	Total length of the tool [mm]
<b>l<sub>2</sub></b>	Length of cutting edge [mm]
<b>l<sub>3</sub></b>	Distance from the front of the tool to the end of the neck [mm]
<b>l<sub>5</sub></b>	Distance from the front of the shank to the end of the neck [mm]
<b>l<sub>6</sub></b>	Shank length [mm]
<b>l<sub>7</sub></b>	Head length [mm]
<b>Θ</b>	Tightening angle «Theta» between d <sub>3</sub> and d <sub>4</sub> [ ° - DEG]
<b>45°</b>	Size of the protective chamfer between the face end blade and the circumference blade [mm]
<b>r</b>	Corner radius [mm]
<b>α</b>	Collision angle «Alpha» [ ° - DEG]
<b>z</b>	Number of cutting edges
<b>R<sub>theo.</sub></b>	Theoretical programming radius (R <sub>theo.</sub> ) for HFC tools [mm] See information at Tool Technology HFC
<b>ap<sub>max</sub></b>	Maximum axial infeed [mm]
<b>b</b>	Tool height of shell end mills [mm]
<b>φ<sub>max</sub></b>	Maximum infeed angle
<b>H</b>	Height of the insert
<b>B</b>	Width of the insert
<b>D</b>	Thickness of the insert
<b>L-Typ</b>	Version: K = short; N = normal; M = medium; L = long; XL = extra long
<b>I</b>	Interface: Interface parameters
	Width across flats. Please note information on installation and torque in the NovoSys X® accessories section.

# Information for cutting data

## Coating suitability related to dry or wet machining conditions



- A: Excellent suitability of the coating A during wet machining.  
 B: The suitability of the coating B during wet machining is sufficient to good.  
 C: Excellent suitability of the coating C during dry machining.  
 D: The suitability of the coating D during dry machining is sufficient to good.

## Infeed angle for monoblock milling tools

Chapter: Steel, stainless steel and titanium												
Material group	Rm 850-1500			HRC 48 - 60			Inox Stainless			Ti Titanium		
Version	N	M	L	N	M	L	N	M	L	N	M	L
Feed rate vf [%]	100%			100%			80%			80%		
z = 2	2.50°	1.80°	1.00°	1.50°	1.00°	0.60°	2.50°	1.80°	1.00°	2.50°	1.80°	1.00°
z = 3	2.00°	1.20°	0.80°	1.00°	0.65°	0.40°	2.00°	1.20°	0.80°	2.00°	1.20°	0.80°
z = 4	1.00°	0.65°	0.40°	0.50°	0.35°	0.20°	1.00°	0.65°	0.40°	1.00°	0.65°	0.40°
z > 4	0.40°	0.30°	0.20°	0.20°	0.15°	0.10°	0.40°	0.30°	0.20°	0.40°	0.30°	0.20°

Chapter: 3D machining												
Material group	Rm 850-1500			HRC 48 - 60			Inox Stainless			Ti Titanium		
Version	N	M	L	N	M	L	N	M	L	N	M	L
Feed rate vf [%]	100%			100%			80%			80%		
z = 2	0.50°	0.35°	0.25°	0.25°	0.20°	0.10°	0.50°	0.35°	0.25°	0.50°	0.35°	0.25°
z = 4	0.30°	0.25°	0.15°	0.20°	0.15°	0.10°	0.30°	0.25°	0.15°	0.30°	0.25°	0.15°
z > 4	0.20°	0.15°	0.10°	0.15°	0.10°	0.10°	0.20°	0.15°	0.10°	0.20°	0.15°	0.10°
HFC	0.50°	0.35°	0.25°	0.40°	0.30°	0.20°	0.50°	0.35°	0.25°	0.50°	0.35°	0.25°

## Infeed angle for NovoSys X<sup>®</sup> milling tools

Chapter: Steel, stainless steel and titanium												
Material group	Rm 850-1500			HRC 48 - 60			Inox Stainless			Ti Titanium		
L-Type	N	M	L	N	M	L	N	M	L	N	M	L
Feed rate vf [%]	100%			100%			80%			80%		
z = 3	1.00°	0.60°	0.40°	0.60°	0.45°	0.30°	1.00°	0.60°	0.40°	1.00°	0.60°	0.40°
z = 4	0.50°	0.40°	0.30°	0.40°	0.30°	0.20°	0.50°	0.40°	0.30°	0.50°	0.40°	0.30°
z > 4	0.30°	0.25°	0.20°	0.20°	0.15°	0.10°	0.30°	0.25°	0.20°	0.30°	0.25°	0.20°

Chapter: 3D machining												
Material group	Rm 850-1500			HRC 48 - 60			Inox Stainless			Ti Titanium		
L-Type	N	M	L	N	M	L	N	M	L	N	M	L
Feed rate vf [%]	100%			100%			80%			80%		
z = 2	0.15°	0.10°	0.10°	0.10°	0.10°	0.10°	0.15°	0.10°	0.10°	0.15°	0.10°	0.10°
z = 4	0.20°	0.15°	0.15°	0.15°	0.10°	0.10°	0.20°	0.15°	0.15°	0.20°	0.15°	0.15°
z > 4	0.15°	0.10°	0.10°	0.10°	0.10°	0.10°	0.15°	0.10°	0.10°	0.15°	0.10°	0.10°
HFC	0.10°	0.10°	0.10°	0.10°	0.10°	0.10°	0.10°	0.10°	0.10°	0.10°	0.10°	0.10°

# Information for cutting data

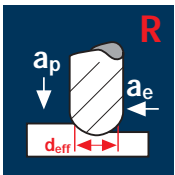
## Infeed angle for indexable insert milling tools

Chapter: Steel, stainless steel and titanium and 3D machining													
Material group		Rm 850-1500			HRC 48 - 60			Inox Stainless			Ti Titanium		
Version		K	M	L/XL	K	M	L/XL	K	M	L/XL	K	M	L/XL
Feed rate vf [%]		100%			100%			80%			80%		
d <sub>1</sub>													
Corner-/Slot end mills 8mm	16	1.00°	0.80°	0.60°	0.70°	0.55°	0.40°	1.00°	0.80°	0.60°	1.00°	0.80°	0.60°
Corner-/Slot end mills 8mm	20	0.75°	0.60°	0.45°	0.55°	0.40°	0.30°	0.75°	0.60°	0.45°	0.75°	0.60°	0.45°
Corner-/Slot end mills 8mm	25	0.75°	0.60°	0.45°	0.55°	0.40°	0.30°	0.75°	0.60°	0.45°	0.75°	0.60°	0.45°
Corner-/Slot end mills 8mm	32	0.50°	0.40°	0.30°	0.35°	0.30°	0.20°	0.50°	0.40°	0.30°	0.50°	0.40°	0.30°
Corner-/Slot end mills 13mm	25	2.00°	1.60°	1.20°	1.40°	1.10°	0.85°	2.00°	1.60°	1.20°	2.00°	1.60°	1.20°
Corner-/Slot end mills 13mm	32	1.60°	1.30°	0.95°	1.10°	0.90°	0.65°	1.60°	1.30°	0.95°	1.60°	1.30°	0.95°
Corner end mills 8mm	40 ; 50	0.20°			0.20°			0.20°			0.20°		
Corner end mills 8mm	63 ; 80	0.10°			0.10°			0.10°			0.10°		
Corner end mills 13mm	40 ; 50	0.40°			0.40°			0.40°			0.40°		
Corner end mills 13mm	63 ; 80	0.20°			0.20°			0.20°			0.20°		
Face milling cutter	40 ; 50	0.15°			0.15°			0.15°			0.15°		
Face milling cutter	63 ; 80	0.10°			0.10°			0.10°			0.10°		
Face milling cutter	100 ; 125	X			X			X			X		
High feed end mills	25 ; 35	0.60°	0.40°	0.20°	0.50°	0.30°	0.15°	0.60°	0.40°	0.20°	0.60°	0.40°	0.20°
High feed end mills	40 ; 50	0.40°			0.30°			0.40°			0.40°		
High feed end mills	63 ; 80	0.20°			0.15°			0.20°			0.20°		

### Application notes can be found in the chapter 3D

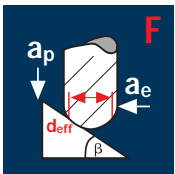
The application symbols are on the left next to the cutting data.

The red letter, top right, provides information concerning strategy in relation to the stated cutting data.



R stands for «Roughing» - a process which requires sufficient power and stability with regard to the machine and clamping.

Z-level roughing: The cutting data given in the catalogue is for layer-by-layer removal. In this case the axial machine axis is set to constant depth and does not change. Pull and push cutting are therefore not recommended!



PF stands for «Pre-Finishing»  
F stands for «Finishing»  
SF stands for «Super-Finishing»

The cutting data given in the catalogue applies for removal from level surfaces and parallel to the shape of the workpiece. Pull and push cutting are permissible. Push cutting is however less than ideal and will result in a reduction in tool life.



# Calculation formulas for cutting data

---

## Formulas

$d_1$	Diameter of the cutting edge [mm]
$z$	Number of cutting edges
$a_p$	Axial infeed depth [mm]
$a_e$	Radial infeed depth [mm]
$v_c$	Cutting speed [m/min]
$f_z$	Feed per tooth and revolution [mm]
$n$	Spindle speed [ $\text{min}^{-1}$ ]
$v_f$	Feed rate [mm/min]
$f$	Feed per rotation [mm]
$Q$	Material removal rate [ $\text{cm}^3/\text{min}$ ]
$d_{\text{eff}}$	Effective engagement diameter [mm]
$\beta$	Setting angle «Beta» [ $^\circ$ - DEG]
•	No application recommendation for the corresponding L-Type
$L_A$	Overall length from the spindle nose

---

Spindle speed

$$n = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \left[ \frac{1}{\text{min}} \right]$$

---

Cutting speed

$$v_c = \frac{d_1 \cdot n \cdot \pi}{1000} \left[ \frac{\text{m}}{\text{min}} \right]$$

---

Feed rate

$$v_f = f_z \cdot z \cdot n \left[ \frac{\text{mm}}{\text{min}} \right]$$

---

Feed per tooth

$$f_z = \frac{v_f}{z \cdot n} \text{ [mm]}$$

---

Feed per rotation

$$f = f_z \cdot z \text{ [mm]}$$

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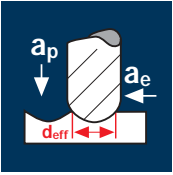
Material removal rate

$$Q = \frac{a_p \cdot a_e \cdot v_f}{1000} \left[ \frac{\text{cm}^3}{\text{min}} \right]$$

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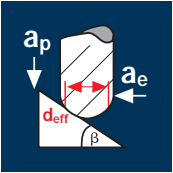
# Calculation formulas for cutting data

Effective diameter for ball nose end mills at a set angle  $\beta = 0^\circ$



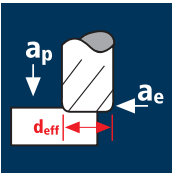
$$d_{\text{eff}} = 2 \cdot \sqrt{d_1 \cdot a_p - a_p^2} \quad [\text{mm}]$$

Effective diameter for ball nose end mills at a set angle  $0 < \beta < 90^\circ$   
 Calculator setting in [° - DEG] ; entry of  $\beta$  in [° - DEG]

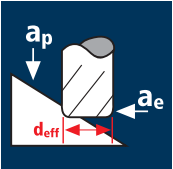


$$d_{\text{eff}} = d_1 \cdot \sin \left[ \beta + \cos^{-1} \left( \frac{d_1 - 2 \cdot a_p}{d_1} \right) \right] \quad [\text{mm}]$$

Effective diameter for corner radius end mills at a set angle  $0 \leq \beta < 90^\circ$   
 Calculator setting in [° - DEG] ; entry of  $\beta$  in [° - DEG]



$$d_{\text{eff}} = d_1 - 2 \cdot r + 2 \cdot r \cdot \sin \left[ \beta + \cos^{-1} \left( 1 - \frac{a_p}{r} \right) \right] \quad [\text{mm}]$$



# Calculation formulas for cutting data

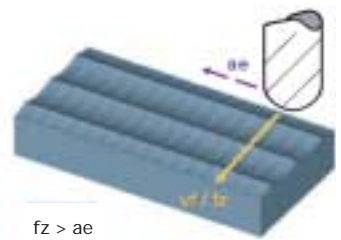
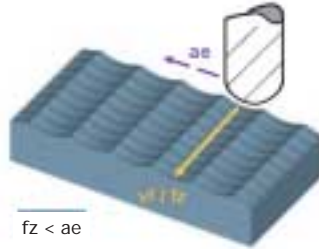
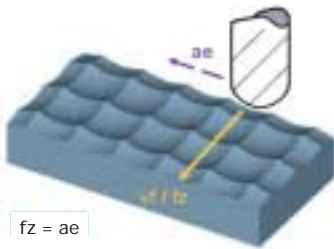
## Theoretical surface roughness and surface qualities

Surface roughness in the direction of feed  $v_f$

$$R_{th,vf} = \left( \frac{d_1}{2} - \sqrt{\frac{d_1^2 - f_z^2}{4}} \right) \cdot 1000 \quad [\mu\text{m}]$$

Surface roughness in the infeed direction  $ae$

$$R_{th,ae} = \left( \frac{d_1}{2} - \sqrt{\frac{d_1^2 - ae^2}{4}} \right) \cdot 1000 \quad [\mu\text{m}]$$



## Surface qualities

Maximum roughness values $R_a$ in $\mu\text{m}$ ; $1 \mu\text{m} = 0.001 \text{ mm}$					
3.2	1.6	0.8	0.4	0.2	0.1
Roughness classes					
N8	N7	N6	N5	N4	N3



# Hardness conversion table ( $R_m \rightarrow HV10 \rightarrow HB \rightarrow HRC$ )

$R_m$ [N/mm <sup>2</sup> ]	HV 10	HB	HRC	$R_m$ [N/mm <sup>2</sup> ]	HV 10	HB	HRC
240	75	71		920	287	273	28
255	80	76		940	293	278	29
270	85	81		970	302	287	30
285	90	86		995	310	295	31
305	95	90		1020	317	301	32
320	100	95		1050	327	311	33
335	105	100		1080	336	319	34
350	110	105		1110	345	328	35
370	115	109		1140	355	337	36
385	120	114		1170	364	346	37
400	125	119		1200	373	354	38
415	130	124		1230	382	363	39
430	135	128		1260	392	372	40
450	140	133		1300	403	383	41
465	145	138		1330	413	393	42
480	150	143		1360	423	402	43
495	155	147		1400	434	413	44
510	160	152		1440	446	424	45
530	165	157		1480	458	435	46
545	170	162		1530	473	449	47
560	175	166		1570	484	460	48
575	180	171		1620	497	472	49
595	185	176		1680	514	488	50
610	190	181		1730	527	501	51
625	195	185		1790	544	517	52
640	200	190		1845	560	532	53
660	205	195		1910	578	549	54
675	210	199		1980	596	567	55
690	215	204		2050	615	584	56
705	220	209		2140	639	607	57
720	225	214			655	622	58
740	230	219			675		59
755	235	223			698		60
770	240	228			720		61
785	245	233			745		62
800	250	238	22		773		63
820	255	242	23		800		64
835	260	247	24		829		65
860	268	255	25		864		66
870	272	258	26		900		67
900	280	266	27		940		68

# Coating suitability for milling tools

## Coating suitability for milling tools in the corresponding material class

1 = Ideally suited 2 = Adequate to well-suited	U UNICUT-4X		P POLYCHROM		D DURO-S		X X-AI		M MICRO		C CELERO		POLYCUT-A	
Material classes														
Steel < 500 N/mm <sup>2</sup>	1	X	1	X	X	X	1	X	1	X	1	X	1	X
Steel 500 - 850 N/mm <sup>2</sup>	1	X	1	X	X	X	1	X	1	X	X	X	1	X
Steel 850 - 1100 N/mm <sup>2</sup>	1	X	1	1	X	X	1	1	1	X	X	X	1	1
Steel 1100 - 1300 N/mm <sup>2</sup>	2	2	2	1	X	X	2	1	1	X	X	X	2	1
Steel 1300 - 1500 N/mm <sup>2</sup>	2	2	2	1	X	2	2	1	2	1	X	X	2	1
Hardened tool steel 48-52 HRC	X	2	X	1	X	2	X	1	X	1	X	X	X	1
Hardened tool steel 52-56 HRC	X	X	X	1	X	1	X	1	X	1	X	X	X	1
Hardened tool steel 56-60 HRC	X	X	X	1	X	1	X	1	X	1	X	X	X	1
Hardened tool steel >60 HRC	X	X	X	2	X	1	X	1	X	X	X	X	X	2
Cold work tool steel (12% Cr) high alloyed [1.2379]	2	2	2	1	X	1	2	1	X	X	X	X	2	1
Cold work tool steel, low alloyed [1.2067]	2	2	2	1	X	1	2	1	X	X	X	X	2	1
Stainless steel ferritic/martensitic	1	X	1	X	X	X	1	X	1	X	X	X	1	X
Stainless steel [Cr-Ni/1.4301]	1	X	1	X	X	X	1	X	1	X	2	X	1	X
Stainless steel [Cr-Ni-Mo-.../1.4571]	1	X	1	X	X	X	1	X	1	X	X	X	1	X
Heat resistant steel [17-4 PH]	1	X	1	X	X	X	2	X	1	X	X	X	1	X
Nickel base alloys prec.-hard. [Inconel 718]	1	X	1	X	X	X	2	X	1	X	X	X	1	X
Cast iron (lamellar / spheroidal)	2	2	2	1	X	1	2	1	2	1	X	X	2	1
Titanium alloys up to 300 HB [Ti5Al2.5Sn]	1	X	1	X	2	X	2	X	1	X	2	X	1	X
Titanium alloy > 300 HB [Ti6Al4V]	1	X	1	X	1	X	2	X	1	X	X	X	1	X
Unalloyed aluminium	X	X	X	X	X	X	X	X	X	X	1	X	X	X
Wrought aluminium Si <6%	2	X	2	X	X	X	X	X	1	X	1	X	2	X
Unalloyed copper	2	X	2	X	X	X	2	X	1	X	1	X	2	X
Wrought copper alloys Bronze	2	2	2	1	X	2	2	1	2	1	X	X	2	1
Brass short chips [Ms58]	2	2	2	1	X	2	2	1	2	1	X	X	2	1
Thermoplastics	2	X	2	X	X	X	X	X	2	X	2	X	2	X
High speed steel hardened	X	X	X	X	X	1	X	X	X	X	X	X	X	X

# General conditions

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## 1. General

- 1.1 The contract is concluded with the written confirmation (Order confirmation) of Fraisa SA or its subsidiaries (hereinafter known in short as «supplier») that it accepts the order.
- 1.2 Any deviation from the order in the order confirmation forms part of the contract, unless the purchaser rejects it in writing within 5 working days from the receipt date of the order confirmation. Quotations, particularly those involving price lists, brochures, etc., which contain no acceptance dates, are non-binding.
- 1.3 These delivery conditions shall be binding if they are declared as applicable in the quotation or order confirmation. Other conditions of the purchaser are only applicable if they have been expressly accepted by the supplier and this acceptance is in writing.
- 1.4 All agreements and legally relevant declarations of the parties need to be made in writing in order to be applicable.
- 1.5 If any provision of these delivery conditions should prove wholly or partially ineffective, the parties shall replace this provision with a new agreement which comes as close to the intended legal and economic outcome as possible.

## 2. Scope of the delivery and services

The supplier's deliveries and services are itemised in the order confirmation, including any appendices to it. The supplier is authorised to make changes that lead to improvements, where these do not increase the price.

## 3. Brochures, catalogues and technical documents

Brochures and catalogues are not binding without other agreements. Information contained in technical documents is only binding if it is explicitly assured.

## 4. Prices

- 4.1 All prices are - in the absence of any agreement - net prices, ex works, excluding packaging, in freely available Swiss Francs or the local currency of the subsidiaries, without any deductions.
- 4.2 All additional costs, e.g. for freight, insurance, export, import and other permits and certifications, shall be borne by the purchaser.
- 4.3 Likewise, the purchaser shall bear all taxes (especially VAT), levies, fees, duties (and the like) that are imposed in connection with the contract, or reimburse the supplier for them against corresponding proof, if the supplier has to pay for them.

## 5. Payment terms

- 5.1 The payments are to be made by the purchaser in accordance with agreed payment terms at the location of the supplier's office without the deduction of

discounts, expenses, taxes, duties, fees, duties (and the like). The obligation to make payment is fulfilled, when at the location of the supplier's office, the arranged amount have been made freely available to the supplier. The payment deadline is 30 days from the invoice date.

- 5.2 The payment deadline and/or the separately agreed payment deadlines must be met even if the transport, delivery or acceptance of the delivery is delayed or prevented for reasons for which the supplier is not responsible, if non-essential items are missing from the delivery, or if subsequent machining is necessary which does not make usage of the delivery impossible.
- 5.3 If the purchaser does not make payment by the payment deadline and/or the separately agreed payment deadline, he must, without notice, pay interest from the date the invoice is due at an interest rate based on the rate where the purchaser has his office, however at least 4% above the discount rate of the Swiss National Bank. The right to claim further damages is reserved.

## 6. Retention of title

- 6.1 The supplier shall retain ownership of all parts of the delivery until he has received the payments in accordance with the contract.
- 6.2 The purchaser is obliged to participate in measures which are necessary for the protection of the supplier's property: in particular, at the expense of the purchaser, he authorizes the supplier to register or enter the title in public records, books and the like according to the relevant national laws and to comply with all relevant formalities.
- 6.3 The purchaser shall maintain the delivered goods at his cost for the duration of retention of title and insure them on behalf of the supplier against theft, breakage, fire, water and other risks. He shall further take all measures to ensure that the supplier's property claim is in no way compromised nor cancelled.

## 7. Delivery deadline

- 7.1 The supplier shall strive to meet the delivery deadline which is recorded in the order confirmation. The delivery deadline is met if the «ready for despatch» message is sent to the purchaser by its expiry.
- 7.2 The meeting of the delivery deadline presupposes full compliance with the contractual obligations by the purchaser.
- 7.3 The delivery deadline shall be extended by an appropriate period if hindrances occur which, despite due care, the supplier cannot avert, regardless of whether they originate from him, the purchaser or a third party. Such hindrances include epidemics, mobilisation, war, riots, major breakdowns, accidents, labour disputes, delayed delivery or mistakes in the delivery of the necessary raw materials and semi-finished products, governmental actions or omissions, and natural events.

- 
- 7.4 If a specific date is agreed upon instead of a delivery deadline, this is equivalent to the last day of a delivery deadline. Points 7.1 to 7.3 apply analogously.
- 7.5 In the case of delay, the purchaser is not entitled to compensation or other benefits, except for the agreement cited in point 7 or an agreement stipulated in a separate agreement. This restriction does not apply to unlawful intent or gross negligence on the part of the supplier.
- 8. Return of goods**  
For commercial product returns up to CHF 1,000.00, it is necessary for us to charge a reduction of 10% of the value of the goods, however at least CHF 30.00 for checking costs incurred by us. In the case of higher return values, prior consent from FRAISA SA is required. Custom designs and products with special labeling may not be returned.
- 9. Packaging**  
Packaging is separately charged by the supplier and cannot be returned.
- 10. Transfer of benefits and risks**  
10.1 At the latest, benefits and risks are passed to the purchaser when the delivery leaves the factory.  
10.2 If the shipment is delayed at the request of the purchaser or for other reasons which the supplier is not responsible for, the risk is passed to the purchaser for the originally scheduled date of delivery from the factory. From this point on, the supplied products are stored and insured at the purchaser's expense and risk.
- 11. Shipping, transportation and insurance**  
11.1 The supplier must be informed of special requests concerning shipping, transportation and insurance in good time. Transportation takes place at the purchaser's expense and risk.  
11.2 Complaints relating to the shipping or transportation should be addressed to the last carrier by the purchaser without delay upon receipt of the delivery or the shipping documents.  
11.3 Insurance against all kinds of damage is the responsibility of the purchaser.
- 12. Checking and acceptance of the delivery**  
12.1 The purchaser must check the delivery upon receipt within 8 days and notify the supplier of any defects within the same period in writing. Failing this, the supply shall be deemed approved.  
12.2 The supplier shall resolve the defects which are notified to him in accordance with point 12.1 as quickly as possible, or - at his option - replace defective goods.
- 12.3 In the case of defects of any sort relating to the delivery, the purchaser has no rights or rights to make claims other than those specifically mentioned in points 12 and 13 (warranty, liability for defects).
- 13. Warranty, liability for defects**  
13.1 The warranty period is 6 months. It begins with the date the delivery leaves the factory. In the case of replaced or repaired products, the warranty period starts afresh and shall last for 6 months from the date the replacement goods are shipped from the supplier. The guarantee expires prematurely if the purchaser or a third party undertakes inappropriate modifications or repairs or if the purchaser, when a fault has occurred, does not immediately take all appropriate measures to mitigate the damage and does not give the supplier the opportunity to resolve the defect.  
13.2 Damage is excluded from the warranty and the supplier's liability which has arisen in circumstances which cannot be proven to be due to poor materials, faulty design or poor workmanship, e.g. natural wear, improper maintenance, failure to follow operating instructions, excessive strain, unsuitable equipment, chemical or electrolytic influences as well as other reasons that the supplier cannot be held responsible for.  
13.3 The purchaser shall only be entitled to the replacement or repair of defective goods. The purchaser is not entitled to further claims, especially for compensation for damage or consequential damage. In no case can claims be considered by the purchaser for compensation for damage which is not caused to the object itself, e.g. loss of production, inability to use the goods, loss of contracts, loss of profit and other direct or indirect damage. This disclaimer does not apply to unlawful intent or gross negligence on the part of the supplier. Moreover, this disclaimer does not apply in so far as any mandatory provisions oppose it.
- 14. Place of jurisdiction and applicable law**  
14.1 The place of jurisdiction for the purchaser and the supplier is the place where the supplier has its head office. The supplier is entitled to take out legal action against the purchaser at its place of residence.  
14.2 The contract shall be exclusively governed by the national commercial law which applies in the supplier's country. The provisions of the CISG do not apply.

## Distribution network

### Sales and service locations

#### Fraisa SA

Gurzelenstrasse 7  
4512 Bellach  
Fon: +41 (0)32 617 42 42  
Fax: +41 (0)32 617 42 41  
mail.ch@fraisa.com  
www.fraisa.com

#### Fraisa GmbH

Hanns-Martin-Schleyer-Str. 15b  
D-47877 Willich  
Fon: +49 2154 489 84-0  
Fax: +49 2154 489 84-33  
info@fraisa.de  
www.fraisa.de

#### Fraisa Sarl.

7, Rue de Lombardie  
F-69150 Décines  
Fon: +33 4 721 45 700  
Fax: +33 4 723 73 490  
fraisa@fraisa.fr  
www.fraisa.fr

#### Fraisa Italia s.r.l.

Via Grosio 10/8  
I-20151 Milano  
Fon: +39 02 334 06 086  
Fax: +39 02 334 06 055  
mail.it@fraisa.com  
www.fraisa.it

#### Fraisa Hungária Kft.

Vásárhelyi Pál u. 3  
H-3950 Sárospatak  
Fon: +36 47 511 217  
Fax: +36 47 511 215  
mail.hu@fraisa.com  
www.fraisa.hu

#### Fraisa USA Inc.

711 5th St SW  
USA-New Brighton MN 55112  
Fon: +1 651 636 8488  
Fax: +1 651 636 8588  
info@fraisausa.com  
www.fraisausa.com

### Toolpartner

#### Och GmbH

Fischbacher Hauptstrasse 156  
D-90475 Nürnberg  
Fon: +49 911 833 07-0  
Fax: +49 911 833 07-10  
info@och.de  
www.och.de

(●) and 70 associated companies.  
To find your contact refer to [www.fraisa.com](http://www.fraisa.com).

[www.fraisa.com](http://www.fraisa.com)





# Article list

Example : Article P5327

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Coating: P

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			UNICUT-4X	POLYCHROM	DURO-S	X-AI	MICRO	CELERO	TRIBO	TRIBO-N	DIAMANT	DIAPLUS
Chemical composition			TiAlCN	TiAlCrN	AlTiN	TiAlN/ AlCrN	TiAlN	TiB2	AlTiN + MoS2	AlCrN/ Si3N4	C	C
Hardness [HV]			3200	3000	3600	3300	3000	4000	3600	3800	1000	1000
Max. temp. [°C]			650	1000	880	1100	800	700	880	1100	600	600
- 0110	61		●									
- 0115	65		●									
- 0190	97		●									
- 0200	111		●									
- 0270	113		●									
- 0391	483							●				
- 0393	489							●				
- 0400	275		●									
- 0410	279		●									
- 0540	175		●	●								
- 0580	87		●									
- 0609	183		●									
- 0610	177		●									
- 0611	181		●									
- 0619	173		●									
- 0621	209		●									
- 0640	205		●									
- 0650	195		●									
- 0659	193		●									
- 0665	207		●									
- 0679	187		●									
- 0695	185		●									
- 0700	131		●									
- 0770	71		●									
- 0780	67		●									
- 0800	341		●									
- 0830	339		●									
- 0890	591		●									
- 0905	587		●									
- 0910	585		●									
- 0915	583		●									
- 0920	581		●									
- 3209	601		●									
- 3490	599		●									
- 5036	125		●	●								
- 5100	317				●							
- 5140	319				●							
- 5173	189		●	●								

Article-N°.		Coating										
INDEX		without	U	P	D	X	M	C	T	N	B	B
			UNICUT-4X	POLYCHROM	DURO-S	X-AI	MICRO	CELERO	TRIBO	TRIBO-N	DIAMANT	DIAPLUS
- 5174	197		●	●								
- 5176	201		●	●								
- 5200	51		●									
- 5213	121			●								
- 5214	31			●								
- 5215	85			●								
- 5218	83			●								
- 5219	103			●								
- 5220	325			●								
- 5222	333			●								
- 5223	335		●									
- 5225	73			●								
- 5227	19			●								
- 5230	43	●	●									
- 5231	49		●									
- 5234	151		●									
- 5240	39		●									
- 5244	81				●							
- 5245	355		●									
- 5246	357		●									
- 5248	79			●	●							
- 5249	119			●	●							
- 5250	345		●		●							
- 5251	101			●	●							
- 5252	359		●		●							
- 5253	347			●	●							
- 5254	349				●							
- 5255	41		●									
- 5256	351				●							
- 5257	361			●	●							
- 5258	29			●	●							
- 5259	139			●	●							
- 5260	219		●									
- 5264	215				●							
- 5265	227		●									
- 5266	217				●							
- 5267	353				●							
- 5268	231		●									
- 5271	473	●										
- 5272	459	●						●				
- 5273	461	●						●				
- 5275	471	●						●				
- 5276	475	●						●				
- 5277	477	●						●				
- 5278	467	●						●				
- 5286	321		●	●								
- 5288	329		●									
- 5289	337		●									
- 5290	323	●						●				
- 5292	331							●				
- 5297	479							●				
- 5300	51		●									
- 5313	121			●								
- 5314	31			●								
- 5315	85			●								
- 5318	83			●								
- 5319	103			●								
- 5325	73			●								
- 5327	19			●								
- 5329	123			●								
- 5330	43	●	●									
- 5331	49		●									
- 5332	93	●	●									
- 5333	107	●	●									
- 5334	151		●									
- 5335	267			●				●				

Article-N°.		Coating										
INDEX		without	U	P	D	X	M	C	T	N	B	B
			UNICUT-4X	POLYCHROM	DURO-S	X-AI	MICRO	CELERO	TRIBO	TRIBO-N	DIAMANT	DIAPLUS
- 5336	263			●					●			
- 5336	269	●	●									
- 5337	281			●					●			
- 5338	283			●					●			
- 5339	265			●					●			
- 5340	39		●									
- 5344	81				●							
- 5345	355		●									
- 5346	357		●									
- 5348	79			●	●							
- 5349	119			●	●							
- 5351	101			●	●							
- 5353	347			●	●							
- 5354	349				●							
- 5355	41		●									
- 5356	351				●				●			
- 5357	361			●	●							
- 5358	29			●	●							
- 5359	139			●	●							
- 5360	219		●									
- 5366	217				●							
- 5367	353				●							
- 5370	171		●									
- 5373	169		●									
- 5376	191		●									
- 5379	157		●	●								
- 5393	115		●									
- 5397	479							●				
- 5400	127		●									
- 5470	145									●		
- 5480	147									●		
- 5500	459	●										
- 5630	569										●	
- 5640	571										●	
- 5645	573										●	
- 5650	575										●	
- 5675	561										●	
- 5680	559										●	
- 5695	563										●	
- 5710	239	●										
- 5712	235	●					●					
- 5712	545										●	
- 5714	245	●					●					
- 5714	547										●	
- 5716	251						●					
- 5716	549										●	
- 5717	255						●					
- 5717	551										●	
- 5721	257						●					
- 5722	237				●							
- 5723	259						●					
- 5724	247				●							
- 5726	253				●							
- 5752	435						●					
- 5752	539										●	
- 5754	439						●					
- 5754	541										●	
- 5756	443						●					
- 5756	543										●	
- 5762	437				●							
- 5764	441				●							
- 5766	445				●							
- 5782	395						●					
- 5782	515										●	
- 5784	401						●					
- 5784	517										●	

Article-N°.		Coating										
INDEX		without	U	P	D	X	M	C	T	N	B	B
			UNICUT-4X	POLYCHROM	DURO-S	X-AI	MICRO	CELERO	TRIBO	TRIBO-N	DIAMANT	DIAPLUS
- 5785	399	●										
- 5786	405						●					
- 5786	519										●	
- 5787	409						●					
- 5787	521										●	
- 5788	417						●					
- 5791	411						●					
- 5791	523										●	
- 5792	397					●						
- 5793	413						●					
- 5793	525										●	
- 5794	403				●							
- 5796	407				●							
- 6032	529											●
- 6034	531											●
- 6036	533											●
- 6038	535											●
- 6040	537											●
- 6062	505											●
- 6064	507											●
- 6066	509											●
- 6068	511											●
- 6070	513											●
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- 6534	421					●						
- 6536	423					●						
- 6562	377					●						
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- 6568	383					●						
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- 6738	427					●						
- 6740	429					●						
- 6742	431					●						
- 6766	385					●						
- 6768	387					●						
- 6770	389					●						
- 6772	391					●						
- 7200	343					●						
- 7204	363					●						
- 7284	565											●
- 7288	567											●
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- 7404	311					●						
- 7408	315					●						
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- 7424	309					●						
- 7428	313					●						
- 7480	553											●
- 7484	555											●
- 7488	557											●
- 7600	365					●						
- 7604	367					●						
- 7608	369					●						
- 7920	579	●										
- 7930	593	●										
- 7940	595	●										
- 7960	597	●										
- 15200	25											
- 15202	75											
- 15205	23											
- 15212	143											
- 15220	37	●										
- 15221	155											
- 15222	27											
- 15223	89											

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-	15225	99		●								
-	15226	135		●								
-	15227	21		●								
-	15230	47	●									
-	15233	33		●								
-	15234	35		●								
-	15240	149		●								
-	15242	77		●								
-	15243	91		●								
-	15245	109		●								
-	15247	117		●								
-	15250	213		●								
-	15251	223		●								
-	15257	141		●								
-	15266	225			●							
-	15268	137		●								
-	15278	481						●				
-	15297	485						●				
-	15298	487						●				
-	15299	105		●								
-	15304	199		●								
-	15300	25		●								
-	15302	75		●								
-	15305	23		●								
-	15306	203		●								
-	15309	165		●								
-	15312	143		●								
-	15320	37		●								
-	15321	155		●								
-	15322	27		●								
-	15323	89		●								
-	15325	99		●								
-	15326	135		●								
-	15327	21		●								
-	15331	161		●								
-	15333	33		●								
-	15334	35		●								
-	15336	167		●								
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-	15345	109		●								
-	15347	117		●								
-	15349	163		●								
-	15357	141		●								
-	15366	225			●							
-	15368	137		●								
-	15379	159		●								
-	15389	211								●		
-	15397	485						●				
-	15398	487						●				
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-	15525	453	●					●				
-	15530	455	●					●				
-	15535	457	●					●				
-	15550	463	●					●				
-	15560	465	●					●				
-	15561	469	●					●				
-	15620	451	●					●				
-	15625	453	●					●				
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-	15650	463	●					●				
-	15660	465	●					●				
-	15661	469	●					●				



