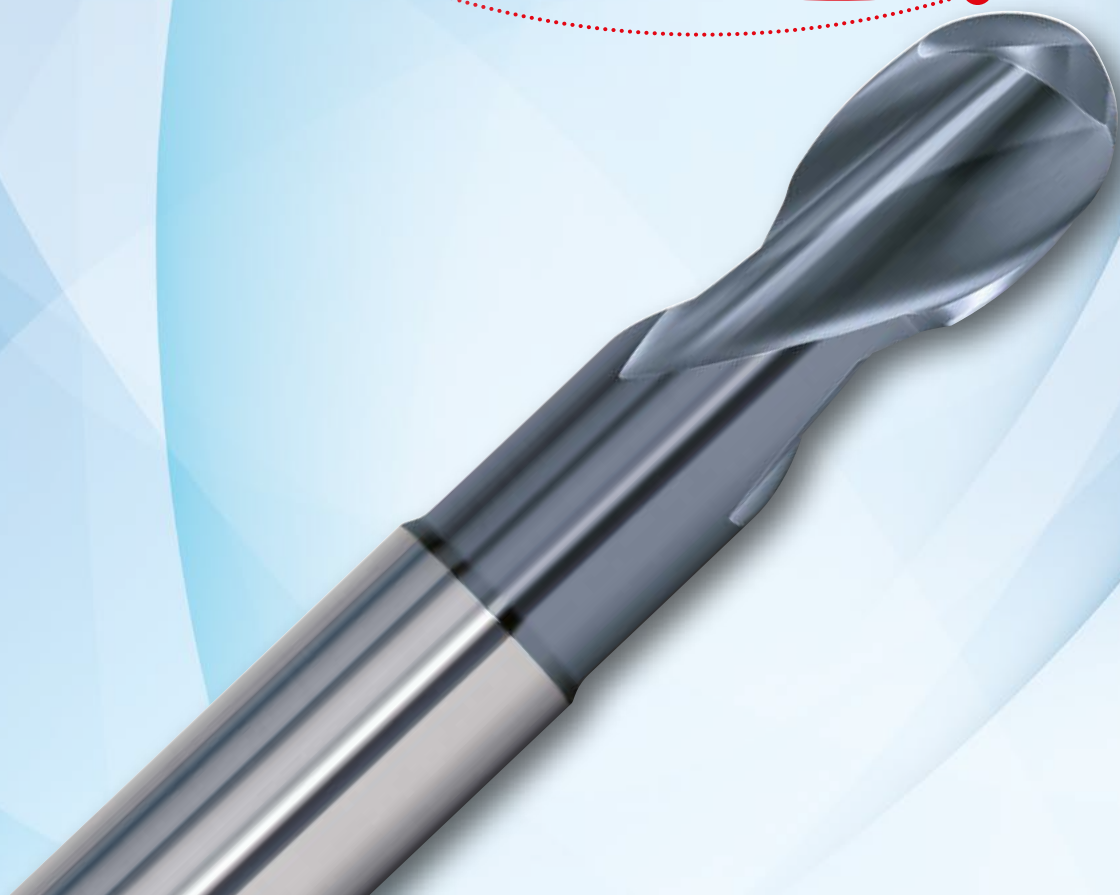


passion  
for precision

fraisa

**SpheroX with radius tolerance  $\pm 0.003$**   
**Superfinishing in hardened steels with the  
new super-precision ball nose end mill**



# SpheroX

## Finishing in hardened steels with the new super-precision ball nose end mill

The new **SpheroX** ball nose end mill is based on the Sphero-XF finisher and is designed for finishing extremely high-precision components.

The innovation of the super-precision ball nose end mill has created a new class of machining that means a quantum leap for superfinishing in the world of mold making.

This outstanding degree of precision means a great improvement in dimensional accuracy and therefore in the product quality too – and it cuts costs at the same time.

**SpheroX opens up a whole new world of potential in superfinishing.**

The new high-precision ball nose end mills are primarily used for machining hardened and tempered steels up to 55 HRC. **SpheroX** ball nose end mills are excellently suited for manufacturing molds and dies for the plastics industry, which demand outstanding levels of component quality and surface finishing.

### Industries and applications with SpheroX

- Making molds for the plastics industry with exceptional standards of component quality, particularly if high levels of dimensional accuracy are required
- All aspects of tool and mold making in which molds are manufactured for parts with smooth, visible surfaces

### The advantages:

- **Better quality components:**

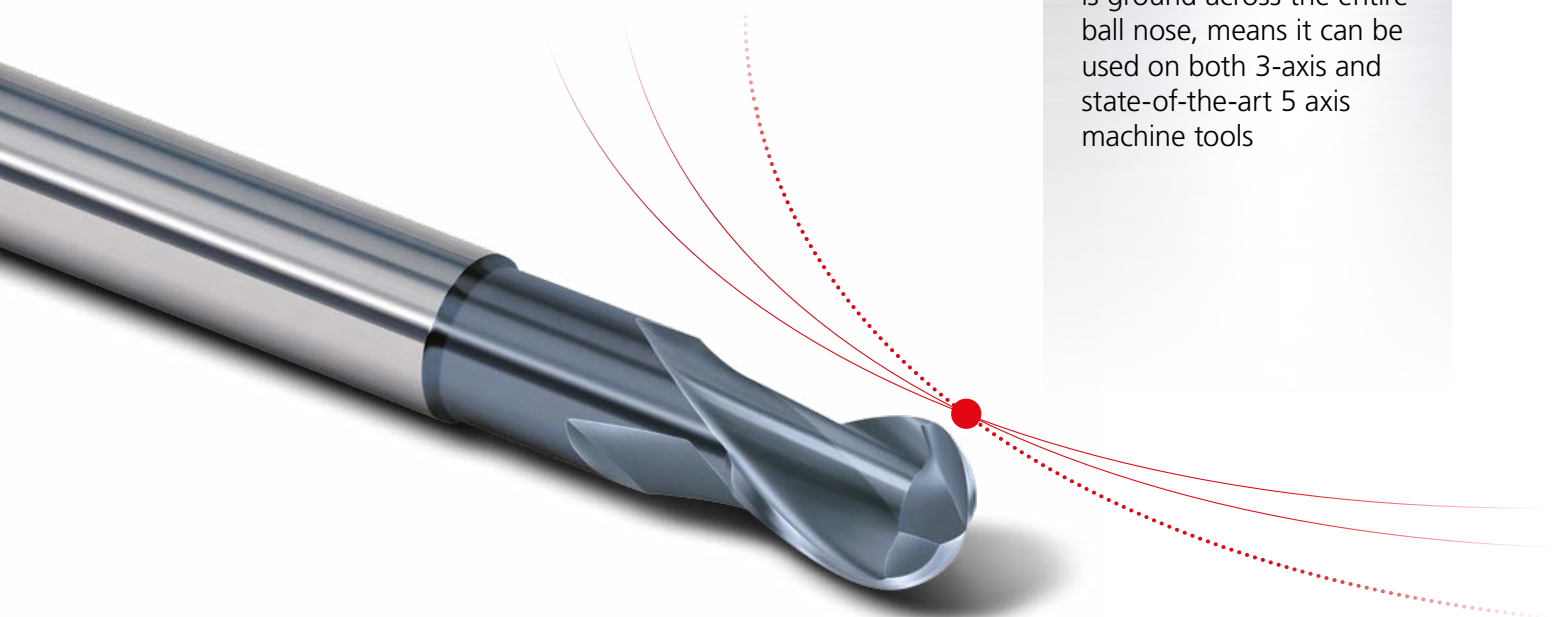
- with extremely narrow radius tolerances of  $\pm 0.003$  over  $180^\circ$  measurement
- with optimal concentricity due to the h4 shaft tolerance

- **Lower process costs:**

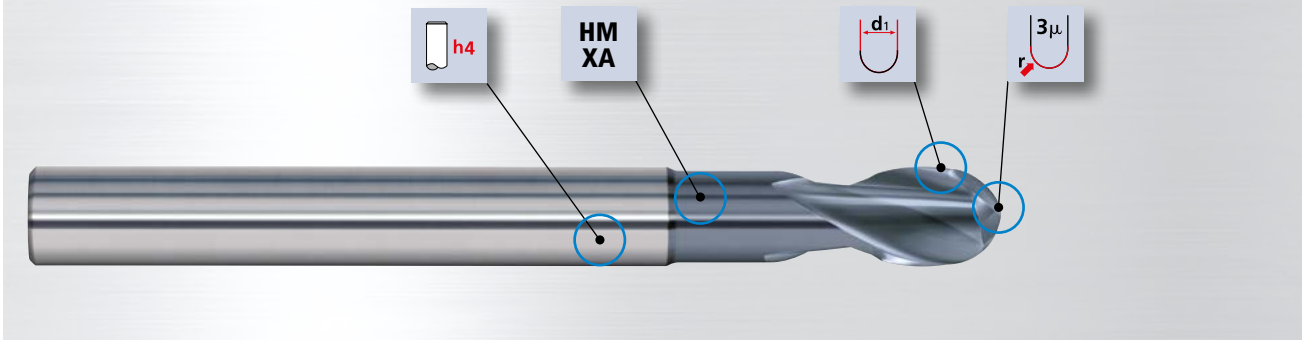
- due to very long tool lives achieved through the combination of a tough, hardened cutting material with a wear-resistant coating

- **Outstanding flexibility:**

- the precision radius, which is ground across the entire ball nose, means it can be used on both 3-axis and state-of-the-art 5 axis machine tools



## Technological features of SpheroX



### HM XA

#### Carbide XA

- Outstanding hardness and a high degree of toughness produces extreme wear resistance in tempered and hardened steel, resulting in long tool life without loss of precision

### 3μ

#### Super-precision ball nose end mill radius tolerance $\pm 0.003$

- Improves component quality and therefore saves costs because less finishing is required
- Precision across the whole ball nose and therefore flexible for use on all types of machine

### d1

#### High-precision diameter

- Tool is easily adjustable and measurable in the machine

### h4

#### Precision shaft

- Reduces the concentricity error of the tool and improves the accuracy of the component

### X-AL

#### X-AL coating

- Highly wear-resistant AlCr-based coating is ideally suitable for machining hardened steels

[ 3 ]

## Innovation and technology in the X-Generation performance class

Geometry, substrate and coating – the combination of all these elements results in a performance that meets all standards in terms of high component quality and long tool life.

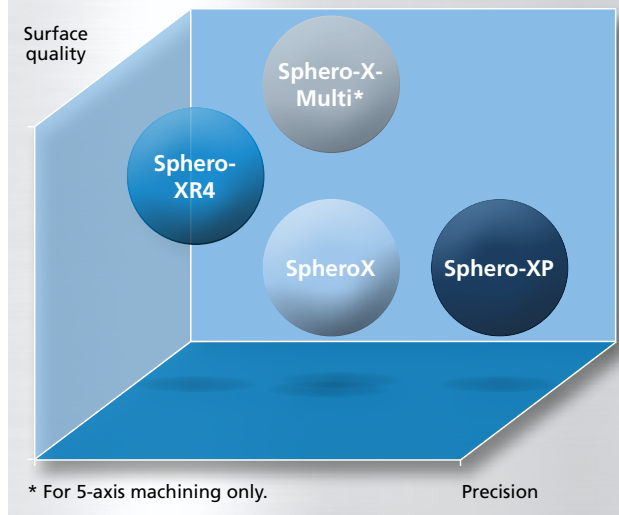
### The radius tolerance of $\pm 0.003$ enables high-precision free-form machining

The new **SpheroX** extremely high-precision tools were developed for superfinishing work in which exceptionally high standards are required in terms of contour accuracy. The very narrow radius tolerance of  $\pm 0.003$  along the entire cutting edge also enables its use on conventional 3-axis machines, making it unnecessary to tilt the tool.

### h4 shaft tolerance

The new **SpheroX** milling cutters are manufactured with h4 shaft tolerance. The high degree of accuracy enables outstanding concentricity of  $< 0.003$ , which also has a positive impact on the quality of the component.

## SpheroX applications

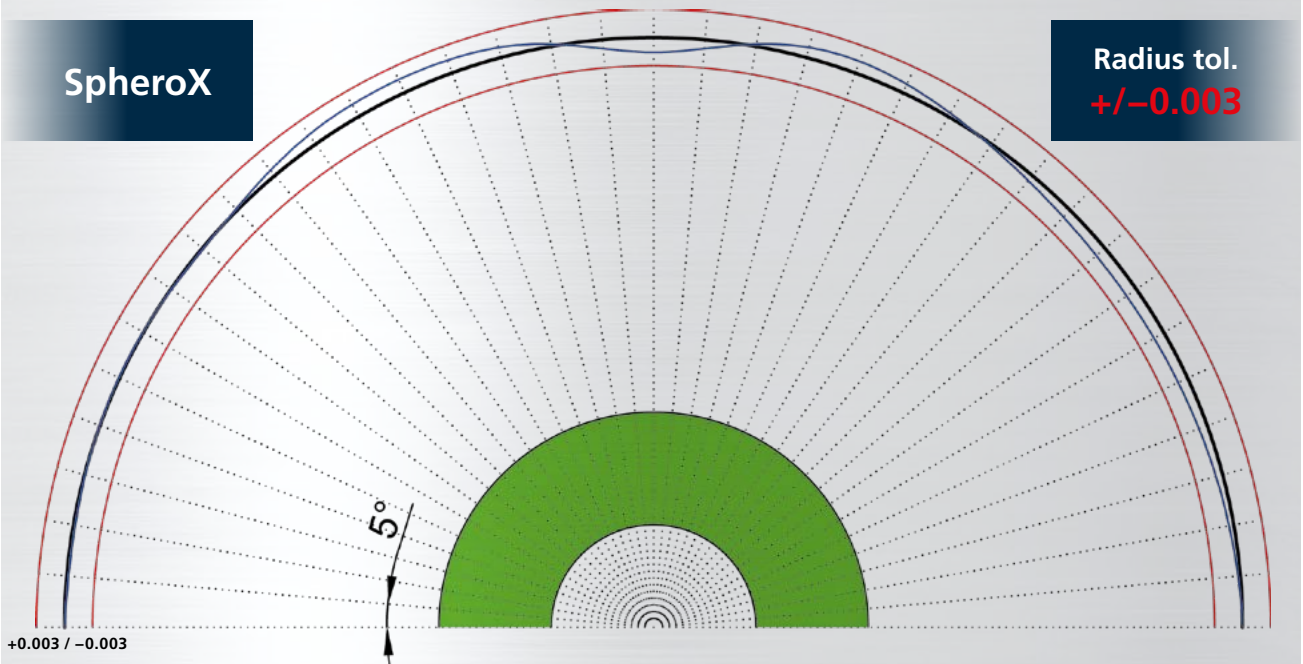


\* For 5-axis machining only.

Precision

SpheroX

Radius tol.  
**+/-0.003**

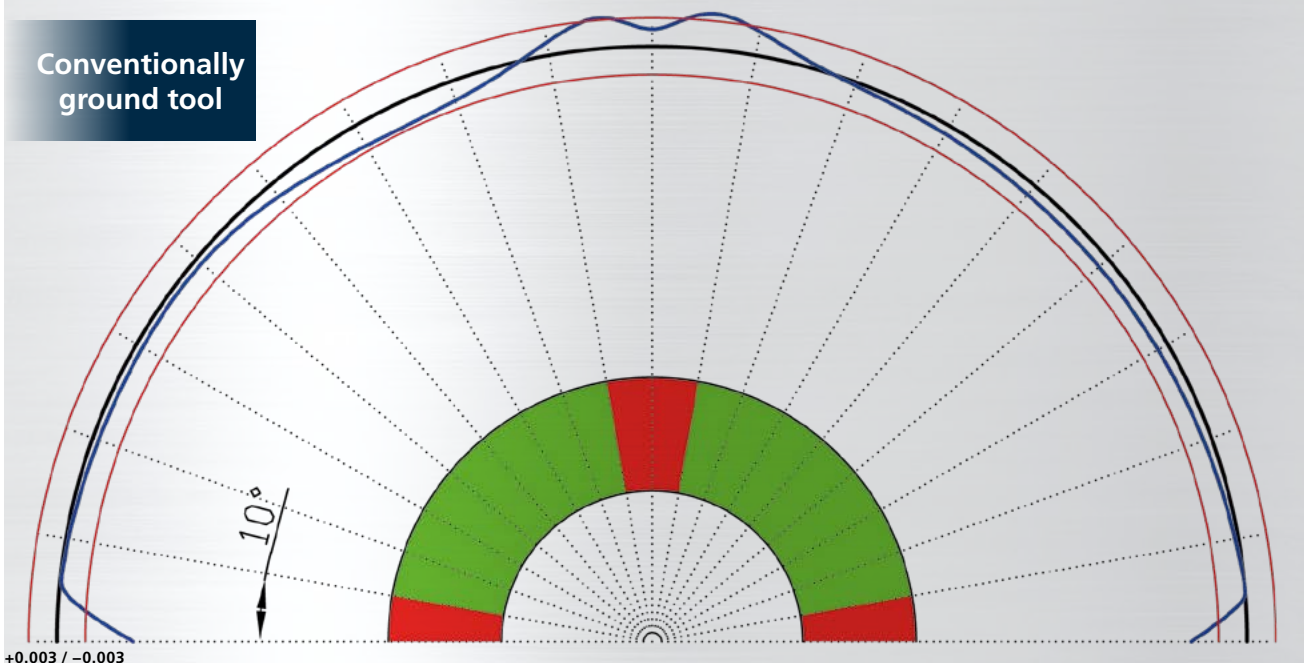


In order to really achieve this high degree of precision, a method of measurement is required that covers the entire cutting edge across 180°. The radius is measured every 5°: from 0° to 180°. This method therefore guarantees a degree of precision that is within the tolerance across the entire

ball nose. Moreover, the shaft, which has been ground to within the h4 field of tolerance, significantly reduces the concentricity error, thus further increasing the accuracy of the component.

[ 4 ]

Conventionally ground tool



By contrast, conventional methods of measurement usually only measure from 10° to 80° and from 100° to 170° in order to exclude the transitions between the radius and the cutting edge and/or the centering errors, which are difficult

to grind. When using these types of tool on conventional 3-axis machines, steep mold inclines and also bottom surfaces cannot be finished with a satisfactory degree of contour accuracy.

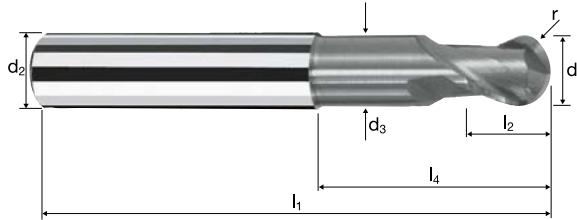
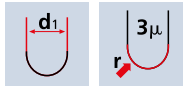


# Ball nose end mills SpheroX (Sphero-XP)

Tolerance  $r \pm 0.003$ , 3xd



HM  
XA  $\lambda$  30°  
 $\gamma$  -10°



Rm	Rm	Rm	HRC	HRC	HRC	Ti	HSS
850-1100	1100-1300	1300-1500	48-56	56-60	> 60	Titanium	ToolSteel

Example: Order-N°.											X-AL	
											X7500	
Ø Code	d <sub>1</sub>	d <sub>2</sub> h <sub>4</sub>	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	r ±0.003	α	z		
100	1.00	6.00	0.95	57	1.50	3.00	13.08	0.500	11.8°	2		●
140	2.00	6.00	1.90	57	3.00	6.00	14.31	1.000	9.0°	2		●
180	3.00	6.00	2.80	57	4.00	9.00	15.63	1.500	6.4°	2		●
220	4.00	6.00	3.70	57	5.00	12.00	16.95	2.000	4.0°	2		●
260	5.00	6.00	4.60	57	6.00	15.00	18.27	2.500	2.0°	2		●
300	6.00	6.00	5.50	57	7.00	19.34	20.00	3.000	0.0°	2		●
391	8.00	8.00	7.40	63	9.00	25.29	26.00	4.000	0.0°	2		●
450	10.00	10.00	9.20	72	11.00	30.20	31.00	5.000	0.0°	2		●
501	12.00	12.00	11.00	83	13.00	36.13	37.00	6.000	0.0°	2		●

[ 5 ]

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passion  
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