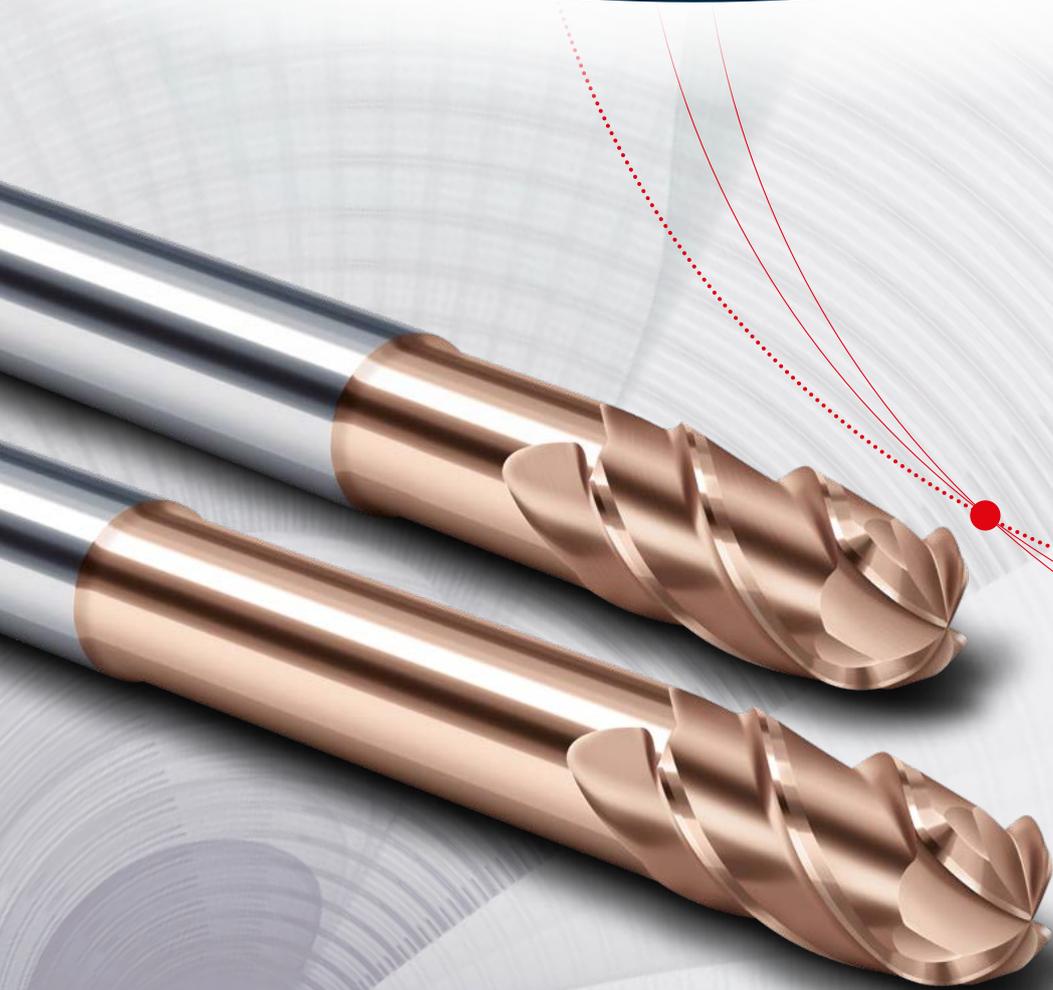


passion  
for precision



## **SpheroX** Ball Nose End Mill

New performance horizons in 3D machining



Available online

**FRAISA**  
**ToolExpert®**

# Highly productive 3D milling technology with **SpheroX** milling cutters

The new generation of **SpheroX milling cutters** opens up some impressive new prospects: Where classic HSC machining reaches its limits, new performance horizons can be opened up with HDC machining processes. The **SpheroX** has been designed for HDC processes and impresses with its high stock removal rates, which can significantly increase productivity compared to conventional milling cutters.

The new **SpheroX milling cutters** have been developed specifically for high-performance roughing and finishing of hard and high-hard steels such as HSS. The tools provide excellent results in the machining of deep-drawn, injection, and die-cast molds, but also in the forming of solid stock.

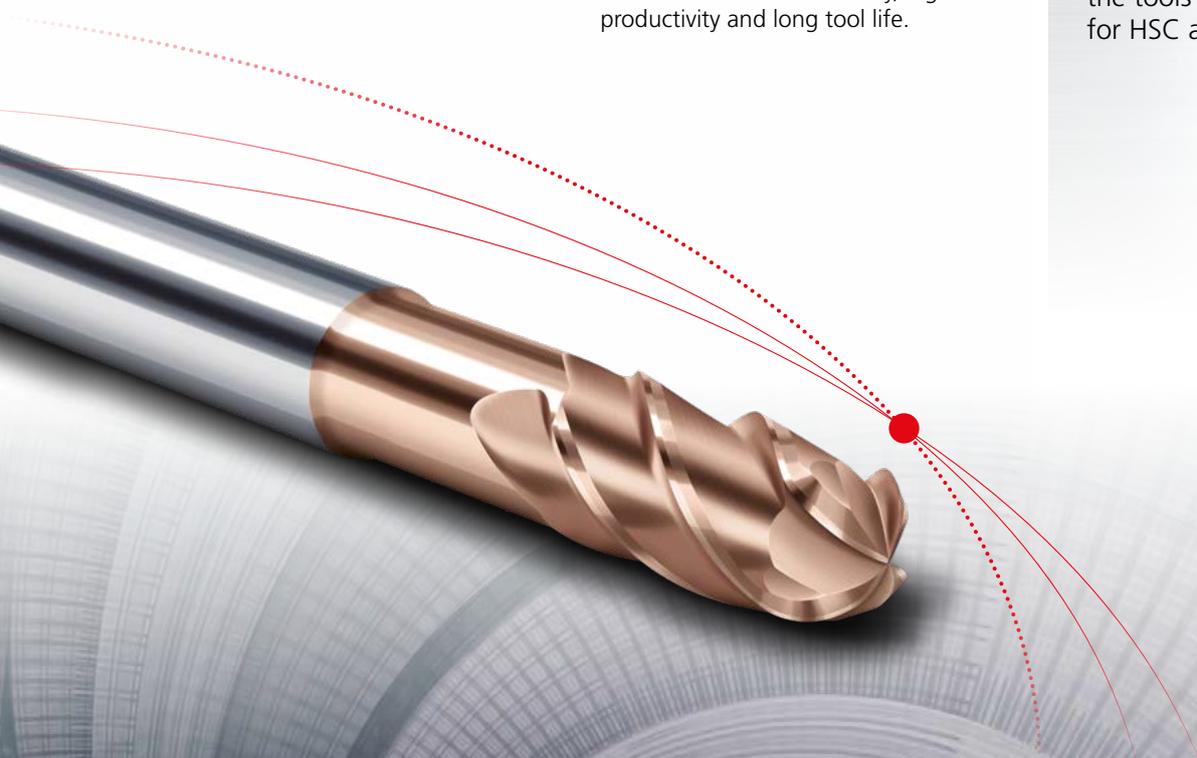
The range of materials they can be used for includes steels in the hardness range from 50 to 70 HRC. The spherical radius, with a tight tolerance of  $\pm 0.005$  mm, is the basis for the dimensional accuracy of the new **SpheroX milling cutters**.

Thanks to the four cutting edges, high feed rates can be achieved. Penetration operations with a penetration angle of up to  $5^\circ$  are also no problem for these new tools thanks to their special edge geometry. The cutting edge length and the flute geometry facilitate HDC machining with high axial infeeds at very high feed rates. This means that even deep cavities can be machined extremely efficiently.

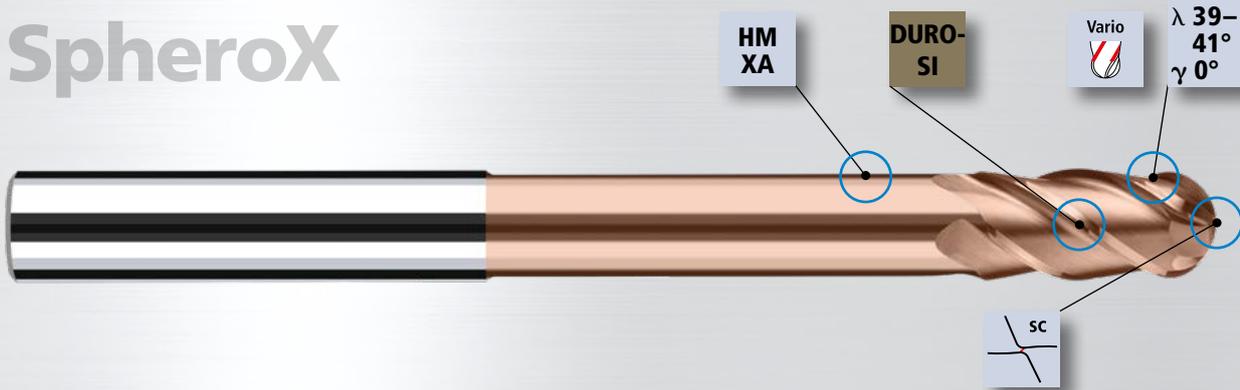
The new DURO-SI coating reduces tool wear and guarantees long-term dimensional accuracy of the workpiece. This results in a large increase in productivity. The new **SpheroX** generation features universal utilizability, high productivity and long tool life.

## The advantages:

- **High productivity** thanks to higher axial infeed and very high feed rates.
- **Low tool costs** thanks to improved wear resistance and high surface finish qualities, which significantly shorten subsequent polishing processes.
- **Improved component quality** thanks to the high-precision ball with a tolerance of just  $\pm 0.005$  mm. The shank is ground to an h4 tolerance.
- **Universal application range** thanks to improved penetration capabilities and the tools' excellent suitability for HSC and HDC strategies.



# SpheroX



**HM XA** High-hard cutting material HM-XA

- Guarantees long-term dimensional accuracy

**λ 39-41° γ 0°** Solid cutting wedge

- Neutral rake angle reduces cutting forces
- Variable helix for smoother running

**DURO-SI** Superhard coating containing silicon

- Delivers maximum process reliability and a long tool life

**SC** Safe-Center cutting edge geometry

- Counteracts chipping during the penetration process

**4 teeth**

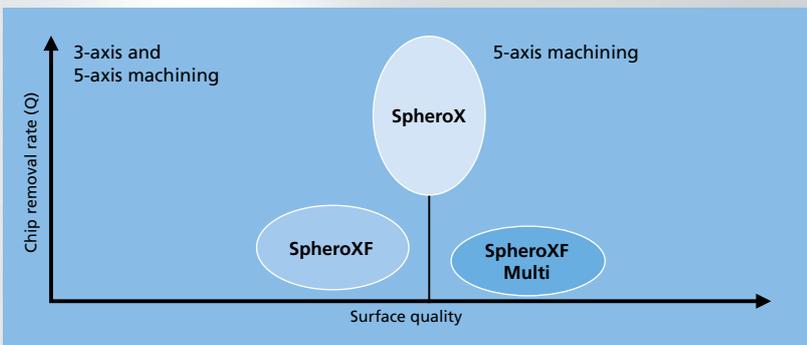
- Allows very high feed rates

**Radius tolerance = +/-0.005 mm**

**r h4** High-precision tool

[ 3 ]

## Recommended use



## All SpheroX milling cutters can be reconditioned after use.

**FRAISA ReTool®** offers an all-round service that restores used tools to their original performance level – using the very latest technology and in a resource-friendly way. Our ability to provide this performance guarantee is a priority of our team of experts right from very early on in product development. The outcome: mint-condition tools as productive as they were the first day they were used.

**Over 30 years' experience in tool reconditioning:**

Our competence center in Germany is Europe's largest service center for carbide milling tools.



**Video on our service product: FRAISA ReTool®**



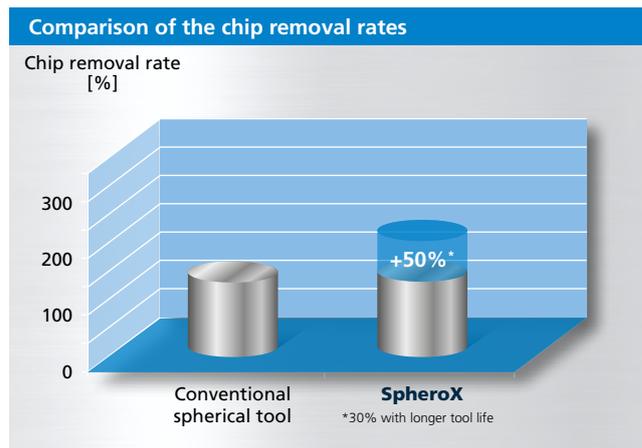
# High-performance tools for machining hardened steels

A key quality feature of the new **SpheroX** ball nose end milling tool is the DURO-SI coating specially developed for machining hardened steels. In combination with cutting edge conditioning, this significantly increases the tool's performance capabilities. High feed rates with simultaneous high infeeds are no problem thanks to the four cutting edges. These four cutting edges, in combination with the variable helix, also ensure incomparably smooth running compared to double-edged tools.

## Higher chip removal rate

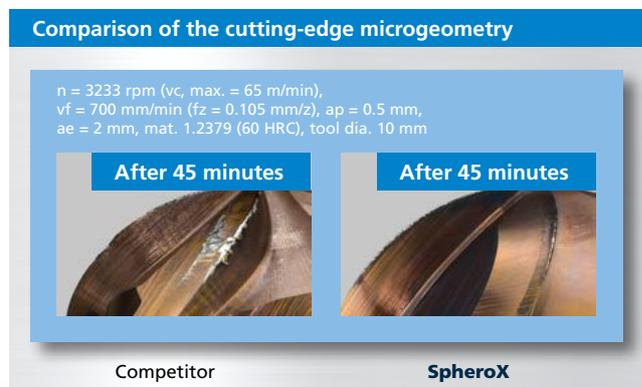
The number of cutting edges on **SpheroX milling cutters** has been doubled compared to conventional ball nose end cutters – enabling the feed rate to be increased by more than 50%. The four cutting edges ensure shorter cutting interruptions, smoother movement of the tool and better surface finish qualities for the workpieces.

[ 4 ]



## Reduced tool costs

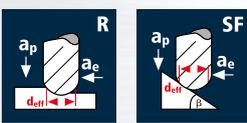
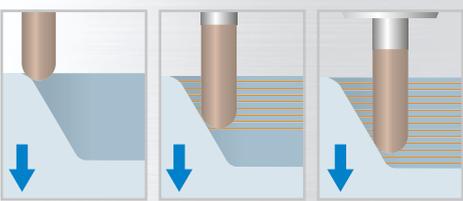
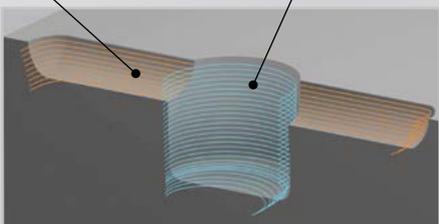
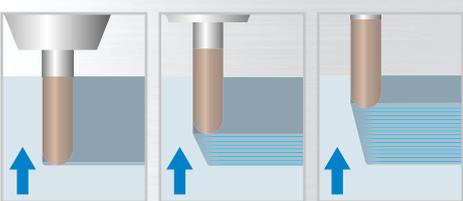
The DURO-SI coating has been specially developed for machining hard and high-hard materials. In addition to outstanding hardness, it features an incomparably high resistance to oxidation. This results in brilliant wear resistance in high-hard materials, which extends the service life of the tool and significantly reduces the associated tool costs. Compared to tools with conventional coatings, the **SpheroX cutters** can therefore be used at considerably higher temperatures, which means better cutting results and productivity. The droplet-free cutting face features reduced friction, which in turn promotes rapid chip removal from the flute.



## Great flexibility of use

An expanded field of application for the new generation of **SpheroX milling cutters**: Due to the large cutting edge length and the variable helix, the tools also master penetration and the modern HDC machining strategy perfectly. This can be used to create flat, relief-like shapes as well as deep outer and inner cavities quickly and cost-effectively.

Due to their specially designed edge geometry, the milling cutters are able to perform penetration operations with penetration angles of up to  $5^\circ$  without any problems. And it goes without saying that the cutters are also highly capable of implementing conventional machining strategies.

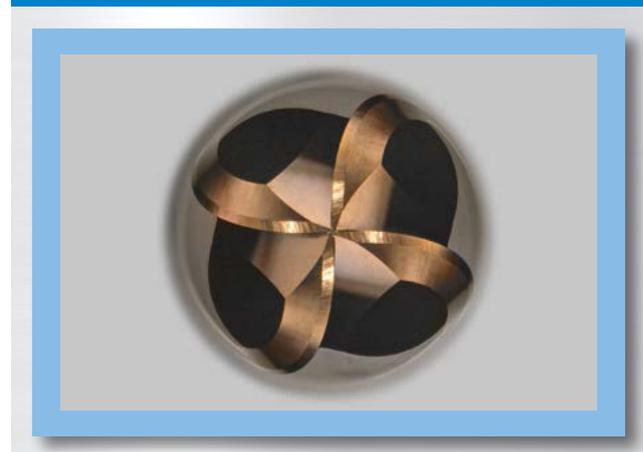
Application	Milling strategy	Tool path
<b>HSC</b> (High Speed Cutting) 	ap steps: from top to bottom 	<div style="display: flex; justify-content: space-around;"> <div> <b>HSC machining</b> High fz, large radial infeed             </div> <div> <b>HDC machining</b> High fz, high axial infeed             </div> </div>  Our tool in use 
<b>HDC</b> (High Dynamic Cutting) 	ap steps: from bottom to top 	

[ 5 ]

## Improved component quality

When finishing, too, the four cutting edges, which go all the way to the center, achieve better results in terms of surface finish quality. The optimized edge geometry allows much higher feed rates when prefinishing than conventional double-edged tools do. Precise dimensional accuracy of the workpiece is ensured by the high precision of the radius.

View of the tool face



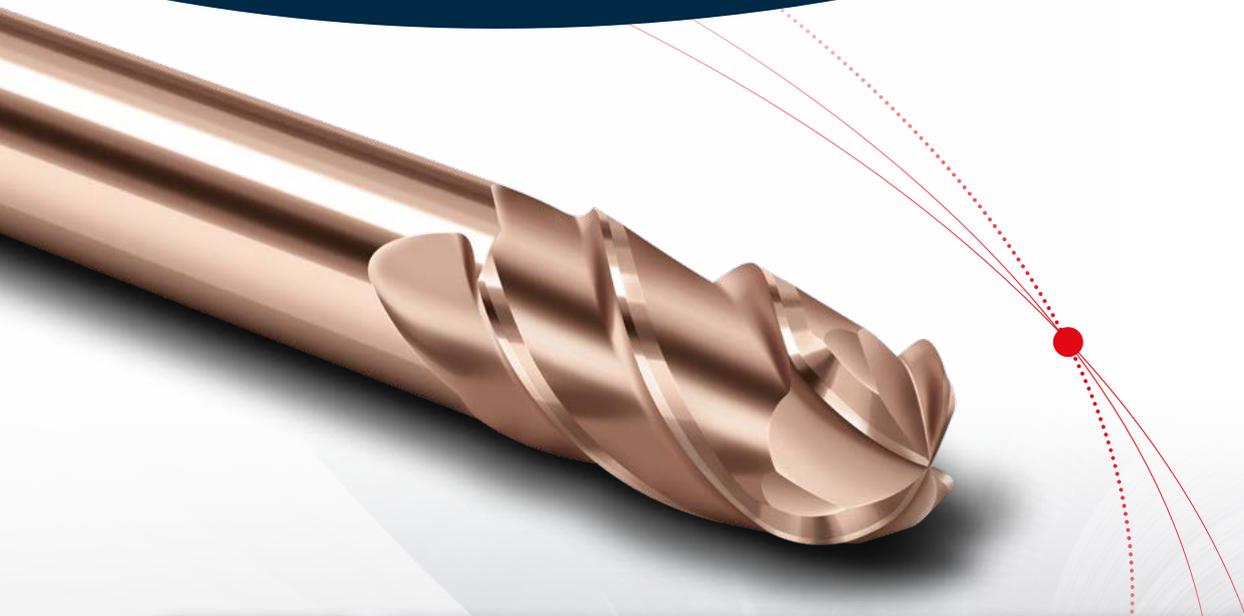
If you have any questions, please send an email to [mail.ch@fraisa.com](mailto:mail.ch@fraisa.com). You may also contact our local customer consultant directly.

The FRAISA application engineers will be happy to advise you.

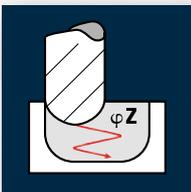
For further information, please refer to [fraisa.com](http://fraisa.com).

Where can you ask questions about the product?

# Machining strategy for components made of hard to high-hard steels

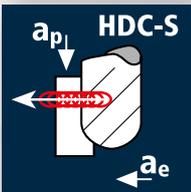


[ 6 ]

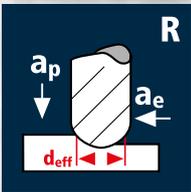


**Penetration** with helical interpolation and with a high penetration angle ( $5^\circ$ ) for deep inner pockets.

Use FRAISA ToolExpert® to determine the cutting data.

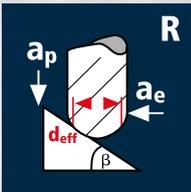


**HDC roughing** of deep inner and outer pockets with max. cutting-edge length. Use FRAISA ToolExpert® to determine the cutting data.



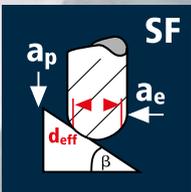
**HSC plane roughing** with constant axial infeed depths. Can be used for flat dies and workpiece areas.

Use FRAISA ToolExpert® to determine the cutting data.



**Contour-parallel roughing** with high feed rates for machining free-form surfaces.\*

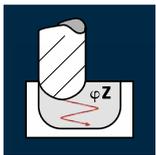
Use FRAISA ToolExpert® to determine the cutting data.



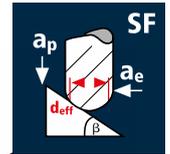
**HSC prefinishing, finishing and super-finishing** of radii and free-form surfaces with steep and flat areas.

Use FRAISA ToolExpert® to determine the cutting data.

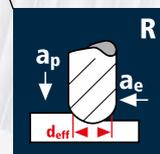
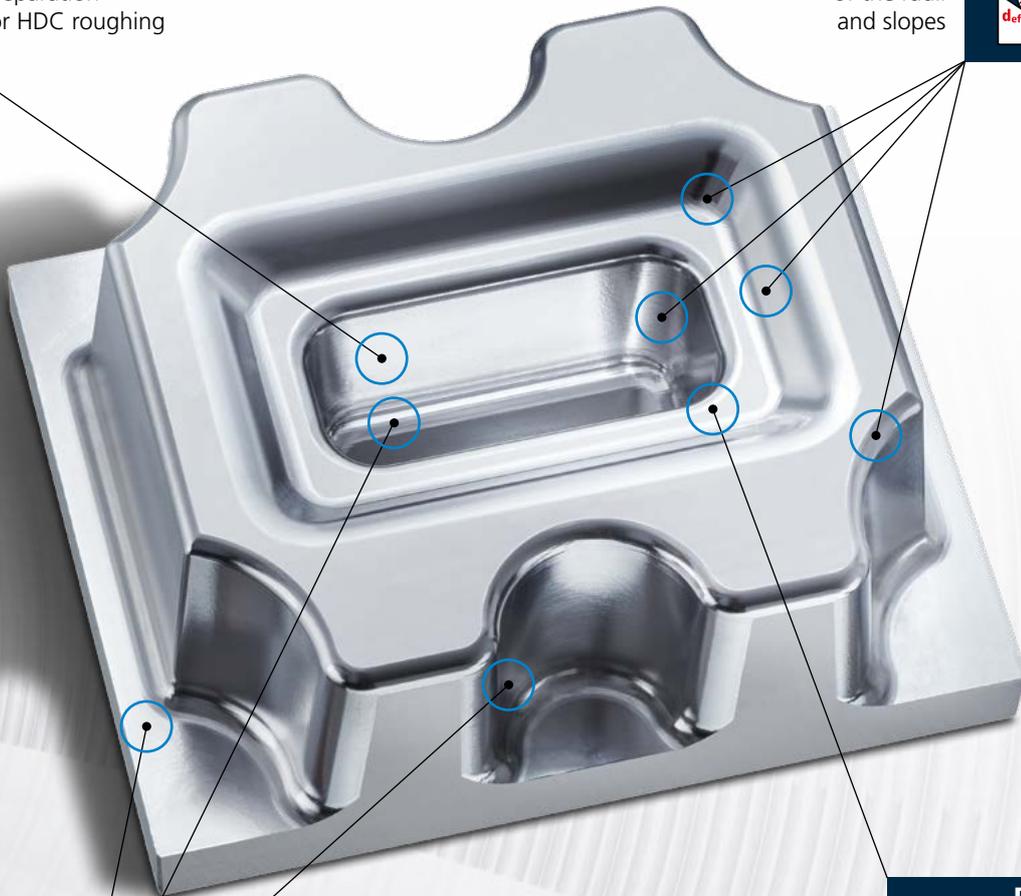
# Flexible **application options** when machining complex, hardened molded components.



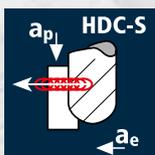
Penetration in preparation for HDC roughing



HSC roughing of the radii and slopes



HSC plane roughing of the flat areas



HDC roughing of the inner and outer pockets

[7]

\*Contour-parallel roughing was not used on this component.

# FRAISA ToolExpert® – the innovative online tool for your production

In the age of Industry 4.0, it's all about working productively and precisely at all times. To achieve this, FRAISA develops not only high-quality and versatile tools, but also innovative software solutions, such as the new ToolExpert.

This user-friendly online tool delivers perfectly coordinated, tool- and material-specific cutting data for production purposes – and the perfect basis for optimum usage of FRAISA tools: quick and easy.

To this end, FRAISA experts determine the optimum operating points in comprehensive tests carried out at the company's own application centers. All factors involved are taken into account and the optimal data is then bundled in the new ToolExpert and continuously expanded.

## When it comes to using the tools, this means you:

- ✓ Find the optimum operating parameters quickly and reliably
- ✓ Use perfectly coordinated tool- and material-specific cutting data
- ✓ Download CAD data for selected tools

## FRAISA ToolExpert® offers many advantages:

- **Precise:** Find perfectly coordinated, tool- and material-specific cutting data
- **Simple:** Access data online at any time and from anywhere without software downloads
- **Quick:** Find application parameters with a just few clicks and without registering
- **Order function:** Order the tool you want directly from our E-shop via a link
- **Flexible:** Search for tools or materials to be machined as required
- **Comprehensive:** Call up cutting data for FRAISA tools from a database of more than 11,000 materials
- **User-friendly:** Work intuitively thanks to the new, responsive design



Available online  
**FRAISA**  
**ToolExpert®**



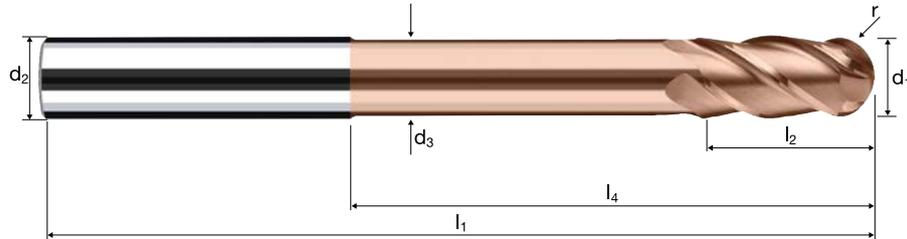


# Ball nose end mills SpheroX

Tolerance  $r \pm 0.005$ , 6xd



HM XA	$\lambda$ 40° $\gamma$ 0°
h4	SC
Vario	r
R	F



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

Example: Order-N°.											DURO-Si
											H7494
											H7494
$\emptyset$ Code	d <sub>1</sub>	d <sub>2</sub> h4	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	r $\pm 0.005$	$\alpha$	z	
100	1.00	6.00	0.95	66	2.00	6.00	16.08	0.500	9.5°	4	●
140	2.00	6.00	1.90	66	4.00	12.00	20.31	1.000	6.1°	4	●
180	3.00	6.00	2.80	66	6.00	18.00	24.63	1.500	3.9°	4	●
220	4.00	6.00	3.70	69	8.00	24.00	28.95	2.000	2.2°	4	●
260	5.00	6.00	4.60	75	10.00	30.00	33.27	2.500	1.0°	4	●
300	6.00	6.00	5.50	80	12.00	42.34	43.00	3.000	0.0°	4	●
391	8.00	8.00	7.40	90	16.00	52.29	53.00	4.000	0.0°	4	●
450	10.00	10.00	9.20	105	20.00	63.20	64.00	5.000	0.0°	4	●
501	12.00	12.00	11.00	120	24.00	73.13	74.00	6.000	0.0°	4	●
610	16.00	16.00	15.00	135	32.00	85.13	86.00	8.000	0.0°	4	●
											●
											●
											●
											●
											●
											●
											●
											●
											●
											●
											●



Scan this QR code to access more information about the FRAISA GROUP.



The fastest way to our E-Shop.

**FRAISA SA**

Gurzelenstr. 7 | 4512 Bellach | Switzerland |  
Tel.: +41 (0)32 617 4242 |  
mail.ch@fraisa.com | [fraisa.com](http://fraisa.com) |

You can also find us at:  
[facebook.com/fraisagroup](https://facebook.com/fraisagroup)  
[youtube.com/fraisagroup](https://youtube.com/fraisagroup)

passion  
for precision



7 613088 498893  
HIB01972 05/2021 EN