

CUTTING TOOLS

**Solid Ceramic
End Mills and Rods**



Precision tools from SPK Cutting Tools have played a key role in providing high-productivity machining solutions for cast iron components for over 70 years. Today, continuous developments in cutting tool materials enable reliable high-performance machining not only of cast

iron materials, but also of heat resistant superalloys and hard materials. Whether it's turning, grooving, milling or boring, using standard or special tools - SPK Cutting Tools machining solutions focus on cost and productivity benefits combined with process reliability.

Milling with Solid Ceramic End Mills



Good to know

- For heat-resistant superalloys, cast iron and graphite materials
- High strength, toughness, and wear resistance
- Optimum process reliability when milling and inserting complex cutting edge geometries into the blank.

Heat-resistant superalloys and cast iron place the highest demands on the cutting material and cutting edge geometry during machining in order to enable efficient and reliable machining. Ceramic cutting materials are ideally suited for this due to their properties.

In the aerospace, power generation, process industry and oil and gas extraction industries, many components are manufactured from heat-resistant superalloys due to the required properties. The properties of these alloys during machining - their heat resistance, work hardening, tendency to carbide formation, high ductility, and good adhesion to a cutting edge - place the highest demands on the cutting material used and the cutting edge geometry. This also applies to milling.

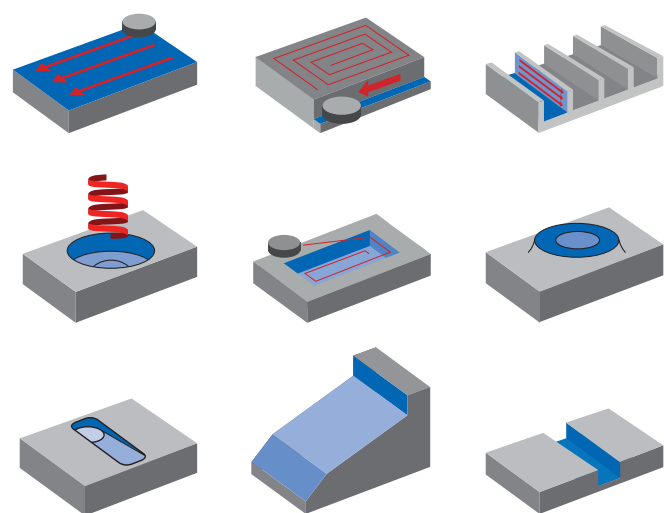
For this application, SPK Cutting Tools offers both ceramic milling cutters and blanks into which the cutting edge geometry can be incorporated. The milling cutters and blanks are made of the SiAlON cutting material, which is specially adapted to the requirements of milling heat-resistant superalloys and cast iron materials.



Application for Solid Ceramic End Mills

The milling cutters are designed for a wide range of applications. They can be used for milling pockets and grooves, plunge milling, shoulder, and ramp milling and, of course, face milling. The cutting material properties and the cutting geometries allow them to be used for roughing of HRSA- and cast iron materials and for semi-finishing of cast iron parts.

High cutting parameters enable large cutting depths, high feed rates and cutting speeds with good tool life. Ceramic milling cutters increase efficiency and process reliability when machining heat-resistant superalloys and cast iron materials.



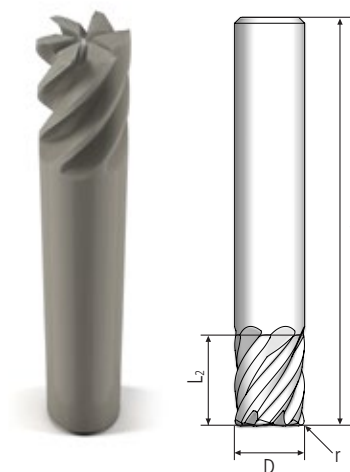
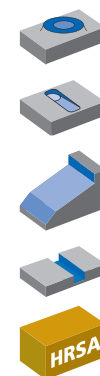
End mills for HRSA materials

Roughing

6.3



$v_c = 550 - 750 \text{ m/min}$
 $f_z = 0,03 - 0,06 \text{ mm}$
 $a_p = \text{bis } 0,5 \times D$



Type	SPK-Ref. Nr.	Dimensions (mm)				
		D	t	r	L ₁	L ₂
CTE-0600Z06R-AA12 LSM800	771.15.060.19.0	6	6	1,20	60	8
CTE-0600Z06R-AA20 LSM800	771.15.060.39.0	6	6	2,00	60	8
CTE-0600Z06R-AA25 LSM800	771.15.060.29.0	6	6	2,50	60	8
CTE-0800Z06R-AB12 LSM800	771.15.080.19.0	8	6	1,20	60	10
CTE-0800Z06R-AB20 LSM800	771.15.080.39.0	8	6	2,00	60	10
CTE-0800Z06R-AB25 LSM800	771.15.080.29.0	8	6	2,50	60	10
CTE-1000Z06R-BC12 LSM800	771.15.100.19.0	10	6	1,20	65	12
CTE-1000Z06R-BC20 LSM800	771.15.100.39.0	10	6	2,00	65	12
CTE-1000Z06R-BC25 LSM800	771.15.100.29.0	10	6	2,50	65	12
CTE-1200Z06R-CD12 LSM800	771.15.120.19.0	12	6	1,20	70	15
CTE-1200Z06R-CD20 LSM800	771.15.120.39.0	12	6	2,00	70	15
CTE-1200Z06R-CD25 LSM800	771.15.120.29.0	12	6	2,50	70	15
CTE-1600Z08R-DF12 LSM800	771.15.160.19.0	16	8	1,20	83	17
CTE-1600Z08R-DF20 LSM800	771.15.160.39.0	16	8	2,00	83	17
CTE-1600Z08R-DF25 LSM800	771.15.160.29.0	16	8	2,50	83	17
CTE-2000Z08R-EF12 LSM800	771.15.200.19.0	20	8	1,20	93	17
CTE-2000Z08R-EF20 LSM800	771.15.200.39.0	20	8	2,00	93	17
CTE-2000Z08R-EF25 LSM800	771.15.200.29.0	20	8	2,50	93	17

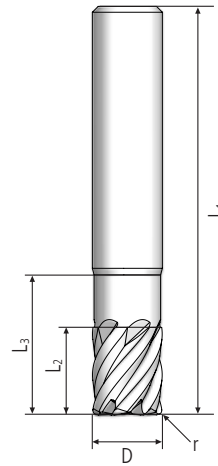
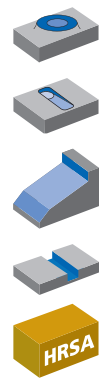
Torus end mill for HRSA materials

Roughing

6.3



$v_c = 550 - 750 \text{ m/min}$
 $f_z = 0,03 - 0,06 \text{ mm}$
 $a_p = \text{bis } 0,5 \times D$



End mills for cast iron materials

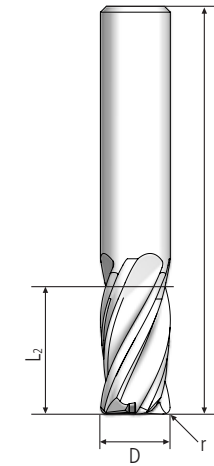
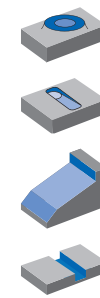
Rough finishing

6.3

3.2



$v_c = 600 - 900 \text{ m/min}$
 $f_z = 0,1 - 0,16 \text{ mm}$
 $a_p = \text{bis } 0,5 \times D$



Type	SPK-Ref. Nr.	Dimensions (mm)					
		D	t	r	L ₁	L ₂	L ₃
CTT-0600Z06R-AA12 LSM800	771.15.060.59.0	6	6	1,20	60	8	12
CTT-0600Z06R-AA20 LSM800	771.15.060.79.0	6	6	2,00	60	8	12
CTT-0600Z06R-AA25 LSM800	771.15.060.69.0	6	6	2,50	60	8	12
CTT-0800Z06R-AB12 LSM800	771.15.080.59.0	8	6	1,20	60	10	16
CTT-0800Z06R-AB20 LSM800	771.15.080.79.0	8	6	2,00	60	10	16
CTT-0800Z06R-AB25 LSM800	771.15.080.69.0	8	6	2,50	60	10	16
CTT-1000Z06R-BC12 LSM800	771.15.100.59.0	10	6	1,20	65	12	20
CTT-1000Z06R-BC20 LSM800	771.15.100.79.0	10	6	2,00	65	12	20
CTT-1000Z06R-BC25 LSM800	771.15.100.69.0	10	6	2,50	65	12	20
CTT-1200Z06R-CD12 LSM800	771.15.120.59.0	12	6	1,20	70	15	24
CTT-1200Z06R-CD20 LSM800	771.15.120.79.0	12	6	2,00	70	15	24
CTT-1200Z06R-CD25 LSM800	771.15.120.69.0	12	6	2,50	70	15	24
CTT-1600Z08R-DF12 LSM800	771.15.160.59.0	16	8	1,20	83	17	32
CTT-1600Z08R-DF20 LSM800	771.15.160.79.0	16	8	2,00	83	17	32
CTT-1600Z08R-DF25 LSM800	771.15.160.69.0	16	8	2,50	83	17	32
CTT-2000Z08R-EF12 LSM800	771.15.200.59.0	20	8	1,20	93	17	40
CTT-2000Z08R-EF20 LSM800	771.15.200.79.0	20	8	2,00	93	17	40
CTT-2000Z08R-EF25 LSM800	771.15.200.69.0	20	8	2,50	93	17	40

Type	SPK-Ref. Nr.	Dimensions (mm)				
		D	t	r	L ₁	L ₂
CKE-0800Z03R-AE12 LSM800	771.16.080.19.0	8	3	1,20	60	16
CKE-0800Z03R-AE20 LSM800	771.16.080.39.0	8	3	2,00	60	16
CKE-1000Z03R-BG12 LSM800	771.16.100.19.0	10	3	1,20	65	20
CKE-1000Z03R-BG20 LSM800	771.16.100.39.0	10	3	2,00	65	20
CKE-1200Z04R-CJ12 LSM800	771.16.120.19.0	12	4	1,20	70	24
CKE-1200Z04R-CJ20 LSM800	771.16.120.39.0	12	4	2,00	70	24
CKE-1600Z04R-DN12 LSM800	771.16.160.19.0	16	4	1,20	83	32
CKE-1600Z04R-DN20 LSM800	771.16.160.39.0	16	4	2,00	83	32
CKE-2000Z04R-EQ12 LSM800	771.16.200.19.0	20	4	1,20	93	40
CKE-2000Z04R-EQ20 LSM800	771.16.200.39.0	20	4	2,00	93	40

Designation system for end mills

CK End mill cast iron	S Special	L Left	A 60 mm	
CT End mill HRSA	- Standard	R Right	B 65 mm	
Designation	Placeholder	Rotation direction	C 70 mm	
			D 83 mm	
			E 93 mm	
			F ...	
			G ...	
			H ...	12 R 1,2 mm
			I ...	20 R 2,0 mm
			J 123 mm	25 R 2,5 mm
			
			Total length L1	Corner radius r

CT E - 0800 Z06 R - A B 12 LSM800

Milling cutter type	Nominal diameter D	No. of teeth t	Cutting edge length L2	Cutting material	
E End mill ceramic solid	0600 6 mm	Z02 2 Zähne		LSM 800	
	0800 8 mm	Z03 3 Zähne		A 8 mm	J 24 mm
F End mill ceramic compound	1000 10 mm	Z04 4 Zähne		B 10 mm	K ...
	1200 12 mm		C 12 mm	L ...
G End mill CBN compound	1600 16 mm	Z20 20 Zähne		D 15 mm	M ...
	2000 20 mm		E 16 mm	N 32 mm
T Torus end mill ceramic Solid		F 17 mm	O ...
				G 20 mm	P ...
				H ...	Q 40 mm
				I



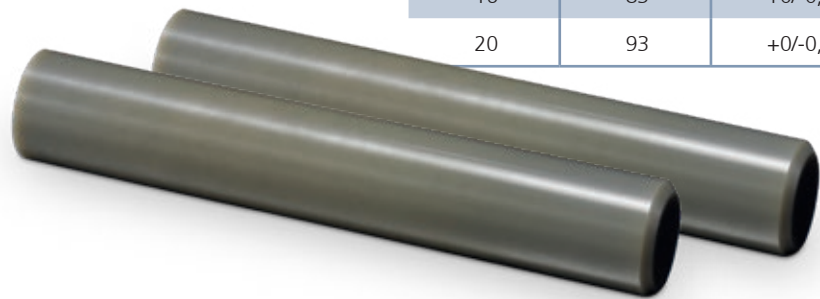
Ceramics for Milling

The machining concept is based on using the highest possible cutting parameters to achieve a high machining volume. This shows that most of the heat introduced is dissipated via the chip and therefore does not reach the component. Tungsten carbide loses its hot hardness and wear resistance properties at temperatures above 800°C. The high temperatures and partial pressures at the cutting edges also cause increased chemical reactions and diffusion processes in carbides, promoting wear.

Cutting ceramics are not subject to these influences and retain their strength, wear resistance and toughness even at high temperatures. The high cutting parameters allow large cutting depths, high feed rates and cutting speeds with good tool life. Ceramics thus increase the efficiency and process reliability of machining.

Rods

Dimensions Rods (mm)			Grade	Ref.-Nr.
D	L	Tolerance h6		
6	60	+0/-0,008	LSM 800	70.91.557.57.0
8	60	+0/-0,009	LSM 800	70.91.557.58.0
10	65	+0/-0,009	LSM 800	70.91.557.59.0
12	70	+0/-0,011	LSM 800	70.91.557.60.0
16	83	+0/-0,011	LSM 800	70.91.557.61.0
20	93	+0/-0,013	LSM 800	70.91.557.62.0





**SPK Cutting Tools
by CeramTec GmbH**

Hauptstraße 56
73061 Ebersbach / Fils, Germany

Phone: +49 7163 166-239

info@spk-tools.com

www.spk-tools.com



Website

www.spk-tools.com



YouTube Channel:

[SPKCuttingTools](https://www.youtube.com/SPKCuttingTools)