

CUTTING TOOLS

# Machining Solutions from SPK Cutting Tools

THE CERAMIC EXPERTS



## Machining Solutions

Turning • Hard Turning • Grooving • Milling • Boring



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.

# High-Performance Machining with SPK Cutting Tools

## Heat resistant superalloys

Components made from heat resistant superalloys, such as those used in aerospace, power generation, process industries and oil and gas production, place the highest demands on the machining process. Process reliability and cutting performance are the defining parameters. With our SiC-whisker reinforced ceramics and variety of SiAlON ceramics, we meet these requirements for our customers every day.

### Example parts

Rings, discs, blisks, turbine shafts

### HRSA materials

Nickel-based: Inco625, Inco718, Rene65, Hastelloy, Waspaloy, MAR, Udimet, Nimonic, ...  
Cobalt-based: Stellite, Haynes, ...



## Cast iron materials

SPK Cutting Tools has one of the most comprehensive ranges of ceramic and CBN cutting materials for machining cast iron materials. With more than 70 years of machining experience, SPK Cutting Tools is able to offer highly economical machining solutions for production.

### Example parts

Clutch pressure plates, brake discs, hubs, planetary carrier, hydraulic elements, engine components, flanges, guides, rollers

### Cast iron in the following versions:

- With lamellar graphite: CI, CI-HC,
- With globular graphite: NCI, ADI,
- With vermicular graphite: CGI
- Centrifugal casting



## Hard materials

Hard materials are used in gear and drive technology as well as in the bearing and roller industry. The machining task focuses on maintaining the required high surface quality and tight dimensional and shape tolerances. Our wide range of ceramic and CBN cutting materials meet these requirements every day.

### Example parts

Gearwheels, shafts, large gear components, bearing rings, especially for large bearings, rolling elements, rollers

### Hard materials

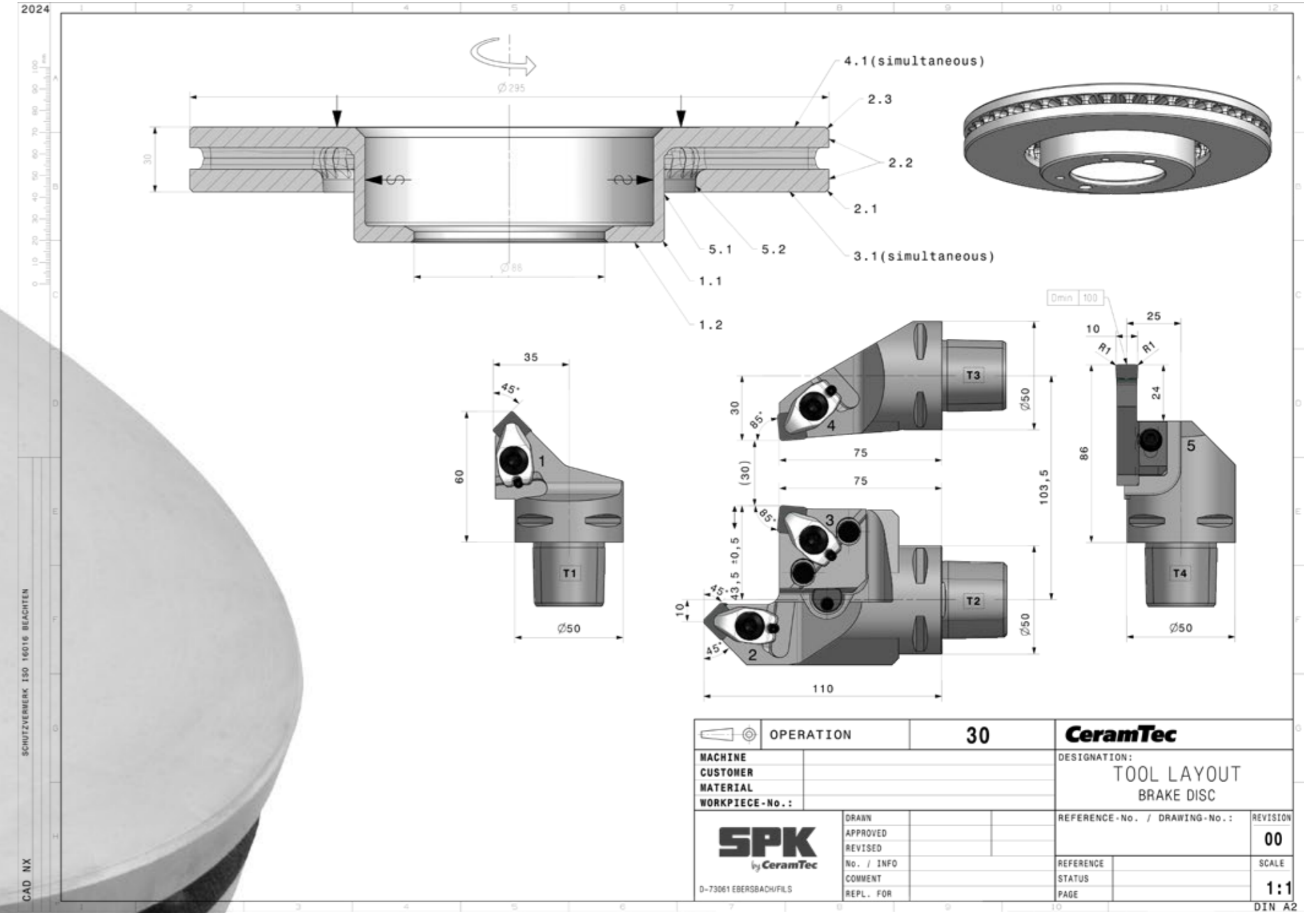
- Hardened steels
- Sintered steels
- Chilled cast iron
- Hardened cast iron

# SPK in Action

What's the best way to machine my part? Is my machining cost-effective? Can my machining process be improved? These and other similar questions come up time and time again in the machining industry. SPK Cutting Tools is at your service worldwide to provide you with practical answers. To create the optimum machining solution, we match cutting tool materials, insert geometry and tool holders with materials, components and the machine situation. We not only make sure that the machining task is performed successfully according to the targets set, but also ensure productivity, process reliability and efficiency.

## SPK-Engineering makes the difference

- Redesign and optimisation of existing machining processes
- Creation of tool layouts for optimized production
- Customized tools
- Optimisation of cutting data and tool design



# THAT'S ALL YOU NEED!

## SPK's **BIG FIVE** for your HRSA Machining

### 1 CUTTING MATERIALS

- SiC-whisker ceramics
- SiAlON
- Polymorphic SiAlON

### 2 INSERTS

- Standard geometries
- Special geometries

### 3 TOOL HOLDERS

- Special tools
- Standard tools

### 4 ENGINEERING

- Tool layouts
- Tool designs
- Time calculations

### 5 PARTNER

- From the first chip
- To optimization
- And troubleshooting
- Worldwide – on-site

When it comes to machining HRSA materials, SPK Cutting Tools' Big Five offers everything you need from a single source to ensure that the machining of your HRSA components is as efficient and reliable as possible.

# High-Performance Cutting Materials

Whether it's turning, grooving, milling or boring: SPK Cutting Tools faces the challenges posed by a wide variety of machining tasks. Our extensive and varied range of ceramic cutting materials, CBN and SiC-whisker reinforced ceramics is unique. This has enabled us to establish ourselves worldwide as a market leader and reliable partner.

## CBN for cast iron



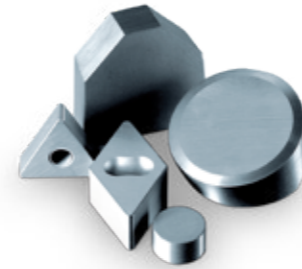
Indexable inserts made of high-strength CBN (polycrystalline cubic boron nitride) are ideal for roughing and finishing grey cast iron components.

## Silicon nitride ceramics



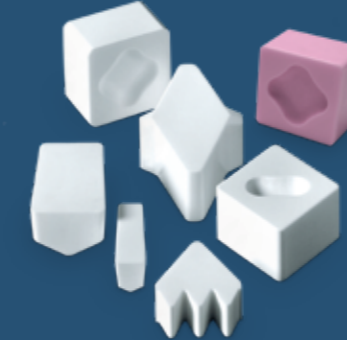
Do you need increased cutting data and high machining speeds? Silicon nitride indexable inserts are ideal for machining cast iron parts.

## Mixed ceramics



These composite cutting materials have excellent wear resistance, edge stability and warm hardness. Applications include hardened steel machining, hard machining of rollers and fine and medium finishing of cast iron parts.

## Oxide ceramics



These classic cutting materials for turning and grooving are ideal for machining grey and nodular cast iron. They are also suitable for the continuous machining of centrifugally cast parts.

## $\alpha/\beta$ SiAlON ceramics



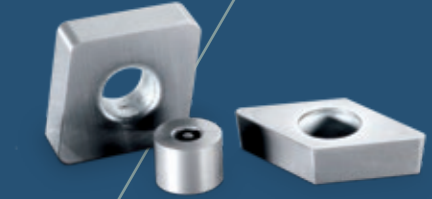
Even in rough conditions, this cutting material enables maximum cutting and feed rates when machining cast iron. When coated, the inserts are also ideal for machining fresh cast iron. HRSA materials can also be reliably machined with this cutting material.

## SiC-whisker reinforced ceramics



Our SiC-whisker reinforced ceramics are ideal for turning, grooving and milling HRSA materials (heat resistant superalloys).

## CBN for hard materials



We offer an extensive range of coated and uncoated CBN and ceramic cutting tool materials for turning, grooving and milling components made from hardened steels, sintered metals and chilled cast iron materials. Our solid CBN variants offer particular advantages in the implementation of new process shortening machining strategies.

AKT 180 – Oxide ceramic

# Tools for Turning

Our external and internal turning tools, cartridges and modular tool changing systems enable a wide variety of turning operations to be successfully implemented in a highly productive, process-optimized and cost-effective manner.

### The ICT tool system

If wear on the clamping elements is affecting process reliability or machining quality, then the ICT tool system is your number one choice. For example, clamping elements are available in carbide. These significantly increase process reliability and the service life of the cartridge.



Tool Holder



Boring Bars



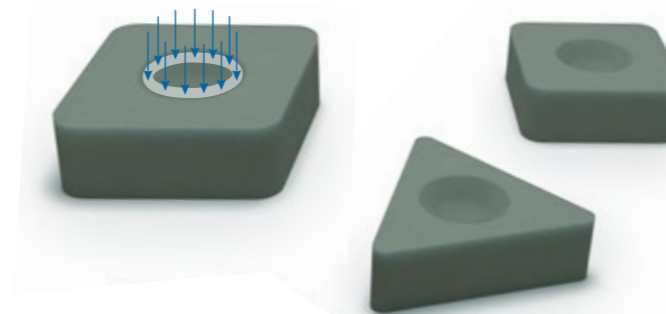
Cartridges



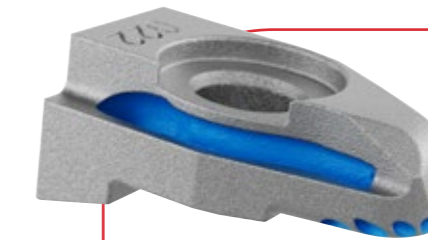
Modular Tool Systems

## H10 - The shape for secure clamping

The trough shape of the H10 ensures a positive, friction-locked connection between the clamping finger and the inserts. When the clamping finger is tightened, the insert is simultaneously retracted into the insert seat, resulting in extremely stable and secure clamping.



## HPC – High-Pressure Cooling



With our HPC tooling system, the coolant is supplied through the clamping finger. The outlet ports are positioned so that the coolant is fed directly into the active zone. A coolant pressure of up to 200 bar is possible.

Another advantage of high pressure cooling is that unwanted ribbon chips can be quickly broken up.



 HPC-Tool in action

# Special Tools

When it comes to optimising process times and increasing productivity for mass and series production, we have a particularly cost-effective solution: the use of special tools.

From cutting inserts with special geometric shapes to custom tool holders: We can design and manufacture even complex special tools within a short space of time - while maintaining our commitment to the highest quality.



HSK holder



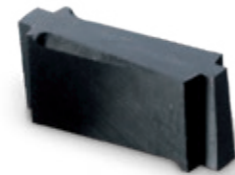
Shank holder



CMS holder



VDI holder



Special geometries





# Machining of Hard Materials

For the machining of hard materials such as hardened steels, sintered steels or chilled cast iron, our cutting tool program includes cutting materials and tools for hard turning, hard grooving and hard milling. Our cutting material program offers a wide range of coated and uncoated high-performance CBN and ceramic grades for light to heavy interrupted cuts and hard/soft transitions in standard and special insert geometries. If special tool designs are required, our engineering department can provide the right tools for turning, grooving, and milling.

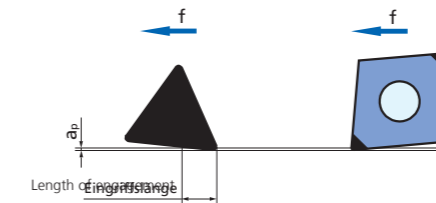


H10-S dimple for Solid CBN inserts

## Solid CBN for turning hard materials

Solid CBN inserts offer a whole range of advantages for various machining tasks:

- Drawn cut (Pic. 1):
  - High feed rates with excellent surface quality
  - Approximately 2/3 of the cutting edge length can be used with solid inserts
- No limit to the length of the cutting edge, allowing optimum number of cutting passes and a significantly reduced number of cuts
- High cutting speeds because there is no desoldering of the CBN cutting edge
- Preturning machining technique: maximum removal rates and free of twists surfaces produced in one operation
- Hard-soft transitions



Pic. 1: Schema drawn cut

## Advantages of our tools

- Increased process reliability
- Shorter process cycles
- Maximum process flexibility
- New processing strategies
- Mixed ceramics as an alternative cutting material

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## Tools for Grooving

In addition to external and internal grooving, SPK Cutting Tools grooving systems also allow radial and axial grooving with a lateral feed. A wide range of ceramics, CBN and cermet cutting materials are available.

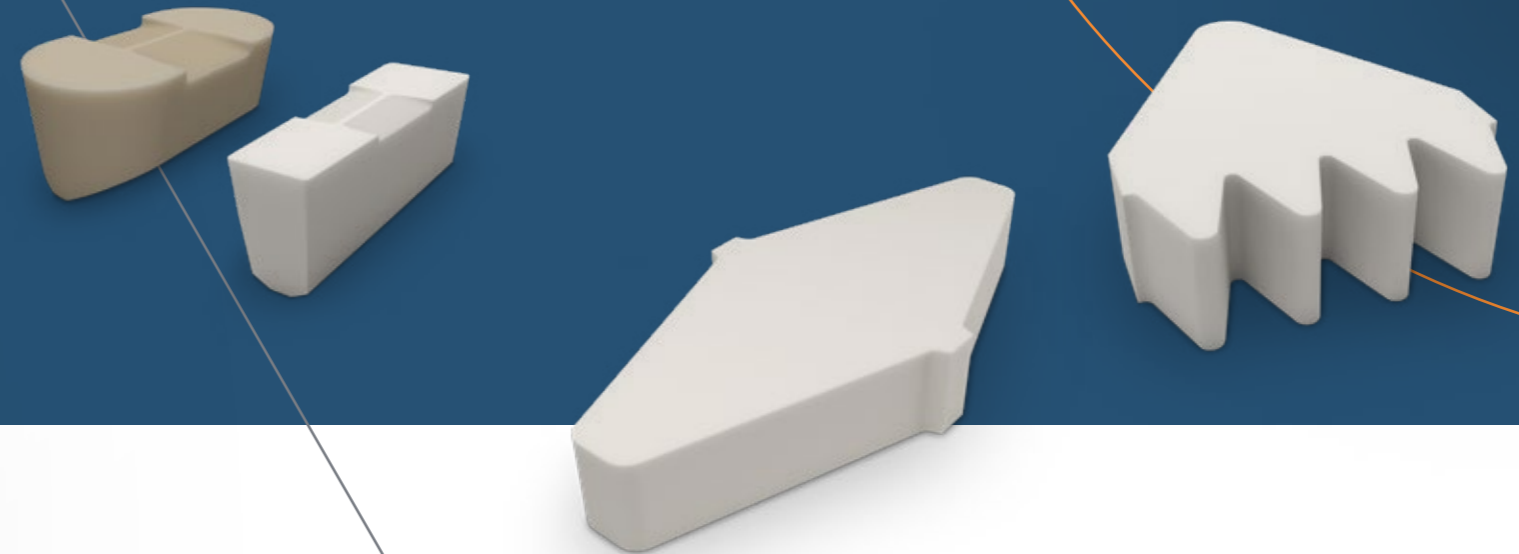


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We offer a comprehensive range of standard and form profile cutting tools for standard and profile grooving, also for V-belt profiles and Poly-V profiles.

To meet specific customer requirements, we design and manufacture specially shaped grooving inserts and custom holders.

When parting and grooving using a lateral feed, our RAG grooving system really comes into its own: The patented double prism clamping for the grooving inserts enables high cutting values with maximum process reliability.



# Tools for Milling

Our portfolio includes milling systems that are tailored to the specific machining task and work-piece situation. Our milling tools are designed with negative or positive insert geometries, and with wedge or hole clamping for high-productivity milling.

## Special milling cutters and engineering

Special milling tasks require special solutions. Our SPK Cutting Tools engineering team is here to help. Whether you need standard or special milling cutters: Our experts will ensure that your project is developed professionally and implemented economically. The milling tools are manufactured on schedule in our own production facility.

- Face finish milling
- Rough face milling
- Groove milling
- Sprue milling
- Ramp milling
- Shoulder milling 88° / 90°
- High-feed milling
- Helical milling
- Trimming
- Plunge milling
- Inclined shoulder milling

### Cast iron



### HRSA



### Hard materials



## Tools for Boring

We offer efficient and flexible tooling solutions for boring operations: Depending on the application and requirements, we equip our boring tools with fixed insert seats or cartridges. The optimum number of insert seats makes our boring tools extremely economical. We offer cut surfaces for all common tool holding systems.



up to:  
 $v_c > 1000 \text{ m/min}$   
 $f_t > 0,14 \text{ mm/z}$

Using our boring tool systems and cutting tool materials takes cast iron boring to a whole new level: Cutting speeds of  $v_c > 1000 \text{ m/min}$  and feeds of  $f_t > 0.14 \text{ mm/t}$  can be achieved, making boring operations highly economical. Other benefits include the tight dimensional and form tolerances achieved with our boring tools.



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