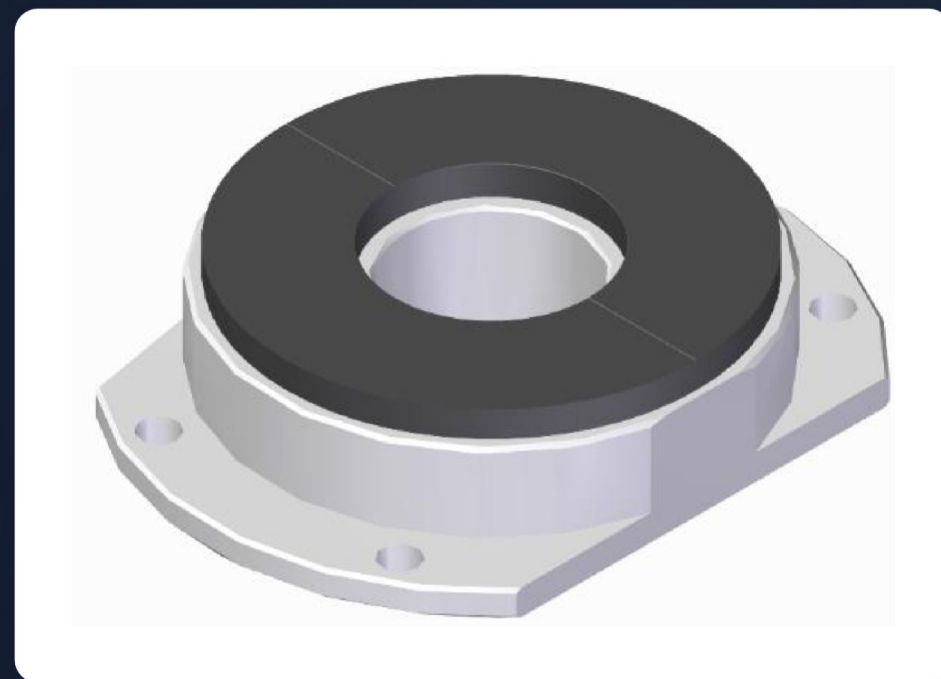




PRECISION WEAR PARTS

# Wearless Tools

Support and guiding tools with PCD, PCBN, tungsten carbide or ceramic tips — for centerless grinding, bearing production and measuring systems.



## CHAPTER 1

### Introduction to Wearless Tools

- 1-1 What is a wearless tool?
- 1-2 Advantages and applications
- 1-3 Types of wearless tool
- 1-4 Manufacturing process
- 1-5 Tip materials and grades

## CHAPTER 2

### Tool Types in Detail

- 2-1 Centerless guide
- 2-2 Backing plate
- 2-3 Sliding V-block
- 2-4 Shoe
- 2-5 Special tools

## CHAPTER 1

# Introduction to Wearless Tools

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Function, materials and manufacture of tools that stay dimensionally stable in permanent workpiece contact.



## What is a Wearless Tool?

A wearless tool is a precision tool that supports or guides the workpiece in repeated contact — in bearing grinding, centerless grinding and measuring operations. The contact surface is a brazed tip of PCD, PCBN, tungsten carbide or ceramic, which keeps the tool dimensionally stable over long production runs.

### CONSTRUCTION

#### Tip

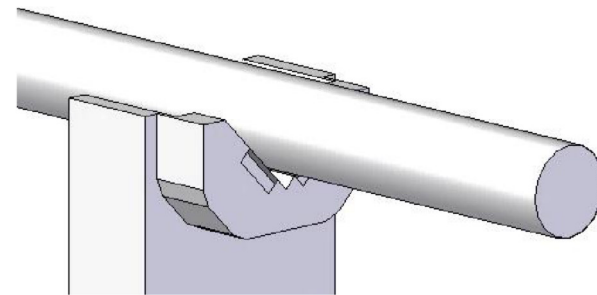
PCD · PCBN · tungsten carbide · ceramic

#### Body and shank

Tungsten carbide or steel, machined to the customer interface

#### Brazed joint

Vacuum-brazed, then ground and eroded to final profile



PCD shoe in contact with the rotating workpiece

1-2

## Advantages and Applications

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### Advantages

- High-precision profiles, including convex and concave forms
- Long, consistent tool life
- Surface quality that prevents scratches on the workpiece
- Four tip materials: PCD, PCBN, tungsten carbide, ceramic

### Applications

- Centerless grinding machines
- Sliding blocks and shoes on grinding machines
- Backing plates in bearing production
- Measuring probes and gauges · machine tools



Centerless grinding machine



Measuring probe



Bearing production

1-3

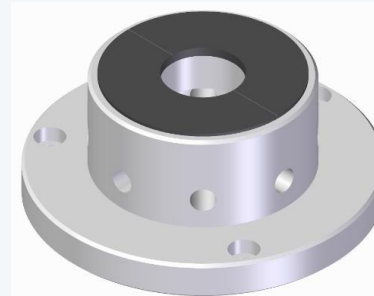
## Types of Wearless Tool



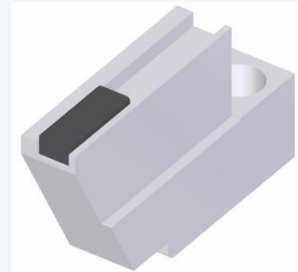
Centerless guide



Sliding V-block



Backing plate



Shoe



Honing gauge



Measuring gauge



Dead center for lathes

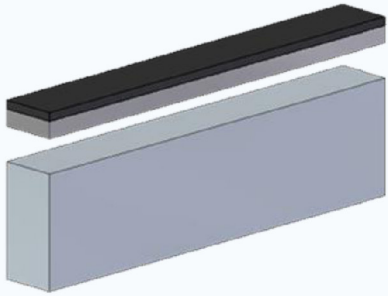
### Special tools

Designed to the workpiece and the machine interface.

1-4

## How a Wearless Tool is Made

The design is derived from the workpiece. Material selection and EHWA's grinding technology then determine profile accuracy and tool life.



### STEP 1

#### Prepare body and tip

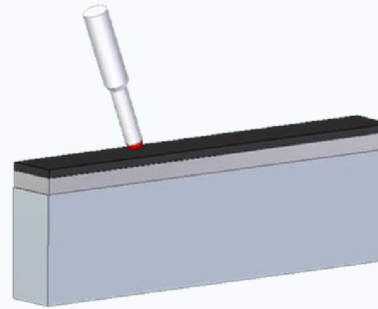
Body: carbide or steel · Tip:  
PCD, carbide, ceramic



### STEP 2

#### Braze the tip

High-strength joint between  
tip and body



### STEP 3

#### Grinding, EDM / EDG

Final profile, radius and angle



### STEP 4

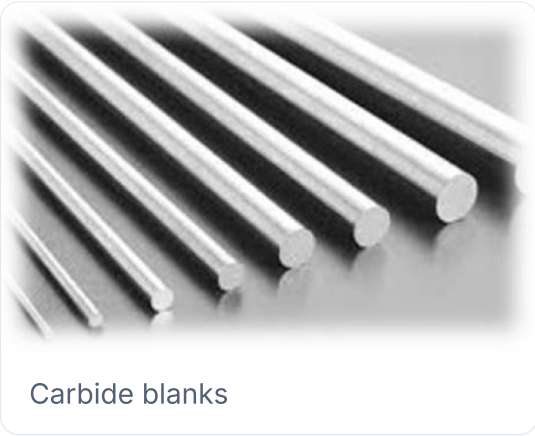
#### Inspection

Optical measurement of profile  
and dimensions

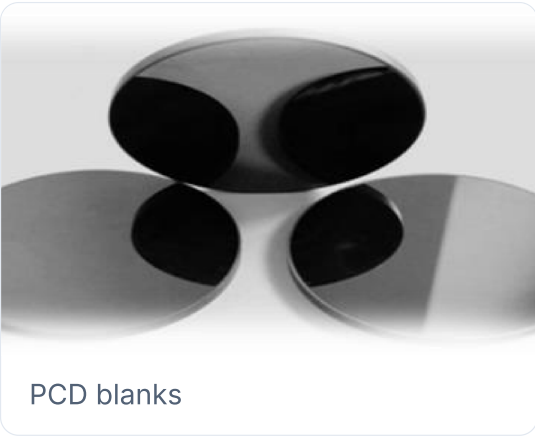
# Tip Materials and Grades

Carbide and ceramic: cost-efficient, widely applicable  
PCD: maximum wear resistance and surface quality

| MATERIAL         | GRADE   | GRAIN SIZE | CHARACTERISTICS                                                                                                   |
|------------------|---------|------------|-------------------------------------------------------------------------------------------------------------------|
| Tungsten carbide | K01     | extra fine | Convex and concave profiles possible · cost-efficient · higher toughness · longer tool life than steel tools      |
|                  | K05     | fine       |                                                                                                                   |
| Ceramic          | Ceramic | extra fine | Convex and concave profiles possible · high thermal and chemical resistance · good wear resistance                |
| PCD              | EP51    | 4 µm       | Convex and concave profiles possible · outstanding wear resistance · outstanding surface quality on the workpiece |
|                  | EPW60   | 10 µm      |                                                                                                                   |



Carbide blanks



PCD blanks

## CHAPTER 2

# Tool Types in Detail

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Centerless guide, backing plate, sliding V-block, shoe and special tools — each designed to the workpiece.



2-1

## Centerless Guide

### ADVANTAGES

- Surface quality that prevents scratches on the workpiece
- Longer tool life than tungsten carbide
- Customised angle, radius and profile

### TIP MATERIAL

- PCD / PCBN
- Tungsten carbide
- Ceramic

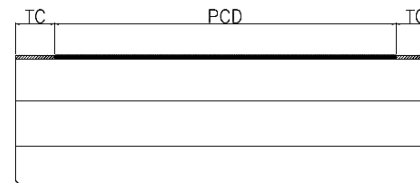
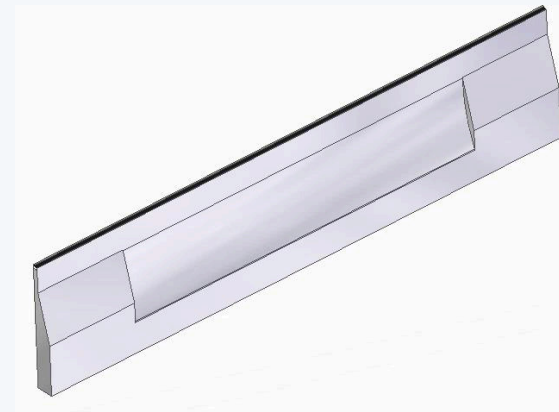
### TIP LAYOUT

#### Single tip

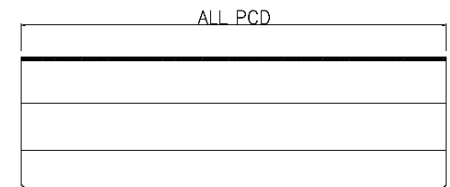
PCD, carbide or ceramic

#### Combination tip

PCD + carbide



Carbide – PCD – carbide



Full PCD

2-2

## Backing Plate

For bearing machining

### ADVANTAGES

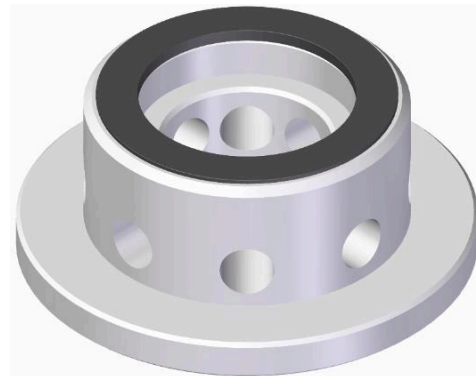
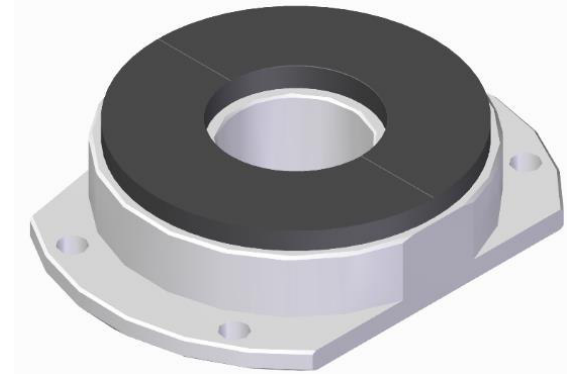
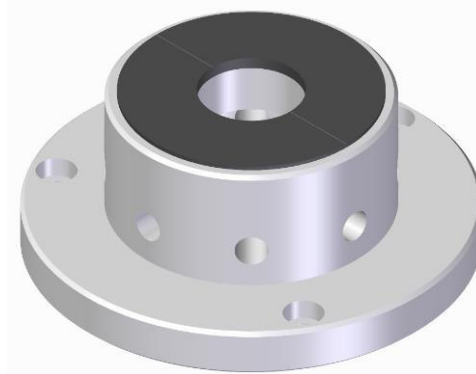
- Long, consistent tool life thanks to the wear resistance of PCD
- Fully customised designs

### TIP MATERIAL

PCD / PCBN

Tungsten carbide

Ceramic



2-3

## Sliding V-Block

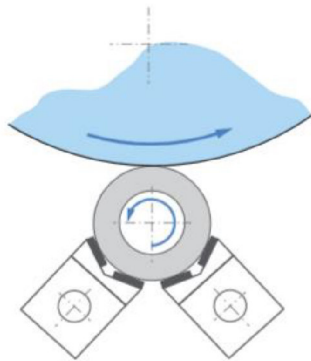
### ADVANTAGES

- Outstanding wear resistance
- Designs matched to the workpiece

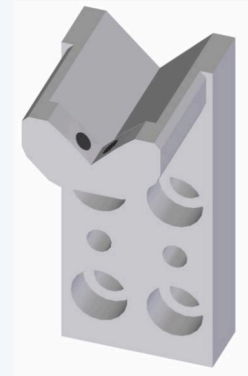
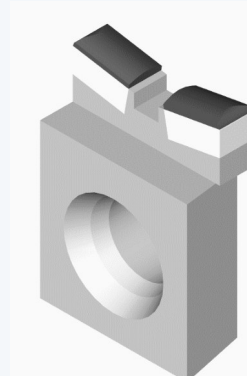
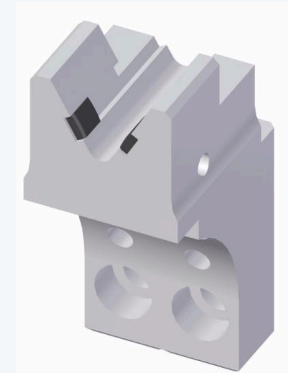
PCD / PCBN

Tungsten carbide

Ceramic



The workpiece runs on two V-blocks



2 - 4

# Shoe

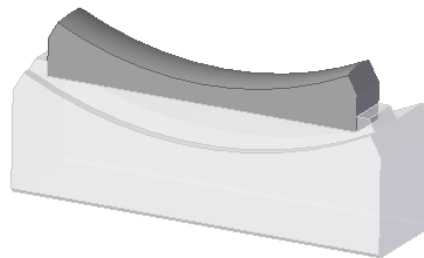
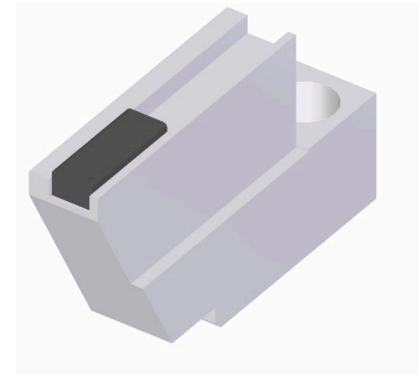
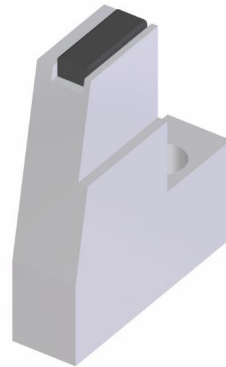
## ADVANTAGES

- Long, stable tool life
- Outstanding wear resistance
- Designs matched to the workpiece

PCD / PCBN

Tungsten carbide

Ceramic



## Special Tools

Reference applications



### Measuring gauge

- PCD, CVD or tungsten carbide
- Measuring systems have to stay accurate over long periods, so they need robust, wear-resistant sensing elements



### Honing gauge

- PCD or tungsten carbide
- Measures the bore diameter during honing
- Longer tool life than carbide



### Dead center for lathes

- PCD or tungsten carbide
- Longer tool life through high wear resistance



# Tools Designed to Your Workpiece

Send us the drawing and the operation. We select the tip material, design the profile and manufacture the tool.

WEB  
[www.ehwadia.de](http://www.ehwadia.de)

COMPANY  
EHWA Diamond Ind. Co., Ltd.

