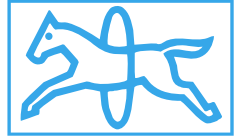


▶ Superhard Diamond and CBN Files,  
Grinding Tools and Cut-Off Wheels

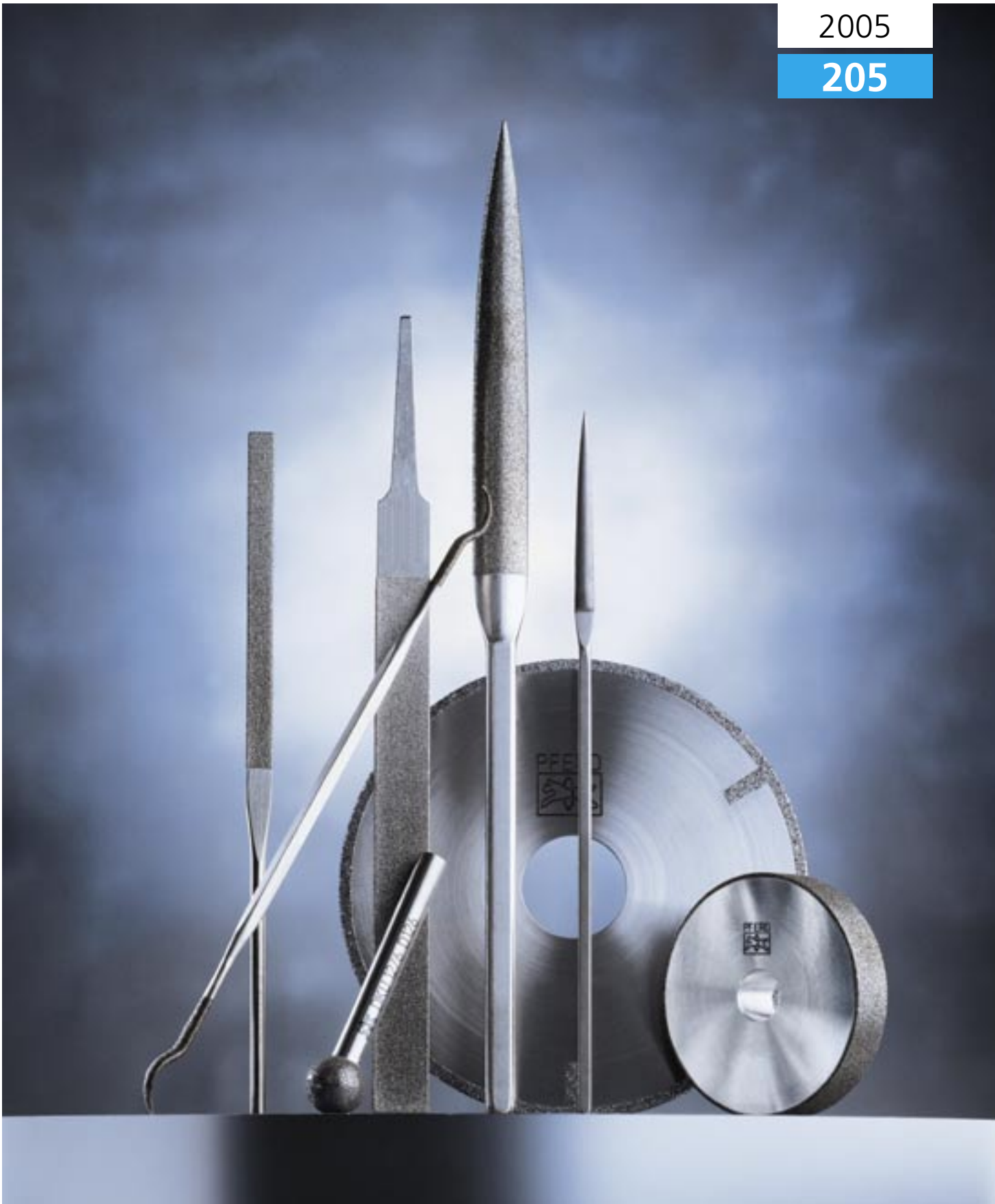
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**PFERD**



2005

**205**



# Superhard Diamond und CBN Abrasives

## Advantages and Range of Applications

### Table of contents:

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Diamond and CBN – general notes on superhard abrasives	2- 4
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**Note:**  
PFERD quality is EN ISO 9001 certified.

### Superhard abrasives

The term “superhard abrasives” refers to  
**1. Diamond**

#### 2. CBN Cubic Boron Nitride

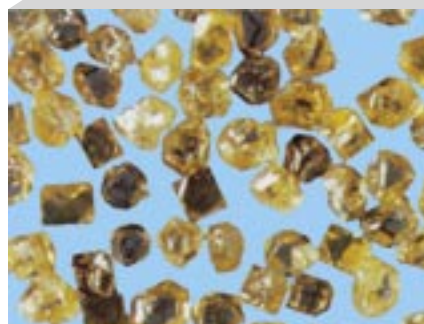
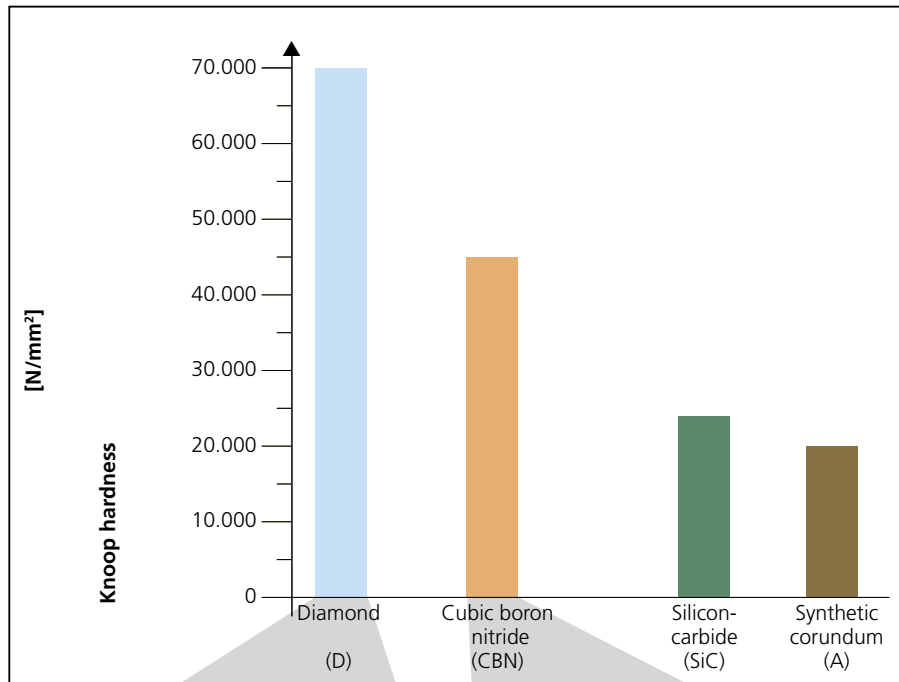
These abrasives are termed “superhard” because they are significantly harder than conventional abrasives, e.g., aluminium oxide and silicon carbide (see graph).

Diamond occurs in nature but, like CBN, can also be produced synthetically.

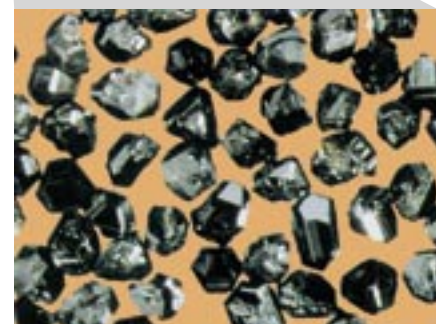
At extremely high pressures and temperatures, pure carbon (C) synthesizes to diamond, whereas the chemical elements boron (B) and nitrogen (N) synthesize to cubic crystalline boron nitride. Different cutting properties can be imparted to these abrasives by varying the process parameters during synthesis.

As the graph shows, CBN is nearly as hard as diamond.

### Comparison: Hardness of Abrasives



Diamond grit



CBN grit

### Advantages of superhard abrasives over conventional aluminium oxide or silicon carbide in grinding tools

- Excellent tool life and profile-holding properties
- Short machining times
- Reduced non-productive time due to fewer dressing and tool changing operations
- Prevention of thermal damage to the work-piece due to lower grinding temperatures
- Constant quality over a large number of workpieces

### Recommendations for use of diamond and CBN tools

Diamond and CBN abrasives do not compete, but complement each other.

Diamond is not suitable for machining steel, because a chemical reaction between the iron (Fe) in the steel and the carbon (C) in the diamond would cause exceedingly fast tool wear. Using diamond abrasives on steel will therefore not be cost-effective.

CBN fills this gap. It is only slightly less hard than diamond (see graph) but does not react with the iron (Fe) in the steel.

### Diamond tools are suitable for machining

- Carbides (sintered)
- Carbides (green compacts)
- Glass
- Ceramics (including engineering ceramics)
- Porcelain
- Wear-resistant coatings
- Ferrite
- Silicon
- Graphite, synthetic carbon
- Thermoset plastics
- Glass-fibre reinforced plastics
- Natural and synthetic stone
- Refractory materials

### CBN tools are suitable for machining:

- High-speed steels
- Tool steels
- Case-hardened steels
- Ball-bearing steels
- Chromium steels
- etc.

# Superhard Diamond und CBN Abrasives

## Grit Size, Grit Concentration

### Definition of grit size

The size of the abrasive particles used for diamond and CBN tools is usually stated according to the FEPA standard (FEPA = Fédération Européenne des Fabricants de Produits Abrasifs).

Grit size is measured in terms of the nominal mesh size of specific screens and denotes the approximate grain diameter in  $\mu\text{m}$ , i.e., a **high number** indicates a **coarse grit** while a **small number** refers to a **fine grit** size.

### Grit size comparison: FEPA Standard / US mesh

Grit sizes	Grit size FEPA standard		Equivalent U.S. mesh number (meshes per inch)
	Diamond	CBN	
	D 46	B 46	325/400
	D 54	B 54	270/325
	D 64	B 64	230/270
	D 76	B 76	200/230
	D 91	B 91	170/200
	D 107	B 107	140/170
	D 126	B 126	120/140
	D 151	B 151	100/120
	D 181	B 181	80/100
	D 213	B 213	70/ 80
	D 251	–	60/ 70
	–	B 252	60/ 80
	D 301	B 301	50/ 60
	D 357	B 357	45/ 50
	D 427	B 427	40/ 50
	D 502	B 502	35/ 45
	D 602	B 602	30/ 40
	D 852	B 852	20/ 30

### Grit concentration

The grit concentration refers to the number of abrasive particles per unit volume of the coating.

It is normally expressed on a scale from C 25 to C 200 (see table).

Diamond and CBN grain weights are conventionally measured in carats (ct). Thus, a C 25 concentration means a carat weight of 1.1 ct per  $\text{cm}^3$  of coating volume.

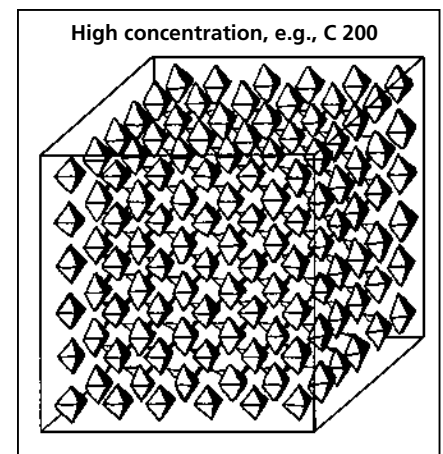
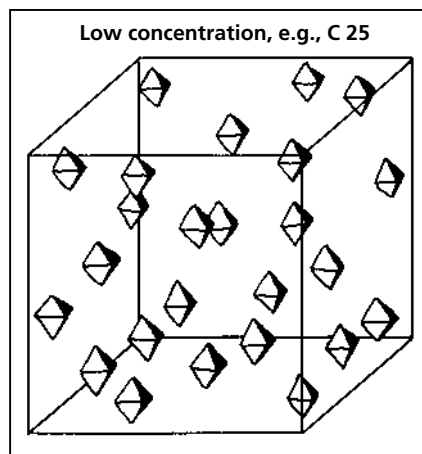
A high concentration of abrasive particles makes the tool more wear-resistant, which is particularly desirable for profile grinding operations or in applications involving very small diameters.

In most cases, the tool life depends on the grit concentration, i.e., the higher the grit concentration the longer the tool life. This more than outweighs the extra tool costs (due to greater diamond or CBN grit volumes).

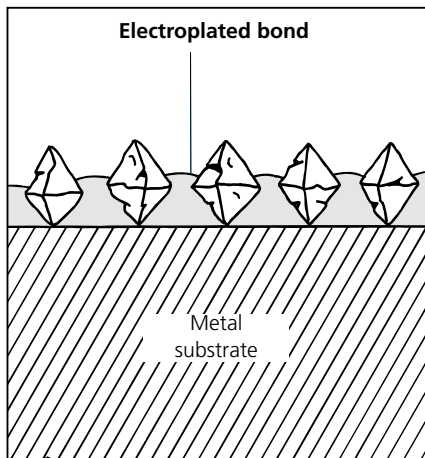
Potential drawbacks of higher grit concentrations lie in the need for higher grinding forces and higher process temperatures. Hence, a higher grit concentration need not necessarily be the best solution in terms of economic and technological efficiency.

### Concentration table C 25 – C 200

Concentration code	Carat weight per $\text{cm}^3$ abrasive volume (ct/ $\text{cm}^3$ )	Grit volume in % of abrasive volume
C 25	1.1	6.00
C 50	2.2	12.50
C 75	3.3	18.75
C 100	4.4	25.00
C 125	5.5	31.25
C 150	6.6	37.50
C 175	7.7	43.75
C 200	8.8	50.00



### Bond types and characteristics of diamond and CBN tools



#### Electroplated bond

##### Abrasive structure

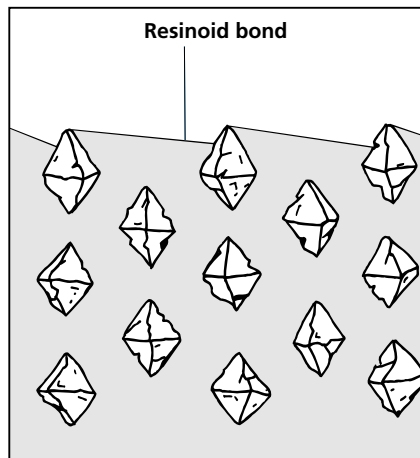
Electroplated diamond and CBN tools have a **monolayer** abrasive coating on a metal substrate. The individual diamond or CBN crystals are bound by a nickel layer measuring roughly half the grain diameter in thickness. This keeps the abrasive particles securely in place but lets them project well out of the bond, thus creating a very open tool surface with exceptionally large chip spaces. Since the grit is applied in a single layer, the profile of an electroplated tool is determined by the profile of the metal substrate. As a result, electroplated tools are obviously unsuitable for dressing.

##### Advantages

Electroplated tools are characterized by their effective abrasive action. Virtually any substrate geometry can be coated - this capability offers unparalleled flexibility in the choice of tool shapes. Moreover, due to their monolayer structure, electroplated abrasive tools are comparatively low in cost.

##### Fields of application

The properties of electroplated tools can be varied over a wide range by selecting the appropriate grit size. Coarse-grained tools have proven particularly suitable for soft materials such as glass-fibre reinforced plastics, whereas harder materials require a much finer grit. The electroplated nickel layer is ultra-hard and wear resistant. The resulting very strong bond with the diamond and/or CBN particles means that this process can be used to manufacture files as well as grinding tools. Diamond files are used on hardened steels or carbide.



#### Resinoid bond

##### Abrasive structure

The abrasive coating of a resinoid-bonded diamond or CBN grinding wheel is composed of  
 ■ abrasive particles,  
 ■ bonding material and  
 ■ filler.  
 The bond is compacted so as to contain no pores (see sketch).

##### Advantages

Resinoid-bonded diamond and CBN tools are noted for their comparatively low bond hardness, a quality which translates into the following process advantages:  
 ■ very high stock removal,  
 ■ short grinding times,  
 ■ low heat generation, i.e., "cool" grinding properties.

##### Fields of application

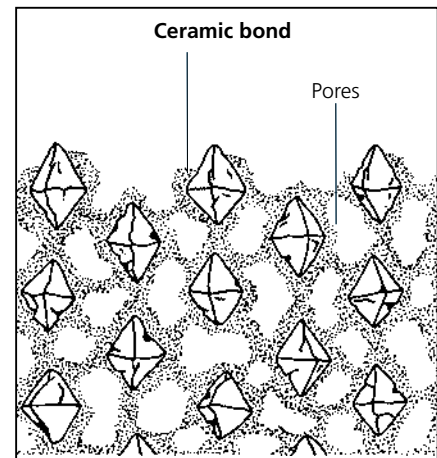
Resinoid-bonded diamond and CBN abrasive tools have met with a particularly rapid acceptance in tool grinding applications (dry and wet grinding). The materials machined in this industry, i.e., carbides (ground with diamond) and high-speed or tool steel (ground with CBN), call for the use of extremely wear-resistant abrasive particles which generate very little heat. In addition, resinoid bonded and CBN grinding wheels have proved highly effective in a wide range of production grinding processes.

##### Dry or wet grinding

Depending on the design of the resinoid bond, these tools can be used for either wet or dry grinding.

##### Please specify in your order whether the tools are intended for wet or dry use.

Technologically, wet grinding is often superior to dry grinding in terms of both tool life and stock removal rates. Cooling is achieved by means of an emulsion or an all-oil coolant, with the latter providing significant extra tool life.



#### Ceramic bond

##### Abrasive structure

One important characteristic of ceramic-bond abrasives is the porous structure of the abrasive coating (see sketch). Ceramic is the only bond type which can be produced in porous form. Ceramic bond coatings are composed of  
 ■ abrasive particles,  
 ■ bonding material and  
 ■ pores.

##### Advantages

The pore spaces in a ceramic facilitate chip transport and coolant flows during grinding. This aspect is particularly important when grinding under unfavourable tool-to-workpiece contact conditions, as in the case of internal grinding (large areas of contact between the grinding wheel and the workpiece which effectively obstruct coolant transport and chip removal).

In addition, ceramic bond CBN tools can be dressed in much the same ways as conventional aluminium oxide or SiC-based grinding tools. The sharpening (opening) treatment often required with resinoid-bonded tools is unnecessary. The structure of ceramic bond tools (bond hardness, pore volume) can be tailored to specific grinding requirements with great sensitivity and precision.

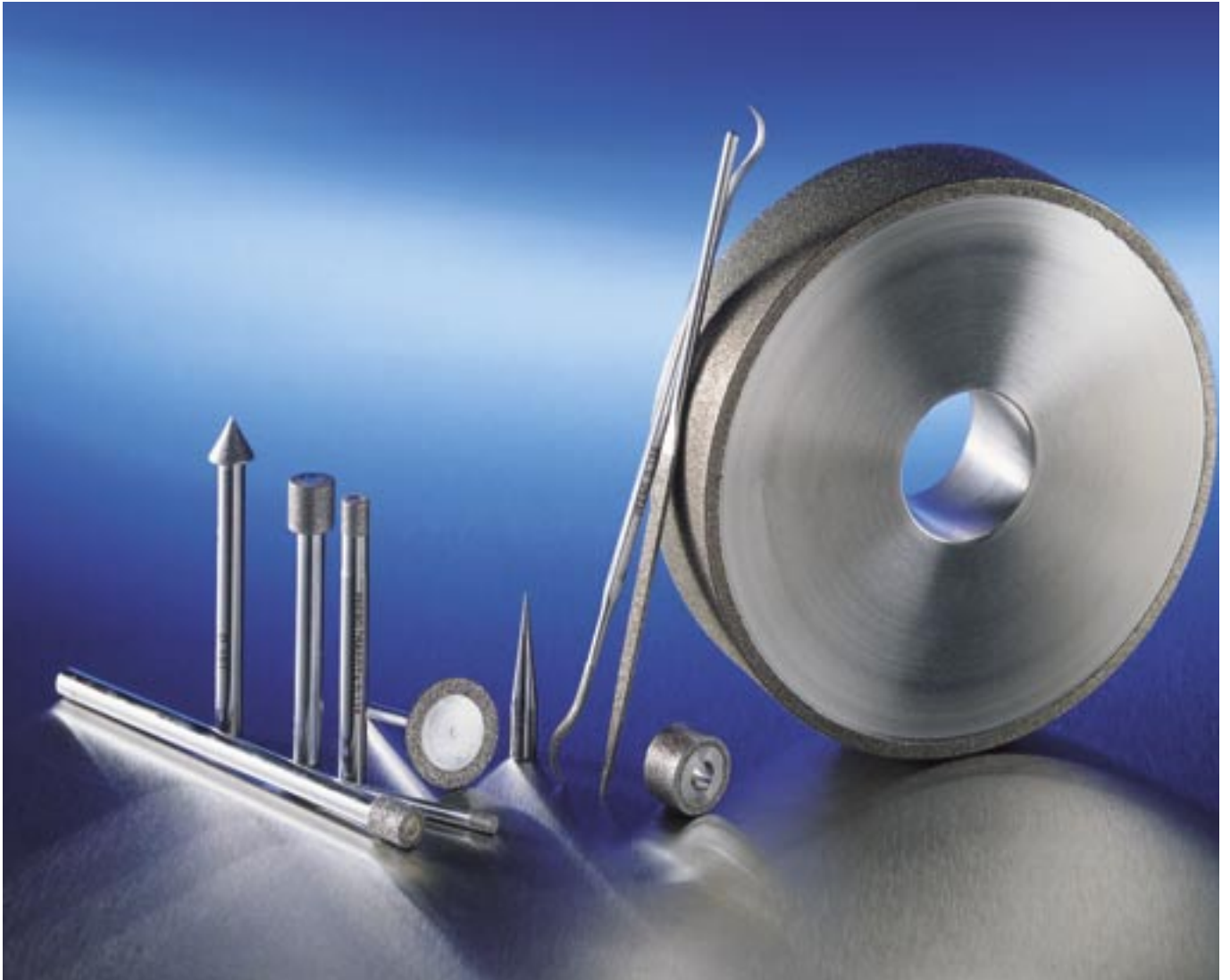
##### Fields of application

Ceramic bond CBN grinding tools are highly effective for internal grinding operations on steel (large contact areas). They are also exceptionally well suited for a larger number of other production grinding processes (e.g. deburring injection nozzle holes).

##### Dry or wet grinding

Ceramic-bonded materials are always used wet. The use of an oil coolant will greatly prolong the service life of the tool.

# Diamond / CBN Grinding Tools, Electroplated Bond



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# Diamond / CBN Grinding Tools, Electroplated Bond

## Recommended Applications

### Advantages of electroplated diamond and CBN tools

- The abrasive grains project well out of the bond, leaving large chips spaces which prevent tool loading even at high removal rates.
- Sharp, superhard abrasive particles ensure maximum cutting performance without undesirable heat build-up.
- Tools are coated with just a single layer of abrasive grains. They are therefore cheaper than other diamond and CBS tools, which makes them suitable for processing smaller batch sizes.
- Virtually any tool shape (profile) can be produced.

### Basic notes on grit selection

These tools are available with different grit specifications (see table below).

FEPA grading	Mesh
D 15	-
D 25	-
D/B 46	325/400
D/B 54	270/325
D/B 64	230/270
D/B 76	200/230
D/B 91	170/200
D/B 107	140/170
D/B 126	120/140
D/B 151	100/120
D/B 181	80/100
D 251	60/ 70
B 252	60/ 80
D/B 301	50/ 60
D/B 357	45/ 50
D/B 427	40/ 50
D 502	35/ 45
D 602	30/ 40
D 711	25/ 30
D 852	20/ 30

One basic consideration is that soft materials like plastics (with or without glass-fibre reinforcement) will require a coarse-grained abrasive, e.g. D 357 or D 427. Tools for working harder materials such as carbide should, on the other hand, be fine-grained (e.g., D 126).

### Selection of grit type for individual materials

**Diamond** is the abrasive material of choice for grinding glass-fibre or carbon-fibre reinforced (GRP/CRP) thermoset plastics, carbides, glass, ceramics, porcelain, refractories, ferrite, silicon, graphite, rubber, etc. (see 'Basic notes on grit selection').

**CBN** is recommended for machining high-speed steel, tool steels, ball-bearing steel, case-hardened steels (H.S.S.), high-temperature alloys, etc. (see 'Basic notes on grit selection').

**The above distinction does not apply to files.**

Files are invariably coated with **diamond** grit. Only little heat is generated at the slow cutting speeds produced by a file moving over the workpiece. This temperature is **not** high enough to trigger a chemical reaction between the carbon in the diamond and the iron in the steel. Files can therefore benefit fully from the superior hardness of diamond (as compared to CBN) to maximize tool life.

### Recommended technical parameters for the use of electroplated tools

The wide range of tasks and applications makes it very difficult to define generally applicable technical parameters for electroplated-bond tools. The rates given below should be considered as a guideline only.

**When in doubt, please contact our application support specialists.**

#### Recommended cutting speeds:

##### Diamond tools

Dry grinding: **8 - 18 m/s**  
Wet grinding: **15 - 30 m/s**

##### CBN tools

Dry grinding: **15 - 30 m/s**  
Wet grinding: **20 - 45 m/s**

CBN abrasives in electroplated bond are becoming increasingly widespread in high-speed applications. In some processes, cutting rates of 120 to 130 m/s and more have been achieved (under favourable conditions such as optimum cooling, high machine rigidity and use of high-precision tools).

### Dry and wet grinding

Wet grinding will always produce superior results. A longer tool life, better surface finishes and a reduced risk of edge zone damage are just some of the advantages.

While diamond tools should be run with an emulsion (1 - 5%), mineral oil is the coolant of choice for CBN tools. With CBN abrasives, the use of oil will additionally result in tool life benefits over emulsion-cooled processes.

# Diamond / CBN Grinding Tools, Electroplated Bond

## Special Tools Made to Customer Requirements

The electroplating process permits cost-efficient bonding of diamond or CBN grit to individual tools or small tool batches, allowing us to adapt this process to every specification or need.

Thus, objects of virtually any geometry and material composition (e.g., steel, high-grade steel, brass, etc.) can be coated with diamond or CBN abrasives.

Tools made of steel (including high-grade or stainless types) can be easily re-coated with abrasive particles several times as long as the basic tool contour has remained undamaged. The abrasive material can be applied to the entire tool surface or, selectively, to specific areas of the tool face and/or circumference only.

It is also possible to coat customer-supplied blanks if the desired abrasive area and grit size are accurately specified. To achieve the final tool dimension with optimum precision, the thickness of the abrasive grit layer must be taken into account.

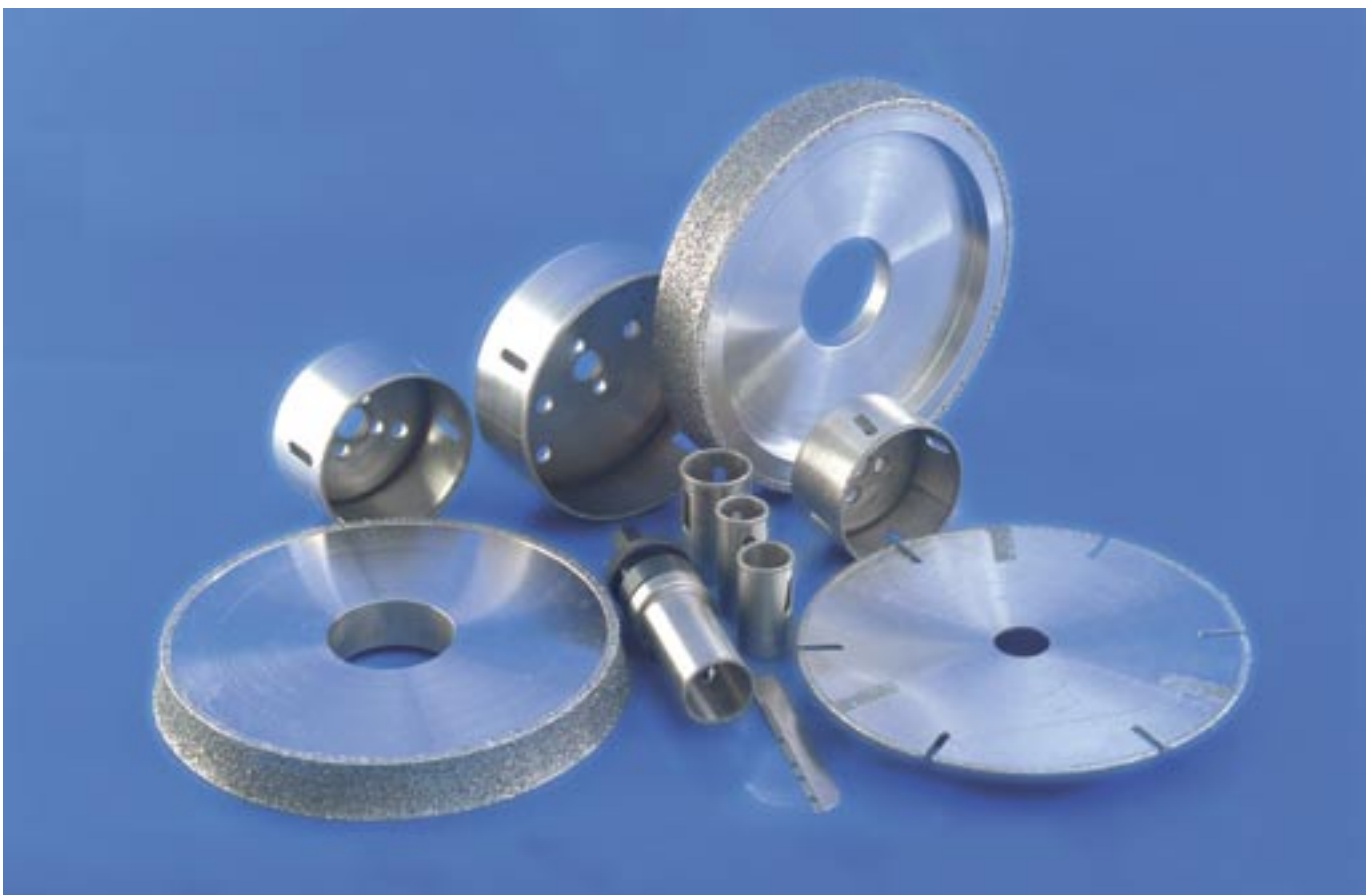
Please enclose a technical drawing with your order (alternatively, a sketch giving full dimensional data may be submitted) and specify the desired grit and abrasive type. If possible, you should also indicate the material to be machined so that we can provide an abrasive optimally matched to your grinding requirements.

Please contact us if you have any questions. We will gladly assist you in solving your application problem.



# Diamond / CBN Grinding Tools, Electroplated Bond

Special Tools Made to Customer Requirements



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# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Handy Files

Diamond grit is electroplated onto precision-forged and ground file blanks. The durable coating with its uniform density and good grip properties ensures outstanding file performance. Diamond files are suitable for use on hardened (e.g., quenched and tempered) steels and hard metal components such as cutting, punching, press/extrusion and profiling dies, as well as for filing workpieces made of glass, ceramics, or fibre-reinforced plastics.

Grit size	FEPA	Recommended applications
Very fine	D 25 / D 46	Superfinishing
Fine	D 91	Finishing
Medium	D 126	General purpose filing
Coarse	D 151 / D 181	Roughing
Very coarse	D 251	Roughing

### Recommendations for use

**Apply only slight pressure to the file, especially in workpiece edge areas!**

**Use a coarse grit for roughing, medium grit for general purpose filing, and fine grit for finishing applications.**

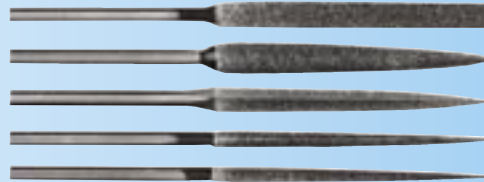
Grit sizes are stated according to the FEPA grading scale.

**Loaded diamond files can usually be cleaned in kerosene or other cleaning fluids (e.g., anti-static plastic cleaner) using a file brush. Often it will suffice to knock the file against a hard object. Avoid contact with grease when using files!**



### Diamond handy files

- DF 2601 hand
- DF 2602 half round
- DF 2607 three square
- DF 2608 square
- DF 2610 round



Diamond handy files have a forged shank which eliminates the need for a handle. Available in five shapes and two grit sizes. Please note recommendations for use! Other grit sizes can be supplied by special arrangement - please enquire.

### Workpiece materials

- Heat-treated steels
- Tungsten carbide and other hard metals
- Glass
- Ceramics
- Fibre-reinforced plastics

### Industry / target group

- Toolmaking
- Mouldmaking

Order No.	Grit size		Overall length [mm]	Coating length [mm]	Cross-section [mm]		
	D 126	D 181					
	EAN 4007220						
DF 2601	017302	535455	215	100	10.3 x 2.8	1	50
DF 2602	017319	535462	215	100	12.5 x 3.8	1	50
DF 2607	017326	535479	215	100	10	1	50
DF 2608	017333	535486	215	100	5.5 x 5.5	1	50
DF 2610	017340	535493	215	100	6.7	1	50

## Sets of Diamond Handy Files

### Sets of diamond handy files



Diamond handy file sets are supplied in a pouch for protection against corrosion and mechanical damage.

### Contents:


- 1 file each of the following:  
 DF 2601 (hand)  
 DF 2602 (half round)  
 DF 2607 (three square)  
 DF 2608 (square)  
 DF 2610 (round)  
 Available in D 126 and D 181 grit.

Order No.	Grit size		Overall length [mm]		
	D 126	D 181			
	EAN 4007220				
DF 2627	017357	535585	215	1	300

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Escapement Files

### Diamond escapement files

DF 3608	half round	
DF 3609	crossing oval	
DF 3610	barette	
DF 3614	three square	
DF 3617	hand	
DF 3619	square	
DF 3621	round	



Diamond escapement files are used on very small shapes in toolmaking applications and general precision mechanics.

Grit sizes D 25 and D 46 provide ultra-fine surface finishes.

An even finer grit size (D 15) can be supplied upon request.



Diamond escapement files have a forged shank, which eliminates the need for a handle.

Available in seven shapes and four grit sizes.

Please note recommendations for use on page 9!

#### Industry / target group

- Toolmaking
- Precision mechanics

Order No.	Grit size				Overall length [mm]	Coating length [mm]	Cross-section [mm]		
	D 25	D 46	D 91	D 126					
	EAN 4007220								
DF 3608	535530	323625	254622	254639	140	40	4.2 x 1.5	1	4
DF 3609	535516	323632	254462	254479	140	40	3.8 x 1.8	1	4
DF 3610	535509	323649	254493	254509	140	40	4 x 1.2	1	4
DF 3614	535561	323656	254554	254578	140	40	3	1	4
DF 3617	535578	323663	254523	254530	140	40	4 x 1.2	1	4
DF 3619	535547	323670	254592	254608	140	40	2 x 2	1	4
DF 3621	535523	323687	254653	254660	140	40	1.8	1	4

## Sets of Diamond Escapement Files

### Sets of diamond escapement files





Diamond escapement file sets are supplied in a plastic pouch for protection against corrosion and mechanical damage.

**Contents:** 1 file each of the following:

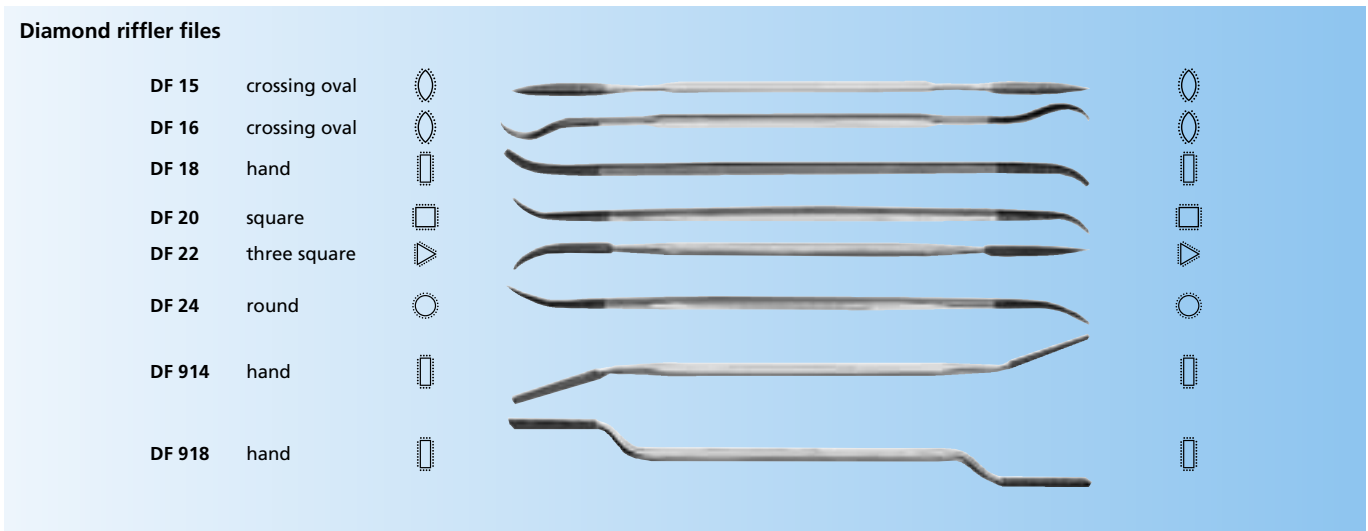
- DF 3608 (half round)
- DF 3614 (three square)
- DF 3617 (hand)
- DF 3619 (square)
- DF 3621 (round)

Available in four different grit sizes.

Order No.	Grit size				Overall length [mm]		
	D 25	D 46	D 91	D 126			
	EAN 4007220						
DF 3090	535639	323700	323694	017364	140	1	27

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Riffler Files



Diamond riffler files are used for work in hard-to-reach areas and on complex geometries.

Diamond riffler files are available in a length of 150 mm, in eight shapes and three grit sizes.

Other lengths and grit sizes can be supplied by special arrangement - please enquire.

Please note recommendations for use on page 9!

Order No.	Grit size			Overall length [mm]	Coating length [mm]	Cross-section [mm]		
	D 91	D 126	D 181					
	EAN 4007220							
DF 15	-	017036	-	150	2 x 25	3.2 x 2	1	8
DF 16	017050	017067	017074	150	2 x 25	3.7 x 2	1	8
DF 18	017081	017098	-	150	2 x 25	3.1 x 3	1	8
DF 20	017111	017128	-	150	2 x 25	2.5 x 2.5	1	8
DF 22	017142	017159	-	150	2 x 25	3	1	8
DF 24	017173	017180	017197	150	2 x 25	3	1	8
DF 914	-	016978	016985	150	2 x 25	3.8 x 1.6	1	8
DF 918	-	017005	-	150	2 x 25	4 x 2	1	8

## Set of Diamond Riffler Files



Diamond riffler file sets are supplied in a plastic pouch for protection against corrosion and mechanical damage.

**Contents:** 1 file each of the following:

- DF 16 (crossing)
- DF 18 (flat)
- DF 20 (square)
- DF 22 (three square)
- DF 24 (round)

Available in D 126 grit.

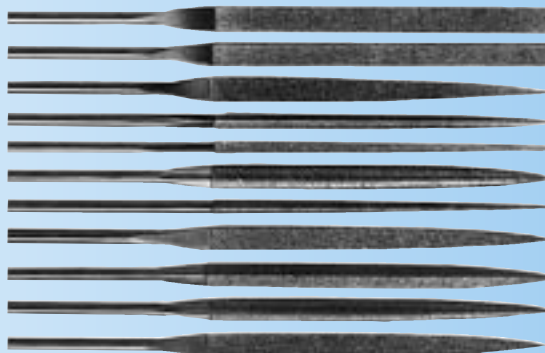
Order No.	Grit size	EAN 4007220	Overall length [mm]		
DF 1624	D 126	355381	150	1	50

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Needle Files

### Diamond needle files

- DF 4112 hand
- DF 4112R hand with rounded edges
- DF 4122 flat
- DF 4132 three square
- DF 4142 square
- DF 4152 half round
- DF 4162 round
- DF 4172 knife
- DF 4182 feather edge
- DF 4192 crossing oval
- DF 4102T barette



Diamond needle files are designed for general use in tool and die making.

quick-mounting handle 210-1 or our needle file holder NFH 212.

Please note recommendations for use on page 9!

These needle files are available ex stock in a length of 140 mm, in eleven shapes and three grit sizes. They can be combined with the

Other lengths and grit sizes can be supplied by special arrangement - please enquire.

#### Industry / target group

■ Toolmaking

Order No.	Grit size			Overall length [mm]	Coating length [mm]	Cross-section [mm]		
	D 91	D 126	D 181					
EAN 4007220								
DF 4112	016664	016671	016688	140	70	5.5 x 1.6	1	8
DF 4112R	016695	016701	016718	140	70	5.5 x 1.6	1	8
DF 4122	016725	016732	016749	140	70	5.5 x 1.6	1	8
DF 4132	016756	016763	016770	140	70	3.5	1	7
DF 4142	016787	016794	016800	140	70	2.6 x 2.6	1	7
DF 4152	016817	016824	016831	140	70	5.5 x 1.6	1	8
DF 4162	016848	016855	016862	140	70	3.2	1	7
DF 4172	016879	016886	016893	140	70	5 x 1.8	1	8
DF 4182	016909	016916	016923	140	70	5 x 2.4	1	8
DF 4192	016930	016947	-	140	70	5 x 2.2	1	8
DF 4102T	016633	016640	016657	140	70	5 x 2	1	8

## Sets of Diamond Needle Files

### Sets of diamond needle files



Diamond needle file sets are supplied in a pouch for protection against corrosion and mechanical damage.

#### Contents of set DF 4205: 1 file each of the following:

- DF 4112 (hand)
- DF 4132 (three square)
- DF 4142 (square)
- DF 4152 (half round)
- DF 4162 (round)

Available in D 91, D 126 and D 181 grit.

#### Contents of set DF 4211: 1 file each of the following:

- DF 4112 (hand)
- DF 4112R (hand with round edges)
- DF 4122 (flat)
- DF 4132 (three square)
- DF 4142 (square)
- DF 4152 (half round)
- DF 4162 (round)
- DF 4172 (knife)
- DF 4182 (feather edge)
- DF 4192 (crossing oval)
- DF 4102T (barrette)

Available in D 91, D 126 and D 181 grit.

Order No.	Grit size			Overall length [mm]		
	D 91	D 126	D 181			
EAN 4007220						
DF 4205	017371	017388	017395	140	1	50
DF 4211	017401	017418	017425	140	1	100

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Machinist's Files



Diamond machinist's files are used, e.g., in the fabrication of large tools, jigs and fixtures. Their fairly coarse grit (D 251) also makes them suitable for filing filled and reinforced plastics.

Diamond machinist's files are supplied with ergonomic handle.


Available in five shapes and various lengths and grit sizes.

Other lengths and grit sizes can be supplied by special arrangement - please enquire.

Please note recommendations for use on page 9!











### Industry / target group

■ Toolmaking

Order No.	Grit size				Overall length [mm]	Coating length [mm]	Cross-section [mm]		
	D 126	D 151	D 181	D 251					
	EAN 4007220								
DF 1112/100	255117	-	255124	-	100	85	10 x 3.2	1	45
DF 1112/125	255131	-	-	-	125	110	11.2 x 4.2	1	65
DF 1112/150	255155	-	255162	-	150	135	13 x 5	1	100
DF 1112/200	-	017203	-	017210	200	180	20 x 5	1	190
DF 1132/100	255179	-	-	-	100	85	7	1	40
DF 1132/200	-	017227	-	017234	200	180	16	1	200
DF 1142/200	-	017241	-	-	200	180	8 x 8	1	130
DF 1152/100	255193	-	-	-	100	85	12 x 4	1	45
DF 1152/200	-	017265	-	017272	200	180	20 x 6	1	150
DF 1162/200	-	017289	-	-	200	180	8	1	110

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Files for Manual Filing Tools

Diamond files for manual filing tools				round	DF 5331 - 5347
	hand, coated on one side	DF 5301 - 5309		three square	DF 5365 - 5375
	hand, coated on both sides	DF 5310 - 5314		crossing oval	DF 5352 - 5362
	hand, both face sides coated	DF 5316 - 5324		knife	DF 5380 - 5386
	square	DF 5390 - 5393		flat conical	DF 0103, DF 0106



Diamond files for use with manual filing tools can be employed in machines as well as for hand filing.

Available in seven shapes and various diamond coatings.

Please note recommendations for use on page 9!

Shank diameter: 3 mm.

Other grit sizes can be supplied by special arrangement - please enquire.

Order No.	Grit size	EAN 4007220	Profile	Coating type	Overall length [mm]	Coating length [mm]	Cross-section [mm]		
DF 5301	D 126	256718	hand	one side	50	15	2.0 x 1.0	1	6
DF 5303	D 126	256749	hand	one side	50	15	3.0 x 1.0	1	6
DF 5305	D 126	256817	hand	one side	50	15	4.0 x 1.0	1	6
DF 5307	D 126	256848	hand	one side	50	15	5.0 x 2.0	1	6
DF 5309	D 126	256879	hand	one side	60	25	5.0 x 2.0	1	6
DF 5310	D 126	256909	hand	one side	50	15	2.0 x 1.0	1	6
DF 5311	D 126	256930	hand	one side	50	15	3.0 x 1.0	1	6
DF 5312	D 126	256961	hand	one side	50	15	4.0 x 1.0	1	6
DF 5313	D 126	256992	hand	one side	50	15	5.0 x 2.0	1	6
DF 5314	D 126	257029	hand	both sides	60	25	5.0 x 2.0	1	6
DF 5316	D 126	257050	hand	both face sides	50	15	0.5 x 4.0	1	6
DF 5318	D 126	257081	hand	both face sides	50	15	0.75 x 4.0	1	6
DF 5320	D 126	257111	hand	both face sides	50	15	1.0 x 4.0	1	6
DF 5324	D 126	257142	hand	both face sides	60	25	1.0 x 4.0	1	6
DF 5390	D 126	257296	square	complete	50	15	1.5 x 1.5	1	6
DF 5391	D 126	257326	square	complete	50	15	3.0 x 3.0	1	6
DF 5392	D 126	257357	square	complete	50	15	4.0 x 4.0	1	6
DF 5393	D 126	257388	square	complete	50	15	5.0 x 5.0	1	6
DF 5331	D 126	257418	round	complete	50	15	1.0	1	6
DF 5335	D 126	257449	round	complete	50	15	2.0	1	6
DF 5339	D 126	257470	round	complete	50	15	3.0	1	6
DF 5345	D 126	257500	round	complete	50	15	4.0	1	6
DF 5337	D 126	257531	round	complete	60	25	2.0	1	6
DF 5343	D 126	257562	round	complete	60	25	3.0	1	6
DF 5347	D 126	257593	round	complete	60	25	4.0	1	6
DF 5365	D 126	257173	three square	complete	50	15	2.0 x 2.0	1	6
DF 5367	D 126	257203	three square	complete	50	15	3.5 x 3.5	1	6
DF 5371	D 126	257234	three square	complete	60	25	3.5 x 3.5	1	6
DF 5375	D 126	257265	three square	complete	60	25	4.5 x 4.5	1	6
DF 5352	D 126	257623	crossing oval	complete	50	15	2.0 x 1.0	1	6
DF 5356	D 126	257654	crossing oval	complete	50	15	3.5 x 2.0	1	6
DF 5360	D 126	257685	crossing oval	complete	50	15	6.0 x 3.0	1	6
DF 5358	D 126	257715	crossing oval	complete	60	25	3.5 x 2.0	1	6
DF 5362	D 126	257746	crossing oval	complete	60	25	6.0 x 3.0	1	6
DF 5380	D 126	257777	knife	complete	50	15	1.0 X 4.0	1	6
DF 5382	D 126	257807	knife	complete	50	15	2.0 x 6.0	1	6
DF 5386	D 126	257838	knife	complete	60	25	2.0 x 6.0	1	6
DF 0106/55	D 126	665879	flat conical	complete	55	16	6.3 x 1.0	1	6
DF 0103	D 126	665862	flat conical	complete	55	16	3.3 x 1.0	1	6
DF 0106/73	D 126	665886	flat conical	complete	73	16	6.3 x 1.0	1	6

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Cut-Off Wheels

### Advantages of electroplated diamond and CBN cut-off wheels

Electroplated-bond diamond and CBN cut-off wheels are characterized by their particularly effective cutting performance. A single layer of diamond or CBN grit (refer to the sketch on p. 16) is deposited on a steel blank. This abrasive material is securely embedded in a metal bonding layer electroplated onto the blank. Large chip spaces between the individual grains provide the tool with a very high cutting capacity. Wheels with coarse (e.g., D 357) diamond abrasive coatings are exceptionally suitable for cutting soft fibre-reinforced thermoset plastics.

### Suitable workpiece materials

#### CBN cut-off wheels

Electroplated-bond CBN cut-off wheels are suitable for cutting quenched and tempered steels in **stationary** cut-off equipment if coolants are used. Oil is a highly advantageous coolant in such applications.

**Please contact us for details!**

#### Diamond cut-off wheels

Electroplated diamond cut-off wheels can be used on

- thermoset plastics
  - uncoated, non-reinforced
  - coated
  - carbon-fibre or glass-fibre reinforced
  - filled (e.g., with sand, quartz, etc.)
- rubber
- cast marble, plaster, slate
- graphite, synthetic carbon
- soft ferrites
- carbides (pre-sintered only)
- brake and clutch linings

A peripheral speed of 20 m/s should not be exceeded in any of these cutting applications.

For specific applications i.e. cutting of fibre reinforced plastic, a higher cutting speed results in enhanced performance.



Removal of risers from injection-moulded thermoset plastic automotive components by means of a cut-off wheel

#### Recommended cutting speeds:

##### Diamond tools

Dry grinding: **8 - 18 m/s**  
Wet grinding: **15 - 30 m/s**

##### CBN tools

Dry grinding: **15 - 30 m/s**  
Wet grinding: **20 - 45 m/s**



Diamond cut-off wheels

#### Recommendation for use

Fine diamond grit such as D 126 or D 181 is employed for cutting glass or ceramics. Please enquire!

#### Ordering note

Diamond cut-off wheels are available ex stock. Special designs (e.g., different grit sizes, diameters, centre hole dimensions and cutting widths) can be made to order - please enquire.

Please provide full tool specifications with your purchase order.

#### Arbor for freehand use.

Cut-off wheels with 1.7 mm centre hole - BO 3/1,7

Cut-off wheels with 10 mm centre hole - BO 8/10 0-4

#### Ordering example

D1A1R 50- 2- 6 D357 GAD

#### How to order

D1A1R = Shape  
50 = Dia.[mm]  
2 = Width of cut [mm]  
6 = Bore dia. [mm]  
D357 = Grit type and size  
GAD = Bond/coating type

Order No.	EAN 4007220	Dia. [mm]	Cutting width [mm]	Blade thickness E [mm]	Bore dia. [mm]	Shape	Protective segment per side	Diamond coating	Side coating depth [mm]		
D1A1R 22-0.5-1.7 D 64 GAD	355190	22	0.5	0.3	1.7	D	none	contin.	2	1	5
D1A1R 30-1-10 D 151 GAD	355206	30	1.0	0.6	10.0	D	none	contin.	2	1	10
D1A1R 40-1-10 D 151 GAD	355213	40	1.0	0.6	10.0	D	none	contin.	2	1	15
D1A1R 50-1.4-6 D 151 GAD	355220	50	1.4	1.0	6.0	D	none	contin.	2	1	20
D1A1R 50-1.4-10 D 151 GAD	666043	50	1.4	1.0	10.0	D	none	contin.	2	1	20
D1A1R 50-2-6 D 357 GAD	308790	50	2.0	1.0	6.0	D	none	contin.	2	1	20
D1A1R 50-2-6 D 357 GAG	168530	50	2.0	1.0	6.0	G	3	contin.	2	1	20
D1A1R 50-2-10 D 357 GAD	666067	50	2.0	1.0	10.0	D	none	contin.	2	1	20
D1A1R 50-2-10 D 357 GAG	666050	50	2.0	1.0	10.0	G	3	contin.	2	1	20
D1A1R 75-2-10 D 357 GAG	393420	75	2.0	1.0	10.0	G	3	contin.	2	1	50
D1A1R 100-2-22.2 D 357 GAD	308806	100	2.0	1.0	22.2	D	none	contin.	2	1	110
D1A1R 100-2-22.2 D 357 GAG	168547	100	2.0	1.0	22.2	G	3	contin.	2	1	110
D1A1R 115-2-22.2 D 357 GAD	308813	115	2.0	1.0	22.2	D	none	contin.	2	1	125
D1A1R 115-2-22.2 D 357 GAG	168554	115	2.0	1.0	22.2	G	3	contin.	2	1	125
D1A1R 125-1.4-20 D 151 GAD	355237	125	1.4	1.0	20.0	D	none	contin.	2	1	150
D1A1R 125-2-22.2 D 357 GAD	308820	125	2.0	1.0	22.2	D	none	contin.	2	1	150

# Diamond / CBN Grinding Tools, Electroplated Bond

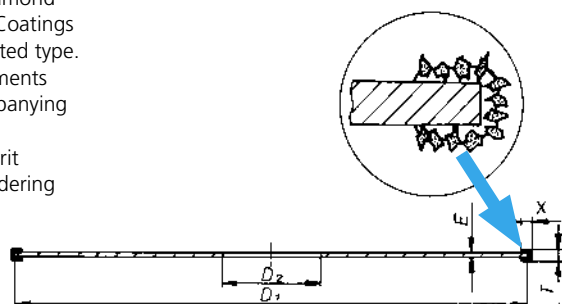
## Diamond Cut-Off Wheels

Order No.	EAN 4007220	Dia. [mm]	Cutting width [mm]	Blade thick- ness E [mm]	Bore dia. [mm]	Shape	Protect- ive segment per side	Diamond coating	Side coat- ing depth [mm]		
D1A1R 125-2-22.2 D 357 GAG	168561	125	2.0	1.0	22.2	G	3	contin.	2	1	150
D1A1R 178-2-22.2 D 357 GAD	355244	178	2.0	1.0	22.2	D	none	contin.	2	1	250
D1A1RSS 230-2.5-22.2 D 357 GAS2	168578	230	2.5	1.5	22.2	S2	none	segment.	2	1	520
D1A1RSS 250-2.5-22.2 D 357 GAS2	355251	250	2.5	1.5	22.2	S2	none	segment.	2	1	650
D1A1RSS 300-2.5-30.0 D 357 GAS2	355268	300	2.5	1.5	30.0	S2	none	segment.	2	1	900
D1A1RSS 350-2.8-30.0 D 357 GAS2	355275	350	2.8	1.8	30.0	S2	none	segment.	2	1	1900
D1A1RSS 400-3.8-30.0 D 357 GAS2	666074	400	3.8	2.8	30.0	S2	none	segment.	2	1	2500

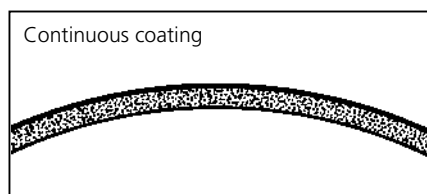
### Our special range – wheels made to your dimensional and grit specifications

Cut-off wheels with electroplated diamond coatings can also be made to order. Coatings may be of the continuous or segmented type. A coating with lateral protective segments can also be specified (refer to accompanying sketches).

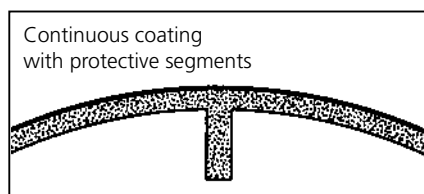
Please provide full dimensional and grit specifications with your order (see ordering example on page 15).



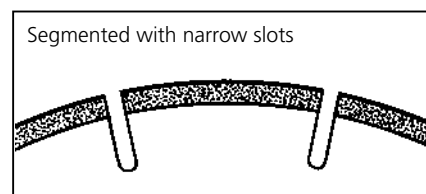
#### Shape D



#### Shape G

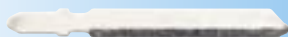


#### Shape S 2



## Diamond-Tipped Sabre Saw Blades

### Diamond-tipped sabre saw blades



Diamond-tipped blades for sabre saws with Bosch-type blade mounting can be used on fibre-reinforced (GRP/CRP) plastics. Diamond-tipped sabre saw blades in electroplated bond are noted for their high cutting performance and long service life.

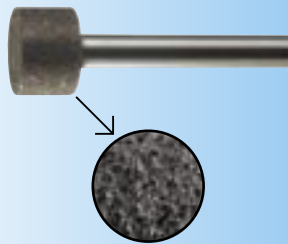
Special applications include cutting of GRP plastic panels and sawing cutouts in tank and pressure vessel construction.

Order No.	EAN 4007220	Coating length [mm]	Thickness [mm]	Overall length [mm]		
Dia-tippend sabre saw blades 50/75 D 357	535950	50	2	75	1	6
Dia-tippend sabre saw blades 75/100 D 357	535967	75	2	100	1	10

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Grinding Points and Special Shapes, Standard Range

Cylindrical shape ZY



**Recommendation for use**

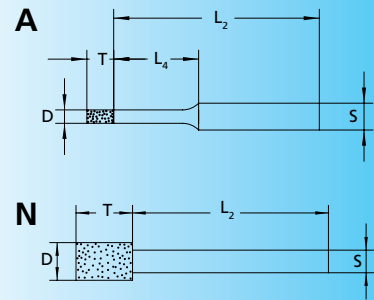
Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

**Recommended peripheral speeds:**

Diamond points - wet: 20 m/s  
Diamond points - dry: 15 m/s

**Ordering note**

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.



A = shouldered shank  
N = cylindrical shank

Order No.	Grit size				Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
	D 64	D 91	D 126	D 181						
	EAN 4007220									
DZY-A 0.5-2/3	354322	-	-	-	0.5 x 2	3	38	5	5	25
DZY-A 0.8-2/3	354339	-	-	-	0.8 x 2	3	38	5	5	25
DZY-A 1.0-4/3	354346	257883	257890	-	1.0 x 4	3	36	9	5	25
DZY-A 1.2-4/3	354353	354360	354377	-	1.2 x 4	3	36	9	5	25
DZY-A 1.4-4/3	354384	354391	354407	-	1.4 x 4	3	36	9	5	25
DZY-A 1.6-4/3	-	354421	354438	-	1.6 x 4	3	36	10	5	25
DZY-A 1.8-4/3	-	354452	354469	-	1.8 x 4	3	36	10	5	25
DZY-A 2.0-4/3	-	260784	119181	-	2.0 x 4	3	36	10	5	25
DZY-A 2.2-4/3	-	-	354506	-	2.2 x 4	3	36	14	5	25
DZY-A 2.4-4/3	-	354520	354537	-	2.4 x 4	3	36	14	5	25
DZY-A 2.6-4/3	-	354551	354568	-	2.6 x 4	3	36	14	5	25
DZY-A 2.8-4/3	-	-	354599	-	2.8 x 4	3	36	14	5	25
DZY-A 3.0-4/3	354605	260821	119204	-	3.0 x 4	3	36	19	5	25
DZY-N 3.5-5/3	-	260845	119211	-	3.5 x 5	3	45	-	5	25
DZY-N 4.0-5/3	-	260869	119228	260876	4.0 x 5	3	45	-	5	30
DZY-N 4.5-5/3	-	260883	119235	-	4.5 x 5	3	45	-	5	30
DZY-N 5.0-5/3	-	260906	119242	260913	5.0 x 5	3	45	-	5	30
DZY-N 5.5-6/3	-	257944	257951	257968	5.5 x 6	3	44	-	5	30
DZY-A 6.0-6/6	-	260920	119259	260937	6.0 x 6	6	54	19	1	18
DZY-N 7.0-8/6	-	-	119266	260951	7.0 x 8	6	52	-	1	18
DZY-N 8.0-8/6	-	260968	119273	260975	8.0 x 8	6	52	-	1	18
DZY-N 9.0-8/6	-	-	258040	-	9.0 x 8	6	52	-	1	18
DZY-N 10.0-8/6	-	260982	119280	260999	10.0 x 8	6	52	-	1	20
DZY-N 12.0-8/6	-	261002	119297	261019	12.0 x 8	6	52	-	1	22
DZY-N 15.0-10/6	-	-	119303	-	15.0 x 10	6	50	-	1	25
DZY-N 15.0-10/10	-	-	355091	-	15.0 x 10	10	110	-	1	100
DZY-N 18.0-10/6	-	-	258163	-	18.0 x 10	6	50	-	1	35
DZY-N 20.0-10/6	-	-	258194	-	20.0 x 10	6	50	-	1	40
DZY-N 25.0-10/12	-	-	355138	-	25.0 x 10	12	110	-	1	140

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Grinding Points and Special Shapes, Standard Range

### Special shape ZY

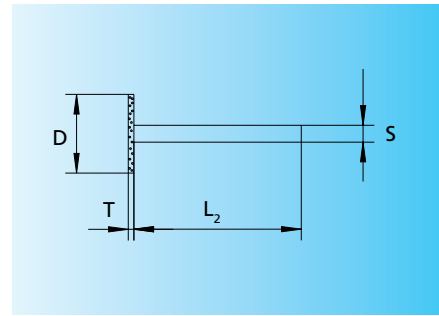


#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.



Order No.	Grit size		Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
	D 64	D 91						
	EAN 4007220							
DZY-N 8.0-0.5 3	353240	-	8.0 x 0.5	3	35	-	1	5
DZY-N 14.0-0.5 3	353257	-	14.0 x 0.5	3	35	-	1	10
DZY-N 14.0-1.0 3	353264	353271	14.0 x 1.0	3	35	-	1	10

### Grinding discs 1 A 1



Diamond grinding discs are intended for use in stationary machines.

Their centring shoulder allows them to be accurately mounted and aligned on the machine spindle.

#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

Special designs can be made to order - please enquire. Other diameters, diamond coating widths and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size		Dimensions dia. x height [mm]	Bore dia. [mm]	With test collar [mm]		
	D 151	D 251					
	EAN 4007220						
D1A1 12-10-8	665893	665930	12.0 x 10.0	8	-	1	5
D1A1 14-10-8	665961	665916	14.0 x 10.0	8	-	1	7
D1A1 16-10-8	665978	665947	16.0 x 10.0	8	-	1	10
D1A1 18-10-8	665992	665985	18.0 x 10.0	8	2	1	15
D1A1 20-10-8	354629	666005	20.0 x 10.0	8	2	1	34
D1A1 30-10-10	354636	666012	30.0 x 10.0	10	2	1	65
D1A1 40-10-10	354643	666029	40.0 x 10.0	10	2	1	110
D1A1 50-10-10	354131	666036	50.0 x 10.0	10	2	1	170

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Grinding Points and Special Shapes, Standard Range

### Spherical shape KU



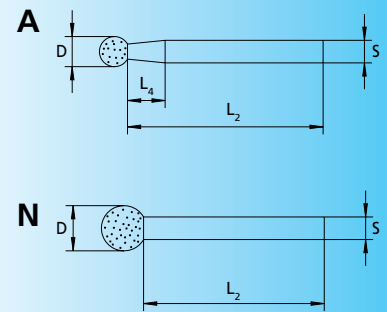
Spherical (ball shape) KU grinding points are commonly used in hand-guided deflashing of plastic shapes.

#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

Special designs can be made to order - please enquire. Other diameters shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.



A = shouldered shank  
N = cylindrical shank

Order No.	Grit size				Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>1</sub> ) [mm]	5	9
	D 64	D 91	D 126	D 181						
EAN 4007220										
DKU-A 1.0/3	354926	258620	258637	258644	1	3	44	10	5	25
DKU-A 2.0/3	354933	258651	258668	258675	2	3	43	8	5	25
DKU-A 3.0/3	354940	258682	258699	258705	3	3	42	6	5	25
DKU-A 4.0/3	-	258712	258729	258736	4	3	41	5	5	25
DKU-A 5.0/3	-	258743	258750	258767	5	3	40	2	5	25
DKU-N 6.0/3	-	258774	258781	258798	6	3	39	-	1	5
DKU-A 8.0/6	-	258835	258842	-	8	6	52	10	1	15
DKU-A 10.0/6	-	258897	258903	258910	10	6	50	5	1	20
DKU-N 12.0/6	-	-	258965	-	12	6	48	-	1	24

### Special shape KU



Special shape KU points are commonly used in hand-guided deflashing of plastic shapes. These special-shape KU points are additionally grit-coated on the narrow shank section below the head. Their special geometry provides optimum results in machining shaped workpieces.

#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

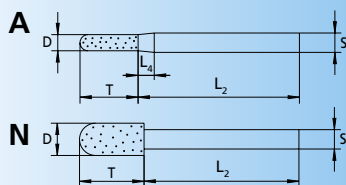
Special designs can be made to order - please enquire. Other diameters, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size		Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>1</sub> ) [mm]	5	9
	D 126	D 181						
EAN 4007220								
DKU 3.0-10.0/3	-	353844	3.0 x 10.0	3	40	10	1	5
DKU 3.3-7.0/3	353851	-	3.3 x 7.0	3	33	7	1	5
DKU 4.0-10.0/3	-	353868	4.0 x 10.0	3	40	10	1	5

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Grinding Points and Special Shapes, Standard Range

### Cylindrical with radius end WR



A = shouldered shank  
N = cylindrical shank



Cylindrical points with radius end (WR) are available exclusively with coarse D 357 grit. This product gives excellent results in machining fibre-reinforced plastics.

#### Recommendation for use

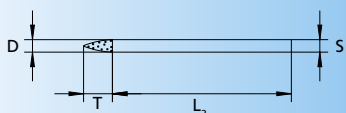
Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size	EAN 4007220	Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
DWR 5.0-18.0/6	D 357	353981	5.0 x 18.0	6	50	5	1	20
DWR 6.0-18.0/6	D 357	353998	6.0 x 18.0	6	50	5	1	20
DWR 10.0-20.0/6	D 357	354001	10.0 x 20.0	6	50	-	1	28

### Pointed tree SPG





#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size	EAN 4007220	Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
DSPG 3.0-7.0/3	D 126	536421	3.0 x 7.0	3	43	-	1	5

### Cup KT





Due to its special geometry, this tool provides optimum results on shaped workpieces.

#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

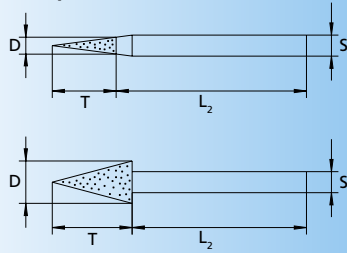
Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size	EAN 4007220	Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
DKT 3.0-8.0°/3	D 126	354018	3.0 x 7.0	3	43	-	1	5
DKT 10.0-30.0°/6	D 126	354025	10.0 x 5.0	6	50	-	1	20

# Diamond / CBN Grinding Tools, Electroplated Bond

## Diamond Grinding Points and Special Shapes, Standard Range

### Conical pointed SK



#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

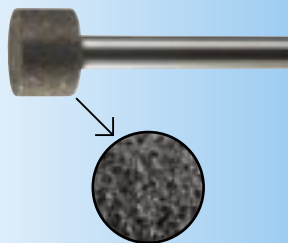
#### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size		Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]			
	D 64	D 126							
EAN 4007220									
DSK 6.0-7°/6	354049	-	6.0 x 45.0	6	50	-	1	20	
DSK 6.0-12°/6	354056	-	6.0 x 26.0	6	50	-	1	20	
DSK 6.0-15°/6	354063	-	6.0 x 21.0	6	50	-	1	20	
DSK 6.0-30°/6	354032	354070	6.0 x 11.0	6	50	-	1	20	
DSK 6.0-45°/6	393383	-	6.0 x 7.0	6	50	-	1	20	
DSK 6.0-60°/6	393390	-	6.0 x 5.0	6	50	-	1	20	

## CBN Grinding Points and Special Shapes, Standard Range

### Cylindrical shape ZY



#### Recommendation for use

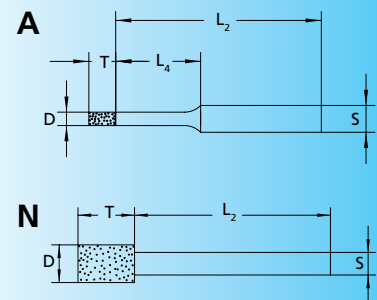
Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Recommended peripheral speeds:

Diamond points - wet: 30 m/s  
Diamond points - dry: 20 m/s

#### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.





A = shouldered shank  
N = cylindrical shank

Order No.	Grit size				Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
	B 64	B 91	B 126	B 181						
EAN 4007220										
BZY-A 0.5-2/3	354650	-	-	-	0.5 x 2	3	38	5	5	25
BZY-A 0.8-2/3	354667	-	-	-	0.8 x 2	3	38	5	5	25
BZY-A 1.0-4/3	354674	-	258224	-	1.0 x 4	3	36	9	5	25
BZY-A 1.2-4/3	354681	-	354698	-	1.2 x 4	3	36	9	5	25
BZY-A 1.4-4/3	-	-	354711	-	1.4 x 4	3	36	9	5	25
BZY-A 1.6-4/3	354728	-	354735	-	1.6 x 4	3	36	10	5	25
BZY-A 1.8-4/3	-	-	354759	-	1.8 x 4	3	36	10	5	25
BZY-A 2.0-4/3	354766	-	119310	-	2.0 x 4	3	36	10	5	25
BZY-A 2.2-4/3	-	-	354780	-	2.2 x 4	3	36	14	5	25
BZY-A 2.4-4/3	354797	-	354803	-	2.4 x 4	3	36	14	5	25
BZY-A 2.6-4/3	354810	-	354827	-	2.6 x 4	3	36	14	5	25
BZY-A 2.8-4/3	-	-	354841	-	2.8 x 4	3	36	14	5	25
BZY-A 3.0-4/3	354858	-	119334	-	3.0 x 4	3	36	19	5	25
BZY-N 3.5-5/3	354865	-	119341	-	3.5 x 5	3	45	-	5	25

# Diamond / CBN Grinding Tools, Electroplated Bond

## CBN Grinding Points and Special Shapes, Standard Range

Order No.	Grit size				Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>1</sub> ) [mm]		
	B 64	B 91	B 126	B 181						
	EAN 4007220									
BZY-N 4.0-5/3	354872	-	119358	-	4.0 x 5	3	45	-	5	30
BZY-N 4.5-5/3	-	-	119365	-	4.5 x 5	3	45	-	5	30
BZY-N 5.0-5/3	354896	-	119372	-	5.0 x 5	3	45	-	5	30
BZY-N 5.5-6/3	354902	-	258286	-	5.5 x 6	3	44	-	5	30
BZY-A 6.0-6/6	354919	-	119389	-	6.0 x 6	6	54	19	1	18
BZY-N 7.0-8/6	-	-	119396	-	7.0 x 8	6	52	-	1	18
BZY-N 8.0-8/6	-	-	119402	-	8.0 x 8	6	52	-	1	18
BZY-N 9.0-8/6	-	-	258408	-	9.0 x 8	6	52	-	1	18
BZY-N 10.0-8/6	-	-	119419	-	10.0 x 8	6	52	-	1	20
BZY-N 11.0-10/6	-	-	258439	-	11.0 x 10	6	50	-	1	20
BZY-N 12.0-8/6	-	-	119426	-	12.0 x 8	6	52	-	1	22
BZY-N 13.0-10/6	-	-	258460	-	13.0 x 10	6	50	-	1	22
BZY-N 14.0-10/6	-	-	258491	-	14.0 x 10	6	50	-	1	25
BZY-N 15.0-10/6	-	-	119433	-	15.0 x 10	6	50	-	1	25
BZY-N 15.0-10/10	-	-	355145	-	15.0 x 10	10	110	-	1	100
BZY-N 18.0-10/6	-	-	258521	-	18.0 x 10	6	50	-	1	35
BZY-N 20.0-10/6	-	-	258552	-	20.0 x 10	6	50	-	1	40

### Cylindrical points with carbide shank



Cylindrical points with carbide shank are used for internal grinding on stationary machines. The modulus of elasticity of the carbide shank is approx. three times higher than that of a steel shank. The modulus of elasticity indicates the amount of deformation which a body undergoes as a result of a given load.



In internal grinding applications, tools with a carbide shank offer higher stock removal rates, superior surface qualities and longer tool life.

### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size		Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>1</sub> ) [mm]		
	B 151	B 252						
	EAN 4007220							
BZY-N 4-5/3 HM	353714	-	4.0 x 5.0	3	43	-	1	10
BZY-N 5-5/3 HM	353721	-	5.0 x 5.0	3	43	-	1	10
BZY-N 6-6/6 HM	353691	-	6.0 x 6.0	6	98	19	1	50
BZY-N 8-8/6 HM	353738	353745	8.0 x 8.0	6	98	-	1	55
BZY-N 12-8/6 HM	-	353752	12.0 x 8.0	6	98	-	1	60
BZY-N 12-10/10 HM	-	353769	12.0 x 10.0	10	128	-	1	160

# Diamond / CBN Grinding Tools, Electroplated Bond

## CBN Grinding Points and Special Shapes, Standard Range

Grinding discs 1 A 1



CBN grinding discs are intended for use in stationary machines. Their centring shoulder allows them to be accurately mounted and aligned on the machine spindle.

**Recommendation for use**

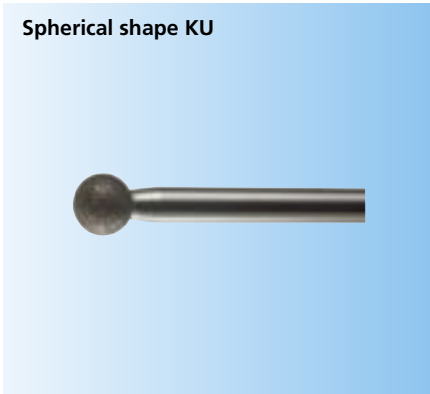
Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

**Ordering note**

Special designs can be made to order - please enquire. Other diameters, diamond coating widths and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size	EAN 4007220	Dimensions dia. x height [mm]	Bore dia. [mm]	With test collar [mm]		
B1A1 20-10-8	B 151	355015	20.0 x 10.0	8	2	1	34
B1A1 30-10-10	B 151	355039	30.0 x 10.0	10	2	1	65
B1A1 40-10-10	B 151	355053	40.0 x 10.0	10	2	1	110
B1A1 50-10-10	B 151	355077	50.0 x 10.0	10	2	1	170

Spherical shape KU

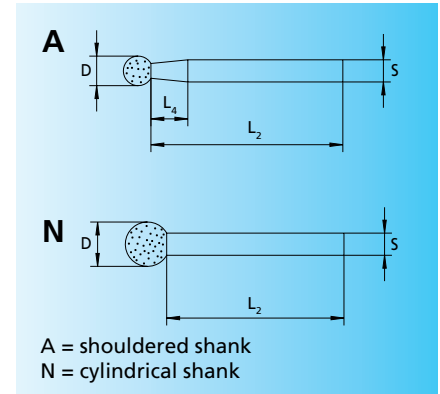


**Recommendation for use**

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

**Ordering note**

Special designs can be made to order - please enquire. Other diameters, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.



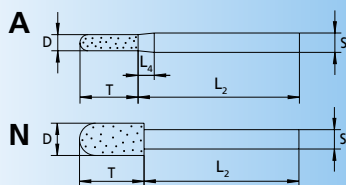
Order No.	Grit size				Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
	B 64	B 91	B 126	B 181						
	EAN 4007220									
BKU-A 1.0/3	-	-	258996	-	1.0	3	44	10	5	25
BKU-A 2.0/3	354964	-	259023	-	2.0	3	43	8	5	25
BKU-A 3.0/3	354971	-	259054	-	3.0	3	42	6	5	25
BKU-A 4.0/3	-	-	259085	-	4.0	3	41	5	5	25
BKU-A 5.0/3	-	-	259115	-	5.0	3	40	2	5	25
BKU-N 6.0/3	-	-	259146	-	6.0	3	39	-	1	5
BKU-A 7.0/6	-	-	259177	-	7.0	6	53	10	1	15
BKU-A 8.0/6	-	-	259207	-	8.0	6	52	10	1	15
BKU-A 10.0/6	-	-	259269	-	10.0	6	50	5	1	20
BKU-N 12.0/6	-	-	259320	-	12.0	6	48	-	1	24

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# Diamond / CBN Grinding Tools, Electroplated Bond

## CBN Grinding Points and Special Shapes, Standard Range

### Cylindrical with radius end WR





A = shouldered shank  
N = cylindrical shank

#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size	EAN 4007220	Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
BWR 5.0-10.0/3	B 126	354087	5.0 x 10.0	3	40	-	1	8
BWR 6.0-10.0/3	B 126	354094	6.0 x 10.0	3	40	-	1	8

### Pointed tree SPG





#### Recommendation for use

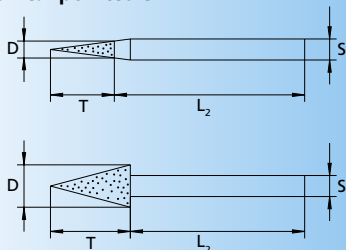
Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

Special designs can be made to order - please enquire. Other diameters, head lengths, shank dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size	EAN 4007220	Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
BSPG 3.0-7.0/3	B 126	354100	3.0 x 7.0	3	43	-	1	5
BSPG 6.0-18.0/6	B 126	354117	6.0 x 18.0	6	50	-	1	20

### Conical pointed SK





#### Recommendation for use

Where these tools are used in stationary machines, we recommend the use of cooling oil to prevent thermal damage in workpiece edge or skin zones and to prolong tool life.

#### Ordering note

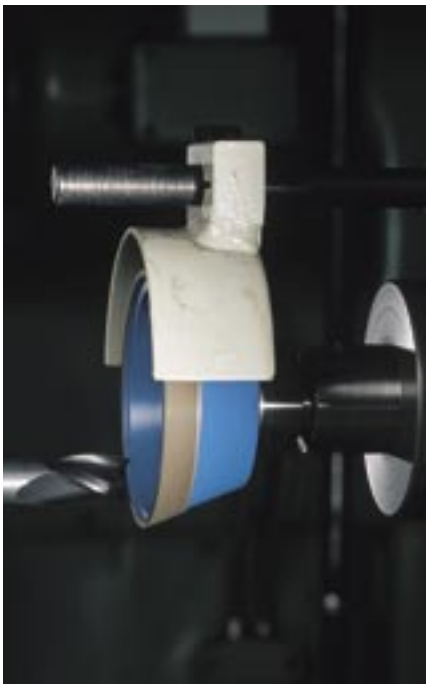
Special designs can be made to order - please enquire. Other diameters, head lengths, shaft dimensions and grit sizes are available upon request. Please specify desired features in your purchase order.

Order No.	Grit size		Dimensions dia. x height [mm]	Shank dia. (S) [mm]	Shank length (L <sub>2</sub> ) [mm]	Length (L <sub>4</sub> ) [mm]		
	B 64	B 126						
EAN 4007220								
BSK 6.0-30°/6	-	354124	6.0 x 11.0	6	50	-	1	20
BSK 6.0-45°/6	393406	-	6.0 x 7.0	6	50	-	1	20

# Diamond / CBN Grinding Tools, Resinoid Bond



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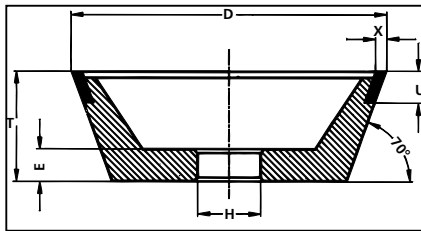


# Diamond / CBN Grinding Tools, Resinoid Bond

## Ordering Instructions, Grit Sizes

### Explanation of the order code system for diamond and CBN tools

A full and unique identification of a PFERD resinoid-bonded diamond or CBN tool will include the following data (explained below for a 11V9 100-2-10-20 by way of example):



### Example:

11V9 100-2-10-20 D126 PHT C 75

#### Tool shape

11V9

For every diamond or CBN abrasive shape there exists a unique FEPA designation based on an alphanumeric code, e.g., 11V9 or 12A2/45°.

An overview of the various shapes, complete with dimensions, is provided in the drawings on pages 28 to 33.

#### Tool dimensions

100-2-10-20

In addition to the shape of the tool, the main dimensions of the grinding wheel body and of the abrasive coating must be specified.

Refer to pages 28 to 33 for main dimensions.

The following letter code is used:

- D = diameter
- W = coating width (face coatings)
- U = coating width (circumferential coating)
- X = coating depth
- Vo = profile angle
- R = radius
- H = bore diameter

#### Composition of the abrasive coating

D 126 PHT C 75

The composition of the abrasive coating (specification) completes the tool description. It consists of the following three items:

#### Grit size

e.g., D 126 for diamond (D), B 126 for CBN (B). The grit size code is explained in more detail below.

#### Bond

The various bond types for dry and wet grinding are described on page 27. Where possible, the material to be machined should also be specified.

#### Grit concentration

e.g., C 75. For further details refer to page 27.

### Grit sizes

Operation	Abrasive type	Diamond (D) grit sizes	CBN (B) grit sizes
Pre-grinding		D 251	–
		–	B 252
		D 213	B 213
		D 181	B 181
		D 151	B 151
Finish-grinding		D 126	B 126
		D 107	B 107
		D 91	B 91
		D 76	B 76
		D 64	B 64
Fine grinding		D 54	B 54
		D 46	B 46

# Diamond / CBN Grinding Tools, Resinoid Bond

## Bond Types, Grit Concentrations, Recommendations for Use

### PFERD abrasive bond types and their characteristics

In addition to the bond types described in this catalogue, a broad range of special bonds for special grinding tasks can be supplied by arrangement with our application engineers.

**For more information please contact our application engineering team.**

#### 1. PHT

Phenolic resin bond for high-performance dry grinding.

PHT bonds are designed for dry grinding, i.e., they provide "cool" grinding properties even without the use of a coolant.

#### 2. PHT4.1 (CBN only)

Bond for maximum stock removal rates. Very long tool life. Suitable for dry and wet grinding.

#### 3. PH4.2 (CBN only)

High-performance bond for cool dry grinding at low feed rates, self-wearing type. It is not necessary to readjust the core. Only for 11 V 9 and 12 V 9 up to 150 mm dia.

#### 4. PHST

Phenolic resin bond for dry grinding at very high stock removal rates.

PHST type bonds have an even higher load resistance, i.e., they allow a greater amount of infeed per stroke without causing thermal damage to the workpiece.

Inevitably, the reduction in grinding time is obtained at the price of a slightly shorter tool life.

#### 5. PHN

Phenolic resin bond for high-performance wet grinding.

PHN is a bond type designed specifically for wet grinding. It is comparatively hard, providing an exceptional tool life and profile holding ability.

### Grit concentrations of resinoid-bonded diamond and CBN tools

The grit concentration is selected according to the following principle:

- A high grit concentration should be chosen where the area of contact between the wheel and the workpiece is small. The tool will thus be sufficiently protected from wear, despite the high local pressure loads.
- A large contact area calls for the use of an abrasive that will reduce the associated grinding temperature and forces. Low grit concentrations are therefore preferable for tools with large contact areas, e.g., our 12A2/45° cup wheels.

The term „grit concentration“ denotes the quantity of abrasive particles (diamond or CBN) in carats (ct) per unit volume (cm<sup>3</sup>) of abrasive coating.

The table lists the grit concentrations normally available for **resinoid-bonded** diamond and CBN tools.

Concentration code	Carat weight per cm <sup>3</sup> of coating volume (ct/cm <sup>3</sup> )	Grain volume in % of abrasive coating
C 38	1.67	9
C 50	2.2	12
C 75	3.3	18
C 100	4.4	24
C 125	5.5	30

### Recommendations for use of resinoid-bonded diamond and CBN tools

Resinoid-bonded diamond and CBN grinding wheels are frequently used to grind or re-

grind (i.e., sharpen) tungsten carbide or super high-speed steel (H.S.S.) tools. Applications include both wet and dry grinding. In addition, these tools are successfully employed in a wide variety of production grinding processes.

In selecting a machine for use with diamond or CBN tools, high rigidity and a sufficient power output are key criteria to be considered. Care should also be taken to ensure that the machine will achieve the recommended cutting speed.

### Cutting speeds

#### Diamond grinding wheels

Dry grinding: **approx. 15-20 m/s**  
Wet grinding: **approx. 20-35 m/s**

#### CBN grinding wheels

Dry grinding: **approx. 18-32 m/s**  
Wet grinding: **approx. 25-45 m/s**

In addition to the above, there are so-called "high-speed" grinding applications that will require the use of special machines.

### Dry or wet grinding

Wet grinding is generally preferable to dry as it reduces the load on the grinding wheel, thereby causing less wear. Moreover, the risk of overheating the workpiece is much lower.

Nevertheless, resinoid-bonded diamond and CBN grinding wheels are very often used dry on tool grinding machines which are not equipped with suitable hoods or where constant visual monitoring is desirable.

### Coolants

#### Diamond grinding wheels

Emulsions (1-5%).

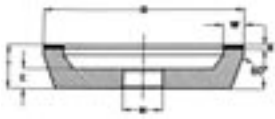
#### CBN grinding wheels



Low-viscosity mineral oils or emulsions (5-8%) with EP additives. Cooling with pure mineral oil has been shown to yield substantial tool life benefits in many production grinding environments.

# Diamond / CBN Grinding Tools, Resinoid Bond

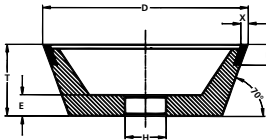
## Standard Range (Dry Grinding)



Shape 11A2/60°



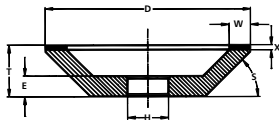
Diamond Shape	Dimension [mm] D - W - X - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
11A2/60°	100 - 8 - 2 - 20	D 64 PHT	C 75	261965	1	277
11A2/60°	100 - 8 - 2 - 20	D 126 PHT	C 75	261972	1	277



Shape 11V9



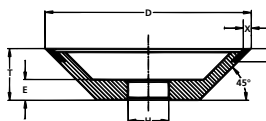
Diamond Shape	Dimension [mm] D - X - U - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
11V9	100 - 2 - 10 - 20	D 126 PHT	C 75	168592	1	261
11V9	100 - 3 - 10 - 20	D 126 PHST	C 75	168622	1	272



Shape 12A2/45°



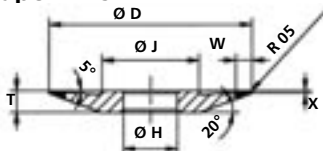
Diamond Shape	Dimension [mm] D - W - X - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
12A2/45°	125 - 10 - 2 - 20	D 64 PHT	C 50	168677	1	391
12A2/45°	125 - 10 - 2 - 20	D 126 PHT	C 75	168660	1	396



Shape 12V9



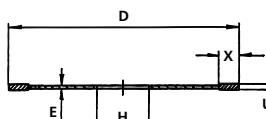
Diamond Shape	Dimension [mm] D - X - U - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
12V9	100 - 2 - 10 - 20	D 126 PHT	C 75	168646	1	234



Shape 4BT9



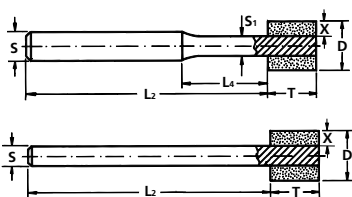
Diamond Shape	Dimension [mm] D - W - X - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
4BT9	100 - 6 - 1 - 20	D 126 PHT	C 75	350119	1	132



Shape 1A1R



Diamond Shape	Dimension [mm] D - X - U - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
1A1R	100 - 5 - 1 - 20	D 151 PHT	C 75	350096	1	94

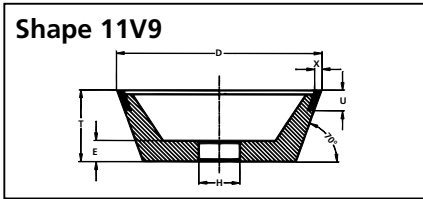
Shape 1A1W



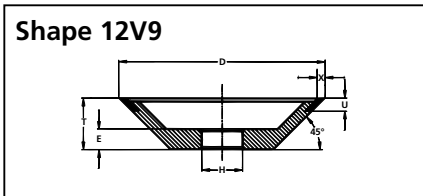
Diamond Shape	Dimension [mm] D - T - X	Shank	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
1A1W	3 - 5 - 0.75	3-50	D 126 PHN/T	C 100	665817	1	25
1A1W	4 - 5 - 1.0	3-50	D 126 PHN/T	C 100	665763	1	25
1A1W	5 - 5 - 1.5	3-50	D 126 PHN/T	C 100	665770	1	25
1A1W	6 - 6 - 1.5	6-50	D 126 PHN/T	C 100	665787	1	27
1A1W	8 - 8 - 2.0	6-50	D 126 PHN/T	C 100	665794	1	30
1A1W	10 - 8 - 2.0	6-50	D 126 PHN/T	C 100	665824	1	35

# Diamond / CBN Grinding Tools, Resinoid Bond

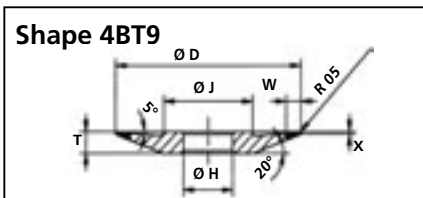
## Standard Range (Dry Grinding)



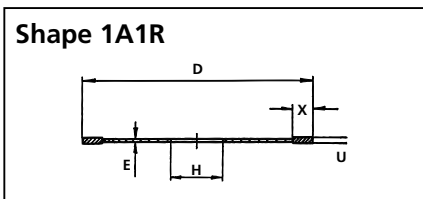
CBN Shape	Dimension [mm] D - X - U - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
11V9	100 - 2 - 10 - 20	B 126 PHT 4.1	C 75	350171	1	261
11V9	100 - 2 - 10 - 20	B 151 PH 4.2	-	535646	1	261
11V9	100 - 2 - 10 - 20	B 181 PHST	C 75	168684	1	261



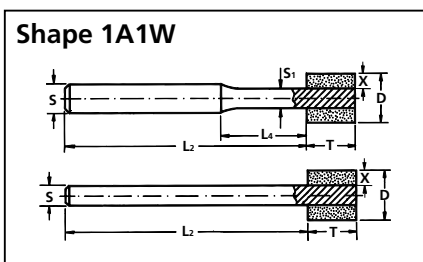
CBN Shape	Dimension [mm] D - W - X - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
12V9	100 - 2 - 10 - 20	B 126 PHT	C 75	168707	1	234



CBN Shape	Dimension [mm] D - W - X - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
4BT9	100 - 6 - 1 - 20	B 126 PHT	C 75	350126	1	132



CBN Shape	Dimension [mm] D - X - U - H	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
1A1R	100 - 5 - 1 - 20	B 151 PHT	C 75	350102	1	94

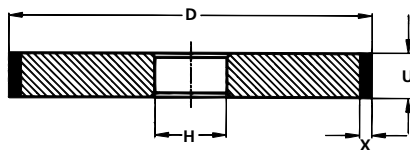


CBN Shape	Dimension [mm] D - T - X	Shank	Abrasive coating Grit / Bond / Concentr.		EAN 4007220		
1A1W	3 - 5 - 0.75	3-50	B 126 PHN/T	C 100	665695	1	25
1A1W	4 - 5 - 1.0	3-50	B 126 PHN/T	C 100	665701	1	25
1A1W	5 - 5 - 1.5	3-50	B 126 PHN/T	C 100	665718	1	25
1A1W	6 - 6 - 1.5	6-50	B 126 PHN/T	C 100	665725	1	27
1A1W	8 - 8 - 2.0	6-50	B 126 PHN/T	C 100	665732	1	30
1A1W	10 - 8 - 2.0	6-50	B 126 PHN/T	C 100	665749	1	35

# Diamond / CBN Grinding Tools, Resinoid Bond

## Tool Shapes, Dimensions, Special Range

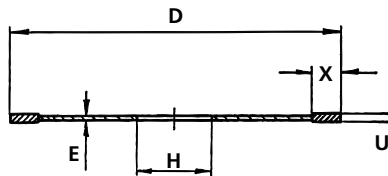
Shape 1A1



D	U	X	H
50	4 - 6 - 8 - 10 - 12	2 - 3 - 4	
75	5 - 6 - 8 - 10 - 12	2 - 3 - 4	
100	6 - 8 - 10 - 12	2 - 3 - 4	
125	8 - 10 - 12 - 15	2 - 3 - 4	
150	8 - 10 - 12 - 15	2 - 3 - 4	
175	8 - 10 - 12 - 15 - 20	2 - 3 - 4	
200	12 - 15 - 20 - 25 - 30	2 - 3 - 4	please specify!
225	12 - 15 - 20	2 - 3 - 4	
250	15 - 20 - 25 - 30 - 40 - 50	2 - 3 - 4	
300	15 - 20 - 25 - 30 - 40 - 50	2 - 3 - 4	
350	20 - 25 - 30 - 40 - 50	2 - 3 - 4	
400	25 - 30 - 40 - 50	2 - 3 - 4	
450	25 - 30 - 40 - 50	2 - 3 - 4	
500	25 - 30 - 40 - 50	2 - 3 - 4	

Ordering example: **1A1 200-20-4-127 D 126 PHN C 75**

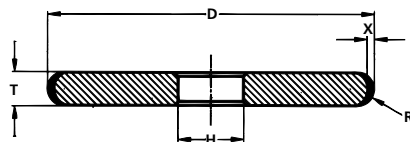
Shape 1A1R



D	U	X	H	E
75	1	5		0,8
100	1	5		0,8
125	1	5	please specify!	0,8
150	1	7	please specify!	0,8
175	1.2	7		0,9
200	1.2	7		0,9

Ordering example: **1A1R 150-1-7-20 D 151 PHT C 75**

Shape 1FF1

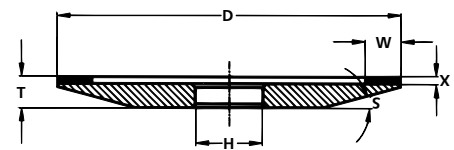


D	T	X	R	H
50	6	2	3	
50	8	2	4	
50	10	2	5	
75	6	2	3	
75	8	2	4	
75	10	2	5	
100	6	2	3	
100	8	2	4	
100	10	2	5	
100	12	2	6	please specify!
125	6	2	3	
125	8	2	4	
125	10	2	5	
125	12	2	6	
150	6	2	3	
150	8	2	4	
150	10	2	5	
150	12	2	6	

Ordering example: **1FF1 150-8/4R-2-32 D 126 PHN C 75**

Other dimensions available upon request!

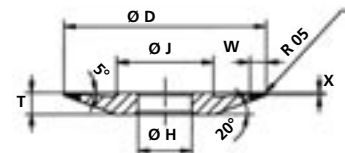
Shape 4A2  
S = 15°



D	W	X	H	T-X
50	3			5
50	5			5
75	3			5
75	3			5
100	3			6
100	4			6
100	5			6
100	6			6
100	8			6
100	10			6
125	3	2 or 3 or 4	please specify!	7
125	4			7
125	5			7
125	6			7
125	8			7
125	10			7
150	3			9
150	4			9
150	5			9
150	6			9
150	8			9
150	10			9
150	12.5			9

Ordering example: **4A2/15° 100-4-2-20 D 64 PHT C 50**

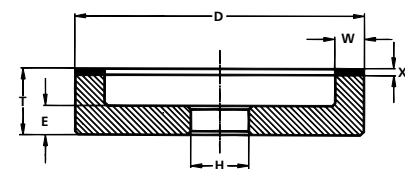
Shape 4BT9



D	W	X	H	T	J
75	6	1		8	36
100	6	1	please specify!	10	50
125	6	1		12	65
150	6	1		15	80

Ordering example: **4BT9 100-6-1-20 D 126 PHN C 75**

Shape 6A2



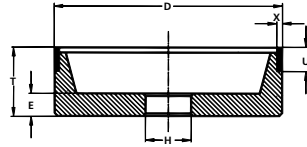
D	W	X	H	T-X	E
50	3			20	8
50	5			20	8
75	3			20	10
75	5			20	10
75	10			20	10
100	5			20	10
100	8			20	10
100	10			20	10
100	12.5			20	10
100	15			20	10
125	4			23	10
125	6	2 or 3 or 4	please specify!	23	10
125	8			23	10
125	10			23	10
125	12.5			23	10
125	15			23	10
125	20			23	10
125	25			23	10
150	6			23	10
150	8			23	10
150	10			23	10
150	12.5			23	10
150	15			23	10
150	20			23	10
150	25			23	10

Ordering example: **6A2 125-10-2-20 D 126 PHT C 50**

# Diamond / CBN Grinding Tools, Resinoid Bond

## Tool Shapes, Dimensions, Special Range

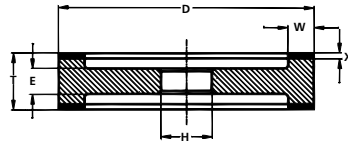
Shape 6A9



D	X	U	H	T	E
75	1.5	6		25	10
75	1.5	10		25	10
75	2	6		25	10
75	2	10		25	10
75	3	6		25	10
75	3	10		25	10
100	1.5	6		30	10
100	1.5	10		30	10
100	2	6		30	10
100	2	10		30	10
100	3	6		30	10
100	3	10	please specify!	30	10
125	1.5	6		30	10
125	1.5	10		30	10
125	2	6		30	10
125	2	10		30	10
125	3	6		30	10
125	3	10		30	10
150	1.5	6		35	10
150	1.5	10		35	10
150	2	6		35	10
150	2	10		35	10
150	3	6		35	10
150	3	10		35	10

Ordering example: **6A9 100-2-10-20 D 126 PHN C 100**

Shape 9A3

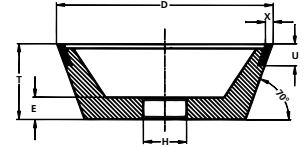


D	W	X	T	H	E
100	6		22		10
100	8		22		10
100	10		22		10
125	6		22		10
125	8		22		10
125	10		22		10
150	3		14		8
150	4		25 or 35		14
150	6		25 or 35		14
150	8	2	25 or 35	please specify!	14
150	10	or	25 or 35		14
150	15	3	25 or 35		14
175	3		25 or 35		14
175	4		25 or 35		14
175	6		25 or 35		14
175	8		25 or 35		14
175	10		25 or 35		14
175	15		25 or 35		14
200	8		25 or 35		18
200	10		25 or 35		18
200	15		25 or 35		18

Ordering example: **9A3 150-8-2-25-20 D 64 PHN C 75**

Other dimensions available upon request!

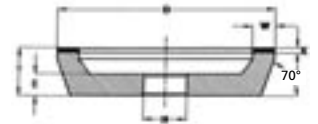
Shape 11V9



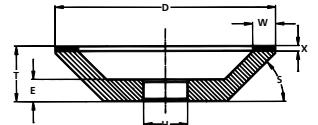
D	X	U	H	T	E
50	2	6		30	10
50	2	10		30	10
75	1.5	6		30	10
75	1.5	10		30	10
75	2	6		30	10
75	2	10		30	10
75	3	6		30	10
75	3	10		30	10
100	1.5	6		35	10
100	1.5	10		35	10
100	2	6		35	10
100	2	10		35	10
100	3	6	please specify!	35	10
100	3	10		35	10
125	1.5	6		40	10
125	1.5	10		40	10
125	2	6		40	10
125	2	10		40	10
125	3	6		40	10
125	3	10		40	10
150	1.5	6		50	10
150	1.5	10		50	10
150	2	6		50	10
150	2	10		50	10
150	3	6		50	10
150	3	10		50	10

Ordering example: **11V9 100-2-10-20 D 126 PHT C 75**

Shape 11A2S = 70°



Shape 12A2S = 45°



D	W	X	H	T - X	E
50	3			15	8
50	6			15	8
75	3			20	9
75	6			20	9
75	10			20	9
100	4			23	10
100	6			23	10
100	8			23	10
100	10			23	10
125	5			23	10
125	6	2 or 3 or 4	please specify!	23	10
125	8			23	10
125	10			23	10
125	12.5			23	10
125	15			23	10
150	6			23	10
150	8			23	10
150	10			23	10
150	12.5			23	10
150	15			23	10
175	6			25	12
175	10			25	12
175	12.5			25	12
175	15			25	12

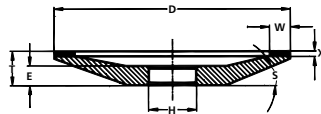
Ordering example: **12A2/45° 125-10-2-20 D 126 PHT C 50**

205

# Diamond / CBN Grinding Tools, Resinoid Bond

## Tool Shapes, Dimensions, Special Range

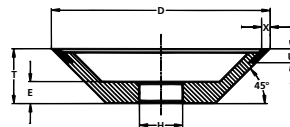
Shape 12A2S = 20°



D	W	X	H	T - X	E
75	3			8	5
75	5			8	5
75	6			8	5
75	8			8	5
75	10			8	5
100	3			10	6
100	5			10	6
100	6			10	6
100	8			10	6
100	10			10	6
125	5	2 or		14	8
125	6	3 or	please	14	8
125	8	4	specify!	14	8
125	10			14	8
150	5			16	9
150	6			16	9
150	8			16	9
150	10			16	9
175	6			18	10
175	10			18	10
200	6			20	11
200	10			20	11
250	6			23	13
250	10			23	13

Ordering example: **12A2/20° 125-10-2-20 D 126 PHT C 50**

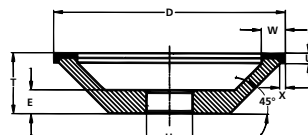
Shape 12V9



D	X	U	H	T	E
50	2	6		20	10
75	2	6		20	10
75	3	6		20	10
100	1.5	6		20	10
100	1.5	10		20	10
100	2	6		20	10
100	2	10		20	10
100	3	6		20	10
100	3	6		20	10
100	3	10	please	20	10
125	1.5	6	specify!	25	10
125	1.5	10		25	10
125	2	6		25	10
125	2	10		25	10
125	3	6		25	10
125	3	10		25	10
150	2	6		25	10
150	2	10		25	10
150	3	6		25	10
150	3	10		25	10

Ordering example: **12V9 100-2-10-20 D 126 PHT C 75**

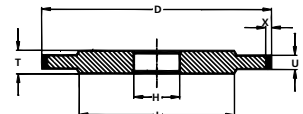
Shape 12C9



D	W	U	X	H	T	E
100	6	4	2		26	10
100	10	4	2		26	10
100	10	4	3		27	10
125	6	4	2		26	10
125	10	4	2	please	26	10
125	10	4	3	specify!	27	10
125	12.5	5	2		26	10
150	10	4	2		26	10
150	10	4	3		27	10
150	12.5	5	2		26	10
150	15	5	2		26	10

Ordering example: **12C9 100-10-4-2-20 D 64 PHN C 75**

Shape 14A1

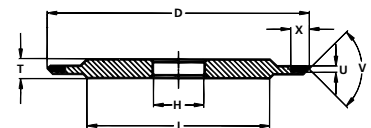


D	U	X	H	T	J
75	1-2	3-6		6	50
75	3-4	2-3-4		6	50
100	1-2	3-6		6	80
100	3-4-5	2-3-4		6	70
125	1-2	3-6		7	105
125	3-4-5-6	2-3-4		7	100
150	1-2	3-6		8	130
150	3-4-5-6	2-3-4		8	120
175	1-2	3-6	please	10	150
175	3-4-5-6	2-3-4	specify!	10	140
200	1-2	6		12	175
200	3-4-5-6-8-10	2-3-4		12	160
250	6-8-10-12	2-3-4		15	200
300	8-10-12	2-3-4		15	250
350	10-12-15	2-3-4		20	300
400	10-12-15-20	2-3-4		25	350
450	10-12-15-20	2-3-4		25	400
500	10-12-15-20	2-3-4		25	400

The abrasive coating of this tool can also be supplied with a radius. Please specify in your order.

Ordering example: **14A1 150-6-3-32 D 107 PHN C 100**

Shape 14E9



D	U	X	V°	H	T	J
50	1-2	6	35		6	32
50	1-2	6	45		6	32
50	1-2	6	60		6	32
50	1-2	6	90		6	32
75	1-2	6	35		6	50
75	1-2	6	45		6	50
75	1-2	6	60		6	50
75	1-2	6	90		6	50
100	1-2	6	35		6	70
100	1-2	6	45	please	6	70
100	1-2	6	60	specify!	6	70
100	1-2	6	90		6	70
125	1-2	6	35		8	100
125	1-2	6	45		8	100
125	1-2	6	60		8	100
125	1-2	6	90		8	100
150	1-2	6	35		8	120
150	1-2	6	45		8	120
150	1-2	6	60		8	120
150	1-2	6	90		8	120

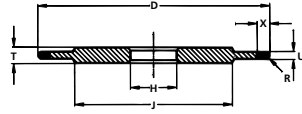
Ordering example: **14E9 150-2-6-60°-32 D 107 PHN C 125**

Other dimensions available upon request!

# Diamond / CBN Grinding Tools, Resinoid Bond

## Tool Shapes, Dimensions, Special Range, Sharpening Block

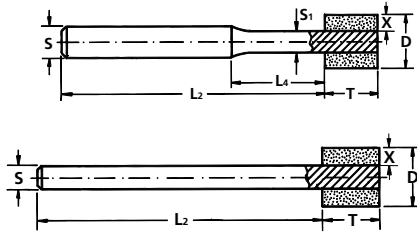
Shape 14F1



D	U	X	R	H	T	J
40	2		1		6	25
40	3		1.5		6	25
40	4		2		6	25
50	2		1		6	30
50	3		1.5		6	30
50	4		2		6	30
75	2		1		6	50
75	3	3 or	1.5		6	50
75	4	4 or	2	please	6	50
100	2	5 or	1	specify!	6	70
100	3	6	1.5		6	70
100	4		2		6	70
125	2		1		6	100
125	3		1.5		6	100
125	4		2		6	100
150	2		1		8	120
150	3		1.5		8	120
150	4		2		8	120

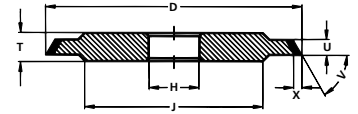
Ordering example: 14F1 150-2/1R-6-32 D 107 PHN C 125

Shape 1A1W



D	T	X	S	L <sub>2</sub>	S <sub>1</sub>	L <sub>4</sub>
3	6	0.75	3	60	1.5	8
4	6	1	3	60	2.0	8
5	6	1.5	3	60	2.0	8
6	6	1.5	6	60	3.0	8
6	8	1.5	6	60	3.0	10
7	6	2	6	60	3.0	8
8	6	2	6	60	4.0	8
8	10	2	6	60	4.0	12
9	6	2	6	60	5.0	8
10	6	2	6	60	-	-
10	10	2	6	60	-	-

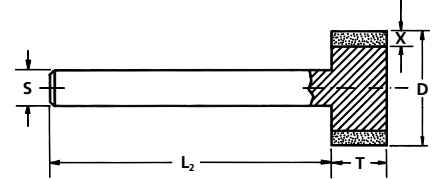
Shape 14V1



D	U	X	V°	H	T	J
50	3-4-5				6	30
50	6-8				6	30
75	3-4-5				6	45
75	6-8-10				6	45
100	4-6				8	70
100	8-10				8	70
125	4-6		20°		8	100
125	8-10		to 89°		8	100
150	4-6	2 or	(please specify individually)	please specify!	8	120
150	8-10	3 or 4			8	120
175	4-6-8				10	140
175	10				10	140
200	4-6-8-10				12	160
200	12-15				12	160
250	4-6-8-10-12				15	200
250	15-20				15	200
300	4-6-8-10-12				15	250
300	15-20				15	250

Ordering example: 14V1 150-8-3/60°-32 D 107 PHN C 100

Shape 1A1W



D	T	X	S	L <sub>2</sub>
12	6	2	6	60
12	10	2	6	60
15	6	2	6	60
15	10	2	6	60
18	6	2	6	60
18	10	2	6	60
20	6	2	6	60
20	10	2	6	60

Ordering example: 1A1W 15-10-2-6-60 D 91 PHNT C 100

### Sharpening block



This sharpening block is used to restore the sharpness of resinoid-bonded diamond and CBN grinding wheels (e.g., after dressing with a diamond dressing tool).

The block is first soaked in coolant and then infed manually or by means of a suitable feeding device.

Grinding with the sharpening block will quickly restore the sharpness of your grinding wheels.



Order No.	EAN	Dimensions [mm]		
SBL 1002413	255605	100 x 24 x 13	1	5

**Diamond / CBN Grinding Tools, Ceramic Bond**



205



# Diamond / CBN Grinding Tools, Ceramic Bond

## Advantages and Applications, Ordering Code

### Explanation of the order code system

#### Tool shapes

PFERD supplies standard FEPA grinding tool shapes as well as any special styles our customers may require. Based on the FEPA standard for diamond and CBN grinding wheels, we distinguish between the following shapes:

- 1A8** – Solid without mount
- 1A1** – Abrasive on mount
- 1A8W** – Solid with cylindrical or shouldered shank
- 1A1W** – Abrasive on mount with shank

#### Tool dimensions

The tool dimensions submitted should describe the tool as fully as possible, i.e., the dimensions of both the abrasive body and the shank (including its shoulder, where applicable) should be indicated as accurately as possible. Tools can also be produced to customer specifications. For tools made to order we need a technical drawing showing all relevant manufacturing dimensions.

#### Abrasive specification

A complete specification of the abrasive should include the following data:

- Grit size
- Grit concentration
- Bond type

The composition of the abrasive can be freely selected to obtain an optimum abrasive product for your application. In addition, the ceramic bond can be adapted exactly to comply to the individual machining task. Just select any desired bond hardness, pore volume and pore structure.

**Please contact our applications engineering team for further details regarding optimum bond selection and tool design.**

### Advantages of ceramic bond grinding tools

CBN abrasive particles are extremely hard and wear resistant. The cutting edge of the grain remains sharp (i.e., retains its cutting capacity) for much longer. This offers the following advantages:

- Low grinding forces, resulting in superior dimensional stability and shape holding properties. Spark-out times are shorter due to minimized spindle deflection.
- Prevention of overheating in the surface and near-surface zones of the workpiece. This characteristic is further emphasized by the exceptional thermal conductivity of the CBN grain.

Ceramic bond CBN tools offer an outstanding tool life and profile holding capability, even at high stock removal rates. The resulting benefits include:

- constant quality level over large product runs;
- reduced idle times due to fewer dressing cycles and tool changes.

### Applications of ceramic bond CBN grinding tools

- Ceramic bond CBN grinding tools are used for grinding steel in **stationary** machines, mainly in volume production environments.
- Ceramic bond CBN grinding tools are always used wet. The coolant should contain EP additives. Tool life can be increased substantially by using a grinding oil.
- Cutting speeds should be in excess of 30 m/s. Higher cutting speeds increase the cost-effectiveness of the grinding process.
- The exceptional performance of ceramic bond CBN grinding tools can be further increased through the use of low-vibration machines.

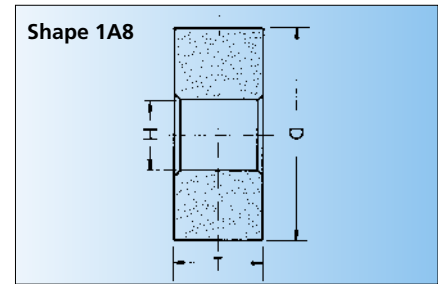
Style **1A8W** (cylindrical or shouldered shank) and **1A1W** tools are available **with steel or carbide shanks**.

The modulus of elasticity of carbides is about three times as high as that of steel.

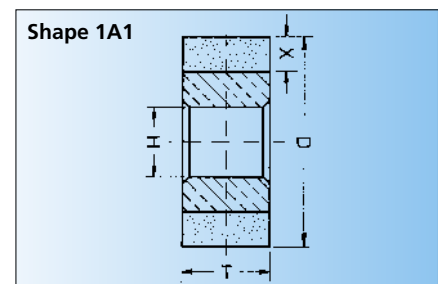
The modulus of elasticity describes the degree of deformation a body will undergo in response to loads. In internal grinding, a high modulus of elasticity of the tool shank means that the deformation of the tool by grinding forces will be minimized.

This will result in the following specific benefits:

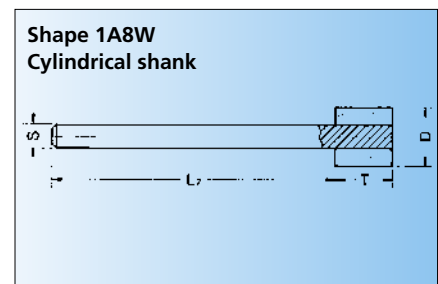
- prevention of geometry errors;
- substantial reduction in (non-productive) spark-out times.



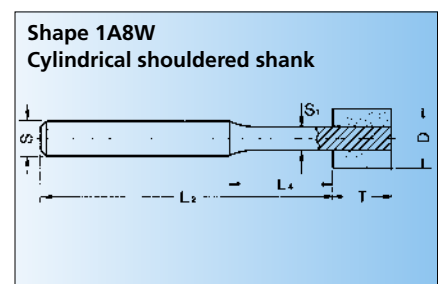
Shape D - T - H  
Example: **1A8 12 - 6 - 6**



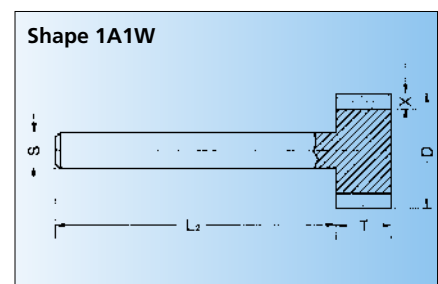
Shape D - T - X - H  
Example: **1A1 20 - 5 - 3 - 5**



Shape D - T - S - L<sub>2</sub>  
Example: **1A8W 10 - 5 - 6 - 50**



Shape D - T - S - L<sub>2</sub> - S<sub>1</sub> - L<sub>4</sub>  
Example: **1A8W 10 - 4 - 8 - 50 - 3 - 10**

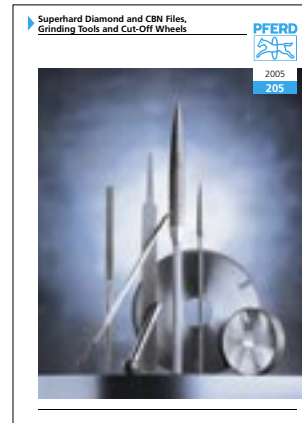


Shape D - T - X - S - L<sub>2</sub>  
Example: **1A1W 6 - 5 - 3 - 8 - 50**



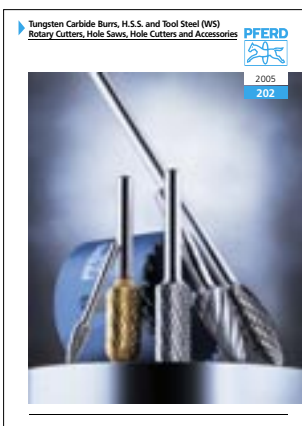
## Catalogue 201

Machinist's Files,  
Sharpening Files,  
Rasps and Precision Files



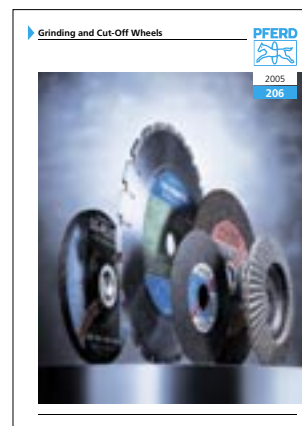
## Catalogue 205

Superhard Diamond  
and CBN Files,  
Grinding Tools and  
Cut-Off Wheels



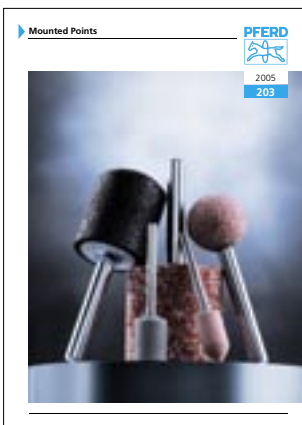
## Catalogue 202

Tungsten Carbide Burrs,  
H.S.S. and Tool Steel (WS)  
Rotary Cutters, Hole Saws,  
Hole Cutters and Accessories



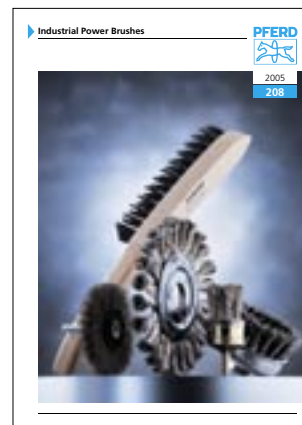
## Catalogue 206

Grinding and  
Cut-Off Wheels



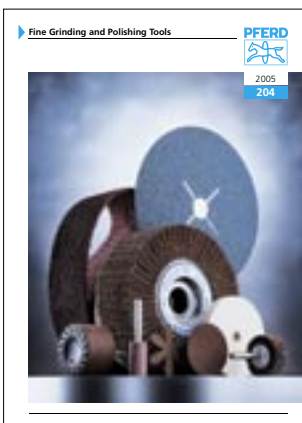
## Catalogue 203

Mounted Points



## Catalogue 208

Industrial Power Brushes



## Catalogue 204

Fine Grinding and  
Polishing Tools



## Catalogue 209

Tool Drives

Subject to technical modifications.

05/2005

833 105

