Grinding Wheels and Dressers: Complete Programme

Grinding Wheels and Dressers: Complete Programme



EHWA Europe GmbH

www.ehwadia.de

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Diamond and CBN for your grinding task

EHWA combines diamond and CBN grinding tools with application-specific dressers. The programme covers automotive components, bearings, glass, cutting tools, medical components and turbines. It also includes stationary and rotary diamond dressers, six tool/bond groups, a complete specification system and the corresponding tool shapes.

Since its founding in 1975, EHWA has developed industrial diamond tools. Quality, technical expertise and service form the basis of customer relationships. The requirements of different markets and customers inform new tools and technical information. Customer success is a measure of that collaboration.

EHWA describes international partnerships, procurement of high-quality industrial diamond and CBN from selected sources, and development cooperation with manufacturers in Europe, Japan and the USA. Joint development areas include high-precision diamond tools, rotary dressers and precision electroplated tools.

The name EHWA expresses cooperation. E refers to two parties: EHWA and people such as customers, employees, partners and society. HWA means cooperation. This gives rise to the objective of long-term customer relationships and continuing quality development.

Start with the application, then select the abrasive, bond and tool shape. The ordering and dimensional chapters connect the application examples with an unambiguous technical specification. Supplementary programmes remain identified as separate variants.

Application area	Tool/process focus
Engine and turbocharger	Camshafts/crankshafts, injector bores, honing and dressing.
Gears, steering and brakes	Profile and surface machining with matching dressers.
Bearings	Grinding, honing and dressing for bearing components.
Glass	Automotive, architectural, optical and other glass applications.
Cutting tools	Rotating tools, inserts and saws.
Medical	Precision machining of medical components.
Turbine	Profiled grinding and dressing tasks.
Stationary dressers	Single-point, multi-point, form and impregnated designs.



Selection of diamond, CBN and dressing tools.



Grinding tools for precision bore machining.



Different grinding-wheel designs.



Diamond grinding wheel for industrial applications.

Development and international cooperation

The chronology below reproduces the development milestones documented in the main catalogue up to 2022. Certifications are historical milestones; their current scope is given in the relevant current certificate.

Year	Documented milestone
1975	EHWA founded in Seoul, Korea.
1981	Exports to the USA began.
1985	Headquarters and production relocated to Osan.
1988	R&D centre established.

Year	Documented milestone
1993	ISO 9001 certification by German TÜV; plant established in Fujian, China.
1995	Sales subsidiary opened in Japan; Gold Industrial Medal received on National Trade Day.
1997	Plant established in Weihai, China.
2000	Presidential Productivity Award received.
2002	Plant established in Shanghai, China.
2003	oSa certification (Organization for the Safety of Abrasives).
2004	Sales subsidiary opened in Germany.
2008	100 Million Dollar Export Presidential Award received.
2011	Selected as a World Class 300 company by the Korean government, first round.
2012	Plant established in Jakarta, Indonesia.
2013	New Dongtan facility opened for R&D and new business development.
2015	Subsidiaries established in India, Mexico and Italy.
2016	KOSHA 18001 certification for occupational safety and health management.
2017	Plants established in Bac Ninh and Hai Duong, Vietnam.
2020	Time-honoured Business certificate received from the Korean Ministry of SMEs and Startups.
2021	Subsidiary established in Alabama, USA.
2022	ISO 45001 certification by German TÜV.

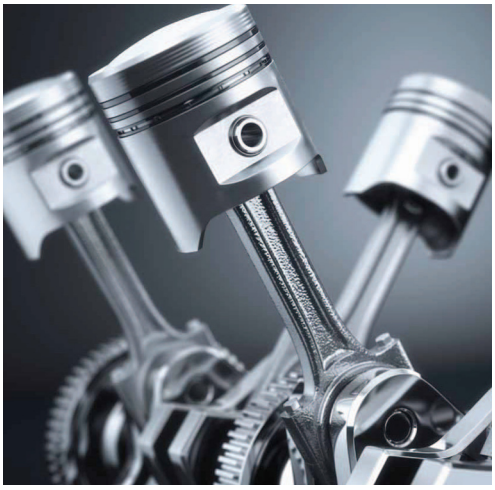


Certificate illustration from the historical catalogue edition.

Engines and turbochargers

Industrial diamond tools perform important machining tasks on engine components, including cylinder heads and cylinder blocks. The programme combines vitrified-bonded CBN grinding wheels for camshafts and crankshafts with injector-bore tools, metal-bonded honing stones for cylinder blocks and connecting rods, and rotary dressers for turbochargers.

Tool selection follows the material, contour, machining stage and grinding machine. The examples below provide specific specifications and comparative results.



Engine components as application examples.



Vitrified-bonded CBN grinding wheel for camshafts.



Vitrified-bonded CBN grinding wheels for crankshafts.



Piston and connecting rod as an engine application example.



Grinding tools for injector bores.



Metal-bonded honing tools for cylinder blocks and connecting rods.



Rotary dressers for turbocharger applications.

Camshaft grinding: removal and profile stability

Vitrified-bonded CBN wheels combine high removal rates with low grinding forces. EHWA identifies excellent surface finish and profile stability, longer dressing intervals and extended wheel life. In the documented camshaft comparison, EHWA achieves a specific removal rate of 10 versus 8.5 and 9 for the two competing tools. Relative to Competitor 1, this corresponds to the catalogue's increase of up to approximately 18%.

The source formula is $Q_w' = \pi \times d_w \times v_f \times \partial_p / b_s$ [mm³/(mm·s)]. Here d_w denotes workpiece diameter, v_f feed rate, ∂_p cam-lobe width and b_s grinding-wheel width. The formula and the parameters below belong to this comparison case.

Comparison condition	Value
Work material	Chrome-molybdenum steel, sintered
EHWA	B126L200VEW
Wheel speed v_s	120 m/s
Feed rate v_f	0.08 mm/s
Stock removal	0.8 mm
Cam-lobe diameter d_w	30-50 mm
Wheel diameter d_s	450 mm

Tool	Q_w' [mm³/(mm·s)]
Competitor 1	8.5
Competitor 2	9
EHWA	10



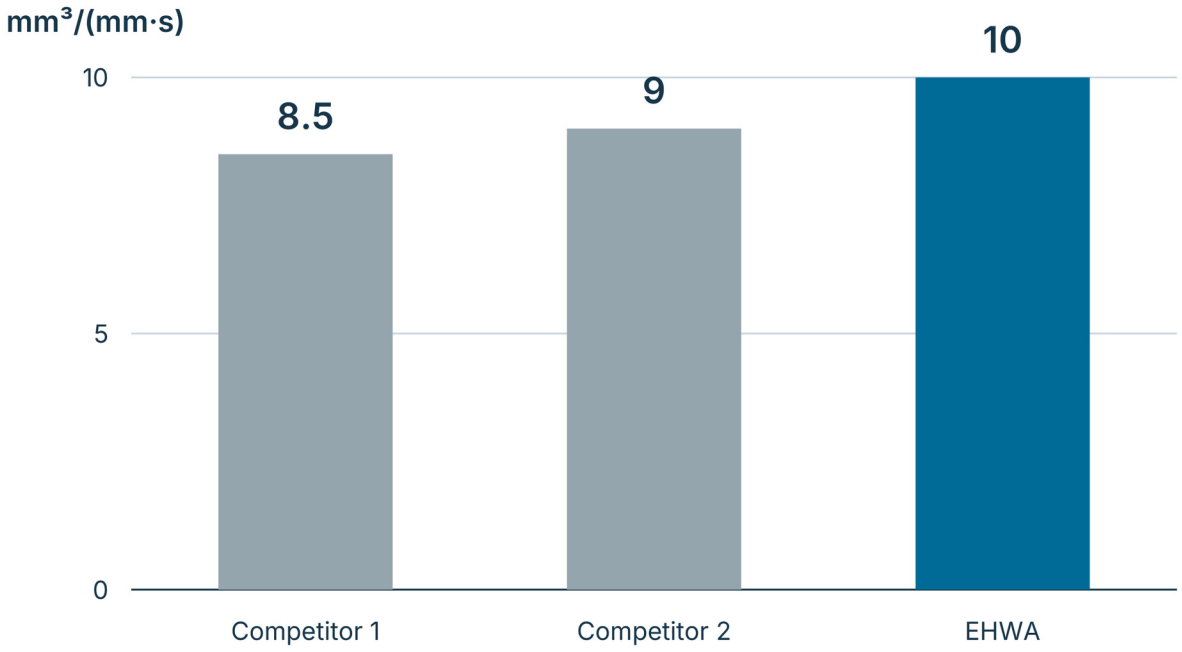
Camshaft and grinding wheel in the machining arrangement.



CBN wheel for camshaft grinding.



Cam lobes as a workpiece detail.



Specific removal rate in the camshaft comparison.

Crankshaft grinding: longer wheel life

EHWA identifies longer dressing intervals and tool life, consistent surface finish, high profile stability and reduced thermal and mechanical damage to the workpiece. In the illustrated comparison, the G-ratio rises from 1500 to 1800; the catalogue describes this as a 20% increase in wheel life.

The G-ratio is the removed workpiece volume divided by the CBN grinding-wheel wear volume. The comparison values relate to the conditions below.

Comparison condition	Value
Work material	FCD, cast material
EHWA	B151L200VEWN
Wheel speed v_s	80 m/s
Feed rate v_f	0.05 mm/s
Stock removal	1.2 mm
Workpiece diameter d_w	60 mm
Wheel diameter d_s	650 mm

Tool	G-ratio
Competitor	1500
EHWA	1800



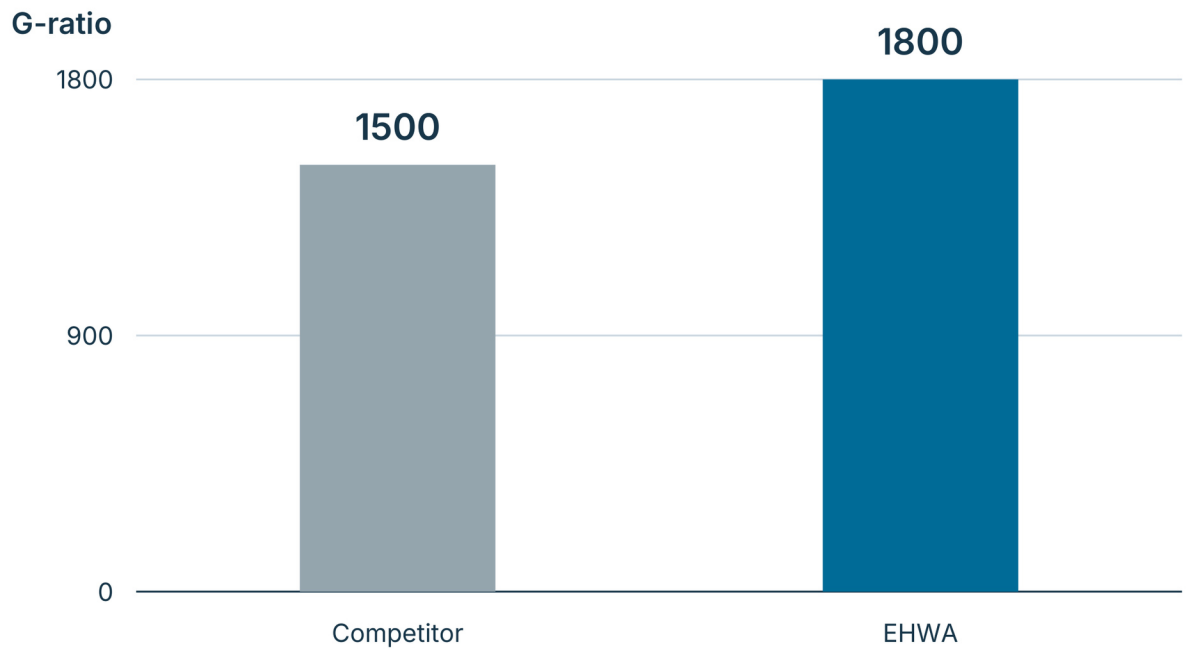
Crankshaft and grinding wheel in the machining arrangement.



CBN grinding wheels for crankshaft grinding.



Crankshaft as a workpiece example.



G-ratio in the crankshaft comparison.

Injector bores and seat surfaces

The tools are designed for fuel-injector bore and seat machining. EHWA identifies free-cutting abrasive, longer dressing intervals and more efficient tool utilisation. Consistent grinding performance and precise wheel forms, including coolant holes and slots, support the machining task.

The standard specifications below apply to the bore and seat tools illustrated in the main programme.

Feature	Bore / seat
Coolant hole	H 0.5-1.0 mm
Wheel size	D 1.5-20 mm
CBN grit size	29-76 µm
Slot	0.4-1.5 mm



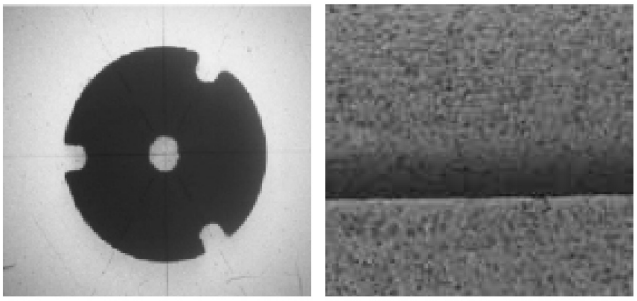
Grinding tools with different bore and seat contours.



Grinding tool for the injector bore.



Grinding tool for the injector seat.



Slot form and enlarged slot detail.

Metal-bonded honing stones for cylinder blocks and connecting rods

Metal-bonded honing stones combine longer tool life with the objective of lower machining costs. For cylinder blocks, the programme distinguishes roughing, semi-finishing and finishing. Connecting rods have a separate grit/bond selection.

Double-S uses a specially coated diamond. EHWA identifies excellent roundness and surface finish, and describes doubled tool life. The illustrated comparison shows 2800 machined parts for regular diamond versus 6000 parts for Double-S. These tool-life figures are results from the application example shown.

Cylinder block: stage	Grit designations	Bond series
Rough	D251-D91	MB, MS, MJ
Semi-finish	D76-D30	MB, MS, MJ
Finish	D25-D8	MJ, MH

Connecting rod: grit designations	Bond series
D151-D25	MJ, MH, MS

Diamond	Tool life [parts]
Regular diamond	2800
Double-S	6000



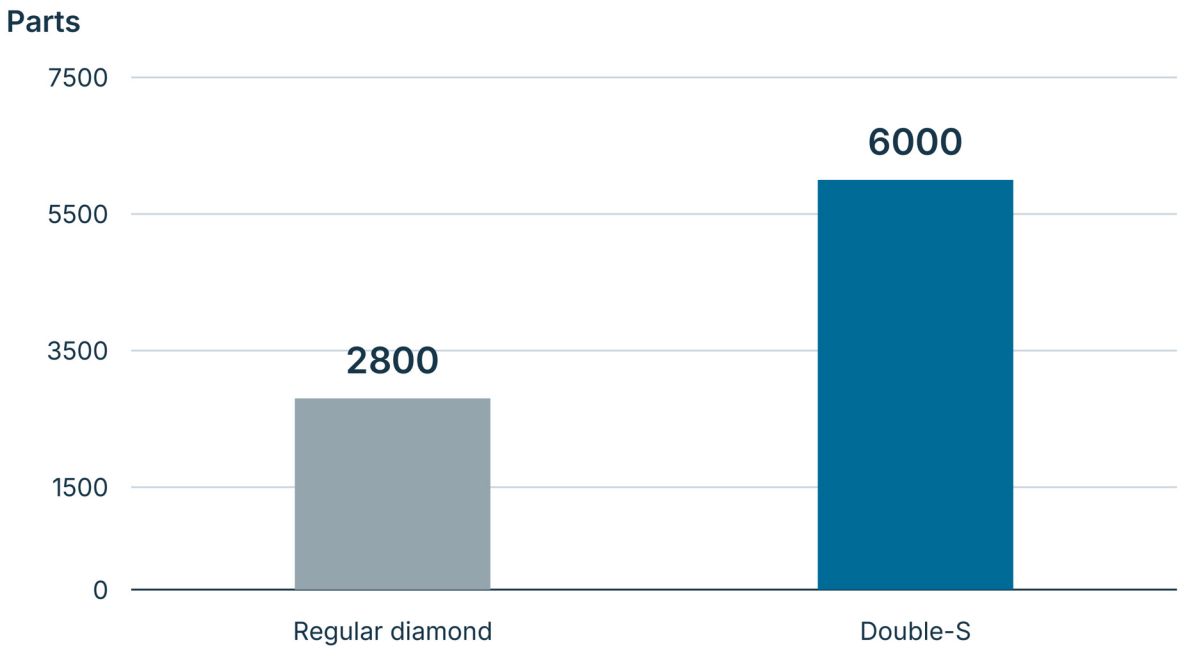
Honing tools, cylinder block and connecting rods.



Metal-bonded honing stones for cylinder blocks.



Honing stones and connecting rods as application examples.



Tool life in the Double-S comparison.

Rotary dressers for engine valves

An engine valve has a head, sealing face and stem. It controls gas exchange: the inlet valve admits the air or mixture required for combustion, while the exhaust valve releases the combustion gases.

EHWA tailors the dressers to the customer's task and identifies high-precision dressing with long tool life. Designs can be supplied as a single tool or an assembly. The three illustrated assignments cover face and neck, centreless stem grinding, and groove and chamfer.

Mark	Machining area
01	Face and neck
02	Stem: centreless grinding
03	Groove and chamfer

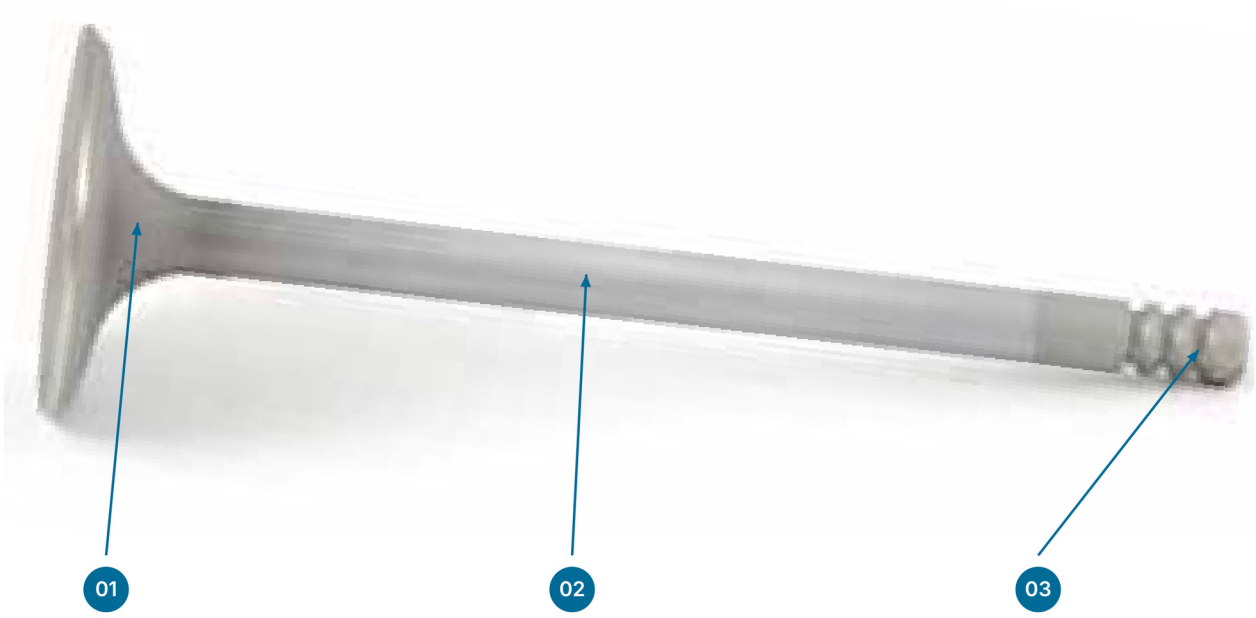




Dressing rolls and engine valves.



Dressing contours for face/neck, stem and groove/chamfer.



01 Face and neck

02 Stem: centreless grinding

03 Groove and chamfer

Machining locations on the engine valve: 01, 02 and 03.

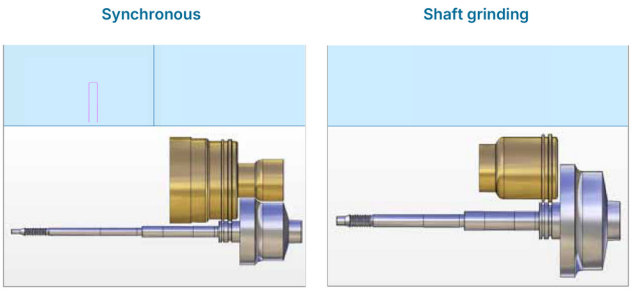
Rotary dressers for turbochargers

A turbocharger uses a turbine to supply additional air to the combustion chamber. This can support the power output and efficiency of an internal-combustion engine.

EHWA identifies customer-specific design, high-precision dressing and longer tool life. CVD reinforcement at key wear areas increases service life. The two diagrams show the arrangements “Synchronous” and “Shaft grinding”.



Rotary dressers for turbocharger applications.



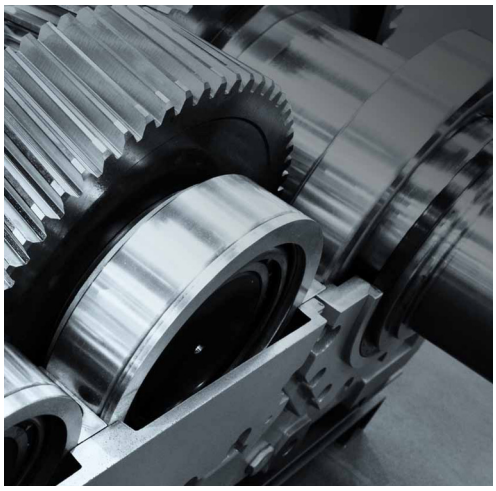
Turbocharger machining arrangements: synchronous and shaft grinding.

Gears, steering and brakes

The programme combines gear-grinding dressers, honing stones for transmission components, and CBN tools for angular and internal grinding. CV-joint applications use vitrified CBN tools and matching rotary dressers. Brake applications include CBN segments for discs, and BSL and electroplated tools for pads.



Transmission components as application examples.



Gear, steering and brake applications.



Diamond dressing roll for gears.



Metal-bonded honing stones for transmission components.



Vitrified CBN wheel for gear and shaft grinding.



CBN grinding tools for internal bores.



Vitrified CBN tools for CV joints.



Rotary dresser for CV joints.



CBN segments for brake discs.



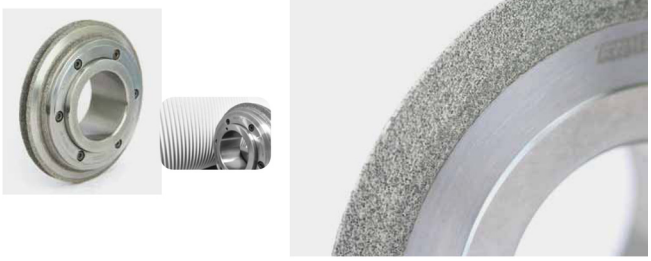
BSL and electroplated tools for brake pads.

Dressers for gear grinding

Controlled raw materials and precisely polished dressing contours support the required profile accuracy. The dresser profiles the grinding worm that subsequently grinds the gear.

The main catalogue shows four designs: Single taper disc type, Single cone type, Single and root type, and Double type. Each has its own tool view and profile-contact view. The illustrated contours belong to this programme edition.

Design	Profile principle
Single taper disc type	Two separate profile sections.
Single cone type	A single main profile.
Single and root type	Main profile and lower root section.
Double type	Two profile tips on a common body.

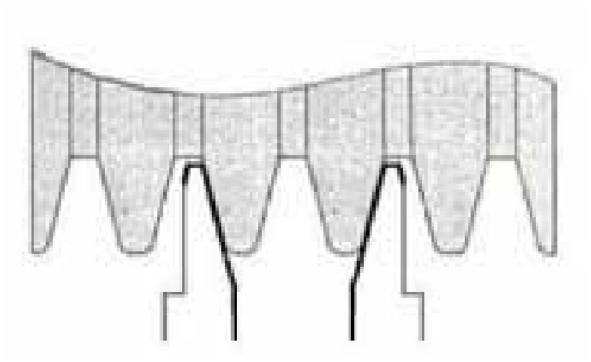


Dressing roll and profiled grinding worm for gear grinding.



Single taper disc type: side view.

Single taper disc type

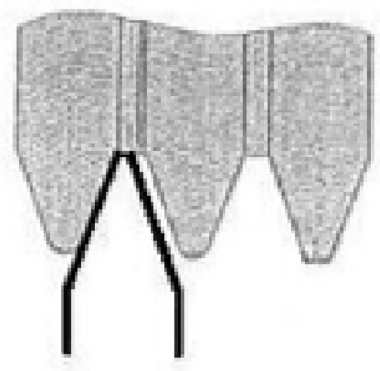


Single taper disc type: profile contact.



Single cone type: side view.

Single cone type

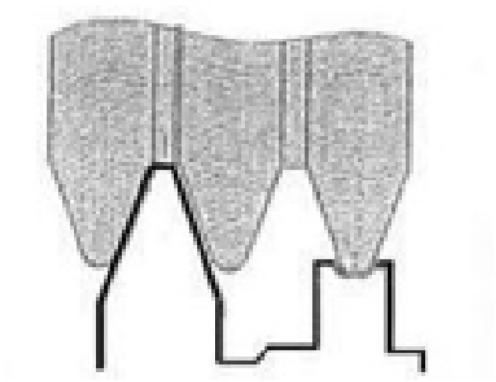


Single cone type: profile contact.



Single and root type: side view.

Single and root type

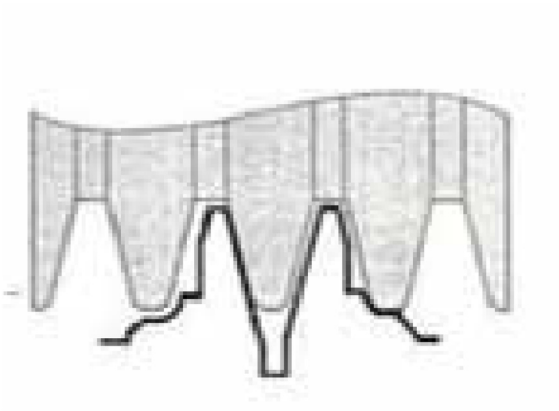


Single and root type: profile contact.



Double type: side view.

Double type



Double type: profile contact.

Honing stones for transmission components and synchro sleeves

For pinions, speed gears and DCT components, EHWA identifies longer tool life, lower costs and machining load, and excellent roundness. The illustrated comparison shows 4000 parts for the competing tool and 8000 parts for EHWA. Roundness values are 0.24 µm and 0.15 µm respectively.

For synchro sleeve gears, effective internal-bore honing is the focus. EHWA identifies longer tool life and better precision than the competing product. The two application types have different grit and bond ranges.

Application	Grit designations	Bond series
Pinion, speed gear, DCT component	D181-D15	MB, MH, MS, MJ
Synchro sleeve: internal bore	D76-D20	MB, MS

Comparison	Tool life [parts]	Roundness [µm]
Competing tool	4000	0.24
EHWA	8000	0.15





Honing tools and transmission gears.



Honing stones for pinions, speed gears and DCT components.



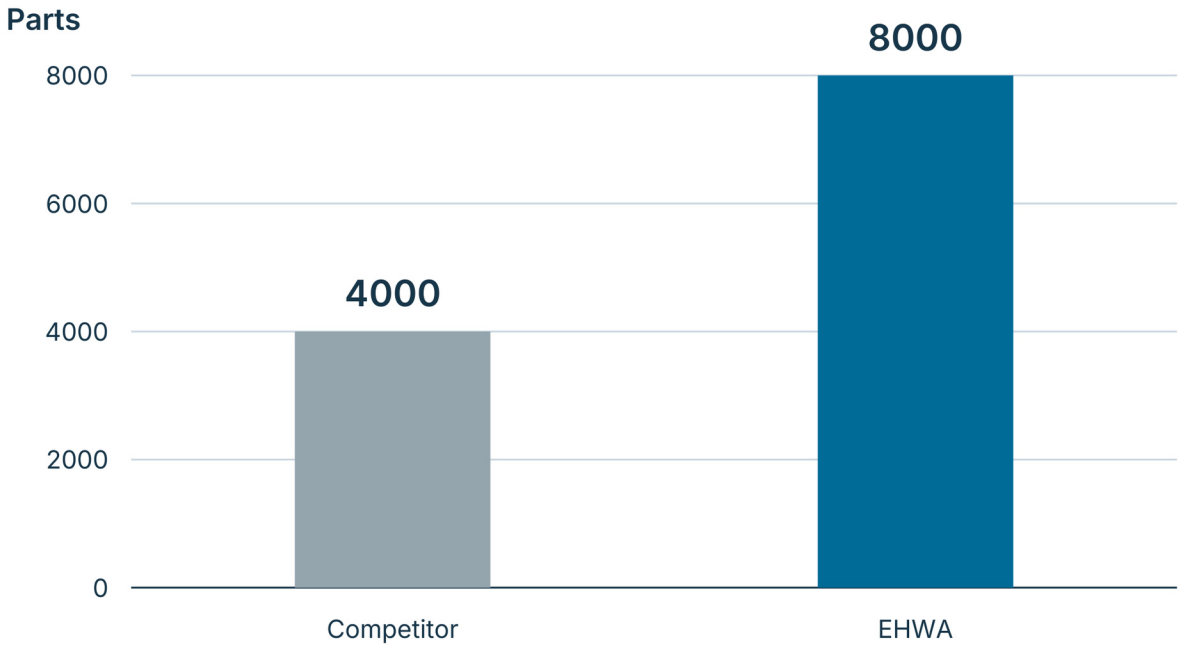
Honing tools and synchro sleeve gears.



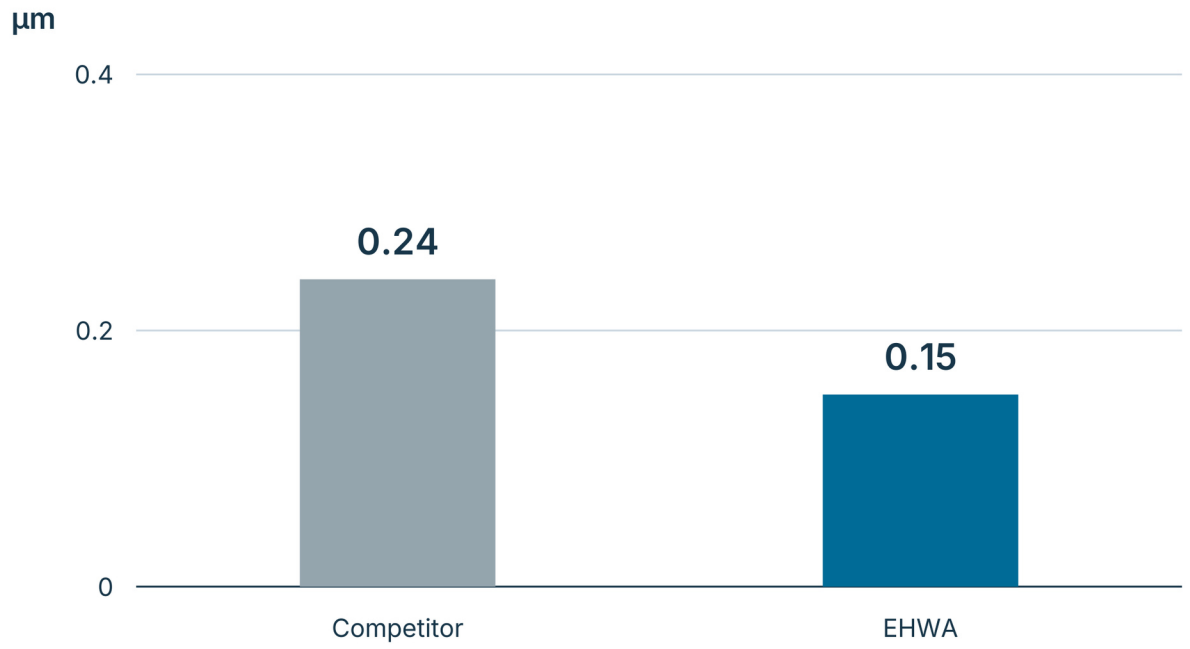
Honing stones for the internal bore of the synchro sleeve gear.



Synchro sleeve gears as workpiece examples.



Tool life when honing transmission components.



Roundness values in the illustrated honing comparison.

Angular grinding of transmission components

Vitrified-bonded CBN tools provide high grinding performance for transmission components. Their free-cutting design supports high removal rates; longer dressing intervals contribute to economical production with high capacity. EHWA also identifies shorter cycles and reduced mechanical and thermal damage to the machined surface.

The following conditions belong to the illustrated angular-grinding application.

Feature	Value
Wheel speed	25-80 m/s
Diametral stock removal	0.1-0.35 mm D
Dressing amount	5-30 µm
Dresser	Diamond rotary dresser
Spindle-axis angle	15° / 30° / 45°
Body material	Steel, aluminium alloy



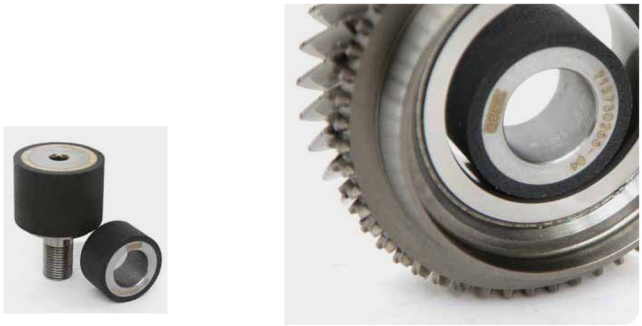
CBN grinding wheel and transmission component in angular grinding.



Detail of the vitrified-bonded CBN wheel.

Internal grinding with CBN

EHWA identifies excellent surface quality, longer wheel life and lower costs, faster production-line setup and high stock removal. The catalogue comparison indicates eight to ten times the wheel life of a conventional wheel for EHWA CBN. Achievable life is matched to the work material, grinding machine and operating conditions.



CBN internal-grinding tools and a transmission component.



Gear and CBN internal-grinding tool.



Relative tool life: catalogue comparison

Relative tool life in the catalogue comparison: conventional wheel and EHWA CBN.

CV joints: cage windows and outer race

The specialised CBN tools support high removal and production capacity. EHWA identifies excellent surface quality with low heat generation and tight tolerances. Longer dressing intervals and reduced wheel wear improve process consistency and support lower costs.

Cage windows and outer races have separate standard specifications. The corresponding CBN and pore-structure images illustrate the different tool designs.

Machining area	Standard specification
Cage windows	B126M180VBTM
Outer race	B181M160VBTM



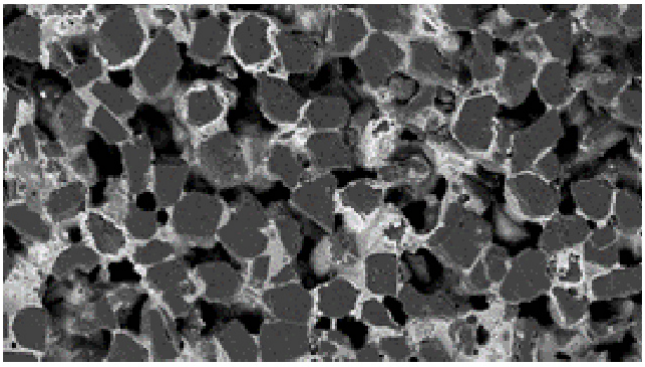
CBN tools and a CV-joint component.



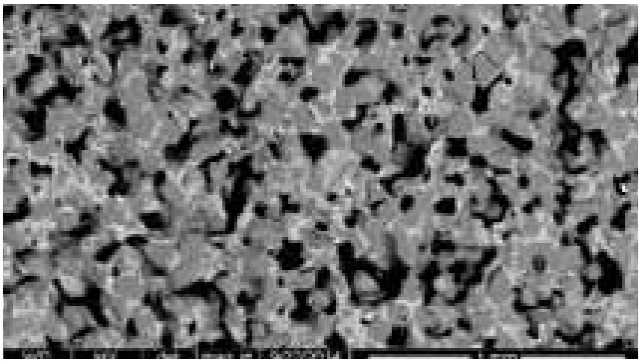
Cage and tools for cage-window grinding.



Outer race and matching grinding tools.



CBN structure for cage-window grinding.



Pore structure of the vitrified-bonded wheel for the outer race.

Rotary dressers for CV joints

CV joints transfer torque supplied by the engine through the transmission to the wheels while maintaining constant-velocity rotation between the connected shafts. Precisely machined contours support this function.

EHWA identifies customer-specific design, high dimensional precision and excellent machining performance through high diamond exposure. The three dresser groups are assigned to the inner race, cage and outer diameter of the outer race.

Assignment	Tool group
Inner race	Rotary diamond dresser
Cage	Rotary diamond dresser
Outer-race outside diameter	Rotary diamond dressers



Rotary dresser and CV-joint cage.



Dressing roll for the inner race.



Dressing roll for the cage.



Dressers for the outer diameter of the outer race.

CBN segments for brake discs

CBN segments support longer tool life and economical machining. EHWA identifies shorter cycles through high grinding speeds. The two workpiece groups have separate bond series and corresponding scanning electron micrographs.

The D181-D54 grit designations follow the table in the main programme; the abrasive is confirmed when the order specification is agreed.

Workpiece group	Grit designations	Bond series
4WD (FC)	D181-D54	MH
2WD (SUS)	D181-D54	MP



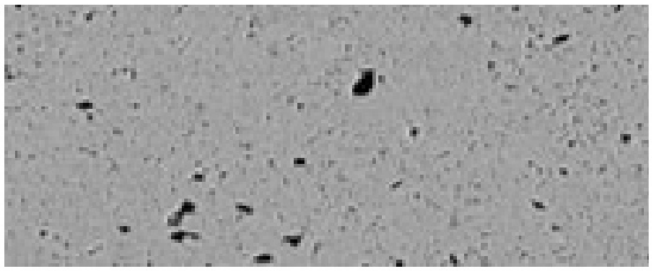
CBN segments and a brake-disc grinding arrangement.



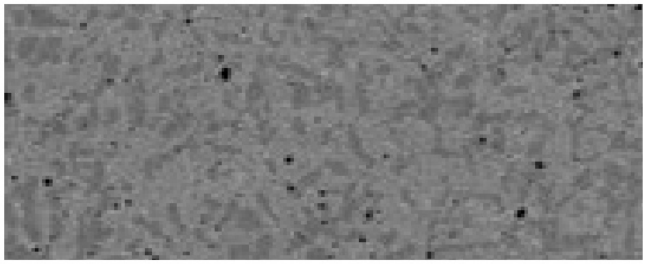
Workpiece example 4WD (FC).



Workpiece example 2WD (SUS).



Scanning electron micrograph of the MH version.



Scanning electron micrograph of the MP version.

BSL and electroplated tools for brake pads

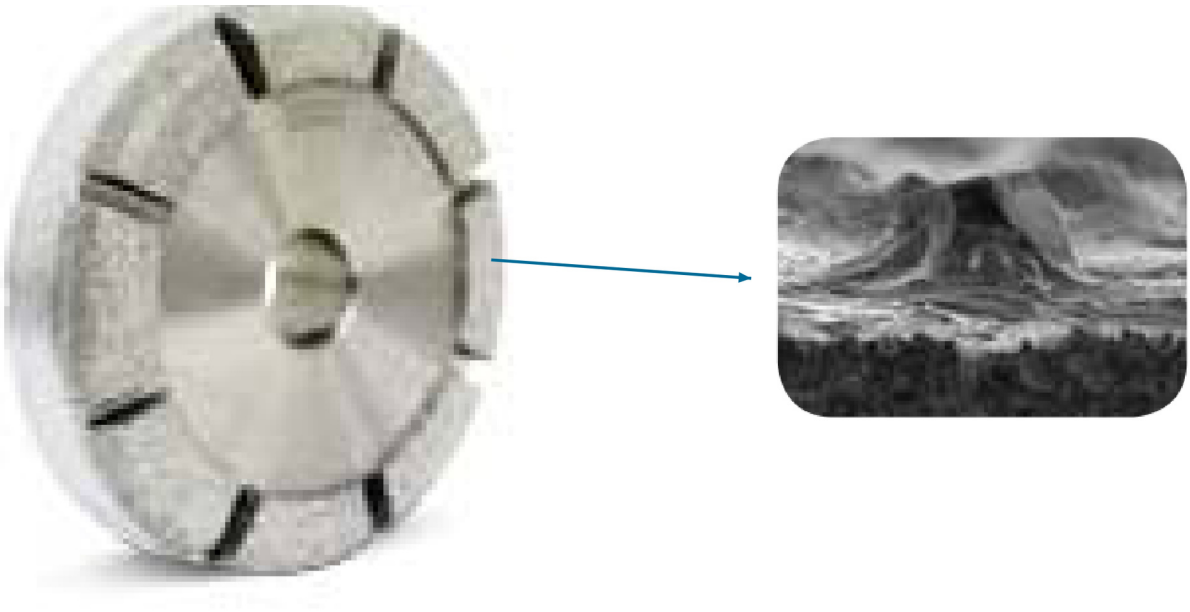
BSL tools combine high diamond exposure with free-cutting machining and effective chip flow. EHWA identifies longer tool life than electroplated tools and the resulting cost benefits.

Electroplated designs are suitable for coordinated chamfer, slot and face grinding. Different and complex tool shapes support the task. The listed materials include composites, ceramics and rubber. EHWA highlights high grinding performance and the possibility of repeated refurbishment.

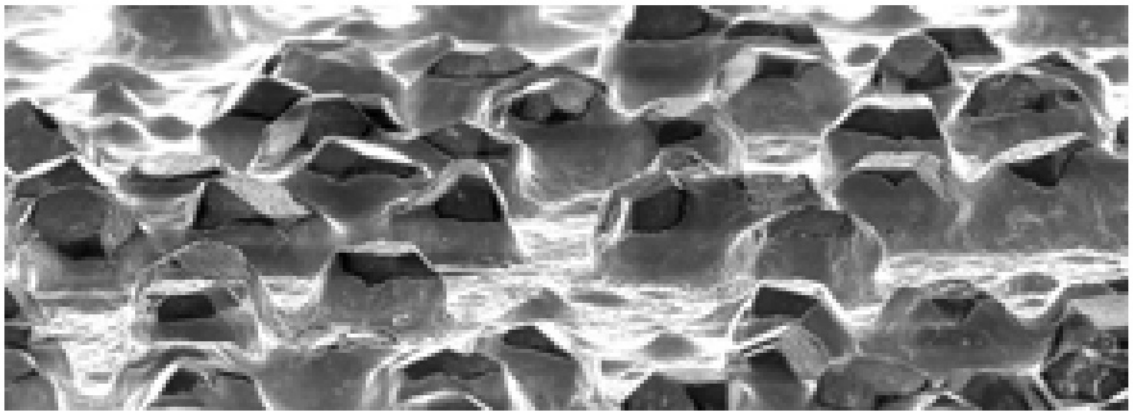
The tool/detail pairs and the structure images present the two abrasive-layer designs separately.



BSL and electroplated grinding wheels with a brake-pad example.



BSL: grinding wheel and abrasive-layer detail.



Structure image of the slotted BSL wheel.



Electroplated: grinding wheel and abrasive-layer detail.



Structure image of the slotted electroplated wheel.

Bearings: grinding, superfinishing and dressing

EHWA develops diamond and CBN tools for bearings and precision components. Applications range from bearing manufacture to aerospace. The programme combines grinding tools for rings and rollers with honing stones and accurate-profile dressers. The following mapping supports selection along the manufacturing sequence.

Tool group	Machining task
Vitrified CBN grinding tools	Bearing diameters, raceways, lips and ring faces
CBN superfinish honing stones	Fine finishing of the bearing raceway
Rotary dressers	Profiles for ball, roller, hub and water-pump bearings
Metal cup dressers	Dressing for internal cylindrical grinding
Face and double-disc grinding tools	End faces of bearing rings and rollers
Taper-roller face grinding wheels	Taper-roller end faces
Profile dressers for linear guides	Ball raceways of guide blocks and rails
Profile dressers for ball screws	R-type ball raceway profile



Bearings: tooling programme for rings and raceways



Vitrified CBN grinding tools



CBN honing stones for superfinishing



Rotary dressers for water-pump and ball bearings



Metal cup dressers for internal grinding



Bearing components and machining areas



Tools for face and double-disc grinding



Wheel for taper-roller end faces



Dresser for ball screws



Dresser for linear guides

Vitrified CBN grinding tools for bearing rings

High removal rates and short cycles support economical bearing production. Reduced grinding force can limit mechanical and thermal loading of the bearing ring. Stable, accurate grinding supports surface finish, cylindricity and low dimensional deviation. Tools are available with ceramic cores, steel cores, steel quills or steel heads.

The process ranges describe this catalogue application. The dressing ratio is stated as 0.3-0.6; rotation direction and the precise speed definition are to be established during process design.

Code	Grinding area
01 ID	Inner-race internal diameter
02 IR	Inner raceway
03 OR	Outer raceway
04	Lip
05	Ring face

Parameter	Range / arrangement
Wheel speed	30-80 m/s
Diameter removal	0.1-0.35 mm D
Dressing amount	5-30 µm
Dressing ratio	0.3-0.6
Dresser	Diamond rotary dresser
Coolant	Oil or emulsion



CBN grinding wheels and mounted tools



01 Inner bore
02 Inner track
03 Outer track
04 Lip
05 Ring face

Grinding areas: 01 ID, 02 IR, 03 OR, 04 lip, 05 ring face



Ceramic-core mounting



Steel-core mounting



Steel-quill mounting



Steel-head mounting

CBN honing stones for superfinishing

CBN honing stones can extend tool life compared with conventional stones, shorten the honing cycle and allow higher stock removal. Improved surface finish and consistent machining support lower scrap rates. The sulphur-free design is a specific feature of the presented programme.

The catalogue states five to ten times the life of conventional stones. The illustrated taper-roller bearing raceway example compares 1,500 with 15,000 processed parts. These values belong to the application example; results in another process depend on workpiece and tooling conditions.

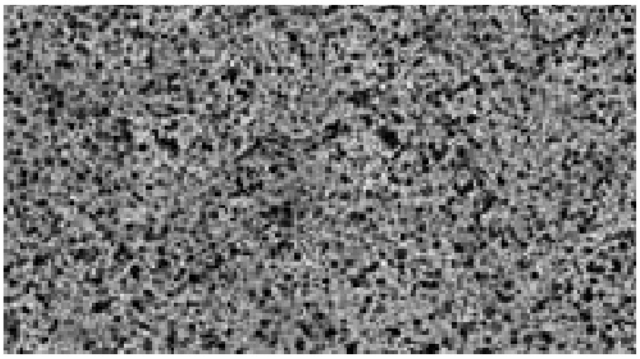
Superfinishing example	Value
Workpiece speed	100-200 rpm
Removal	5 µm
Surface roughness	Ra 0.06 µm
Stone specification	B2400K120VHWPN
Conventional stone	1,500 parts
EHWA CBN stone	15,000 parts



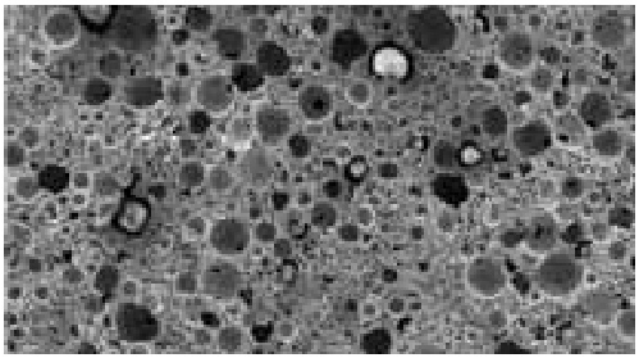
CBN honing stones for bearing superfinishing



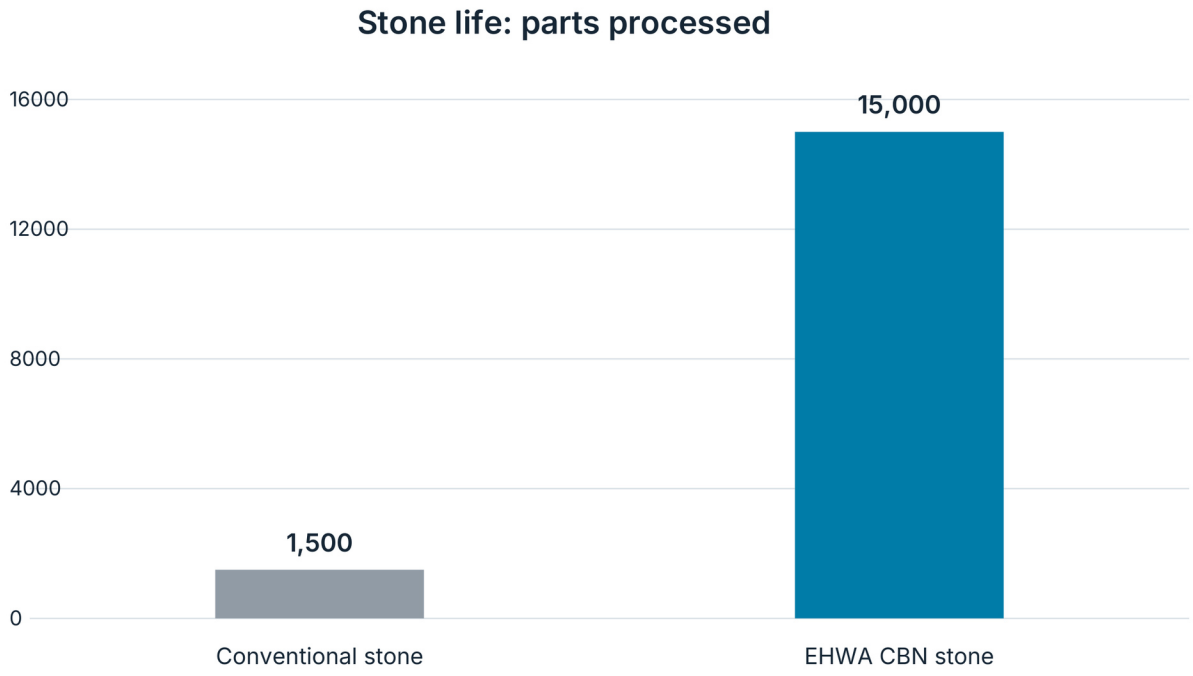
Honing stone in contact with a bearing ring



CBN honing stone: small, homogeneous pores



CBN honing stone: coarse pore structure



Superfinishing example: 1,500 versus 15,000 processed parts



Contact between CBN stone and taper-roller bearing raceway

Rotary dressers for bearing profiles

Diamond rotary dressers produce complex contours with high profile accuracy. Low dressing load supports dressing performance, while long tool life and short dressing cycles can improve economy. The illustrated dressers are intended for vitrified CBN grinding wheels. The three tool/workpiece pairs show water-pump bearings, ball bearings, and taper-roller and hub bearings.



Diamond rotary dresser



Diamond-coated profile area



Water-pump bearing: workpiece



Dresser for water-pump bearings



Ball bearing: workpiece



Dresser for ball bearings



Taper-roller and hub bearing: workpiece



Dresser for taper-roller and hub bearings

Cup dressers for internal cylindrical grinding

Cup dressers support accurate dressing and low grinding deviation after dressing. Long dressing intervals can reduce downtime. For the illustrated designs, the catalogue states 20,000-30,000 uses, depending on grinding-wheel size.

Diamond layer width affects dressing performance and dimensional stability. The comparison charts distinguish the designations 2.5W and 1W. Their scale has no stated unit and compares the illustrated variants. The application shows vitrified wheels with steel quills and steel heads.



Metal cup dressers



Diamond-coated cup edge



Metal cup dresser: examples



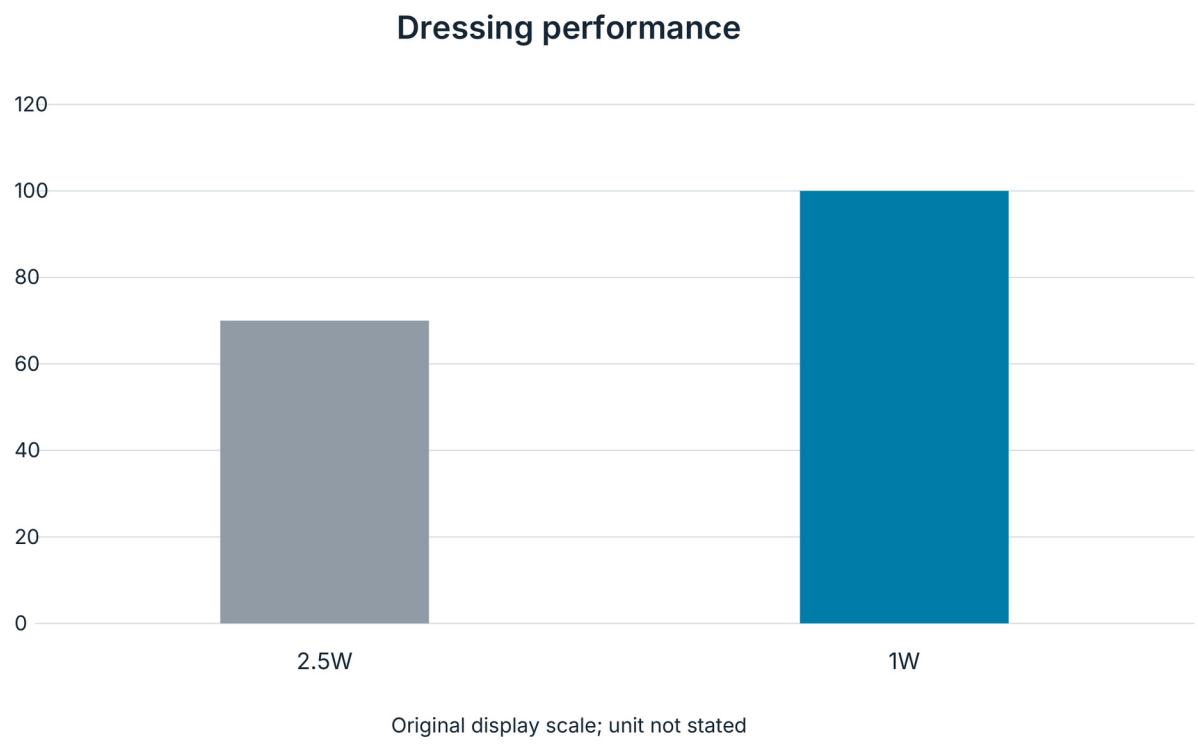
Rotary cup dresser: examples



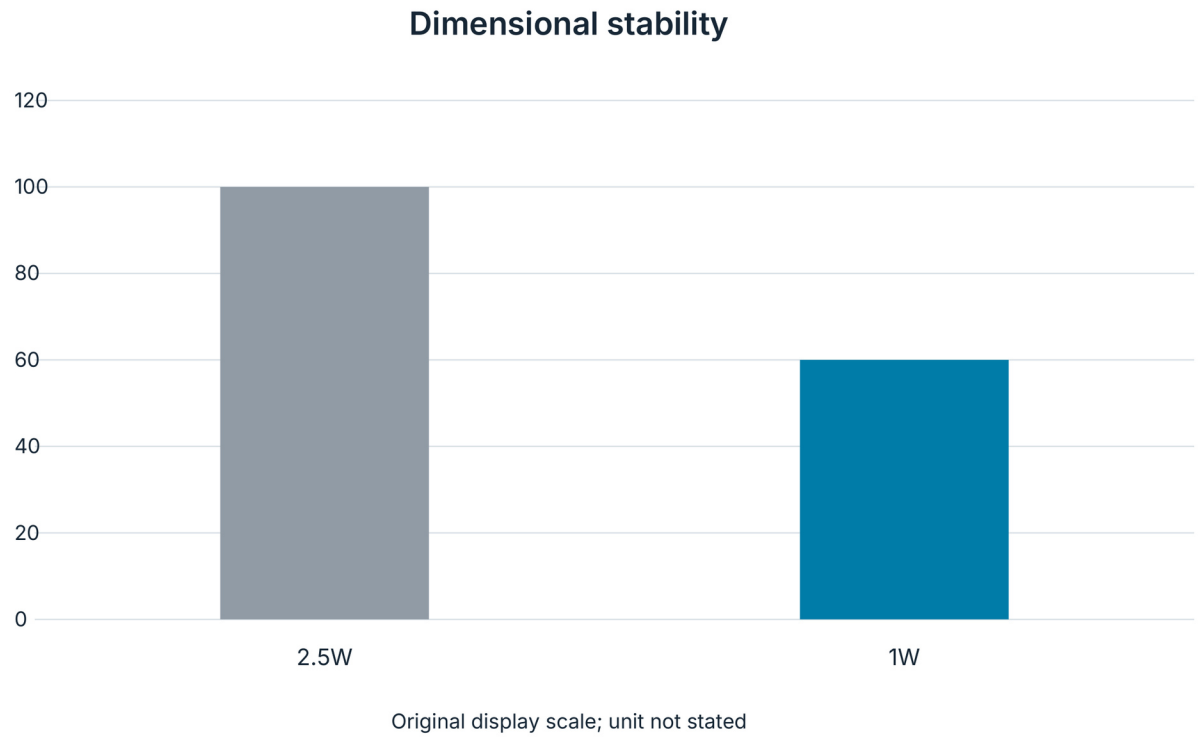
Vitrified wheel with steel quill



Vitrified wheel with steel head



Dressing performance at layer widths 2.5W and 1W



Dimensional-stability comparison at layer widths 2.5W and 1W

Face and double-disc grinding of bearing components

The tools machine end faces of bearing rings and rollers. Applications include needle-bearing and roller-bearing rollers, and inner and outer rings. Shorter cycle times support higher productivity, while long tool life can lower costs. Good surface finish remains a central quality objective. The illustrated tools show different sizes and designs for these tasks.



Tools for face and double-disc grinding



Grinding layer for bearing end faces



Ball bearings: ring end faces



Roller bearing: roller and ring end faces

Face grinding wheels for taper rollers

The illustrated wheels combine long tool life with high stock removal and good surface finish. This can reduce machining costs and increase productivity. The catalogue comparison shows relative life of 100% before improvement and 150% afterwards. It illustrates the presented development; absolute part counts and full test conditions are not stated.



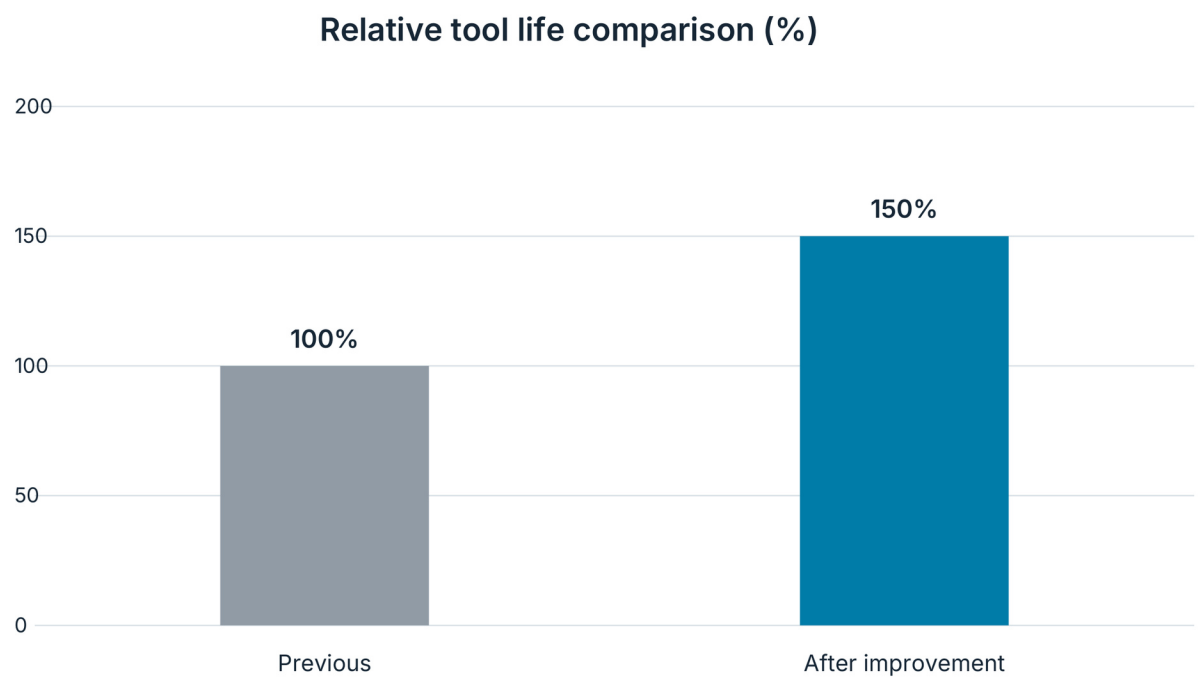
Face grinding wheel with taper-roller bearing



Taper-roller bearing: end-face machining



Taper-roller face grinding wheel designs



Tool-life comparison: previous 100%, improved 150%

Rotary dressers for linear guides

Linear guides consist of a guide block, rail and recirculating balls between them. They provide linear motion and are used, for example, in automotive manufacturing equipment. Rotary dressers profile CBN grinding wheels for the ball raceways in the block and rail.

The two profile drawings show different geometries and tolerances. Dimension, radius and angle values belong to the respective drawing; the contact diagrams distinguish the grinding wheel from the guide block or rail.



Rotary dresser for linear guides



Profiled diamond layer for linear guides

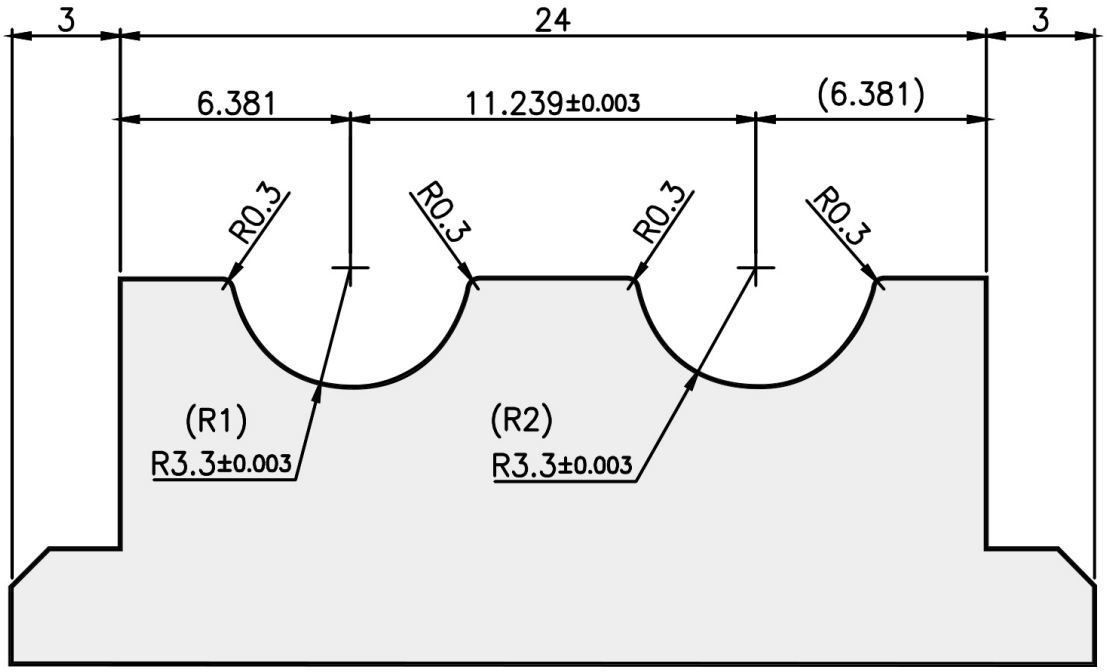


Dresser for the guide block



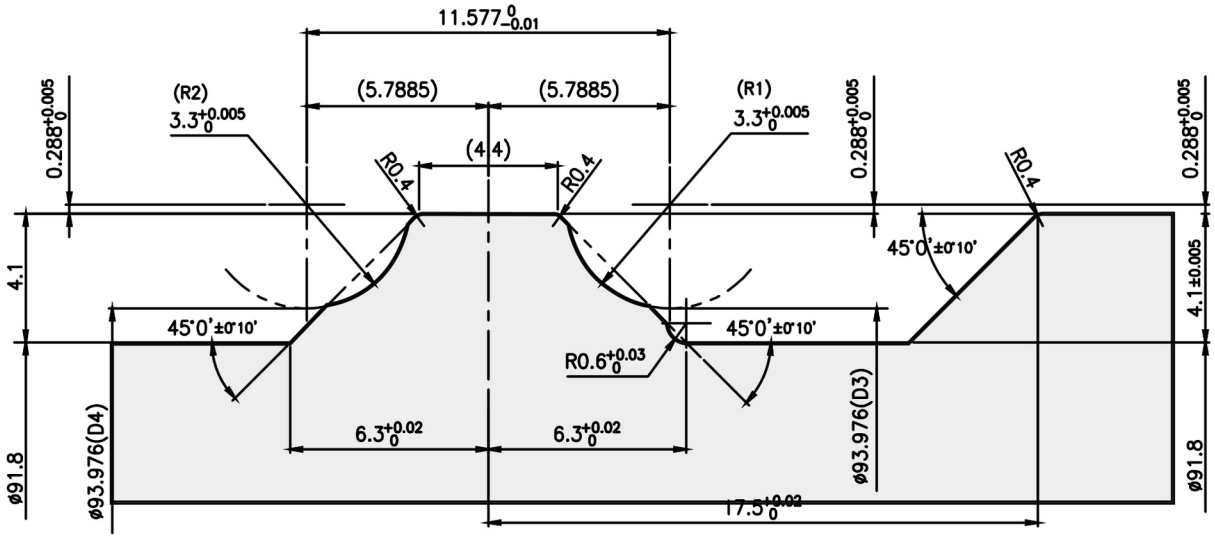
Dresser for the guide rail

Original dimensions and tolerances

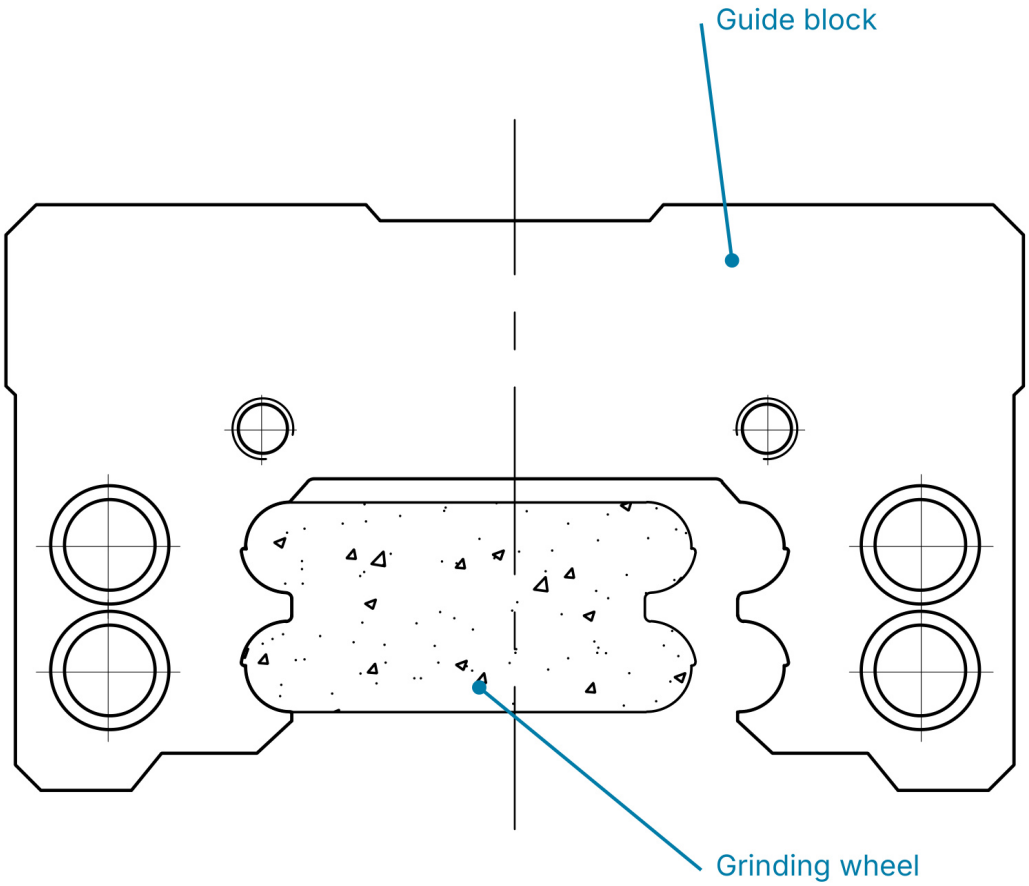


Guide-block profile: dimensions and tolerances

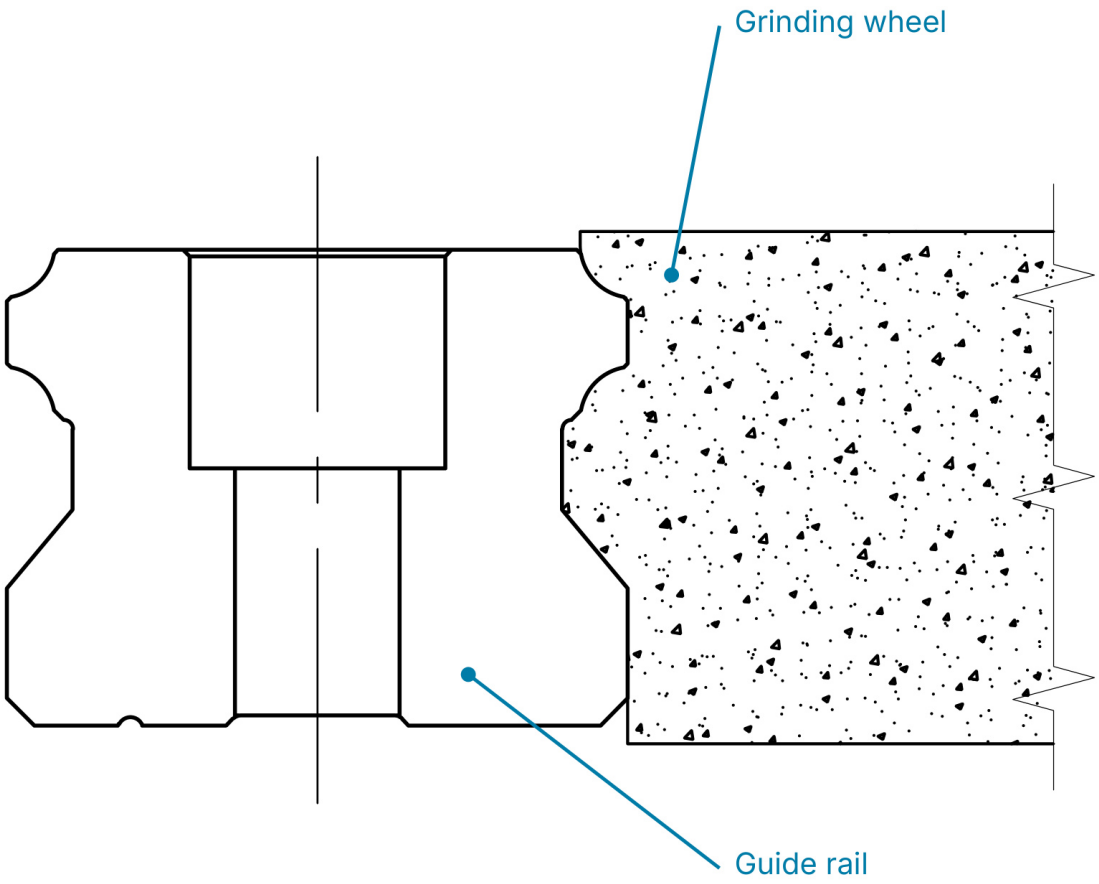
Original dimensions and tolerances



Rail profile: dimensions, radii and angle tolerances



Grinding wheel and guide block in profile contact



Grinding wheel and guide rail in profile contact

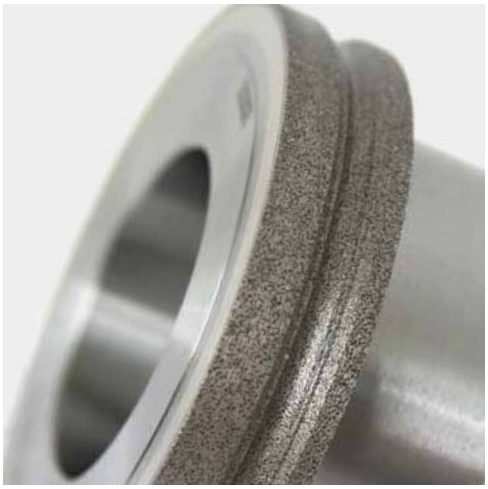
Rotary dressers for ball screws

A ball screw converts rotary motion into linear motion. The screw and nut form the main assemblies, with balls transmitting movement through raceway contact. The illustrated dressers combine high profile accuracy and long tool life with high diamond concentration.

The R-type drawing contains radii, reference dimensions and angle tolerances for the illustrated example. V1 and V2 are stated as 45° +0/−2°. This tolerance differs from the linear-guide angle tolerances and belongs to the respective profile.



Rotary dresser for ball screws

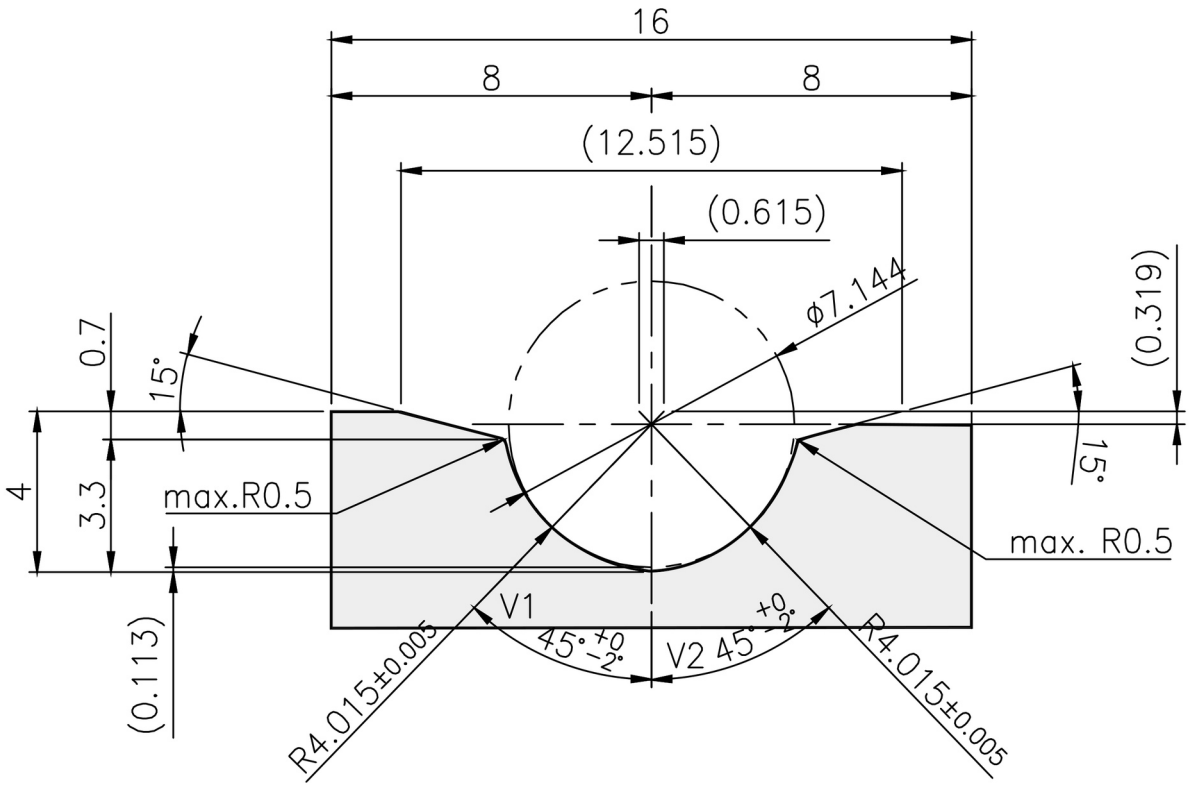


Diamond-coated raceway profile



Dresser for an R-type profile

Original dimensions and tolerances



R-type ball-screw profile: complete dimensioning

Diamond tools for glass and optics

Diamond tools machine the hard, brittle materials used in glass and optics. The programme covers automotive safety glass, architectural glass, home-appliance glass, crystal, spectacle lenses and other optical lenses. Wheels and mounted tools are designed for edge, hole and lens machining. The following applications distinguish their bonds and process stages.



Automotive glazing: windscreens and side windows



Diamond tools for automotive glass



Diamond tools for home-appliance glass



Automotive safety glass



Diamond tools for architectural glass



Diamond tools for optical lenses

Edge grinding of automotive and home-appliance glass

Metal-bond diamond tools with MB, MC and MG bond series are specified for automotive glass. The range runs from a softer bond through a standard design to a harder bond. The micrographs show the respective structures.

Home-appliance glass tools target good edge quality and low chipping rates. The example distinguishes the previous condition, a new EDM tool and a refurbished EDM tool. The illustrated chipping rates are 1.9%, 0.3% and 0.6%, respectively. The refurbished design also remains below 1% in this example; this describes the comparison rather than a universal scrap limit.

Application	Grit	Bond	Feature
Automotive glass	D107-D30	MB series	Softer
Automotive glass	D107-D30	MC series	Standard
Automotive glass	D107-D30	MG series	Harder



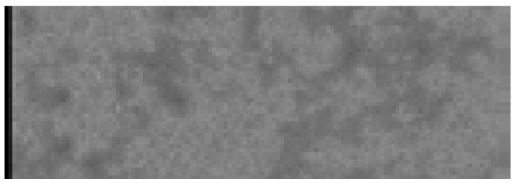
Metal-bond edge grinding tools for automotive and architectural glass



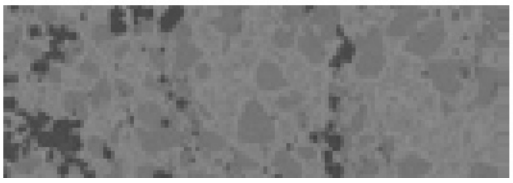
Metal-bond edge wheel: grinding layer



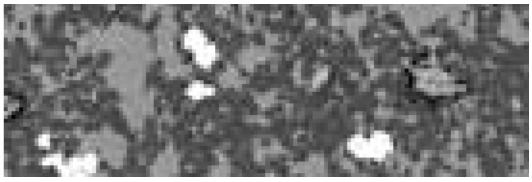
Wheels and mounted tools for automotive glass



MB bond: softer design



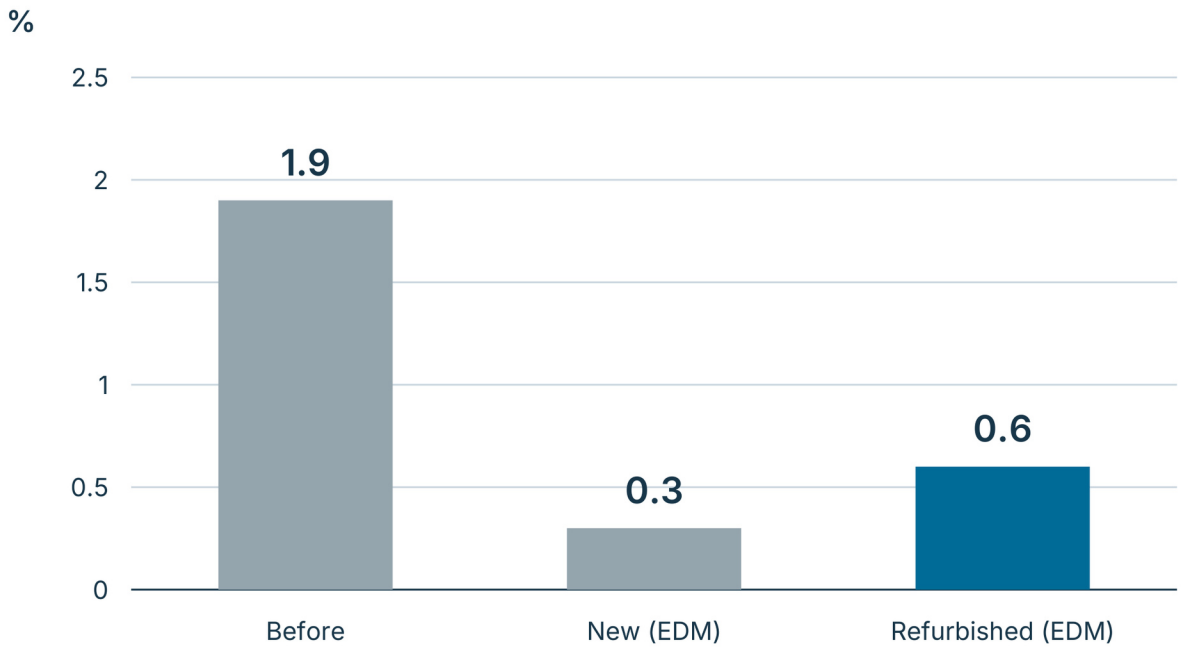
MC bond: standard design



MG bond: harder design



Edge grinding tools for home-appliance glass



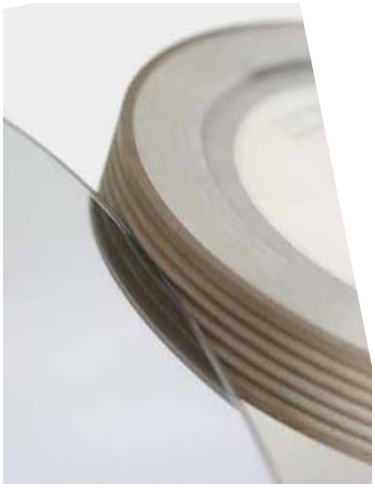
Chipping rate: 1.9% before, 0.3% new, 0.6% after refurbishment

Optical lenses: process stages and tool forms

The optical-lens programme covers roughing, finishing and polishing. The specification distinguishes the GL and PL application designations used in the catalogue. BSL designs are illustrated with slotted or continuous layers.

The comparison for CR39, PL and HI shows a comparison tool, EHWA #1 and EHWA #2. Results differ by material designation; the scale has no stated unit. Three further application images show side-mirror edge grinding, glass-hole grinding and home-appliance glass machining.

Process	Type	Grit
Roughing (GL)	MD-1A1	D251-D151
Roughing (PL)	MD-BSL	D301-D151
Finishing	MD-1EE6Y	D46-D30
Polishing	MD-1EE6Y	D2



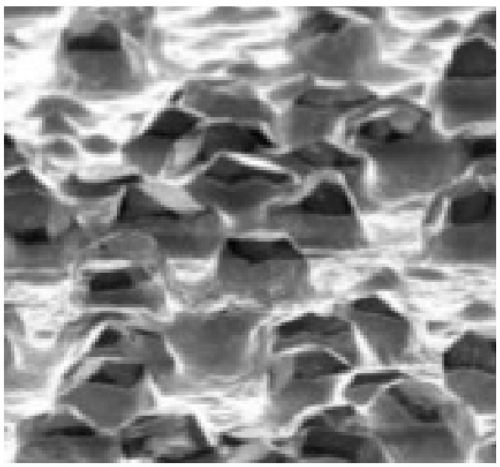
Metal-bond edge wheel for side mirrors



Metal-bond tool for glass-hole grinding



Metal-bond edge wheel for home-appliance glass



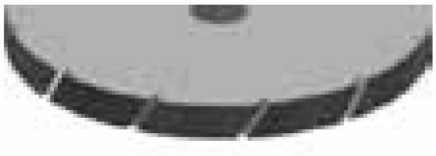
Surface structure of a lens grinding wheel



Optical-lens machining



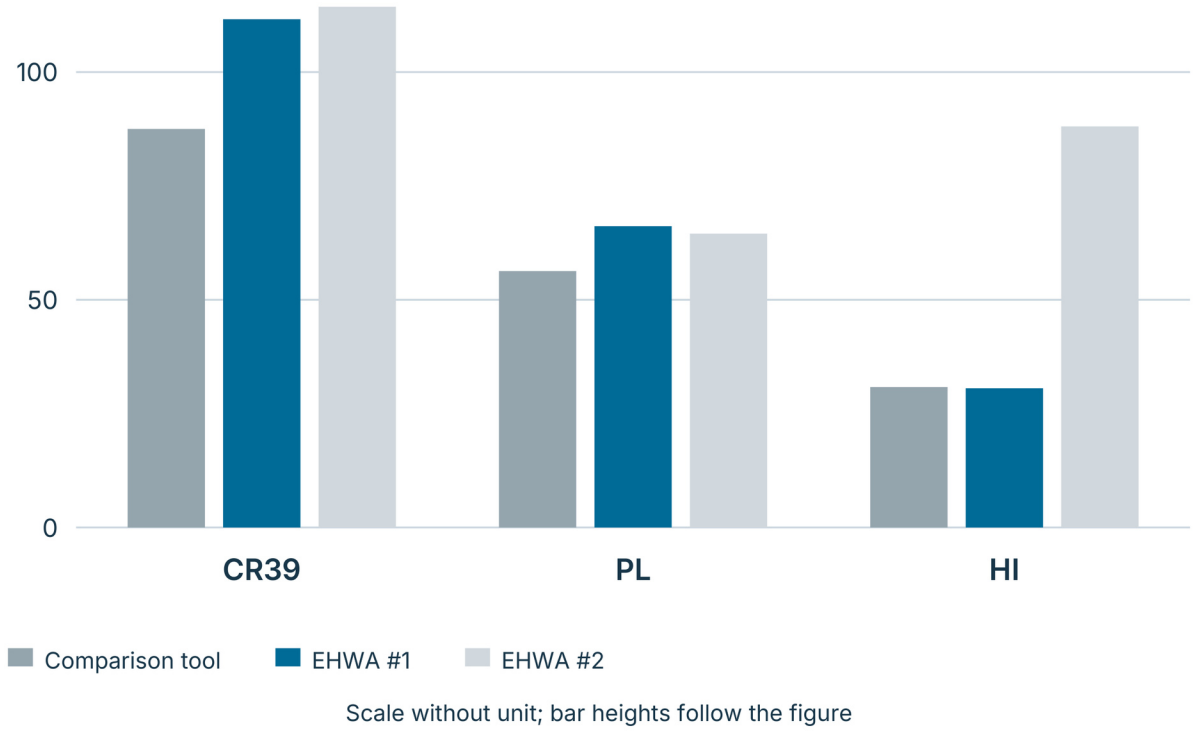
Grinding tools for optical lenses



EHWA #1: slotted layer



EHWA #2: continuous layer

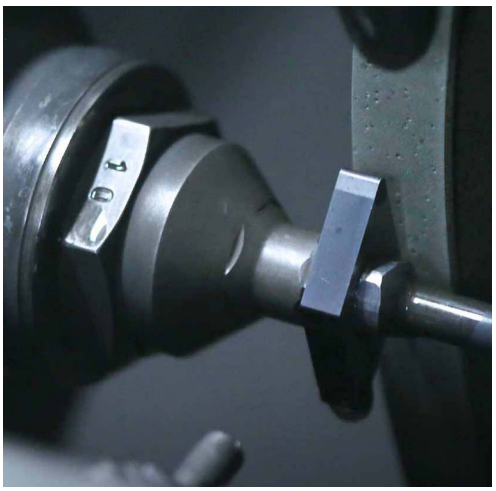


BSL grinding comparison for CR39, PL and HI

Grinding tools for cutting-tool manufacture

The programme supports manufacturing and regrinding of cutting tools made from high-speed steel, carbon steel, ceramics, carbide, PCD and PCBN. Abrasive and bond selection depends on the tool material and process. Tungsten-carbide-based tools are an important application for diamond grinding wheels.

Tool forms range from peripheral and face grinding wheels for inserts through wheel packs for rotating tools and microtools to wheels for tipped saws.



Peripheral grinding of a cutting insert



Peripheral wheels for cutting inserts



Ring wheel for top and bottom faces



Wheel for top and bottom faces



Grinding wheel for cutting-tool manufacture



Hybrid wheel pack for rotating tools



Precision wheel pack for micro rotating tools



Grinding wheels for tipped saws

Cutting inserts: periphery, top and bottom faces

EHWA provides grinding wheels for inserts made from carbide, ceramics, cermet, PCD and PCBN. Specifications consider cycle time and dressing intervals. The aim is consistent inserts with good surface finish and edges with minimal chipping.

In peripheral grinding, high feed rates support short cycles; small edge chips and long dressing intervals are further advantages. Top and bottom grinding targets short cycles, long dressing intervals and high dimensional stability. The bond matrix maps the tool materials to bond series. Its arrow describes increasing content without specifying a quantitative composition.

Operation	Machines named in the catalogue
Peripheral grinding	Agathon, Wendt, Waida, Ewamatic, Ewag
Top and bottom grinding	Stahli, Peter Wolters, Wendt WBM, Agathon T&B, Fujisanki

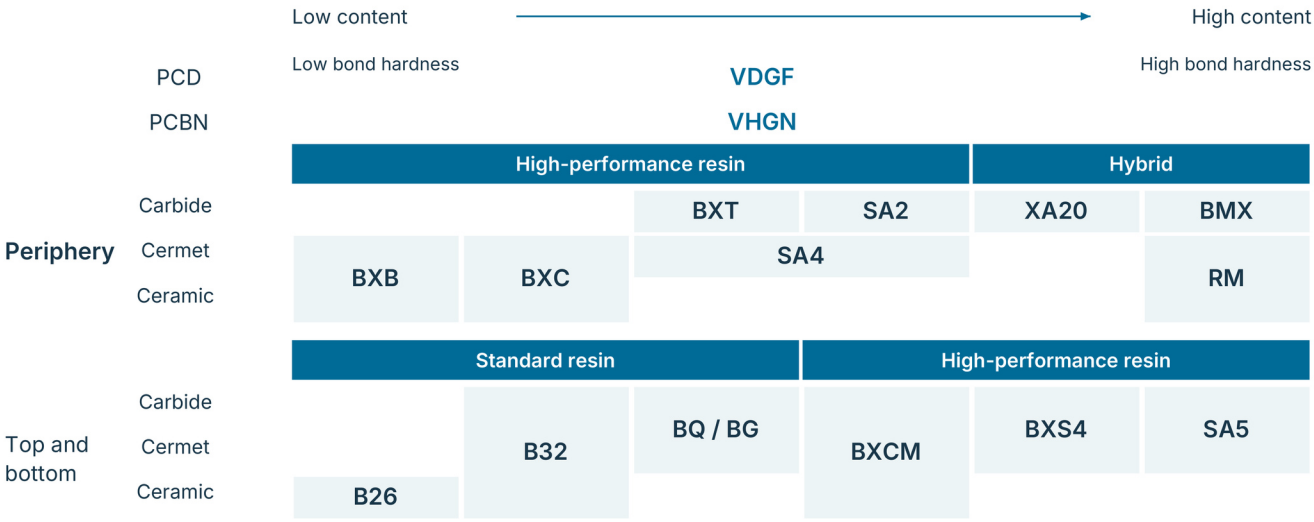


Peripheral wheel for cutting inserts



Top and bottom wheel for cutting inserts

Selection by material and grinding surface



Bond selection for PCD, PCBN, carbide, cermet and ceramics

Cutting inserts: three separate application examples

High-temperature polyimide bonds are used for peripheral grinding. Hybrid and soft-metal bonds extend the options for shorter cycles, small edge chips and stable dimensions. The following examples use different workpieces, machines and specifications.

In the carbide comparison, the hybrid bond achieves 30% longer life, 30% shorter cycle time and 30% longer dressing intervals than the high-temperature resin bond. In the PCBN example, chip size falls from 5 to 3 µm and cycle time decreases by 20%. In face grinding, tool life rises by 20% and the dressing interval by 30% compared with the reference tool. Each improvement belongs to its respective illustrated test.

Parameter	Periphery: carbide	Periphery: PCBN	Top and bottom: carbide
Machine	Wendt 715 WAC Quattro	Agathon	Wendt WBM221-Duo Lift
Workpiece	Carbide insert	PCBN insert	Various carbide inserts
Wheel speed	20 m/s	18 m/s	-
Typ	RD-11A2	VD-11A2	RD-2A2T
Specification	400D-39T-10W-6X-355.06H	400D-39T-15W-6X-355.06H; D6M120VHGN	501D-5X-40W; D126BXS4
Compared bonds	D46 high-temperature resin / D40 hybrid	-	-
Coolant	-	-	Oil



Cutting insert during peripheral grinding

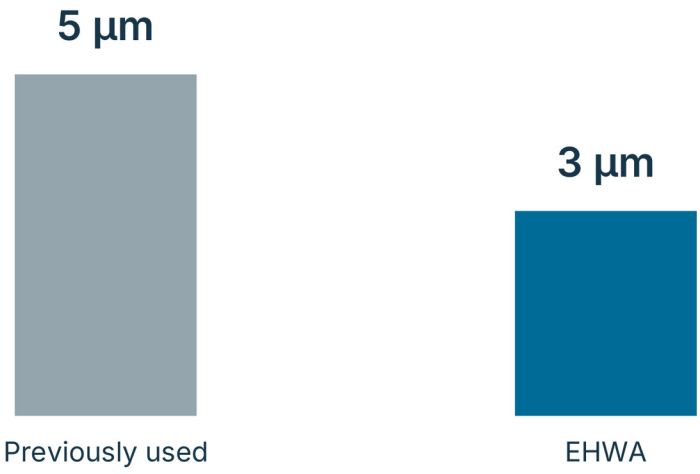


Cutting inserts in different tool materials

+30 %	-30 %	+30 %
Tool life	Cycle time	Dressing interval

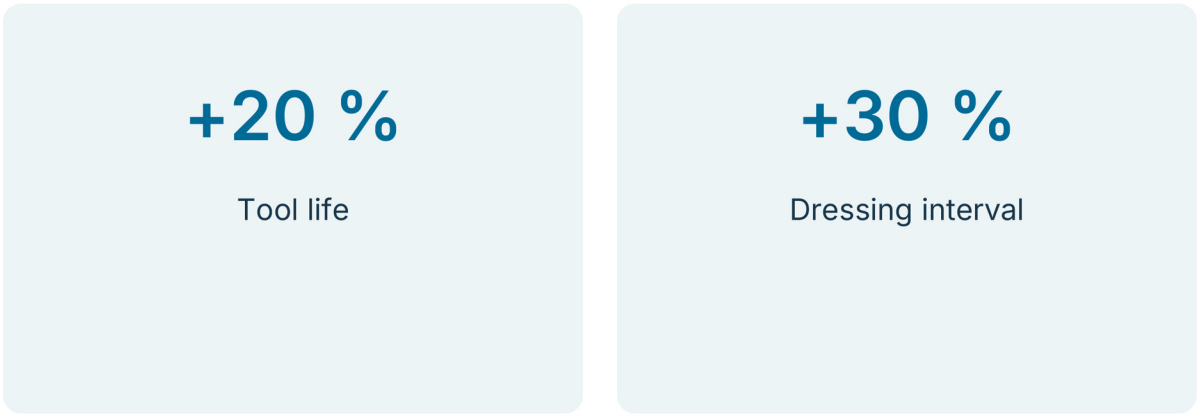
High-temperature resin bond / Hybrid bond

Carbide example: tool life +30%, cycle time −30%, dressing interval +30%



Cycle time −20%

PCBN example: chip size 5 µm to 3 µm, cycle time −20%



Comparison tool / EHWA

Face grinding example: tool life +20%, dressing interval +30%

Bonds for rotating tools

Polyimide bonds have higher thermal stability than the phenolic and epoxy bonds compared here. In suitable processes, this supports grinding performance and tool life. Hybrid bonds combine polyimide and metal components, bringing together grinding performance and elasticity with wear resistance and thermal stability.

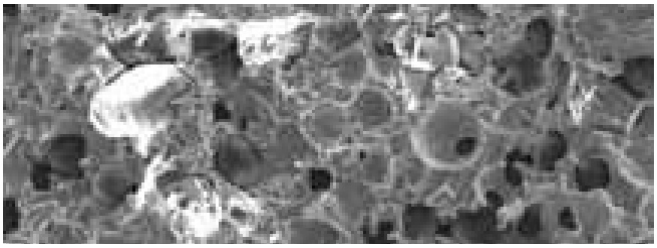
The pore structure of a porous hybrid bond helps diamond protrusion and coolant access. Lower grinding load can allow a higher permissible feed rate and shorter cycle time. The overview compares phenolic, standard polyimide, high-performance polyimide and hybrid bonds and their respective features.



Hybrid grinding wheel pack



Precision grinding wheel pack



Porous hybrid bond: microstructure

Phenolic bond	Standard polyimide bond **BX**	High-performance polyimide bond **PA**	Hybrid bond **BMX**
• Free cutting • Good elasticity	• Thermal stability • Edge stability	• High thermal stability • Excellent surface finish	• High feed, short cycles • Low grinding load

Bond families and their process features

Drills, endmills, microtools, taps and rotary burrs

The drill/endmill example compares spindle load for a hybrid bond and a new porous hybrid bond over the number of ground parts. In the illustrated trend, load increases less strongly with the porous design. Test conditions are listed in the table.

For precision tools and microtools, priorities include productivity at economical tooling cost, good surface and cutting-edge quality, and stable edges. The two microtool images are marked ×200 and ×50.

For taps, the illustration shows a VB-1A1 grinding wheel and an R/D-RR dresser. Rotary burrs are machined with MD-1V1 and the ME4 bond series.

Drill/endmill example	Test condition
Machine	ANCA FX7 (19 kW)
Material / tool	Carbide Ø12-50 mm (LOF), 2 flutes (K10)
Wheel speed	18 m/s
Feed rate	120 mm/min
Depth of cut	2.4 mm

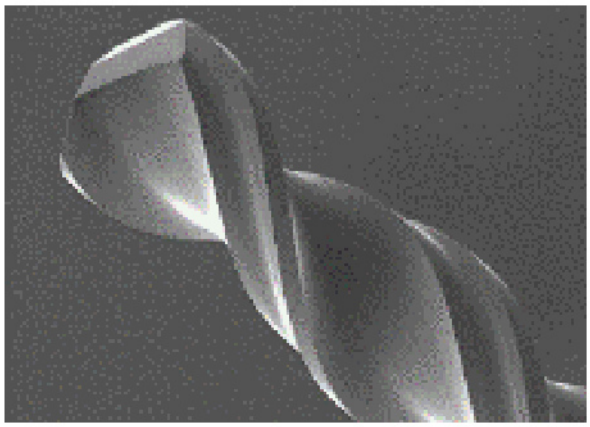
Application	Type / specification	Bond
Tap: grinding	VB-1A1	-
Tap: dressing	R/D-RR	-
Rotary burr	MD-1V1; 110D-160D / 30V-60V	ME4 series



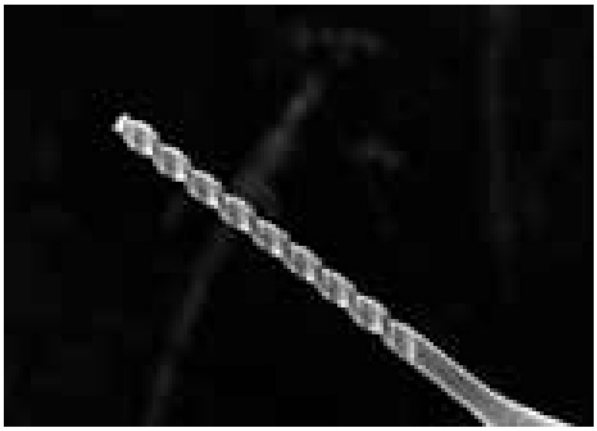
Flute grinding of a rotating tool



Grinding test on a tool grinding machine



Microtool: magnification ×200



Microtool: magnification ×50



Grinding wheel for taps



Profiled layer of the tap grinding wheel



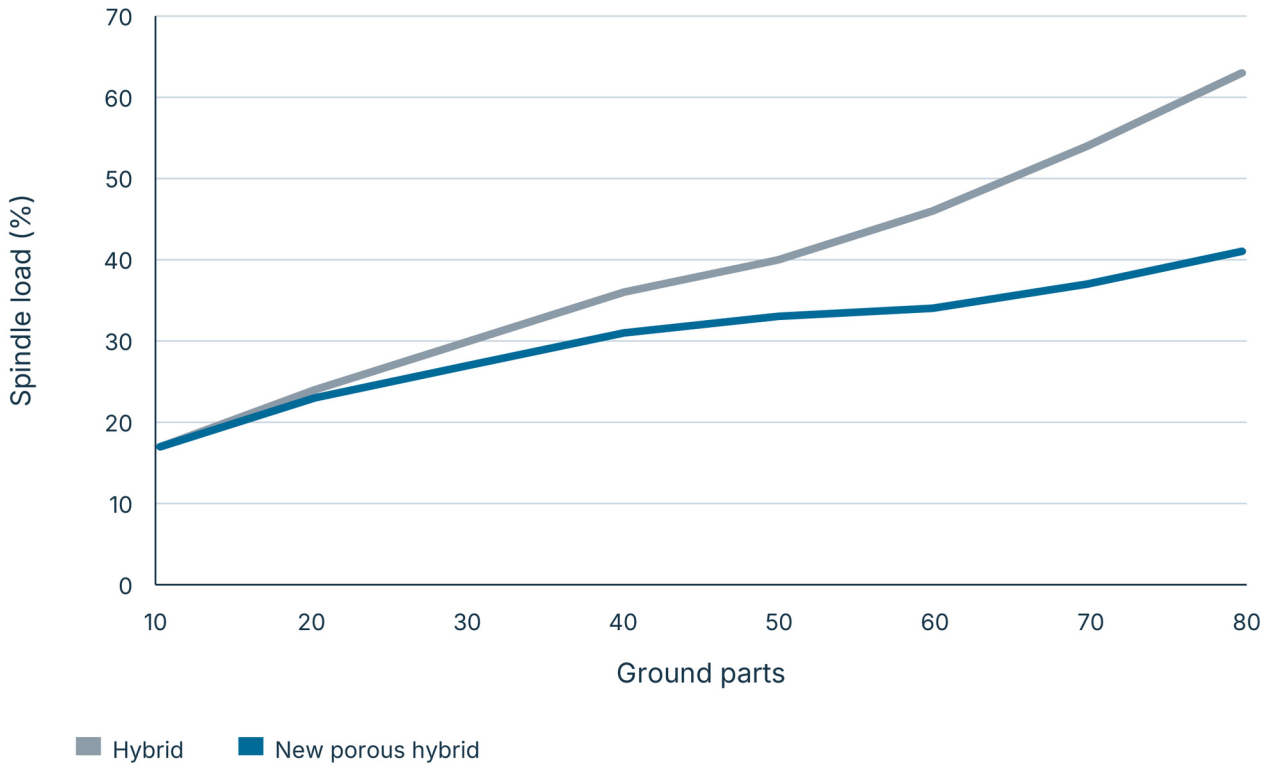
Rotary dresser for tap profiles



Grinding wheel for rotary burrs



Rotary burrs: workpieces



Spindle load versus ground parts: hybrid and new porous hybrid bond

Circular saws, hob cutters and broaches

For carbide-tipped circular saws, the programme distinguishes flank, top and face grinding. Long tool life, short cycles, good surface finish and high dimensional stability support saw-tooth manufacture and resharpening. Image codes 01, 02 and 03 map the machining surfaces to their corresponding wheels.

For profile grinding of HSS saw blades, RB-14F1/S with CBN107 is specified. The dimensional designations D, x1, x2 and U are retained in the selection below. Application images also show grinding of hob cutters and broaches.

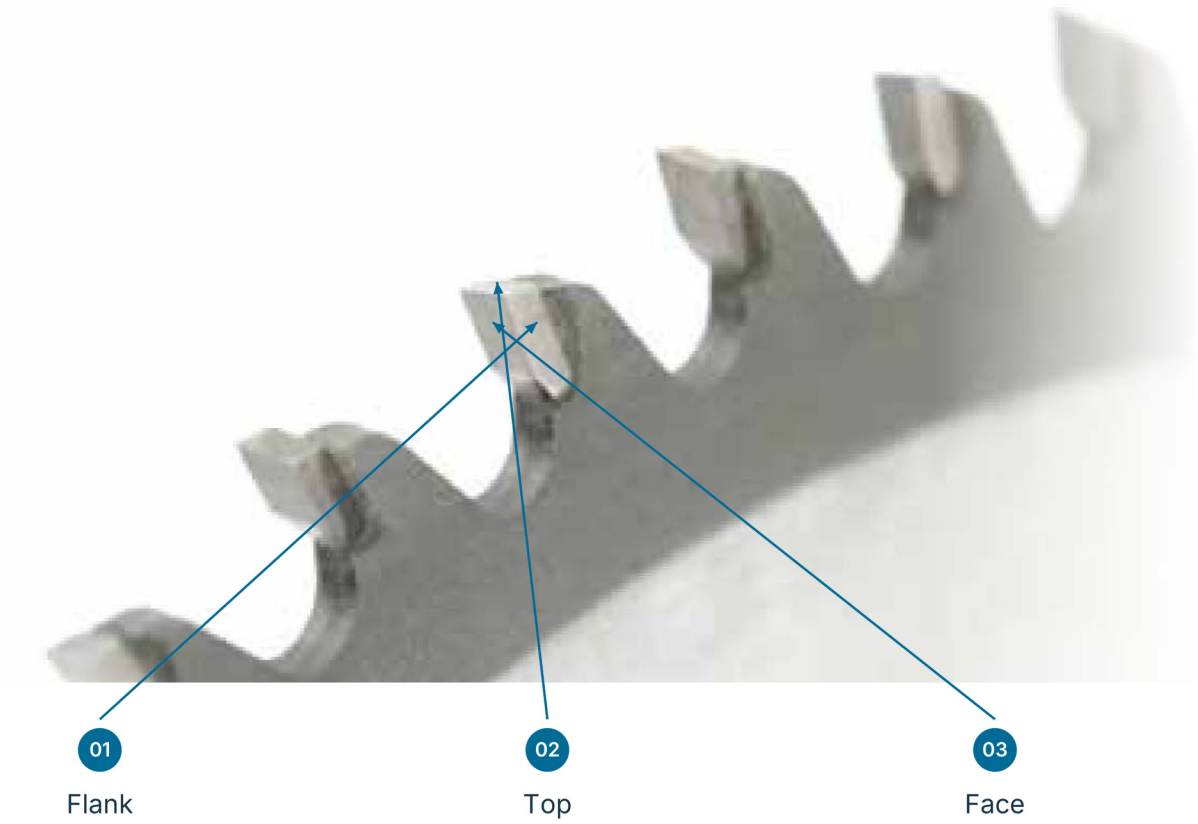
Type	D	x1	x2	U	Bond
RB-14F1/S	150	6	8	1, 1.3, 1.6, 2, 2.5	Hardened resin bond
RB-14F1/S	150	6	10	3	Hardened resin bond
RB-14F1/S	150	8	12.5	3.5	Hardened resin bond
RB-14F1/S	150	8	12.5	4	Hardened resin bond
RB-14F1/S	150	10	15	5, 6	Hardened resin bond
RB-14F1/S	200	6	8	1, 1.3, 1.6, 2, 2.5	Hardened resin bond
RB-14F1/S	200	6	10	3	Hardened resin bond
RB-14F1/S	200	8	12.5	3.5	Hardened resin bond
RB-14F1/S	200	8	12.5	4	Hardened resin bond
RB-14F1/S	200	10	15	5, 6	Hardened resin bond



Grinding wheels for tipped circular saws



Saw-tooth grinding wheel: grinding layer



Saw tooth surfaces: 01 flank, 02 top, 03 face



01 Flank grinding: wheel



02 Top grinding: wheel



03 Face grinding: wheel



Profile grinding wheel for HSS saw blades



Profile grinding of saw blades



Grinding a hob cutter



Grinding a broach

Tools for medical components

Superabrasive grinding tools support manufacture of precision medical components. The programme covers wheels and dressers for artificial-knee components, medical-wire grinding wheels and ECG tools for needles.

For artificial-knee components, designs include vitrified wheels with CFRP, aluminium-alloy or steel/aluminium bodies, and electroplated steel/aluminium designs. The following sections show tooling variants, specifications and machining benefits.



Knee joint: component-manufacturing application context



Vitrified wheel with CFRP body



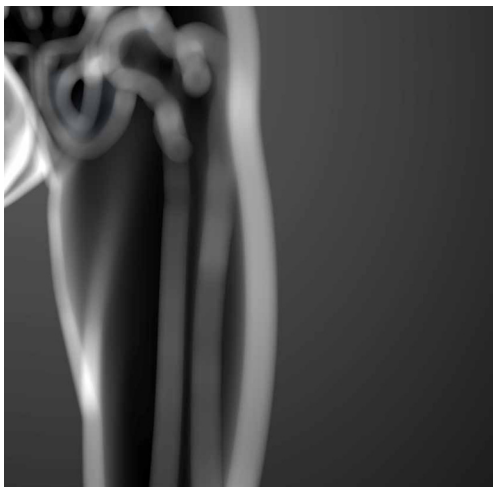
Vitrified wheel with aluminium-alloy body



Vitrified wheel with steel/aluminium body



Electroplated wheel with steel/aluminium body



Grinding tools for medical-component manufacture



Rotary dresser for artificial-knee components



Grinding wheels for medical wire



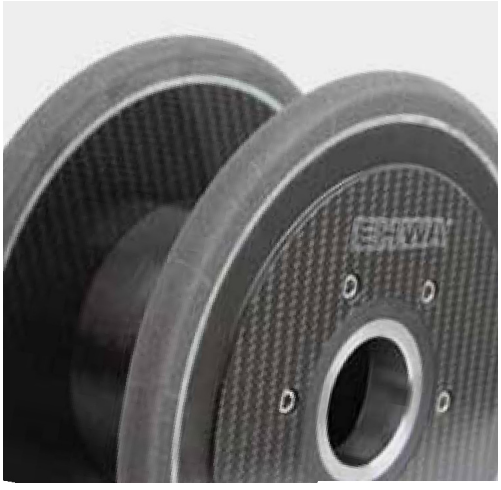
ECG wheel for needles made from SUS/SUS304

Grinding and dressing artificial-knee components

Tool forms are designed for grinding artificial-knee components. The described process features include high stock removal, good balance for high-speed operation, long dressing intervals and wheel life, and good grinding performance and surface quality. Profiled diamond dressers support grinding-wheel shaping.

The four body/bond variants are shown separately. Standard size and specification codes are listed in the table; the actual profile contour depends on the component being machined.

Tool	Size designation	Specification
Vitrified CBN	VB-14F1, 250D-120T-20X-16U-8R-51H	B252L150VBW
Vitrified CBN	VB-14F1, 240D-120T-20X-18U-10R-51H	B252L150VBW
Diamond rotary dresser	ROTARY-RP 98D-25T-10R-25H	-
Diamond rotary dresser	ROTARY-IP1, 175D-2R-22T-52H	-
Electroplated CBN	EB-1FF1, 200D-120T-20U-12R-51H	B427
Electroplated CBN	EB-1FF1, 200D-120T-12U-6R-51H	B252, B301
Electroplated CBN	EB-1FF1, 160.45D-16T-8R-20H B427	B427



Vitrified grinding wheels with CFRP bodies


Artificial-knee component: machining application



CFRP body: vitrified design



Aluminium-alloy body: vitrified design



Steel/aluminium body: vitrified design



Steel/aluminium body: electroplated design



Diamond profile of a dresser for artificial-knee components



Rotary dressers: examples



Profile area of the rotary dresser

Grinding wheels for medical wire

The first illustrated wheel design operates with low pressure and free cutting. Good wire surface quality, long wheel life and good balance support economical machining.

The second design provides a straight working face with a sharp edge. Low cutting force and a free-cutting layer support wire surface quality. The two workpiece images show coiled and straight wire.



Grinding wheels for medical wire



Wire grinding wheel layer



Wire machining: first wheel design



Medical wire: coiled workpiece



Wire machining: second wheel design



Medical wire: straight workpiece

Electrochemical grinding of medical needles

The metal-bond ECG wheels are intended for medical needles made from SUS/SUS304. ECG combines electrochemical removal with abrasive machining. The design supports low cost per part, high stock removal, consistent grinding performance and good, burr-free surfaces.

The comparison images show a needle surface with burrs after conventional machining and a burr-free example using the EHWA ECG wheel. The catalogue also uses the term “electrolytic polishing wheel”; the tooling and process are identified here as electrochemical grinding (ECG).

Type	Specification
MB-1A1	204D-3T-15T
MB-3A1	204D-1U-2.9U



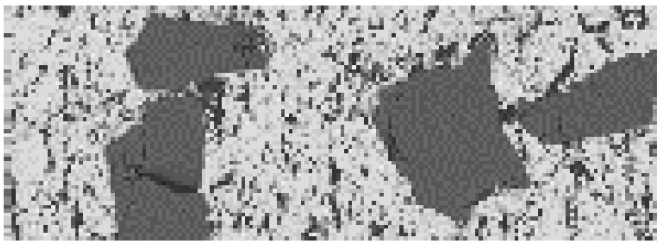
Electrochemical grinding wheel for medical needles



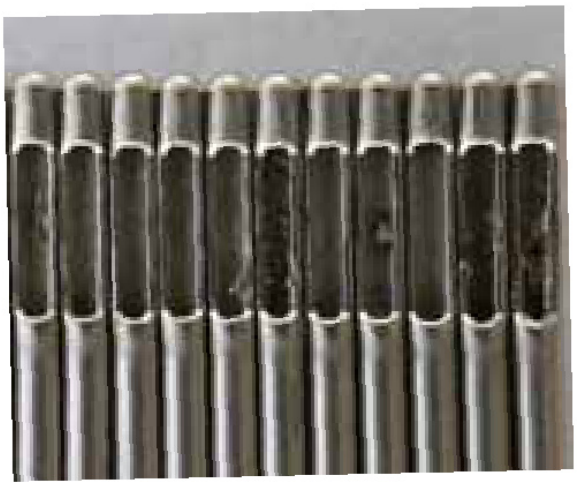
Needle workpiece made from SUS/SUS304



Medical needle: manufacturing context



Bond microstructure of the ECG grinding wheel



Surface comparison: conventional wheel, visible burr



Surface comparison: EHWA ECG wheel, burr-free example

Rotary dressers for turbine blades

The dressers are intended for turbine blades in aircraft engines, power-generation turbines and marine turbines. Roll contours are designed for the workpiece. Long tool life and high tool precision support stable dressing performance in creep-feed grinding.

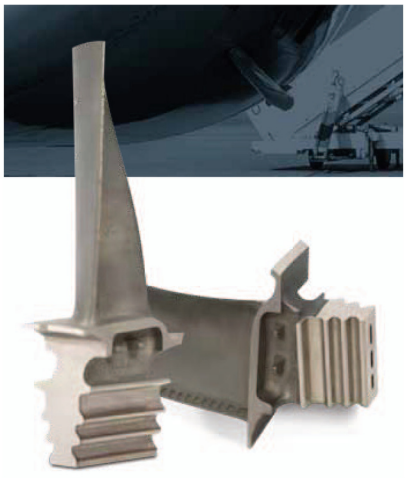
The four contact arrangements show different blade and counterprofile positions. They complement the tool and blade photographs with the corresponding form and contact geometry.



Aircraft engine: application context



Rotary dresser for turbine blades



Turbine blades and profiled blade roots



Dresser and turbine blade: profile example

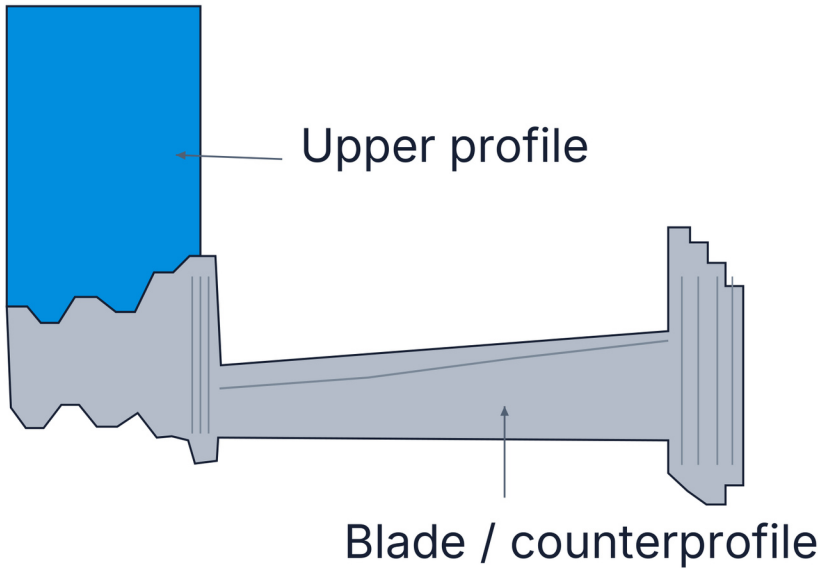


Diamond profile of the turbine-blade dresser



Aircraft engine

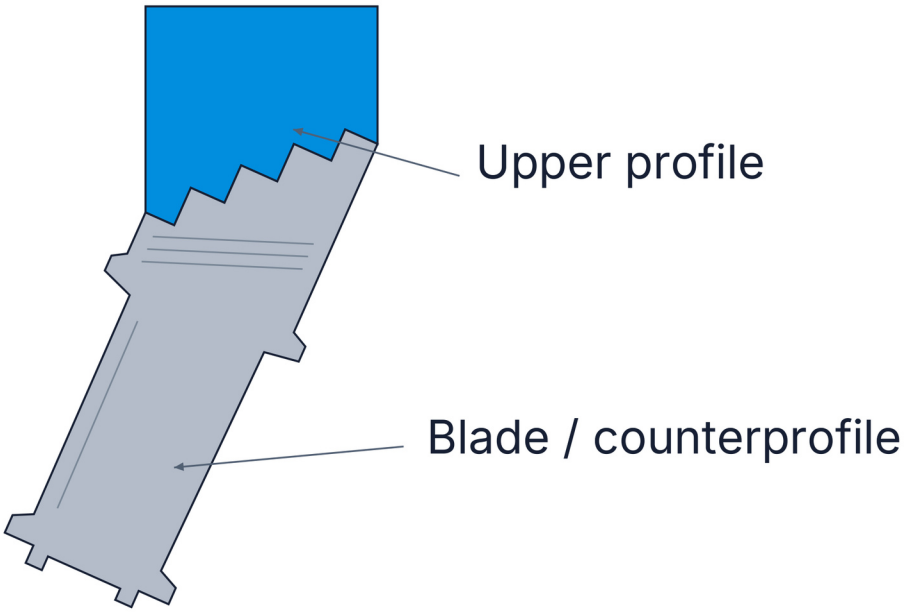
Horizontal profile contact



Schematic illustration

Profile contact 1: turbine-blade machining

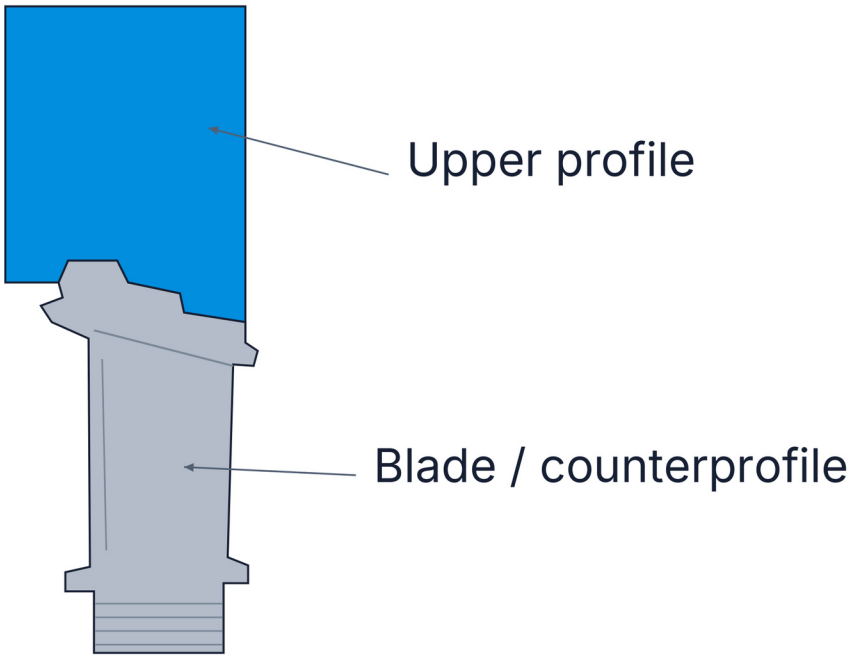
Inclined profile contact



Schematic illustration

Profile contact 2: turbine-blade machining

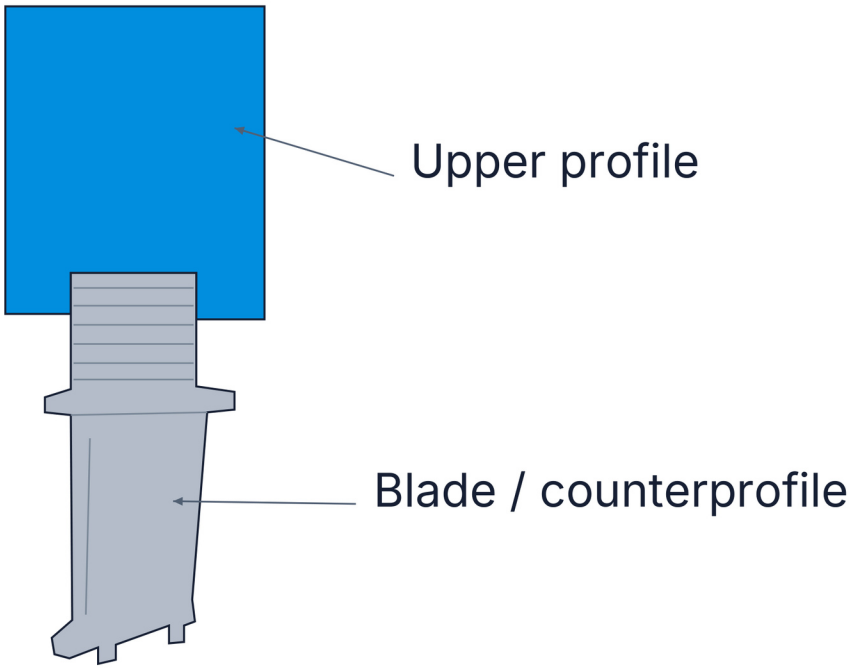
Asymmetric profile contact



Schematic illustration

Profile contact 3: turbine-blade machining

Central stepped contact



Schematic illustration

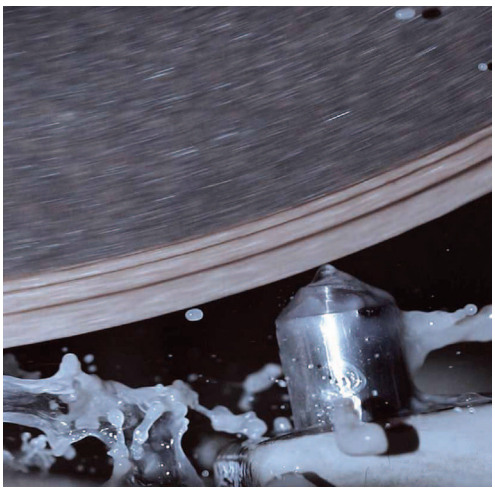
Profile contact 4: turbine-blade machining

Stationary diamond dressers: materials and types

Stationary diamond dressers machine conventional abrasive wheels. Options include single-point, forming, multi-point and impregnated dressers. Natural, mono and CVD diamonds provide different starting forms for tool design. CVD stands for chemical vapour deposition.

Mono and CVD diamonds are presented as alternatives with comparable diamond properties for dressing. Suitability is assessed against the profile, cutting-point arrangement and loading; this does not imply identical life for all diamond materials.

Diamond material	Mapped dresser types
Natural diamond	SDD, FDD, MDD, IDD
Mono diamond	SDD, FDD, MDD
CVD diamond	SDD, FDD, MDD



Stationary diamond dressing with coolant



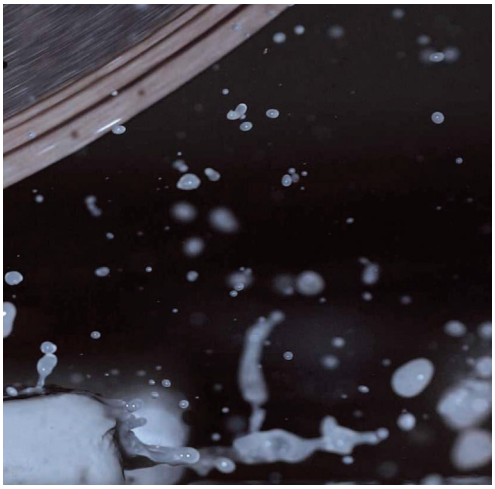
Natural diamond for dressing tools



Mono diamond for dressing tools



CVD diamond for dressing tools



Dressing a conventional abrasive wheel



SDD: single-point diamond dressers



FDD: forming diamond dressers



MDD: multi-point diamond dressers



IDD: impregnated diamond dressers

Selecting dressers by wheel shape and profile

Wheel shape determines the suitable dresser type. The six illustrations distinguish straight, tapered, convex, concave, angled and multi-angled wheels. The selection table adds the tasks and size designations of the four dresser groups.

Single-point dressers are classified by carat size; forming dressers distinguish angle and radius forms. Multi-point dressers are selected by the number and arrangement of diamond rods. Impregnated dressers are intended for large, wide wheels, surface grinding and centreless grinding.

Wheel shape	Dresser
Straight	SDD, MDD, IDD
Tapered	SDD, MDD, IDD
Convex	SDD, FDD, MDD
Concave	SDD, MDD, IDD
Angled	FDD, MDD
Multi-angled	FDD, MDD

Type	Applications	Selection feature
SDD	Straight and simple profiles; thread and gear grinding	Carat range 1/30-1.5 CT
FDD	Simple and complex profiles; thread and gear grinding	Angle/radius form: roof, chisel, cone
MDD	Straight shapes and accurate complex profiles; particularly angular profiles	Diamond rods: 2-10
IDD	Large and wide wheels; surface and centreless grinding	Grit #18-#140



Stationary dressers using natural and synthetic diamond



Conventional abrasive wheel in a machining process



Straight wheel shape: SDD, MDD, IDD



Tapered wheel shape: SDD, MDD, IDD



Convex wheel shape: SDD, FDD, MDD



Concave wheel shape: SDD, MDD, IDD



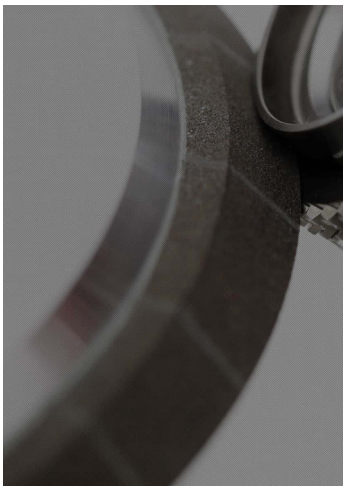
Angled wheel shape: FDD, MDD



Multi-angled wheel shape: FDD, MDD

Bonds for superabrasive grinding tools

The bond holds the abrasive grains and influences cutting behaviour, profile stability, coolant access and tool life. The following product sections describe bond families and their applications separately.



Superabrasive grinding wheel: bond and grinding layer

Product families and bond systems

The six product groups combine different bond systems and dressing methods. Resin, metal, vitrified and electroplated bonds are selected according to tool material, contour and operating conditions. Rotary and stationary diamond dressers complement the grinding wheels for controlled shaping and restoring cutting ability.



Grinding programme: tool forms and bonds



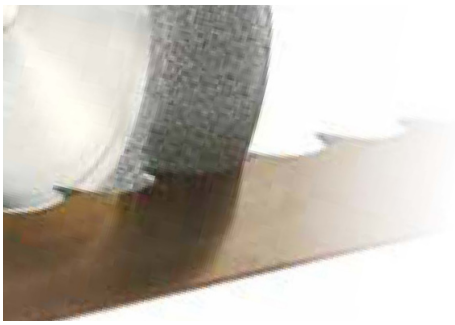
Resin-bond grinding wheel



Metal-bond grinding wheels



Vitrified grinding wheel



Electroplated grinding wheel



Diamond rotary dressers



Stationary diamond dresser

Resin-bond diamond and CBN grinding wheels

Increasing use of difficult-to-grind materials and alloys in automotive and machinery industries drove development of diamond and CBN tools. Resin-bond wheels combine these abrasives with inorganic fillers and resins such as phenolic resin or polyimide; curing forms the bond.

Applications include surface, external cylindrical, internal cylindrical and centreless grinding, grooving and creep-feed grinding. Depending on abrasive and specification, materials include superalloys, cermet, ceramics, glass, ferrite, high-speed steel and other tooling materials.

Diamond designs support fast cutting with favourable thermal behaviour on carbide-tipped saws, cutters and reamers. Further tasks include precision grinding of carbide dies, rolls and wear parts, ceramic finishing, and machining of tungsten-carbide and ceramic thermal-spray coatings. CBN designs are intended for high-speed, tool and die steels and the catalogue materials with hardness above HRC 50; the mapping depends on material and heat treatment.

EHWA has been developing the programme through research and manufacturing experience since 1975. It includes cylindrical, creep-feed, saw and insert grinding wheels for series production with consistent surface finish. Wet or dry operation is designed for the specification. The service offering includes application-appropriate quality, economical tooling selection, coordinated delivery times and support.



Resin-bond wheel during tool grinding



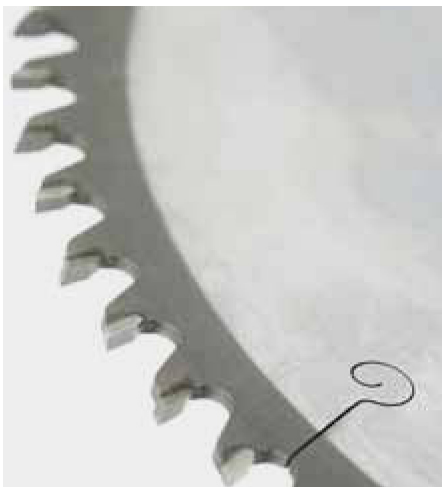
Resin-bond wheels for cutting inserts



Cutting inserts: application examples



Resin-bond wheels for tipped circular saws



Tipped circular saw blade



Grinding wheels for microtools



Top and bottom grinding wheels for inserts



Resin-bond grinding tools: examples

Metal-bond diamond grinding tools

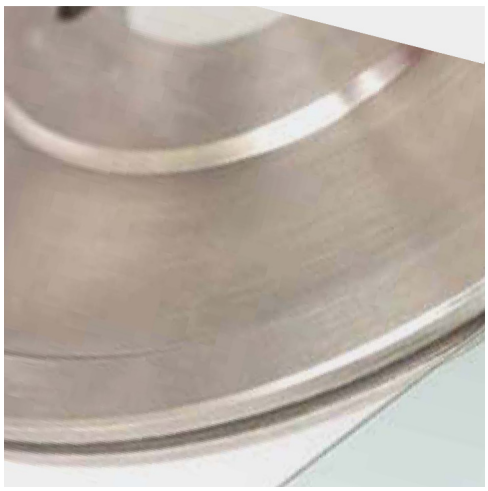
Glass products combine optical function, design and diverse shapes. Metal-bond diamond tools enable grinding and shaping of these hard, brittle materials, including automotive glass, architectural glass and spectacle lenses.

Further applications include grinding and sharpening carbide-tipped saws and machining ferrite, ceramics, tungsten carbide, automotive parts, quartz and stone. The images show automotive edge grinding tools, lens tools, honing stones and mounted tools.

In the development history documented by the catalogue, EHWA manufactured edge wheels for automotive glass and 14-33 inch cathode-ray tubes from the late 1970s. The programme expanded to display glass in the early 1990s, followed by electrolytically assisted grinding tools. Continued metal-bond tool development addresses the requirements of different customer applications.



Metal-bond diamond wheels: grinding layer and body



Glass edge grinding wheel: layer



Metal-bond grinding tools for automotive glass



Metal-bond grinding tools for lenses



Metal-bond honing stones and honing-tool forms



Mounted metal-bond tools

Vitrified diamond and CBN grinding wheels

Automated grinding processes need durable, form-stable tools with reliable cutting behaviour. Vitrified bonds provide an adaptable system of grain retention, pore structure and dressability. Free cutting, long tool life and high productivity can reduce process intervention. Self-sharpening behaviour complements controlled dressing; runout and profile are still established for the application.

From the late 1980s, EHWA developed vitrified CBN wheels for automotive components such as constant-velocity joints. The programme expanded to precision machine parts, bearings, gears, tools and dies, semiconductors, ceramics and cermet, particularly PCD/PCBN cutting tools.

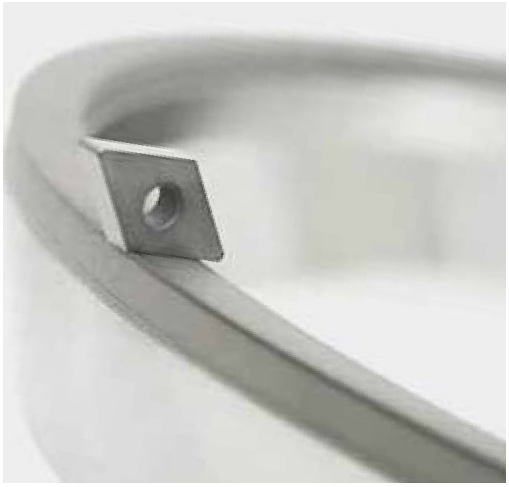
The images show peripheral wheels for PCD/PCBN inserts, injection-nozzle bore grinding tools, bearing tools and honing stones, and crankshaft wheels. Continued development addresses process performance and the requirements of these applications.



Vitrified wheel and camshaft



Vitrified wheels for PCD/PCBN inserts



PCD/PCBN insert in grinding contact



Tools for injection-nozzle bores



Grinding tools and honing stones for bearings



CBN grinding wheels for crankshafts



Crankshaft and CBN wheel

Electroplated diamond and CBN tools

In electroplated tools, a nickel matrix retains diamond or CBN grains on the body. The catalogue describes single- or multilayer constructions depending on the application. The process allows different forms and contours. High grain protrusion and dense surface grain coverage support free cutting, high stock removal and efficient grinding.

Material groups include non-ferrous metals, hardened steels, fibre-reinforced plastics, ceramics and composites; diamond or CBN is selected for the material. EHWA has developed and manufactured electroplated tools since 1992. Alongside conventional nickel-plated designs, the programme includes reverse-plated diamond rotary dressers for automotive and aerospace applications and nickel-bond wafer dicing blades for semiconductors.

Illustrated designs include reamers, brake-pad wheels, ferrite grinding wheels and tools for SiC moulds. The programme continues to develop for individual customer applications.



Electroplated layer in profile contact



Electroplated reamers



Electroplated wheel for brake pads



Profiled layer of the brake-pad wheel



Electroplated wheels for ferrite



Grinding tools for SiC moulds



Electroplated tool forms

Electroplated diamond needle files

EHWA's supplementary electroplated-tool application programme also illustrates diamond needle files. The illustration shows different file forms as product examples. Selection is coordinated with EHWA according to the workpiece, required contour and machining task.



Electroplated diamond needle files in different forms.

Diamond rotary dressers: precision for series production

Diamond rotary dressers support economical series manufacture of high-precision parts, including engine and turbine components for automotive and aerospace applications. They form the required contours in the grinding wheel quickly and accurately.

According to the catalogue history, EHWA invested in rotary-dresser development, manufacture and specialist personnel from 1990. Supply to automotive and aerospace applications began in 1992. Dressers profile aluminium-oxide and silicon-carbide wheels and other application-matched grinding systems. Profile tasks include bearings, screw and thread forms, and gears.

The illustrations show dressers for water-pump and ball bearings, gears, injection needles and turbocharger components. Tool precision, repeatable profile form and appropriate contour design underpin selection.



Diamond rotary dresser: complex profile



Diamond rotary dresser: example



Dresser layer for bearing profiles



Dressers for water-pump and ball bearings



Dressers for gear machining



Profile dresser for injection needles



Dressers for turbocharger components



Dresser profile for turbocharger components



Rotary dressers: profile programme

Stationary dressers: truing and restoring cutting ability

Truing establishes the form and runout of the mounted grinding wheel. Dressing opens the grinding surface and restores grain exposure and cutting ability. It removes adhering residues such as braze and steel particles and small amounts of bond. It is required when the wheel becomes loaded or glazed and, depending on the process, after form or runout correction. The catalogue recommends wet truing.

SDD are produced by sintering a selected diamond in a metal matrix within a steel shank, with its point concentric to the shank. MDD contain two or more diamonds in a metal matrix. Their distributed cutting points suit larger and wider wheels. They distribute loading, can reduce frictional heat and premature failure, and support long life and faster dressing.

FDD use high-quality mono diamond sintered in a metal matrix in a steel shank, then ground to the required form, such as a conical point with radius, facet or profile. IDD are produced by sintering selected diamond particles with a metal matrix. They support economical dressing and long tool life on large and wide wheels. Continued development of all four types addresses customer requirements.



Stationary diamond dressing: dresser and grinding wheel



SDD: single-point diamond dressers



MDD: multi-point diamond dressers



FDD: forming diamond dressers



IDD: impregnated diamond dressers



Stationary diamond dressers: examples

Technical specification: from abrasive to tool form

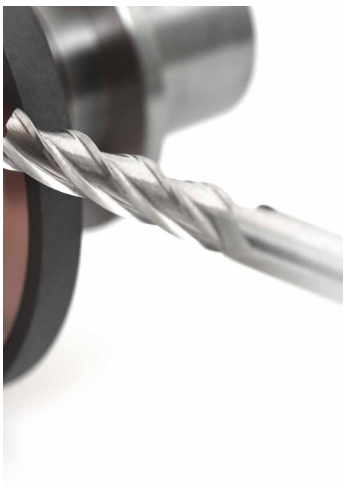
The following selection guides cover abrasive, grit, concentration, bond and tool form. Product codes and dimensional designations remain the basis for the specific design.



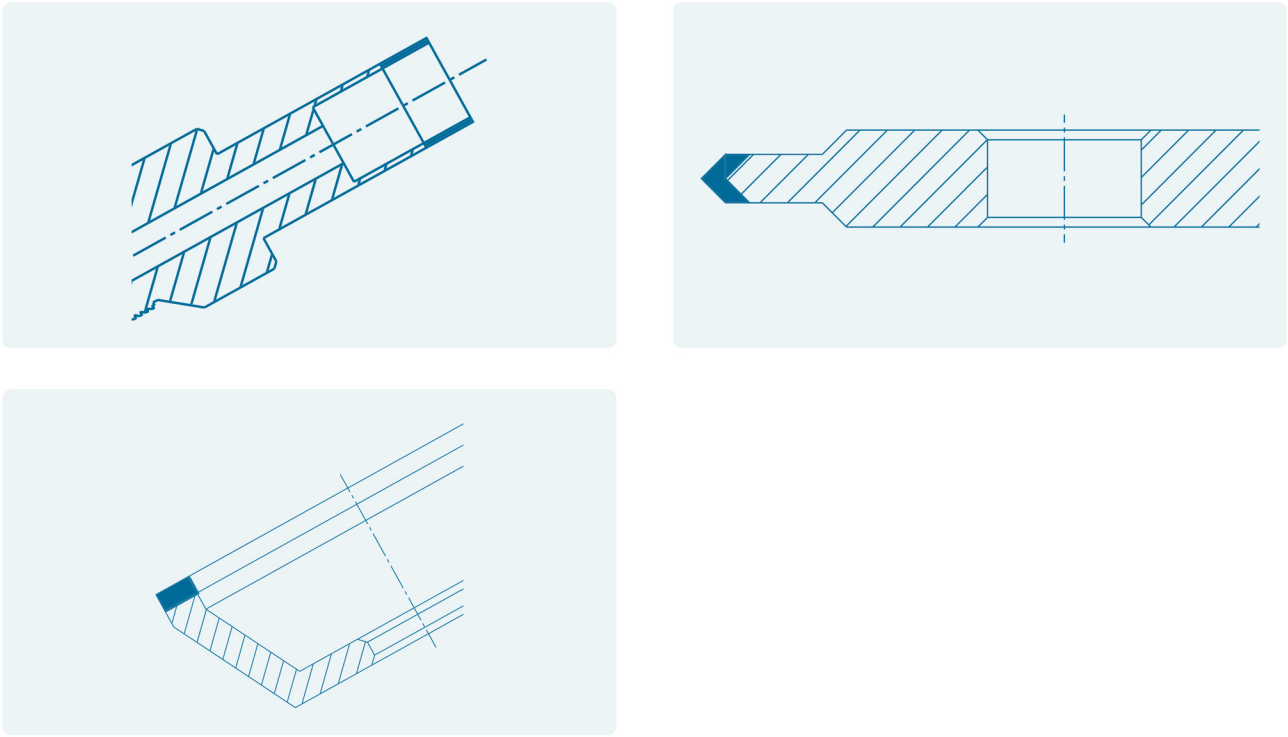
Grinding layer and body of a superabrasive tool

Technical selection and ordering information

Technical selection combines abrasive, grit, grade, concentration, bond and tool geometry. The following sections explain EHWA markings for resin, vitrified and metal bonds, abrasive types, bond modifications, wheel shapes and key dimensions. Reference charts and general guidance for diamond and CBN wheels follow.



Superabrasive wheel in tool machining



Tool cross-sections: geometry as the basis of specification

Information for enquiries and orders

Accurate shape and dimension information supports tool design. Please include a drawing where possible. The following eleven items bring together tool selection and process data.

No.	Information	Required details
1	Shape	Tool or wheel form
2	Dimensions	Detailed dimensions; drawing where possible
3	Abrasive	Diamond or CBN type
4	Grit size	Grit designation and system used
5	Grade	Required grade
6	Concentration	Concentration designation
7	Bond	Bond series and modification
8	Quantity	Order quantity
9	Workpiece	Material type and quality; shape; dimensions and tolerances; hardness; removal or depth of cut; required roughness Rmax, Ra, Rz
10	Machine	Type and power
11	Grinding conditions	Wheel speed (rpm); infeed with unit; table speed (m/min); cross feed (mm); dry/wet operation and coolant type

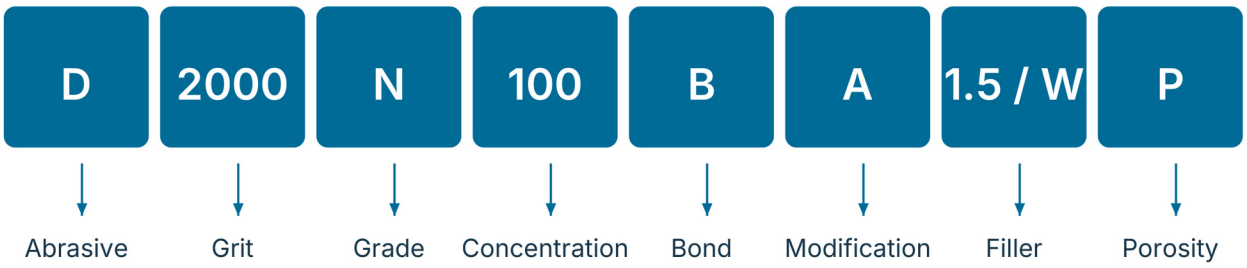
EHWA marking: resin and vitrified bonds

The marking separates the specification into abrasive, grit, grade, concentration, bond, bond modification, filler and porosity. The example shows D | 2000 | N | 100 | B | A | 1.5 or W | P. Numeric filler designations apply to resin bonds, and letter designations to vitrified bonds. Not every designation is required for every tool design.

Field	Designations
Diamond types	D, ND, DM, CSD
CBN types	B, NB, BM, NBM
Normal grit sizes (mesh)	60, 80, 100, 120, 140, 170, 200, 230, 270, 325, 400
Micron grit sizes (µm)	40/60, 40/50, 30/40, 22/36, 20/30, 15/25, 8/16, 6/12, 4/8, 3/6, 2/4, 0/2
Bond	B: resin; V: vitrified
Resin modifications	BA, BB, BC, BCT, BD, BE, BG, BH, BP, BQ, BX, BXT, BXC, PAE, PA8, BMX
Vitrified modifications	VB, VBT, VE, VA, VD, VCL, VH
Resin filler designations	1.5, 2, 3, 4, 5, 6, 7, 8, 10
Vitrified filler designations	W, M, G, A, N, V, Z
Vitrified porosity designations	B, F, P, U, Y, I, C

Grade	Classification
J	Soft
N	Medium
R	Hard

Concentration	Abrasive content
25	1.1 ct/cm³
50	2.2 ct/cm³
75	3.3 ct/cm³
100	4.4 ct/cm³
125	5.5 ct/cm³
150	6.6 ct/cm³
175	7.7 ct/cm³
200	8.8 ct/cm³



Example specification code

Marking example for resin and vitrified bonds

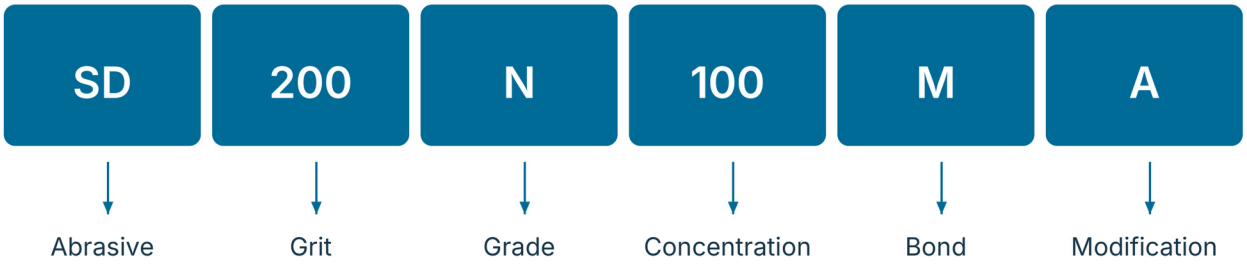
EHWA marking: metal bond

The example SD | 200 | N | 100 | M | A shows the sequence of abrasive, grit, grade, concentration, bond and modification. M denotes the metal bond. The modification list includes both series and specific grade designations.

Field	Designations
Diamond types	SD, SDC, SDM
CBN types	CBN, CBS, CBM
Normal grit sizes (mesh)	20, 30, 40, 50, 60, 80, 100, 120, 140, 170, 200, 230, 270, 325, 400
Micron grit sizes (µm)	40/60, 30/40, 22/36, 15/25, 10/20, 8/16
Bond	M: metal
Modifications	MB21, MC9, MA, MF, MP1, ME4, MG7, MG21N, MX32, MX4, MFS, MX56, MX57

Grade	Classification
G, H, I	Very soft
J, K, L, M	Soft
N	Normal
P, Q, R	Hard

Concentration	Abrasive content
25	1.1 ct/cm³
50	2.2 ct/cm³
75	3.3 ct/cm³
100	4.4 ct/cm³
125	5.5 ct/cm³
150	6.6 ct/cm³



Example specification code

Marking example for metal bonds

Diamond and CBN types for resin and vitrified bonds

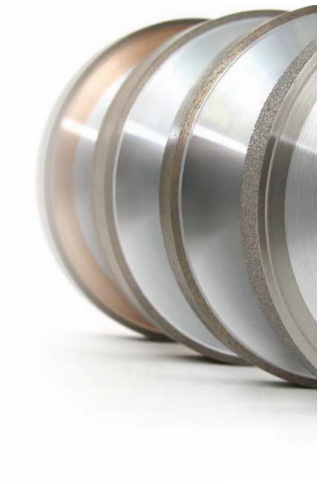
Coating, grain form and size influence retention and cutting behaviour. The eight types therefore distinguish material mapping, bond and wet/dry operation. The listed grit ranges belong to the respective catalogue specification.

Type	Features and application	Grit range
D	Diamond, uncoated; friable, irregular shape. General carbide grinding. Resin and vitrified bonds; mainly wet.	#60-#3000
ND	Nickel-coated diamond with good bondability. Carbide, ceramics, cermet, glass and ferrite. Resin bond; wet or dry.	#60-#400
DM	Micron diamond; friable, regular shape. Lapping and polishing of carbide, ceramics and glass. Resin and vitrified bonds; wet only.	D40/60-D0/2
CSD	Nickel-coated diamond; high strength and excellent bondability. Combination grinding of carbide and hardened steel.	#60-#400; D40/60-D20/30
B	CBN, uncoated. General grinding of bearings, camshafts, rolls and dies. Vitrified bond; wet only.	#60-#325
NB	Nickel-coated CBN with good bondability. Hardened steels such as HSS, SKD-11 and SUS. Resin bond; wet or dry.	#60-#400
BM	Uncoated micron CBN for lapping and polishing. Vitrified bond; wet only.	G45, G30, G15
NBM	Nickel-coated micron CBN for lapping and polishing. Resin bond; mainly wet.	G45, G30, G15

Diamond and CBN types for metal bonds

Metal-bond types distinguish blocky, tough diamond grains and CBN types for ferrous materials. Printed range designations are retained for micron grits. The CBM row also uses the letter D; tool orders should identify the CBM abrasive type together with the required grain-size range.

Type	Features and application	Grit range
SD	Special synthetic diamond; blocky form, high toughness.	#60-#400
SDC	Coated special synthetic diamond; blocky form, high toughness.	#60-#400
SDM	Micron diamond; blocky, regular form. Precision grinding and polishing.	D40/60-D1/2
CBN	Ferrous alloys and cast steel.	#60-#400
CBS	Special CBN for hardened steels: HSS, SKD-11, SCM, SUS.	#60-#400
CBM	Micron CBN for precision grinding.	D40/60-D2/4



Metal-bond wheels: profile and grinding-layer area

Resin bonds: modifications and relative hardness

The bond series distinguish elasticity, heat transfer, shape retention and removal performance. Features describe the respective application design. The second table shows hardness order within specific wheel forms, from soft to hard.

Code	Features and application
BA	Good elasticity; grinding depth about 10 µm. Mainly micron abrasives for carbide, hardened steel and PCD.
BB	Good heat transfer in dry grinding. Particularly CBN for HSS regrinding; mainly cup wheels.

Code	Features and application
BC	Good heat transfer and shape retention. Fluting of HSS endmills, reamers and drills.
BCT	CNC machining with 11V9 and 12V9 cup wheels.
BD	Very soft; low noise and good form/surface quality. General grinding of carbide, ceramics and glass.
BE	Heavy-duty CBN grinding for HSS regrinding; also dry operation.
BG	Standard bond for varied workpieces. Profile, face, cylindrical and centreless grinding.
BH	Good shape retention and heat transfer. Profile and face grinding.
BP	Lubricating bond; applications as for BG, but softer.
BQ	Finishing of glass and quartz.
BX	Good cutting ability. Fluting of endmills, reamers and carbide tools by creep-feed grinding.
BXT	Applications as for BX, but harder.
BXC	Grinding of cermet and ceramic inserts.
PAE	High-temperature polyimide bond for carbide microtools.
PA8	High-temperature polyimide bond for small to medium carbide tools.
BMX	Hybrid bond for heavy stock removal in carbide tool grinding.

Wheel form	Order: soft → hard
D11V9	BG → BE → BCT
B11V9	BB → BE → BCT
1A1	BA → BP → BG → BH → BX
1A1R	BD → BG → BH
4A2/6A2/2A2T	BA → BB → BG → BE → BH → BC → BX → BXT

Vitrified bonds: balancing performance and tool life

The seven modifications support application-based selection between grinding performance, machining load, surface quality and tool life. Comparisons such as “harder” or “shorter life” refer to the bond series specifically named.

Code	Features and application
VB	General CBN bond for bearings, camshafts, rolls, constant-velocity joints and dies.
VBT	Development of VB for reduced machining load; also used together with VB for improved grinding performance.
VE	Targets grinding performance and surface roughness; reduces machining load, but shorter life than VB.
VA	For diamond and CBN. In CBN applications, performance and life lie between VB and VE. For diamond, harder than VD and suitable for longer life.
VD	General diamond bond for carbide, PCD and PCBN.
VCL	For crushing wheels. Higher grinding performance than VD, but shorter life than VD.
VH	Targets low chipping, particularly PCBN and honing stones. Shorter life than VD and VCL.



Vitrified grinding wheel and camshaft

Metal bonds: composition and application

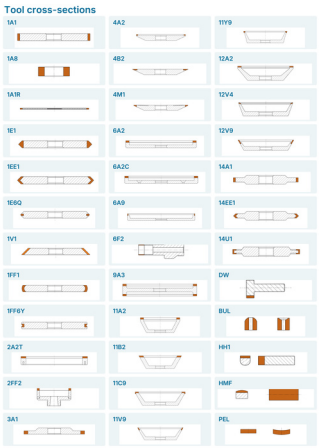
Bronze, iron and cobalt components, or special bronze bonds, underpin the metal-bond series. The table retains all 13 grades with their compositions, applications and relative hardness mappings.

Code	Bond basis	Features and application
MB21	Bronze	Glass and lens machining.
MC9	Bronze and iron	Harder than MB21; designed for longer wheel life in glass and lens applications.
MA	Bronze	Ceramics, hardened steel and carbide.
MF	Bronze	Sharp-edged profile wheels for hardened steel and carbide.
MP1	Bronze and cobalt	Sharp-edged profile wheels for carbide.
ME4	Bronze and cobalt	Mainly automotive glass on automatic machines.
MG7	Iron	Automotive glass and CNC machines.
MG21N	Iron	Automotive glass on CNC machines for longer life; harder than MG7.
MX32	Special bronze bond	Good grinding performance; general carbide grinding.
MX4	Special bronze bond	Softer than MX32; roughing carbide and cermet, also sapphire.
MFS	Special bronze bond	Softer than MX4; finishing carbide and cermet, also sapphire.
MX56	Special bronze bond	Diamond grinding and polishing; grit #3000-#5000.
MX57	Special bronze bond	Electrolytically assisted polishing and crushing grinding.

Wheel shape overview

The overview covers 36 tool forms. The following dimension diagrams combine sections, front views and spatial tool models. The grinding layer is distinguished from the body; letter designations describe the respective dimensions. The shape overview does not specify fixed order dimensions.

Form group	Types
1	1A1, 1A1R, 1A8, 1E1
2	1E6Q, 1EE1, 1FF1, 1FF6Y
3	1V1, 2A2T, 2FF2, 3A1
4	4A2, 4B2, 4M1, 6A2
5	6A2C, 6A9, 6F2, 9A3
6	11A2, 11B2, 11C9, 11V9
7	11Y9, 12A2, 12V4, 12V9
8	14A1, 14EE1, 14U1, DW
9	BUL, HH1, HMF, PEL

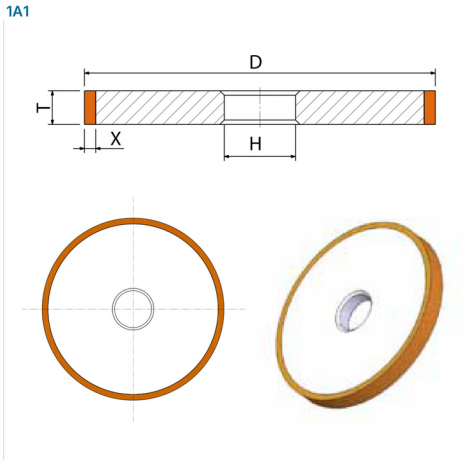


36 section forms: grinding layer and body

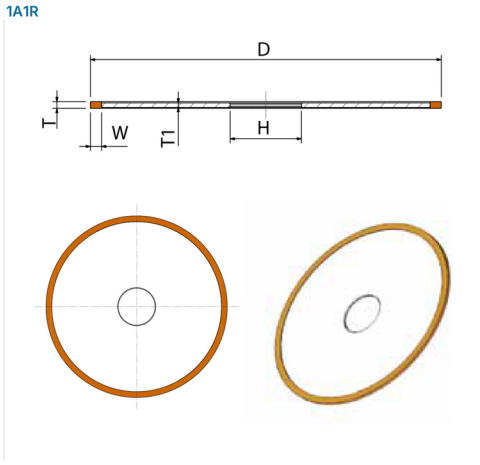
Dimension diagrams: 1A1, 1A1R, 1A8, 1E1

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

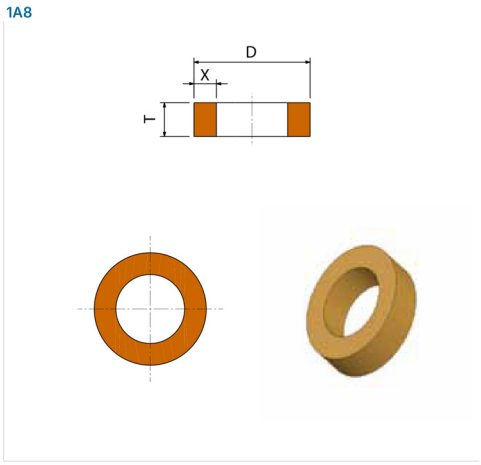
Type	Dimension designations
1A1	D T X H
1A1R	D T W T1 H
1A8	D T X
1E1	D T X H V



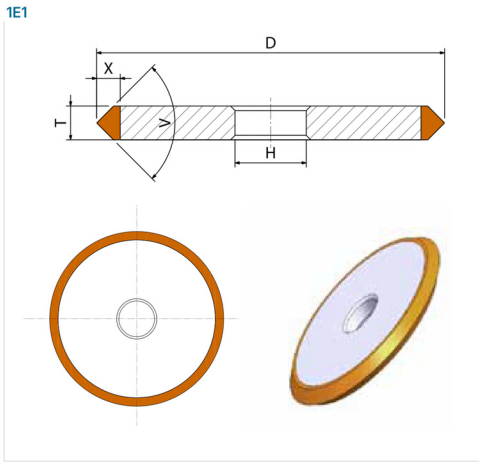
1A1: section, dimension codes and tool model



1A1R: section, dimension codes and tool model



1A8: section, dimension codes and tool model

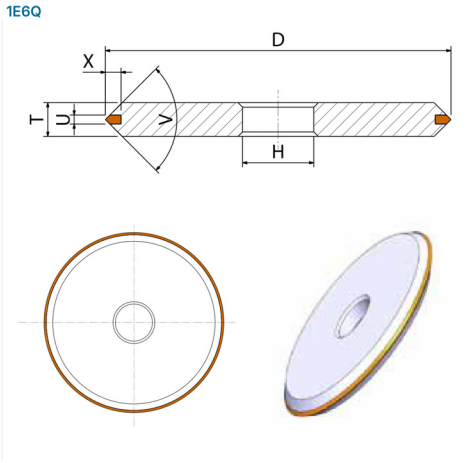


1E1: section, dimension codes and tool model

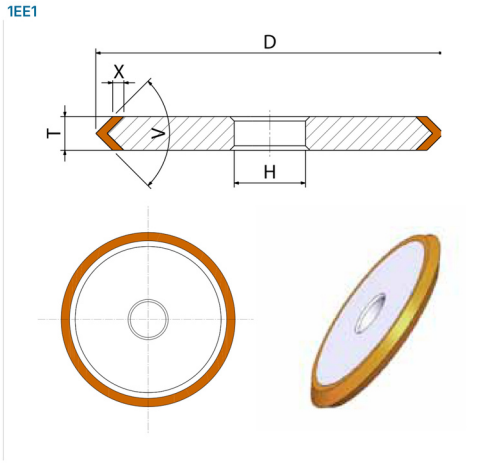
Dimension diagrams: 1E6Q, 1EE1, 1FF1, 1FF6Y

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

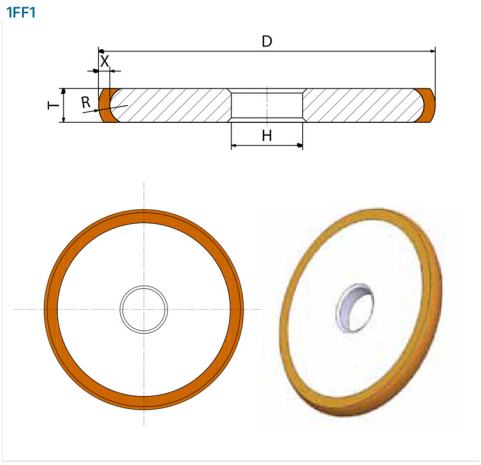
Type	Dimension designations
1E6Q	D T U X H V
1EE1	D T X H V
1FF1	D T X H R
1FF6Y	D T U X H



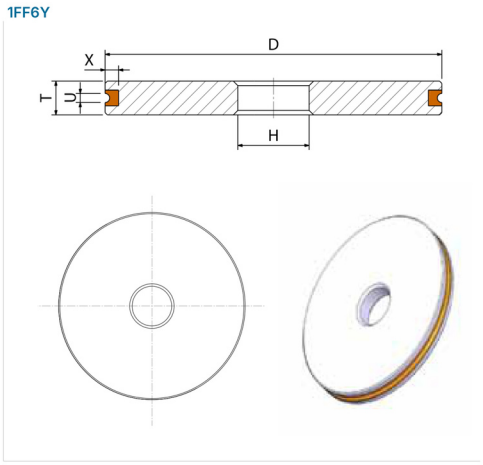
1E6Q: section, dimension codes and tool model



1EE1: section, dimension codes and tool model



1FF1: section, dimension codes and tool model

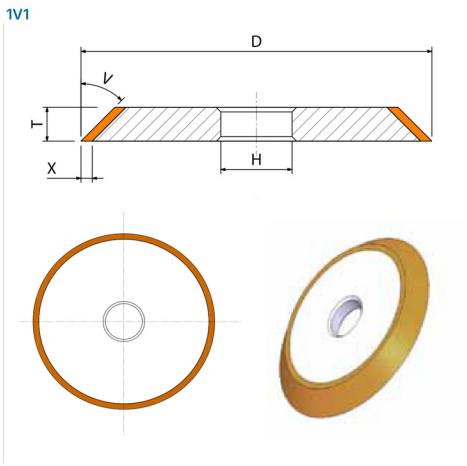


1FF6Y: section, dimension codes and tool model

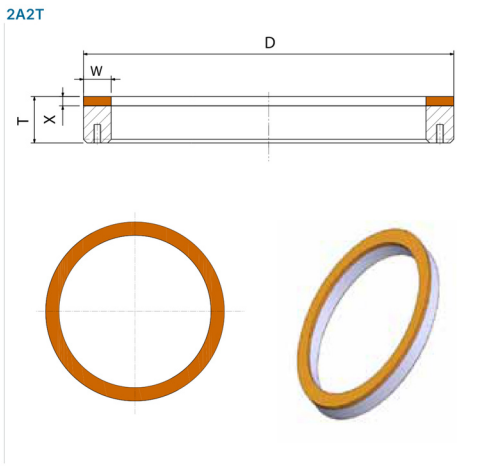
Dimension diagrams: 1V1, 2A2T, 2FF2, 3A1

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

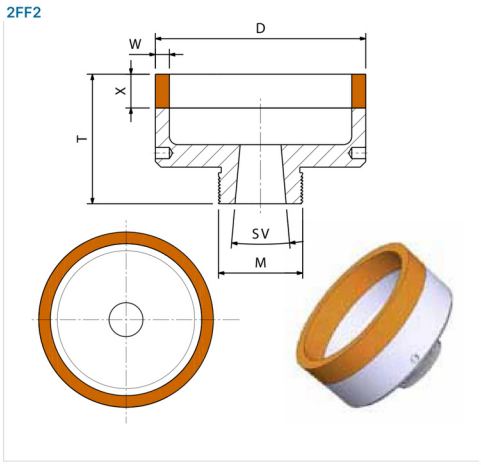
Type	Dimension designations
1V1	D T X H V
2A2T	D T X W
2FF2	D T X W M SV
3A1	D T U X J H



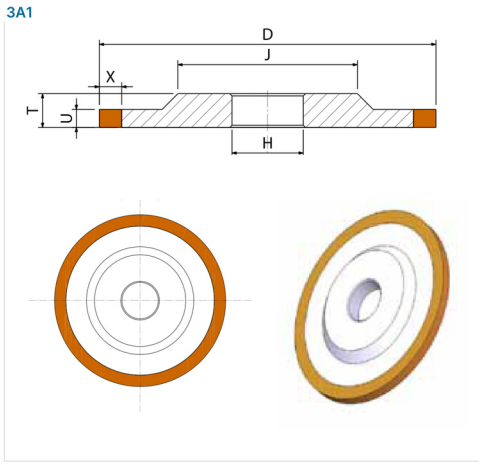
1V1: section, dimension codes and tool model



2A2T: section, dimension codes and tool model



2FF2: section, dimension codes and tool model



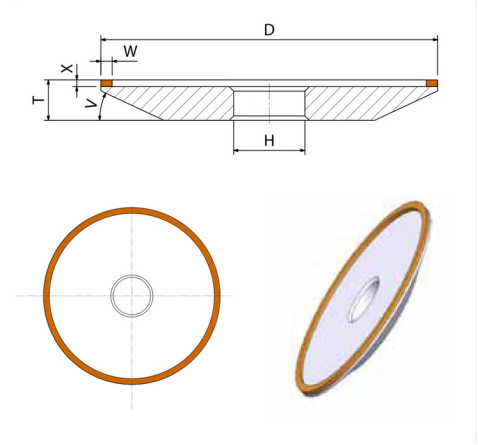
3A1: section, dimension codes and tool model

Dimension diagrams: 4A2, 4B2, 4M1, 6A2

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

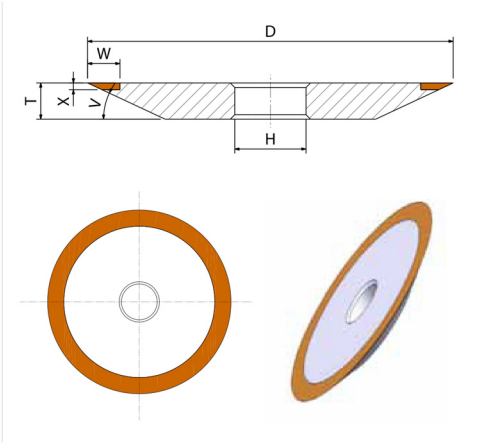
Type	Dimension designations
4A2	D T X W H V
4B2	D T X W H V
4M1	D T W J H V R
6A2	D T X W H E

4A2



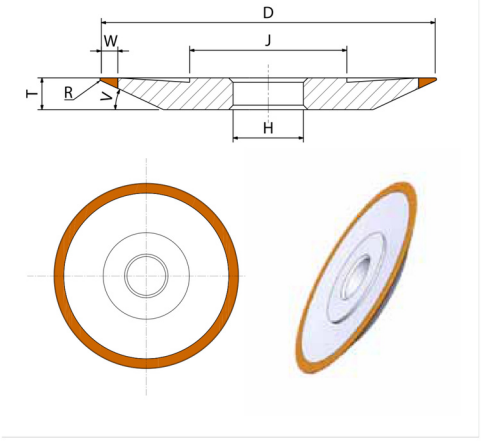
4A2: section, dimension codes and tool model

4B2



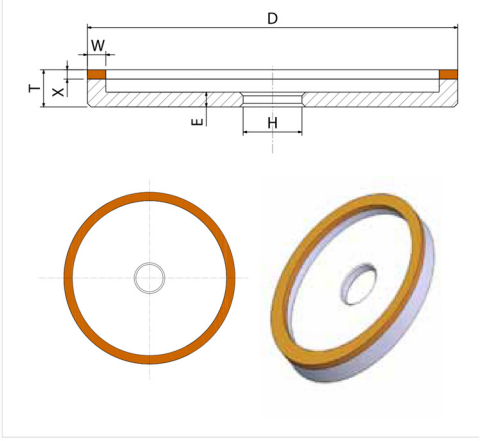
4B2: section, dimension codes and tool model

4M1



4M1: section, dimension codes and tool model

6A2



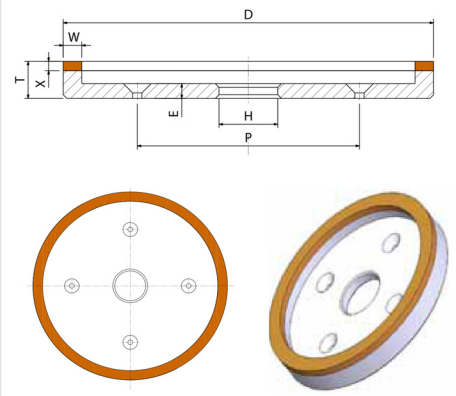
6A2: section, dimension codes and tool model

Dimension diagrams: 6A2C, 6A9, 6F2, 9A3

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

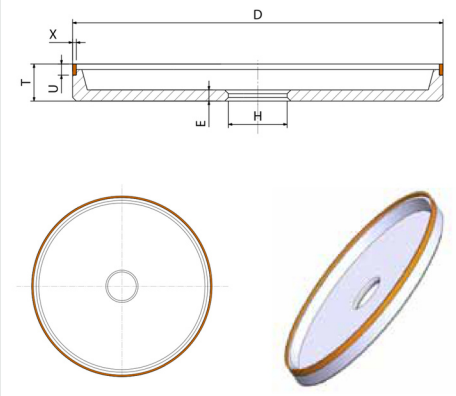
Type	Dimension designations
6A2C	D T X W H E P
6A9	D T U X H E
6F2	D W X L L1 Y M
9A3	D T X W H E

6A2C



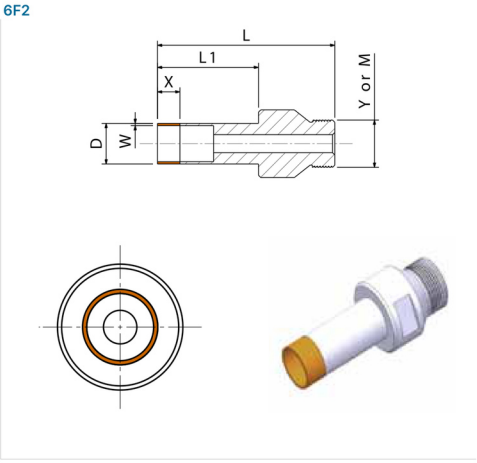
6A2C: section, dimension codes and tool model

6A9



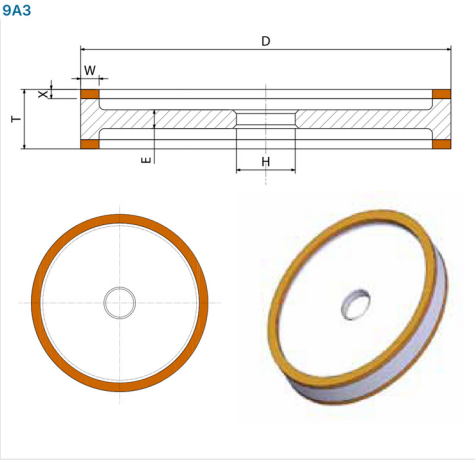
6A9: section, dimension codes and tool model

6F2



6F2: section, dimension codes and tool model

9A3



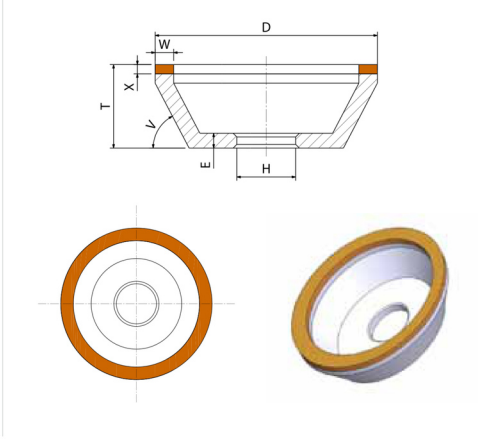
9A3: section, dimension codes and tool model

Dimension diagrams: 11A2, 11B2, 11C9, 11V9

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

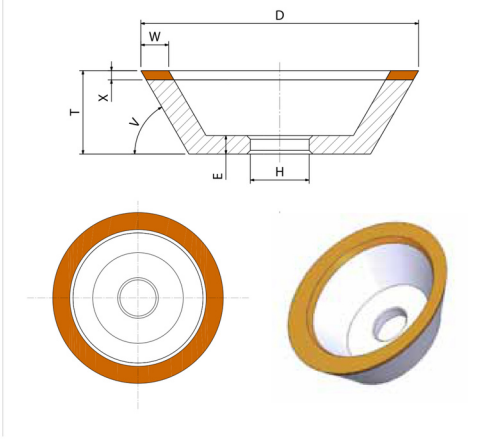
Type	Dimension designations
11A2	D T X W H E V
11B2	D T X W H E V
11C9	D T U X W H E V
11V9	D T U X H E 70°

11A2



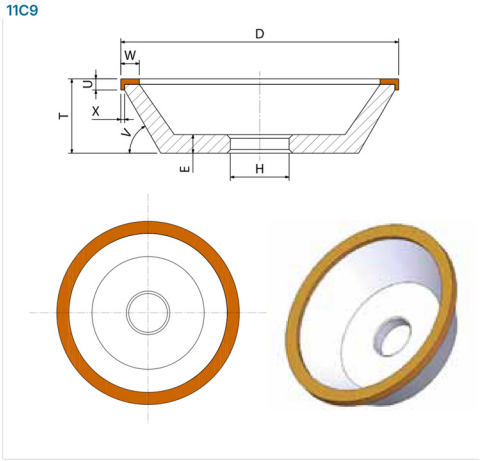
11A2: section, dimension codes and tool model

11B2



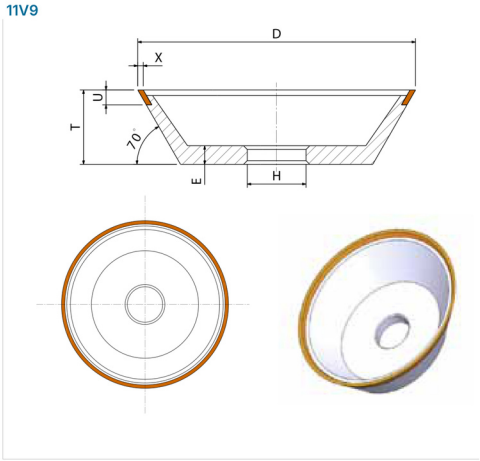
11B2: section, dimension codes and tool model

11C9



11C9: section, dimension codes and tool model

11V9



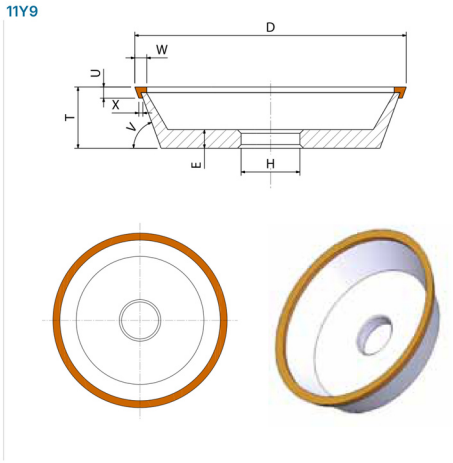
11V9: section, dimension codes and tool model

Dimension diagrams: 11Y9, 12A2, 12V4, 12V9

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

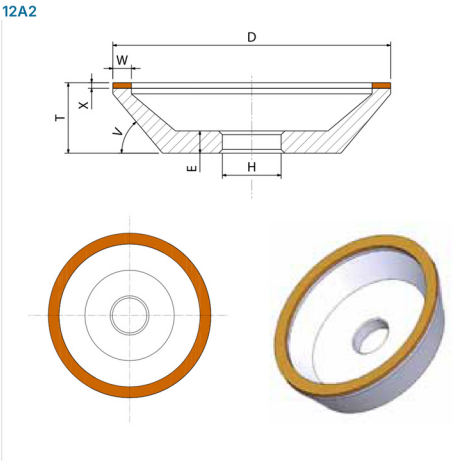
Type	Dimension designations
11Y9	D T U X W H E V
12A2	D T X W H E V
12V4	D T U X H E V 60°
12V9	D T U X H E 45°

11Y9



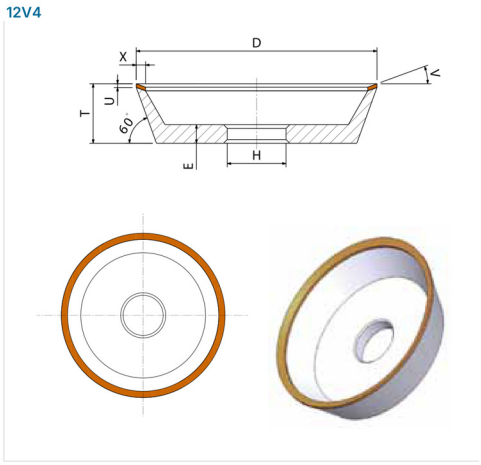
11Y9: section, dimension codes and tool model

12A2



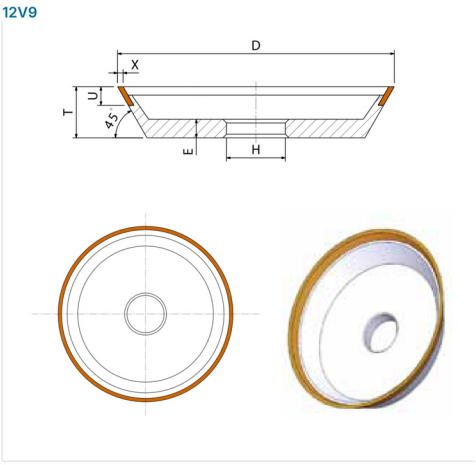
12A2: section, dimension codes and tool model

12V4



12V4: section, dimension codes and tool model

12V9

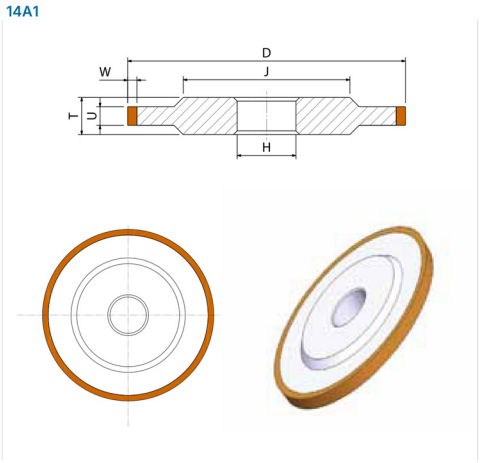


12V9: section, dimension codes and tool model

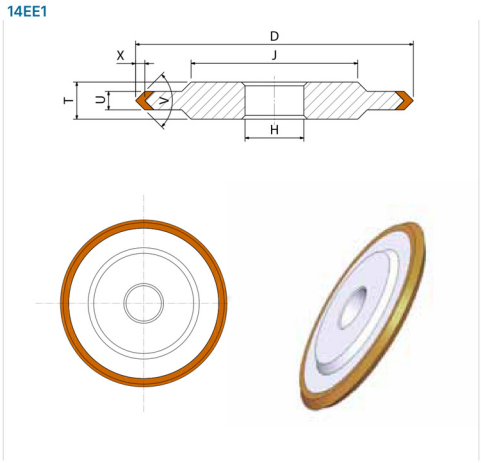
Dimension diagrams: 14A1, 14EE1, 14U1, DW

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

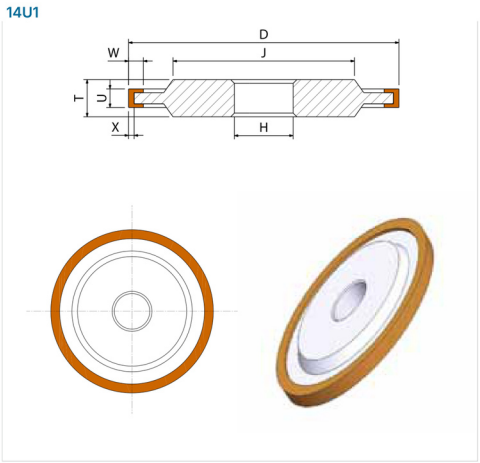
Type	Dimension designations
14A1	D T U W J H
14EE1	D T U X J H V
14U1	D T U W X J H
DW	D W X L Y



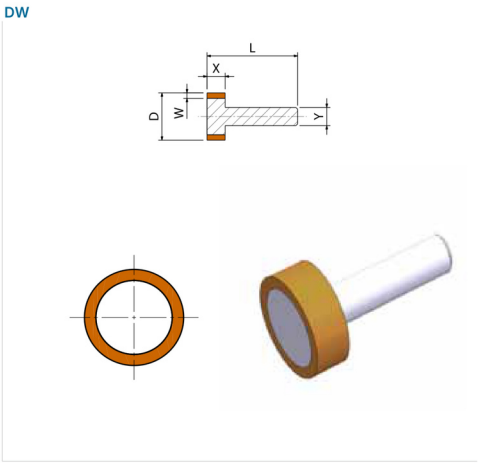
14A1: section, dimension codes and tool model



14EE1: section, dimension codes and tool model



14U1: section, dimension codes and tool model



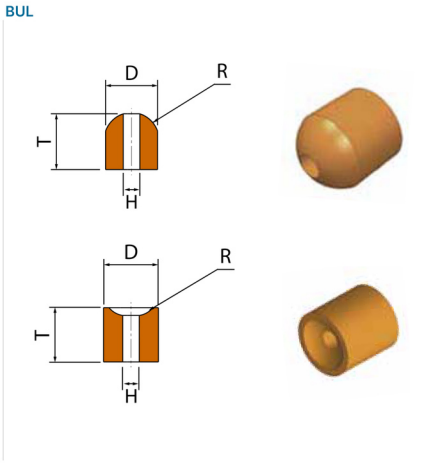
DW: section, dimension codes and tool model

Dimension diagrams: BUL, HH1, HMF, PEL

Dimension designations apply to the illustrated tool profile. Sections and front views show the locations of the grinding layer, mounting features and other form details.

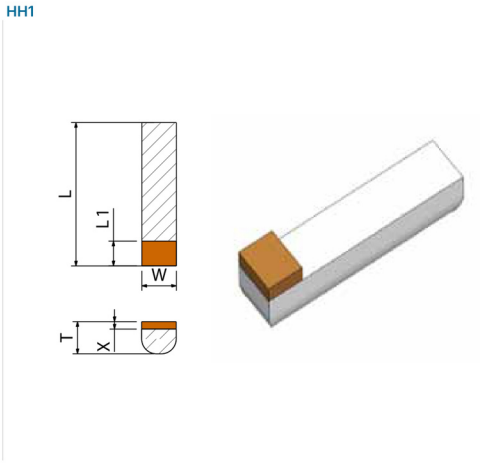
Type	Dimension designations
BUL	D T H R
HH1	L L1 W T X
HMF	L W T X R
PEL	D X R

BUL



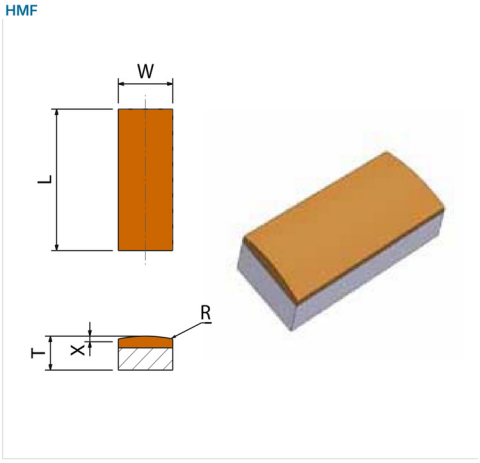
BUL: section, dimension codes and tool model

HH1



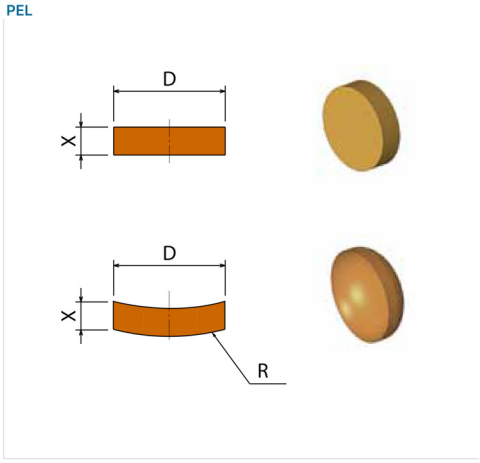
HH1: section, dimension codes and tool model

HMF



HMF: section, dimension codes and tool model

PEL



PEL: section, dimension codes and tool model

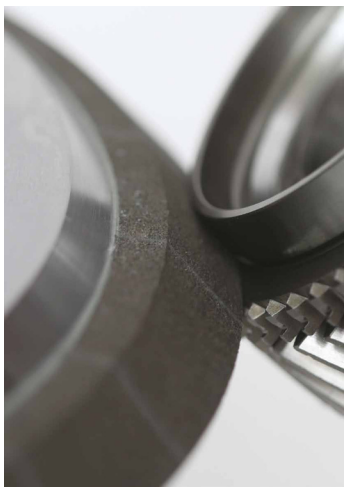
Key to dimension letters

Dimension diagrams support selection of shape and type. Each designation describes the feature marked in its drawing. Please also specify dimensions that are not filled in a selection. Additional designations such as T1, L1, M, SV and P belong to the respective dimension diagram.

Code	Meaning
B.C.	Bolt circle
D	Wheel diameter
d	Description of mounting hole
E	Back thickness
H	Hole size
J	Hub diameter
R	Radius
T	Wheel thickness
S	Back angle
L	Length for types DW, HH1, HMF, 2FF2, 6F2
n	Number of mounting holes
U	Diamond face for 3A1, 14A1, 14EE1, 14U1; abrasive insert length for 1E6Q, 6A9, 11C9, 11V9, 11Y9, 12V9 and pencil edgers
V	Face angle for 1V1, 4B2, 11B2, 12V4; included angle for 1E1, 1EE1, 1E6Q, 14EE1
W	Rim width
X	Diamond/CBN depth
K	Inside flat diameter
Y	Shank diameter for DW and 6F2



Grinding tool: body and mounting



Profiled grinding tools and layer structure

Process guidance for diamond and CBN grinding tools

Abrasive, bond and tool form work together with the machine, mounting, coolant and operating conditions. The following guidance supports tool selection, mounting, preparation and economical use.



Grinding tools and profiled workpieces

Diamond: abrasive, concentration and grit

Wheel diamond is divided into natural and synthetic diamond. Industrial use of synthetic diamond expanded in the 1950s; the source catalogue names 1957 as its introduction year. Development of tough, strong grains for saw blades and suitable grains for resin bonds broadened applications. Metal coatings can improve bondability. The catalogue description distinguishes 50 diamond-powder grades and maps them to resin, metal and vitrified bonds. Grain type and size are selected for the workpiece, bond and grinding conditions.

Concentration denotes diamond content per unit volume of the abrasive layer. Concentration 100 corresponds to 25 volume% or 4.4 ct/cm³. Concentration influences tooling cost; appropriate selection depends on material and process.

The grit overview contains 22 sizes. For sieve grits, the designation identifies the coarser end of the range: #140/170 passes the #140 sieve and is retained by #170, with #140 as the nominal designation. The catalogue treats sizes up to #325 as sieve grits, with a different classification for finer sizes.

The third column retains the printed catalogue designations. The diamond table mixes B and D designations, and not every sieve mapping matches a current standard mapping. In the FEPA system, D identifies diamond and B identifies CBN. The printed B designations are therefore not confirmed diamond ordering codes. Orders should establish abrasive type, actual size range and the grit system together.

Grain content (volume%)	Concentration	Diamond content (ct/cm³)
25	100	4.4
18.75	75	3.3
12.5	50	2.2
6.25	25	1.1

Nominal grit (mesh)	Grit range (mesh)	Catalogue designation, “FEPA” column
16	16/20	-
20	20/30	B852
30	30/40	B602
40	40/50	B426
50	50/60	B301
60	60/80	B252
80	80/100	B181
100	100/120	B151
120	120/140	B126
140	140/170	D107
170	170/200	D91
200	200/230	D76

Nominal grit (mesh)	Grit range (mesh)	Catalogue designation, “FEPA” column
230	230/270	D64
270	270/325	D54
325	325/400	D46
400	-	-
600	-	-
800	-	-
1000	-	-
1500	-	-
2000	-	-
3000	-	-

Diamond bonds, wheel diameter and contact area

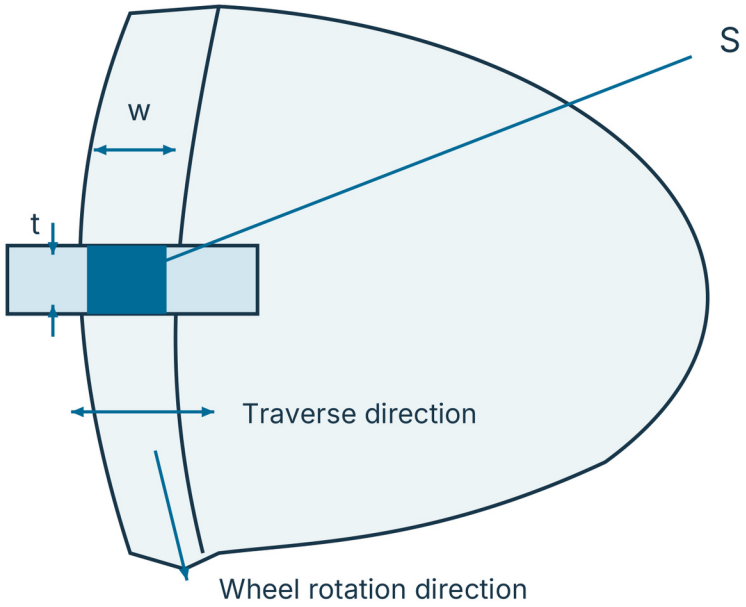
Resin bonds are manufactured with phenolic resin or polyimide. The catalogue describes phenolic resin as a commonly used option. Good elasticity, surface finish and grinding performance support carbide grinding, combined machining of carbide and hardened steel, cermet machining, and precision grinding of magnetic materials, glass and ceramics. Polyimide bonds are particularly intended for heavy removal and creep-feed grinding.

Metal bonds are produced by sintering metal powder with diamond grains. Strong grain retention is beneficial where long life or low wheel wear is required, in hand grinding of carbide, profile grinding, and cutting or grinding of ceramics, glass, quartz, ferrite, stone and graphite. Strong retention can also favour glazing or loading. Process conditions, coolant and dressing intervals are therefore selected to limit pressure and thermal loading.

Porous vitrified bonds facilitate truing and dressing compared with suitable resin- or metal-bond reference designs. Applications include carbide and sintered diamond tools.

Grinding heat is removed by coolant and air. Small diameters can shorten the time before the next grain contact, favouring heat accumulation, grain wear and bond deterioration. A larger diameter is often beneficial within machine, geometry and speed limits, particularly at high removal rates.

Contact area S depends on layer width w and contact length t. Force also depends on machine rigidity, workpiece support and the workpiece itself. At the same force, a smaller contact area raises contact pressure and can improve cutting. Wider layers can instead improve tool life. Selection balances removal performance and life against machine rigidity.



Contact area S, layer width w and contact length t

Machine, mounting, truing and dressing

A rigid, low-vibration machine with sufficient power maintains peripheral speed and infeed. Table or spindle vibration can cause chatter marks and heavy wear. Insufficient power favours speed loss and inefficient machining.

Correct mounting avoids workpiece marks, machine vibration, increased noise and shortened life. For the wheels described, the catalogue specifies less than 0.02 mm side runout for cup/dish wheels and less than 0.02 mm peripheral runout for straight wheels. Mounting takes place with the machine stopped: initially fasten the wheel lightly on its flange, check runout with an indicator, adjust in a controlled way where the fit permits, then secure the wheel and recheck. Adjustment requires clearance between bore and flange; without clearance, another runout-correction method is needed. The older catalogue describes light tapping at the periphery. In practice, use only the adjustment method approved for the particular wheel, such as a suitable wood or rubber block; mounting instructions from the manufacturer remain decisive.

Truing corrects runout and contour by removing grains and bond. Dressing then establishes a free-cutting layer by recessing the bond and exposing diamond. The catalogue recommends relatively hard truing tools about two grit grades coarser. The selection distinguishes C and WA designations; WA does not denote silicon carbide.

The four described methods are a brake-controlled truing device, abrasive stick, mild steel and a separate grinding unit. Their application features follow in the next section.

Diamond-wheel grit	Truing tool
#80 or coarser	C46-M
#100-#200	C60-M
#230-#325	C80-M
#400 or finer	WA200-G

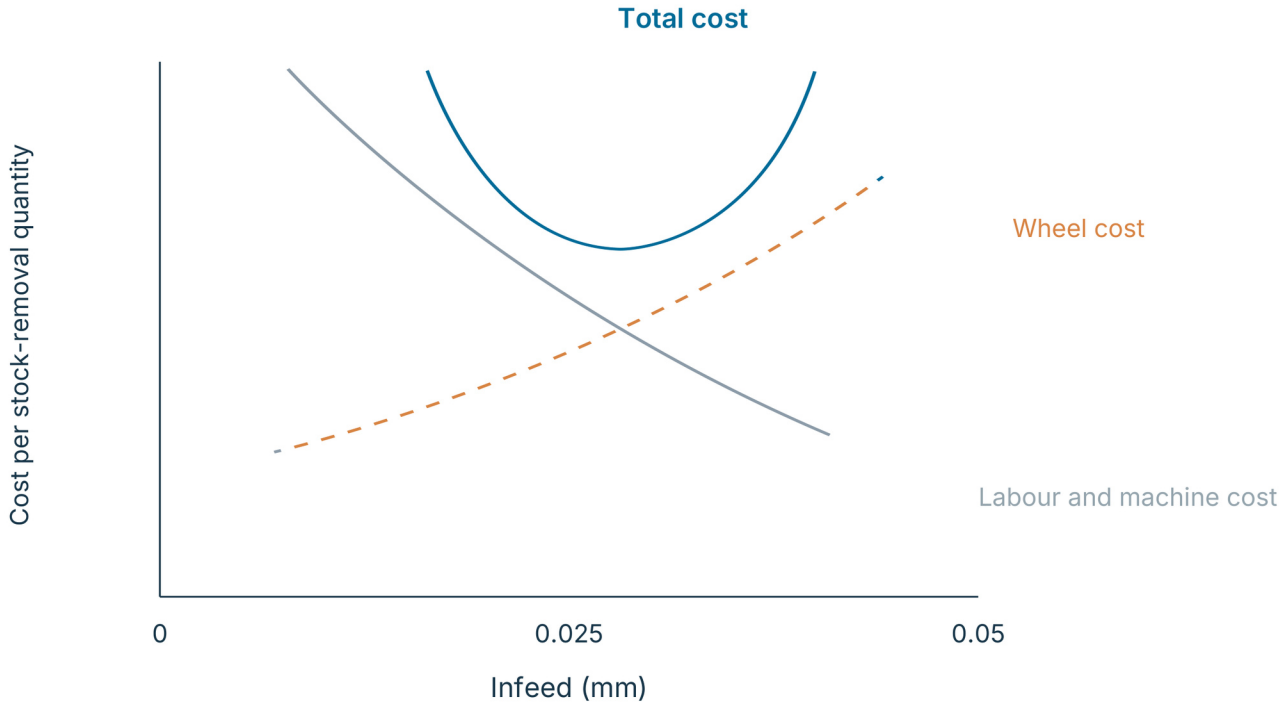
Preparing diamond wheels and assessing economy

A brake-controlled device provides fast, simple and stable truing with the wheel remaining on the machine. A fixed abrasive stick can also correct the form, while possible rounding of the wheel edge should be considered. Mild steel provides a simple method without a special truing device, but requires abundant coolant to avoid thermal damage to the diamond wheel. A separate grinding unit machines the removed diamond wheel with a silicon-carbide wheel; runout must be checked again after remounting.

Dressing should mainly remove bond and expose diamond. The catalogue recommends sticks about two grit grades finer; the selection is listed in the table. Dressing uses suitable guidance and the equipment intended for the machine and tool. Coolant is specified; for dry operation, the source describes a wetted stick, whereas it recommends dry dressing with a lapping stick. Actual selection depends on stick and wheel specification.

Economy consists of wheel cost plus other processing costs, particularly labour and machine cost. Tool life alone therefore does not describe the full benefit. The cost diagram shows the trade-off: wheel cost increases with infeed, while labour and machine cost per stock-removal quantity can fall. Their sum has a minimum in the illustrated scheme. Axis values of 0.025 and 0.05 mm illustrate this relationship and do not specify a universal optimum infeed.

Diamond-wheel grit	Dressing stick
#80 or coarser	WA120-G
#100-#200	WA200-G
#230-#325	Lapping stick
#400 or finer	Lapping stick



Schematic processing cost versus infeed

Diamond: peripheral speed, coolant and infeed

Peripheral speed influences life, removal and finish. It depends on wheel diameter and spindle speed. The stated ranges are catalogue recommendations for the named bonds; allowable tool and machine speed remains decisive.

Dry regrinding can permit direct observation of the contact area. However, a large contact area increases heat, loading and bond wear; wet grinding can reduce thermal loading. Coolant is directed into wheel/workpiece contact. Good lubrication and adequate supply pressure are particularly relevant in heavy removal or creep-feed grinding.

Infeed affects machining efficiency, but excessive increases can shorten tool life. The table gives recommended depths of cut by grit. For form grinding, the source describes balancing greater depth of cut with reduced feed to avoid profile deviation.

Finish depends on process, material and grit. Separate roughing and finishing allows high removal followed by a fine surface. The grit lists provide separate selections rather than a fixed pairing of each row. Spark-out can further improve finish.

Bond	Wet (m/min)	Dry (m/min)
Resin	1400-1600	900-1200
Metal	1000-1800	600-900

Grit	Depth of cut
#100-#120	0.02-0.03 mm
#140-#200	0.01-0.02 mm
#230 or finer	≤0.01 mm

Process stage	Grit selection
Roughing	#100, #120, #140
Finishing	#270, #325, #400, #600

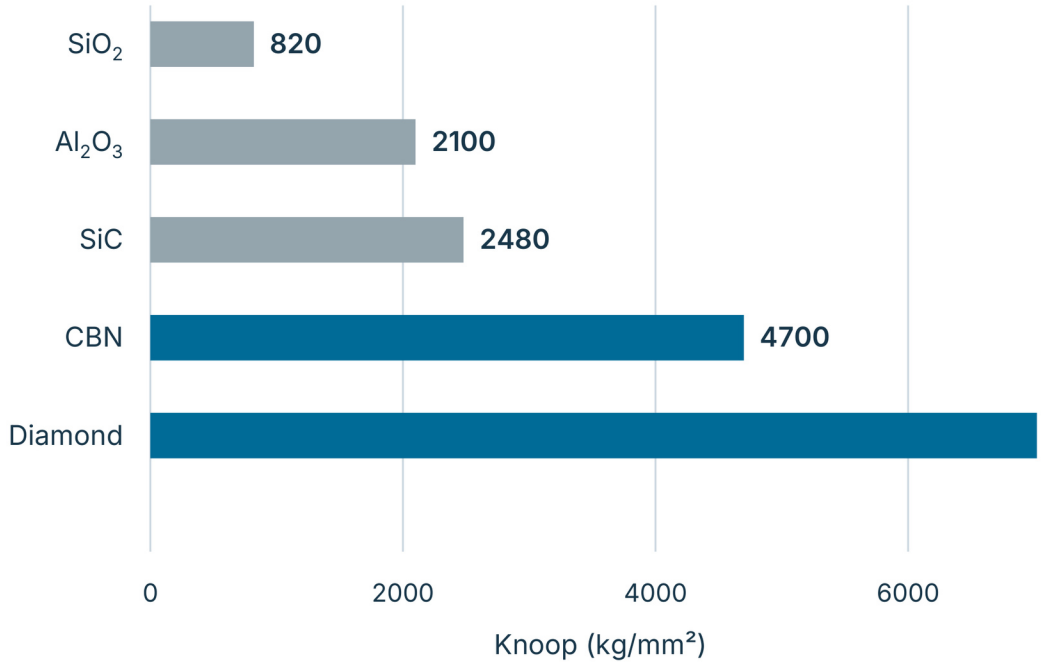
CBN: hardness, material mapping and grit

CBN is cubic boron nitride, a superabrasive for grinding steel. It is synthesised from boron-nitride feedstock at high pressure and temperature. CBN is harder than conventional abrasives such as aluminium oxide and silicon carbide; the Knoop comparison includes the material values stated in the catalogue.

Diamond has high hardness but can wear in contact with steel through chemical interaction with iron. The source gives 600-700°C as an indicative oxidation range in air and 1370°C as a CBN stability comparison value. These describe abrasive behaviour under respective conditions, not an allowable temperature for an entire grinding wheel. CBN combines high thermal resistance with low chemical affinity for iron, making it particularly suitable for appropriate ferrous materials.

Metal-coated CBN is mainly used in resin bonds; uncoated grains are used in electroplated, metal-bond and vitrified tools. Concentration follows the table explained earlier. The grit table retains both sieve sizes and G micron-grit designations.

Nominal grit (mesh)	Sieve range / micron code	Catalogue designation, “FEPA” column
60	60/80	B252
80	80/100	B181
100	100/120	B151
120	120/140	B126
140	140/170	B107
170	170/200	B91
200	200/230	B76
230	230/270	B64
270	270/325	B54
325	325/400	B46
400	G45	-
800	G30	-
1000	G15	-
1500	G9	-
2000	G6	-
3000	G3	-
5000	G1	-



Abrasive hardness comparison: Knoop scale

CBN: bond, speed and coolant

Resin-bond CBN wheels are used for surface, cylindrical, creep-feed, centreless, double-disc and internal grinding. CBN can work economically on suitable ferrous materials harder than HRC 50. Metal bonds are made by sintering metal powder with CBN and are intended for honing or cutting hardened steel and high removal in medium-hard steel. Porous vitrified bonds facilitate truing and dressing and support high-precision forms. The overview separates CBN and diamond applications.

Peripheral speed influences tool life, removal and finish. For resin-bond CBN, the source gives 1750-1850 m/min wet and 900-1200 m/min dry. It additionally describes an increase to 13,000 ft/min with sufficiently effective coolant supply. This is a catalogue process indication rather than a universal speed approval: tool and machine limits determine allowable speed.

Straight, water-immiscible oil provides strong lubrication and can benefit tough materials such as stainless steel, Inconel and Waspaloy and heavy-duty machining; its cooling effect is lower than that of water-based systems. The catalogue divides water-based fluids into emulsion, translucent soluble fluid and clear chemical fluid. Emulsion appears milky and combines lubrication with better cooling than oil. For the described emulsion application, the source specifies concentration above 5%; actual concentration depends on product and process. Translucent fluids offer stronger cooling but lower lubrication than emulsions and may suffice for general grinding. Clear chemical fluids offer strong cooling with lower lubrication; a suitable process does not automatically require changing fluid systems.

Abrasive	Vitrified-bond application
CBN	Automotive parts: CV joints, gears, camshafts and crankshafts
CBN	Tool parts: endmills and thread dies
CBN	Bearings
CBN	Electronic parts: motors and sleeves
CBN	Hydraulic and pneumatic machines: compressors
CBN	Fuel pumps: injection nozzles
Diamond	Cutting tools: ceramic and PCD/PCBN inserts
Diamond	Surface grinding: silicon and cemented-carbide wafers
Diamond	Honing stones

The historical application list also places double-disc grinding of “Rotor gear” under diamond. The workpiece material is not documented, so this entry is not a general selection rule. For rotor or gear components, material, abrasive and bond are confirmed for the specific process.

Resin-bond CBN	Recommended peripheral speed
Wet	1750-1850 m/min
Dry	900-1200 m/min



Precision component in the CBN application context

Surface roughness: historical reference comparison

The comparison retains every catalogue value for Rmax, Ra, RMS and Rz. It provides historical orientation rather than an exact conversion between roughness parameters. Different parameters describe different properties of the surface profile.

The printed RMS column in µin is also not mathematically identical to the RMS column in µm. Exact unit conversion is: 1 µin = 0.0254 µm. Required roughness should therefore be specified with parameter, unit and measurement conditions.

Rmax (µm)	Ra (µm)	RMS (µm)	Rz (µm)	RMS (µin), source value
0.1	0.02	0.02	0.1	1
0.2	0.03	0.04	0.2	2
0.3	0.05	0.06	0.3	3
0.4	0.07	0.08	0.4	4
0.5	0.09	0.10	0.5	5
0.6	0.10	0.11	0.5	6
0.7	0.12	0.13	0.6	7
0.8	0.14	0.15	0.7	8
0.9	0.15	0.17	0.8	9
1.0	0.17	0.19	0.9	10
1.2	0.20	0.23	1.1	12
1.4	0.24	0.27	1.3	14
1.6	0.27	0.30	1.4	16
1.8	0.31	0.34	1.6	18
2.0	0.34	0.38	1.8	20
2.4	0.41	0.46	2.2	24
2.8	0.48	0.53	2.5	28
3.2	0.54	0.61	2.9	32
3.6	0.61	0.68	3.2	36

Rmax (µm)	Ra (µm)	RMS (µm)	Rz (µm)	RMS (µin), source value
4.0	0.68	0.76	3.6	40
4.5	0.77	0.86	4.1	45
5.0	0.85	0.96	4.5	50
5.5	0.94	1.05	5.0	55
6.0	1.02	1.14	5.4	60
7.0	1.19	1.33	6.3	70
8.0	1.36	1.52	7.2	80
9.0	1.53	1.71	8.1	90
10.0	1.70	1.90	9.0	100



Crankshaft and CBN wheel: application image

International cooperation and locations

Since 1975, EHWA has developed long-term partnerships with customers across industries. Product development and service support this cooperation. The location photographs show the international network documented in the source catalogue, including Korean locations and offices, plants and affiliated businesses in other countries.

The following overview belongs to source edition 02/2022 and documents its information. For technical coordination in Europe, contact EHWA Europe at info@ehwadia.de or +49 6173 997780.

Region	Locations in the source edition
Korea	Osan, Osan 2, Dongtan, Pyeongtaek, Seocheon, Cheongju
China	Fujian, Weihai, Shanghai
Vietnam	Bac Ninh, Hai Duong
Further countries	Indonesia, Germany, Japan, California/USA (affiliate), Alabama/USA, Italy, Thailand, India, Mexico



Osan: location photograph in the source catalogue



Osan 2: location photograph in the source catalogue



Dongtan: location photograph in the source catalogue



Pyeongtaek: location photograph in the source catalogue



Seocheon: location photograph in the source catalogue



Cheongju: location photograph in the source catalogue



Fujian, China: location photograph in the source catalogue



Weihai, China: location photograph in the source catalogue



Shanghai, China: location photograph in the source catalogue



Bac Ninh, Vietnam: location photograph in the source catalogue



Hai Duong, Vietnam: location photograph in the source catalogue



Indonesia: location photograph in the source catalogue



Germany: location photograph in the source catalogue



Japan: location photograph in the source catalogue



California, USA (affiliate): location photograph in the source catalogue



Alabama, USA: location photograph in the source catalogue



Italy: location photograph in the source catalogue



Thailand: location photograph in the source catalogue



India: location photograph in the source catalogue



Mexico: location photograph in the source catalogue



Network in source edition 02/2022

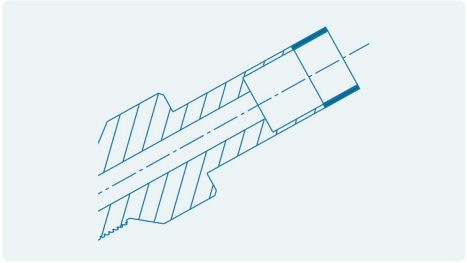
International network in the source catalogue

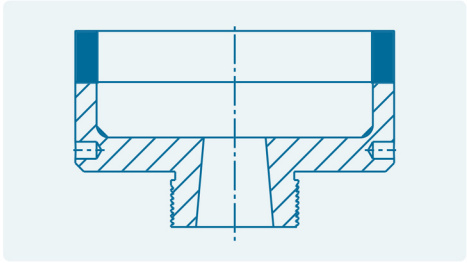
Manufacturer and source edition of the main programme

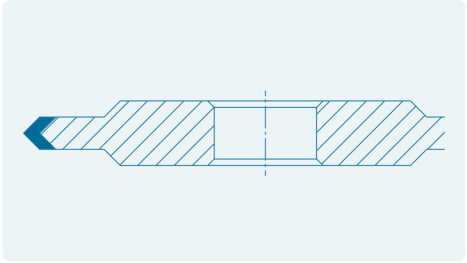
The main catalogue was issued by EHWA DIAMOND INDUSTRIAL CO., LTD. and carries the print marking 02/2022. The back cover names ISO 9001 and ISO 14001 in the TÜV Management Service symbol used in that edition. This records the catalogue marking rather than providing evidence of a current certificate.

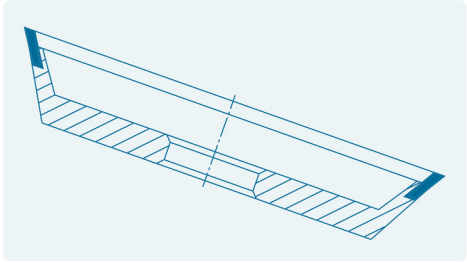
Manufacturer information from the source edition is listed in the table. EHWA Europe is your contact for enquiries about the European tooling programme. This newly typeset programme has editorial edition 2026-10-13.

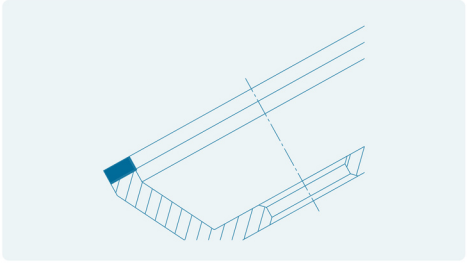
Item	Manufacturer contact in the source edition
Manufacturer	EHWA DIAMOND INDUSTRIAL CO., LTD.
Address	374, Nambudae-ro, Osan-city, Gyeonggi-Do, 18145, Korea
Website	http://www.ehwadia.com
E-Mail	bkkim@ehwadia.co.kr
Phone	+82 (31) 370-9220
Fax	+82 (31) 370-9840
Print marking	02/2022











Tool cross-sections: body and grinding layer

Tooling supplement: porous hybrid bond

Porous-hybrid-bond diamond wheels grind flutes in carbide drills and end mills, perform drill gashing and grind clearance angles. The bond supports high feed rates and high stock-removal rates. Further benefits include reduced residual stress and thermal damage, high dimensional stability, good surface and edge quality, long dressing intervals and low power consumption.

The test on an ANCA MX7 Linear uses D54 in a porous hybrid bond. The charts and tables retain the printed maximum spindle-load values. At every compared feed rate, the porous EHWA wheel has a lower load than the competitor. In the speed comparison, it also has a lower load than the EHWA hybrid variant. These are results of this test; additional engagement and workpiece conditions are not quantified in the sheet.

For cycle time, the main programme explains that higher permissible feed rates can enable shorter machining times. The supplement also says “Longer cycle time”, which is not clearly consistent with that explanation. This wording is not interpreted here as a measured time reduction or as a benefit of taking longer to machine a part.

Feed rate (mm/min)	EHWA porous hybrid: load (%)	Competitor: load (%)
100	14	15
120	15	16
160	19	20
200	23	24
240	26	27
260	28	30
280	30	31

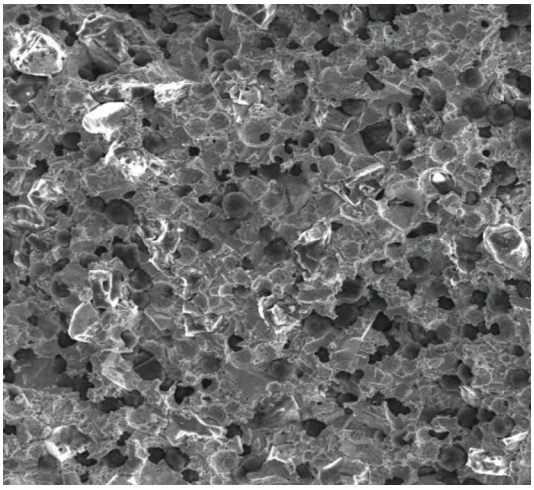
Wheel speed (m/s)	EHWA hybrid: load (%)	EHWA porous: load (%)	Competitor: load (%)
18	17	14	15
20	17	14	15
22	17	14	15
24	18	15	16



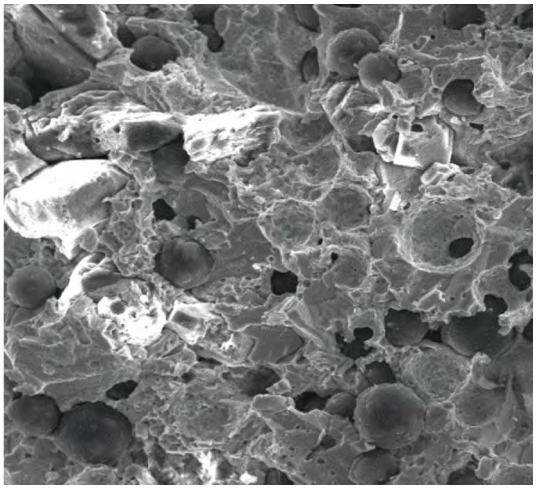
Wheel pack for rotary tools



Tool and grinding wheel during flute grinding



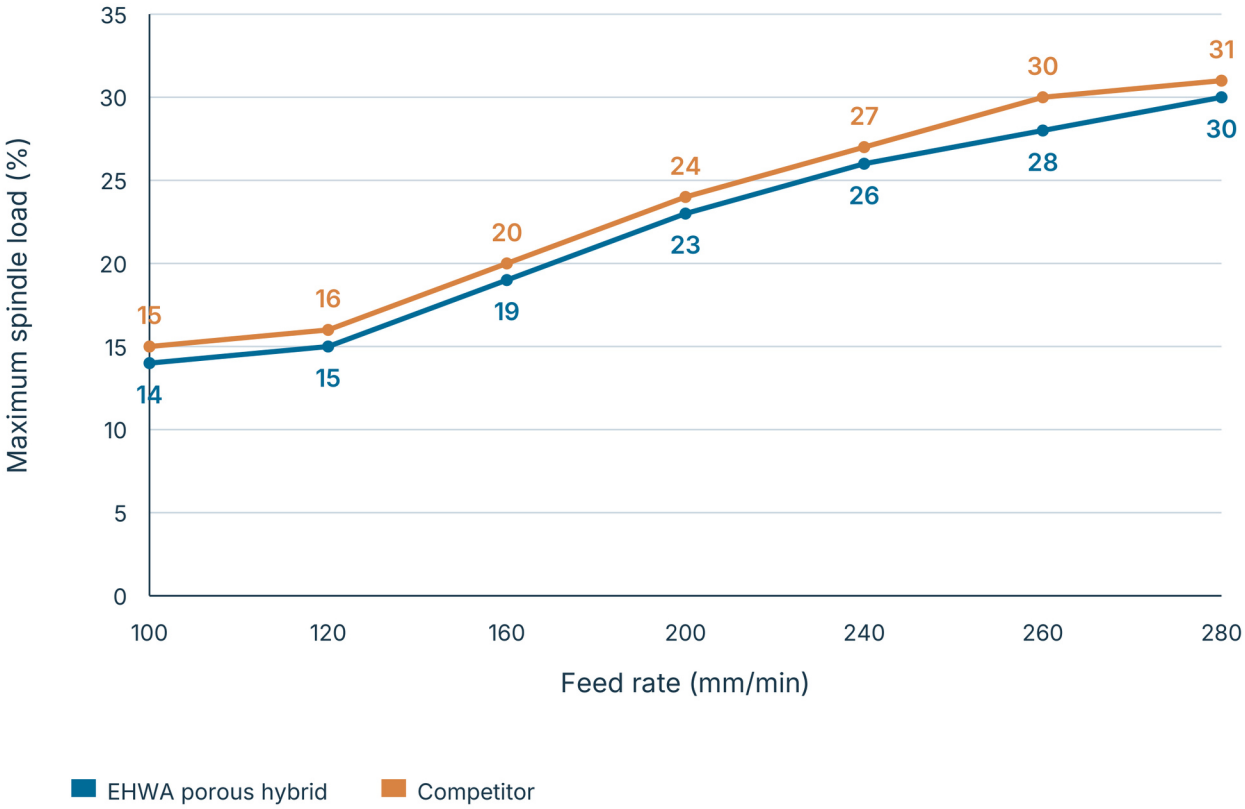
Porous hybrid bond: microstructure 1



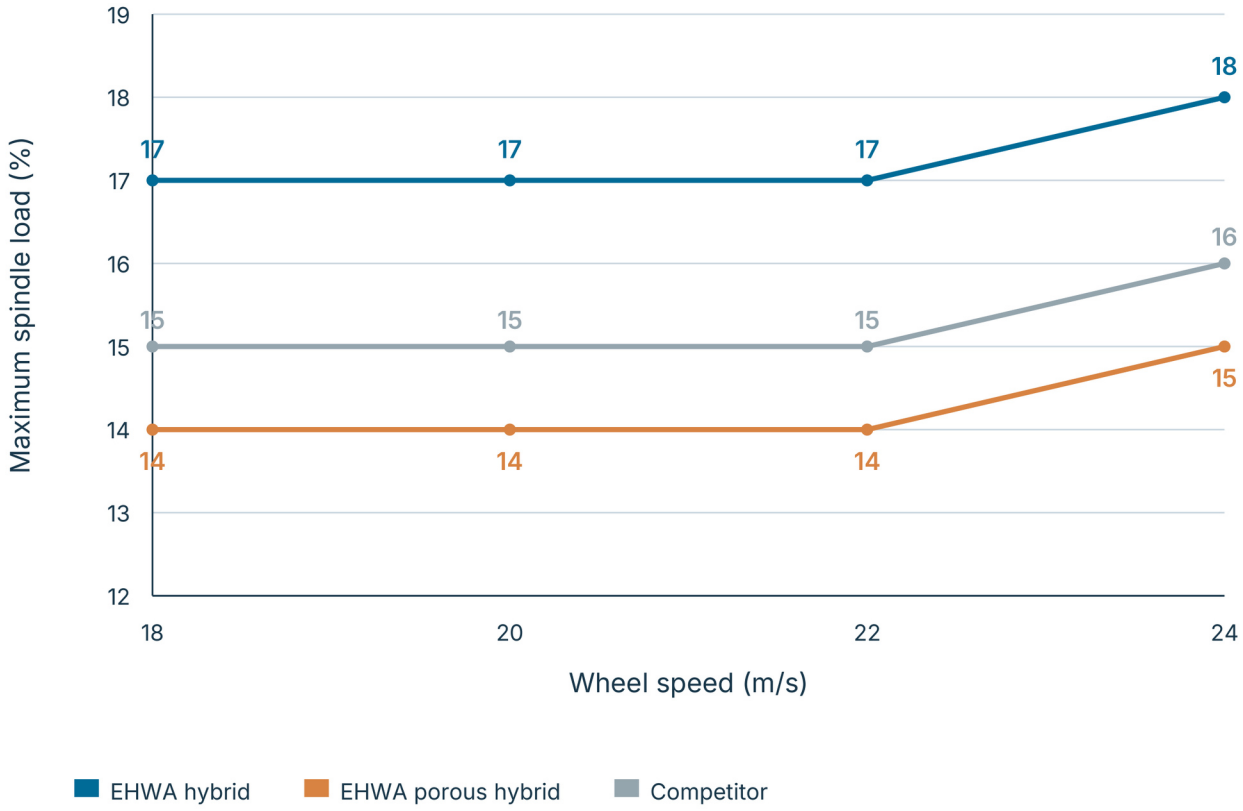
Porous hybrid bond: microstructure 2



Diamond grinding wheel, shape 1A1



Maximum spindle load versus feed rate: ANCA MX7 Linear, D54



Maximum spindle load versus wheel speed: ANCA MX7 Linear, D54

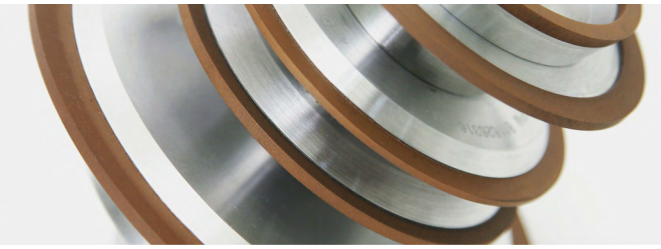
Tooling supplement: micro rotary tools

For micro drills, micro end mills and router bits, EHWA combines high productivity with low tooling costs. The described wheels offer high heat resistance, good surface and edge quality and precise dimensional edge stability. The micrographs show a hybrid bond and a high-performance polyimide bond as separate options.

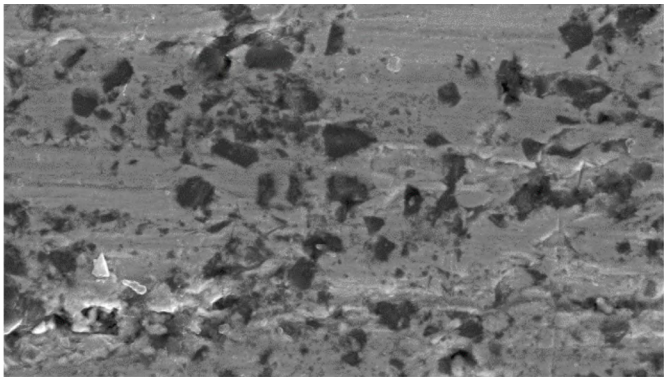
EHWA lists ROLLOMATIC, ANCA and WALTER as machine examples. The cutting-tool images are marked at ×200 and ×50 magnification. They illustrate micro geometries; no extra dimensions are inferred from the images.



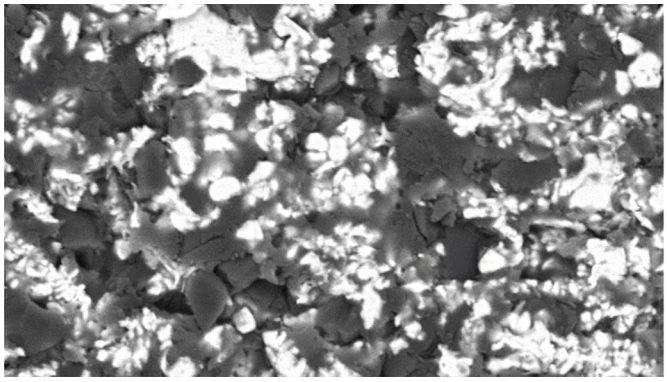
Wheel pack for micro rotary tools



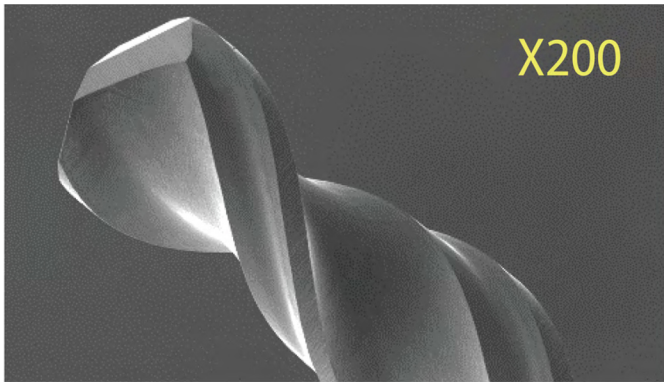
Grinding wheels for precise micro geometries



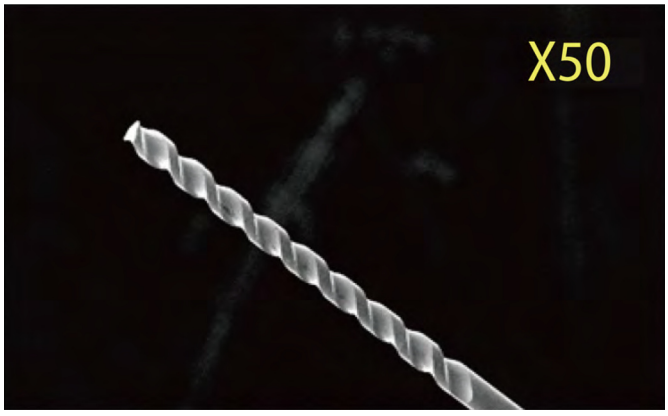
Hybrid-bond microstructure



High-performance polyimide-bond microstructure



Micro cutting tool, ×200



Micro cutting tool, ×50

Tooling supplement: Mevious metal/vitrified hybrid

Mevious MNC combines the wear resistance of a metal bond with the grinding performance of a vitrified bond. This metal/vitrified hybrid is a separate bond family and is not equated with the polyimide/metal hybrid described earlier. Long tool life and good profile stability are central benefits.

Applications include carbide end mills and drills, alloy tools and honing stones for gears. The sheet lists MNC series MJ and MS, the following grit range and the wheel-size range.

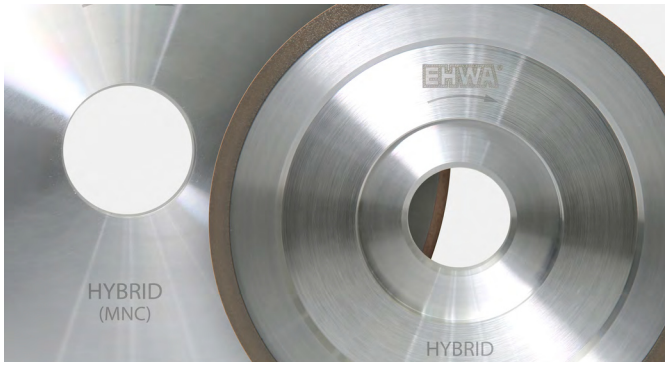
In the relative catalogue comparison, tool life is 120% and the criterion labelled “Surface roughness” is 115%, each against 100% for the competitor. For the second criterion, the source supplies neither Ra/Rz, a physical unit nor an assessment direction. The 115% value is therefore a comparison index, not a promise of roughness being 15% higher or lower.

Grit size	Wheel size	MNC bond
#60-#3000	40D-450D	MJ, MS

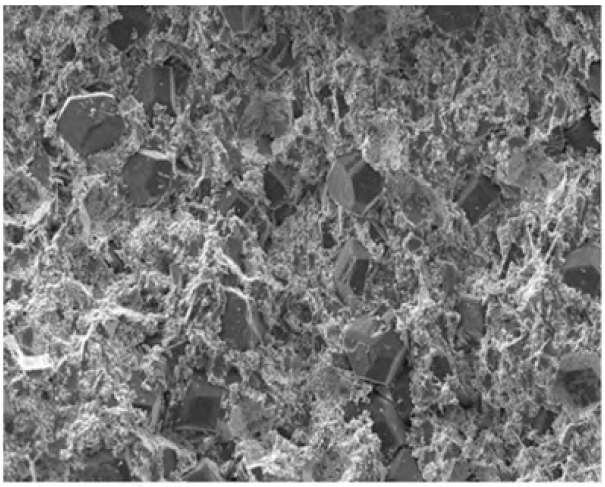
Comparison criterion	EHWA	Competitor
Tool life	120%	100%
“Surface roughness”: source index	115%	100%



MNC grinding wheels and application examples



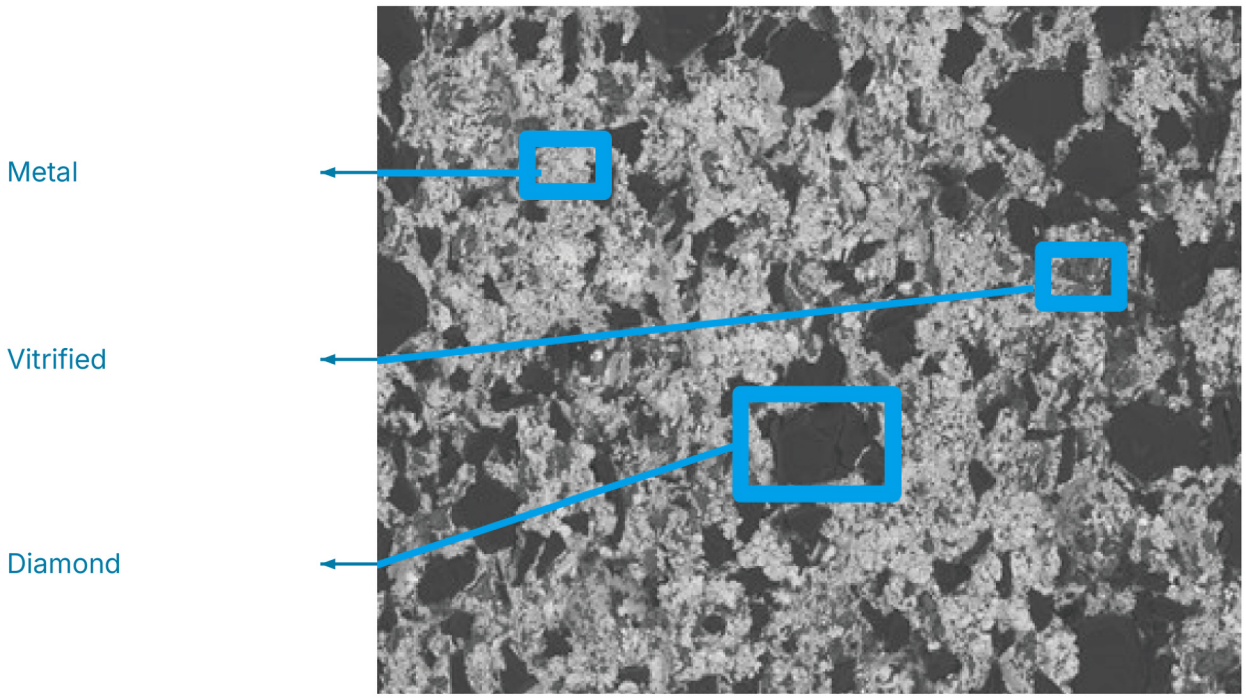
Metal/vitrified-hybrid grinding wheels



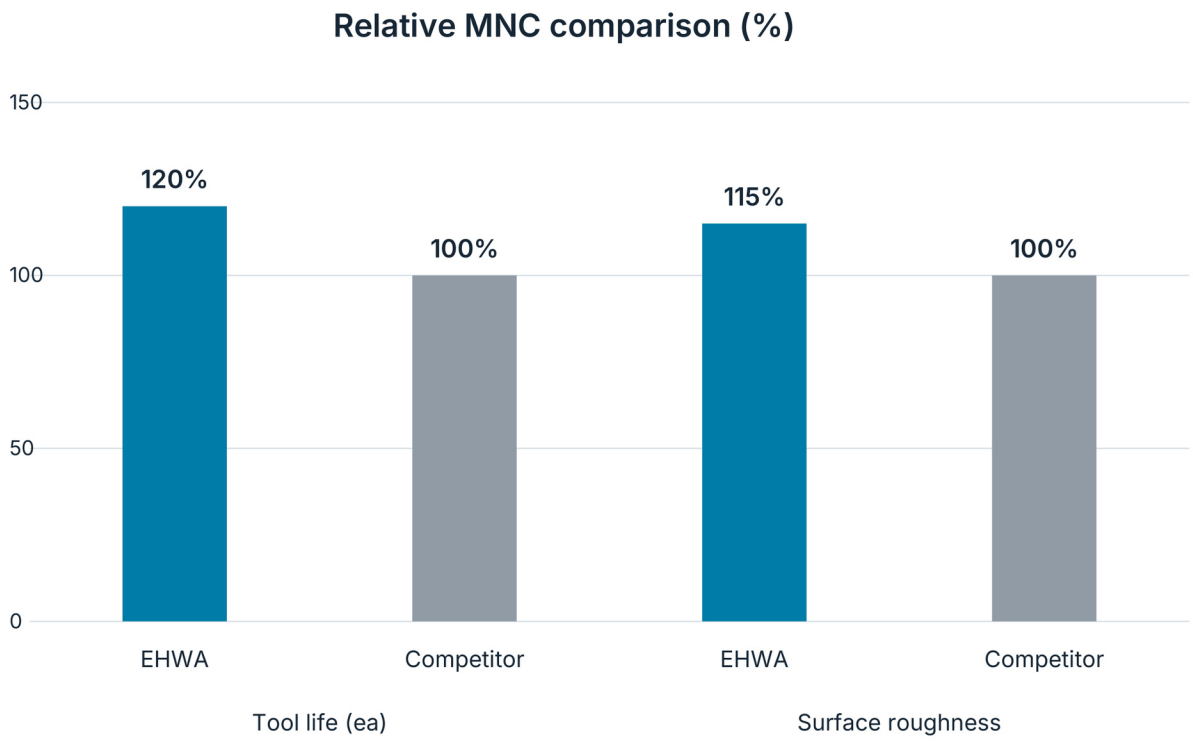
MNC-bond microstructure



Carbide rotary tools and gear applications



MNC microstructure: metal, vitrified phase and diamond



Relative MNC comparison: tool life and source surface index

Tooling supplement: vitrified CBN wheels for bearing rings

Vitrified CBN wheels grind the inner bore, inner-race track, outer-race track, lip and ring face. They support high removal rates and shorter cycle times with reduced grinding force. Further benefits include lower mechanical and thermal damage to the rings, precise surface finish and cylindricity and reduced dimensional deviation.

The supplement gives the same six process figures as the main programme. They describe this application range and are matched to the ring, wheel, dresser and machine. Four mounting arrangements are shown: ceramic core, steel core, steel quill and steel head.

Parameter	Supplement value
Wheel speed	30-80 m/s
Diameter removal	0.1-0.35 mm D
Dressing amount	5-30 µm
Dressing ratio	0.3-0.6
Dresser	Diamond rotary dresser
Coolant	Oil or emulsion



Vitrified CBN grinding wheels



Ceramic core



Steel core



Steel quill



Steel head



01 Inner bore
02 Inner track
03 Outer track
04 Lip
05 Ring face

Bearing-ring areas: 01 inner bore, 02 inner track, 03 outer track, 04 lip, 05 ring face

Tooling supplement: injector bore and seat grinding

CBN mounted points grind the bore and sealing seat of fuel-injection components. Free-cutting behaviour, long dressing intervals and efficient tool utilization support consistent grinding performance. The precise wheel shape also includes the coolant hole and slots.

The standard figures match the ranges given in the main programme. Cylindrical and pointed tools for bore and seat grinding and the slot geometry are shown as different tool forms.

Feature	Standard figure
Coolant hole	H 0.5-1.0 mm
Wheel size	D 1.5-20 mm
CBN grit size	29-76 µm
Slot	0.4-1.5 mm



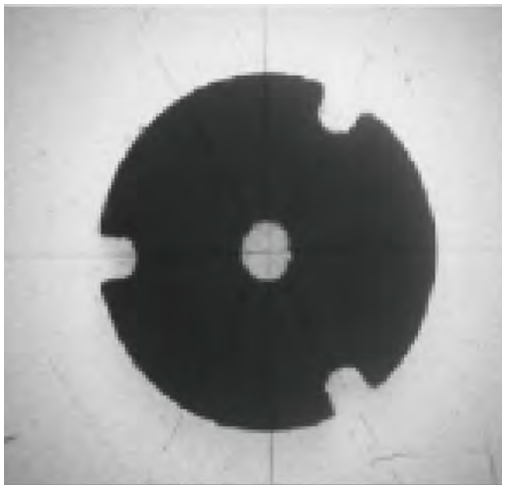
Mounted point for injector bore grinding



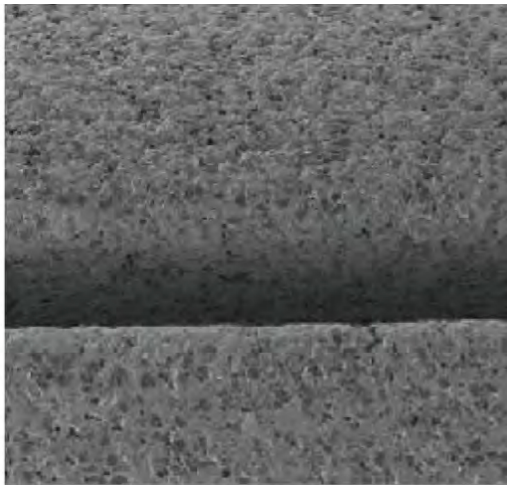
Mounted point for seat grinding



Bore and seat mounted points with different contours



End view of slot geometry



Slot in the abrasive layer: detail

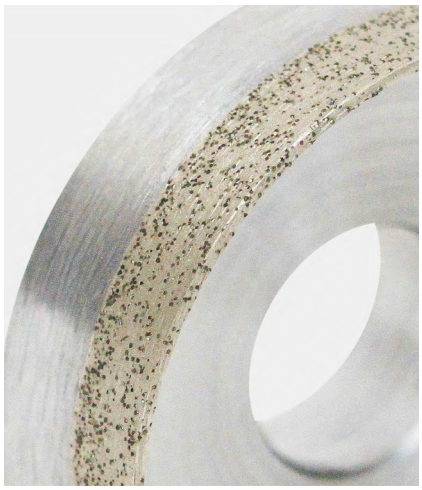
Tooling supplement: metal cup dressers

Metal cup dressers are used for bearing-ring internal grinding. They offer long life, precise dressing with low dimensional deviation after dressing and long dressing intervals. The sheet gives 20,000-30,000 dressing operations explicitly depending on grinding-wheel size.

The reference arrangements show vitrified wheels with a steel quill and a steel head. Two comparisons relate layer widths 2.5W and 1W to dressing performance and workpiece dimensional stability. No physical unit is given for the bar scales. The charts compare the illustrated variants on the original relative scales.



Metal cup dressers for bearing-ring internal grinding



Diamond layer of a cup dresser



Metal cup dressers: examples



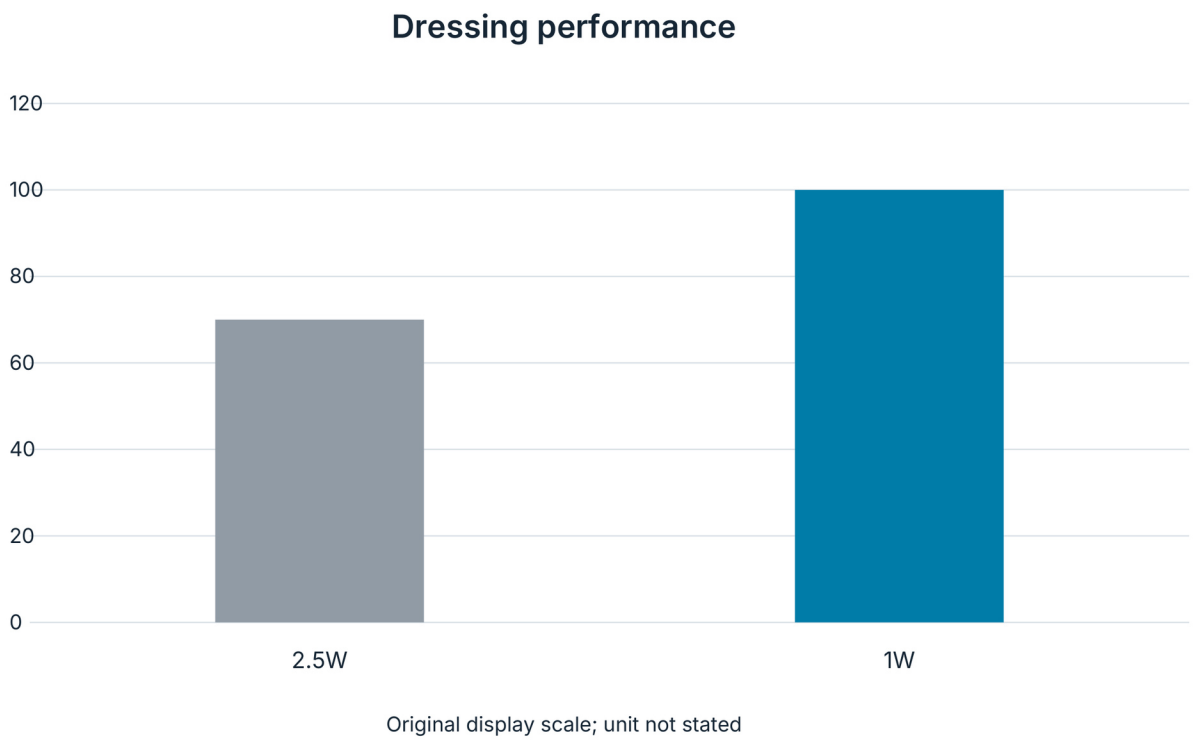
Rotary cup dressers: examples



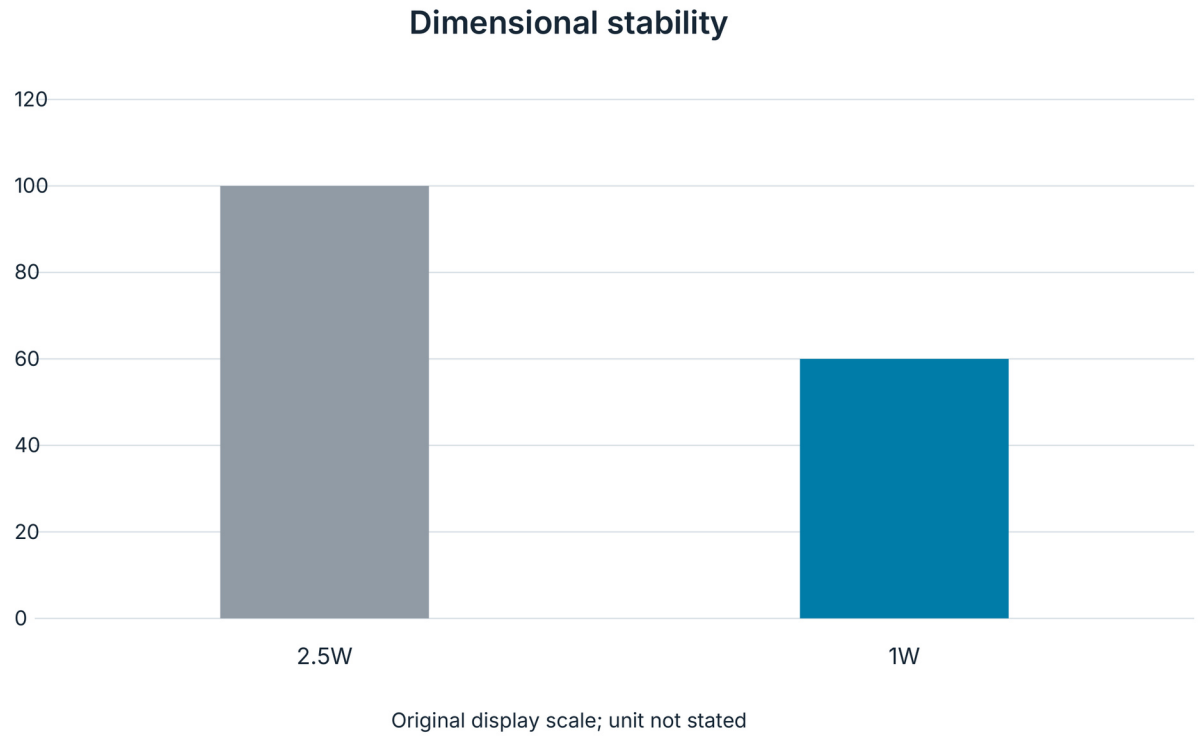
Vitrified wheel with steel quill



Vitrified wheel with steel head



Dressing performance versus diamond-layer width



Dimensional stability versus diamond-layer width

AMB supplement: peripheral insert grinding

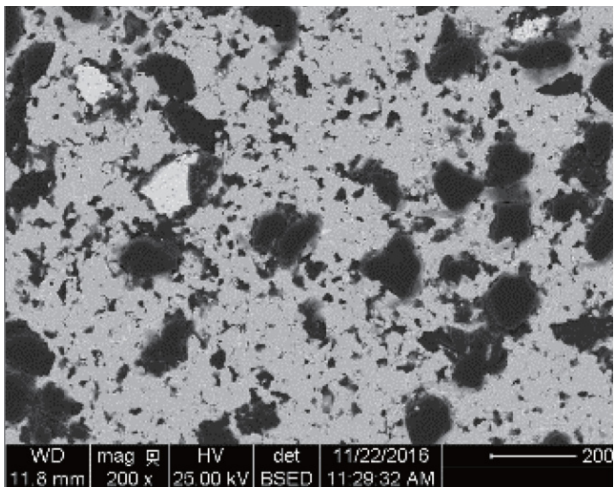
EHWA hybrid-bond wheels grind the periphery of carbide, cermet and ceramic inserts. Benefits include higher feed rates, shorter cycle times, longer dressing intervals, precise edge dimensional stability and smaller edge chipping. WENDT, AGATHON and WAIDA are listed as machine examples.

This separate trial on a WENDT WAC 715 QUATTRO uses D40C100 in a hybrid bond at 21 m/s and reports a chipping size of 10 µm. It remains separate from the earlier main-programme trial, which publishes different specifications and conditions. The microstructure and edge images illustrate the bond and cutting edge; the measured value is the test value given below.

Machine	Specification	Wheel speed	Chipping size
WENDT WAC 715 QUATTRO	D40C100 Hybrid bond	21 m/s	10 µm



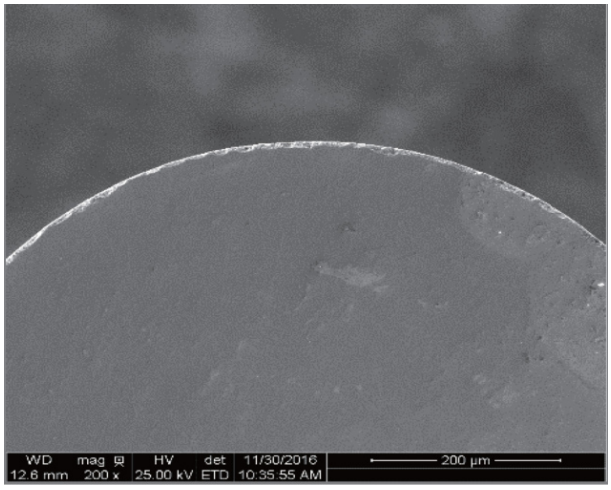
Hybrid wheel for insert peripheral grinding



Hybrid-bond microstructure



Inserts: application examples

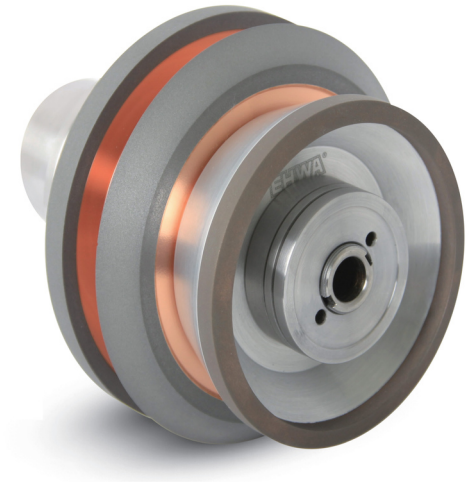


Edge micrograph in the hybrid-bond application example

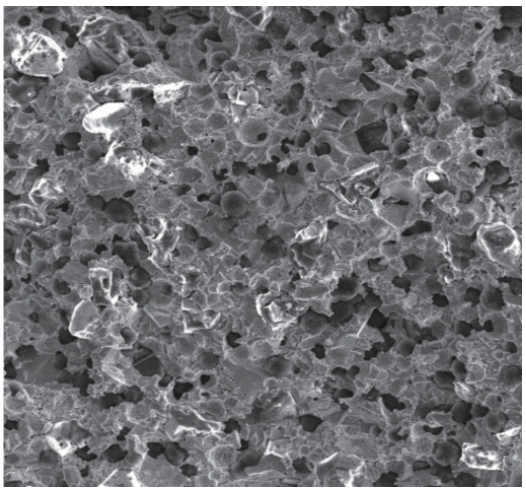
AMB supplement: porous hybrid for rotary tools

The AMB sheet presents porous hybrid bonds for flute grinding in carbide drills and end mills, drill gashing and clearance-angle grinding. It again lists high feed rates, high stock-removal rates, reduced residual stress and thermal damage, dimensional stability, surface and edge quality, long dressing intervals and low power consumption as benefits.

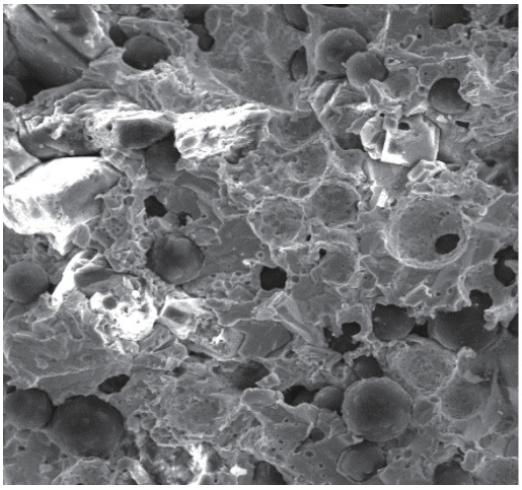
The two trials fully match the Tooling sheet presented earlier: ANCA MX7 Linear, D54 in a porous hybrid bond and the same 26 spindle-load values. The complete tables are therefore given once in that section; this AMB presentation retains both charts and the additional wheel-pack photograph. The same local explanation applies to its wording “Longer cycle time”; no new cycle time was measured or specified.



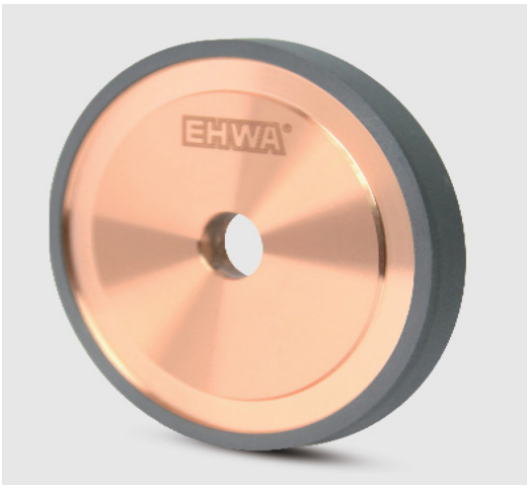
Porous hybrid wheel pack



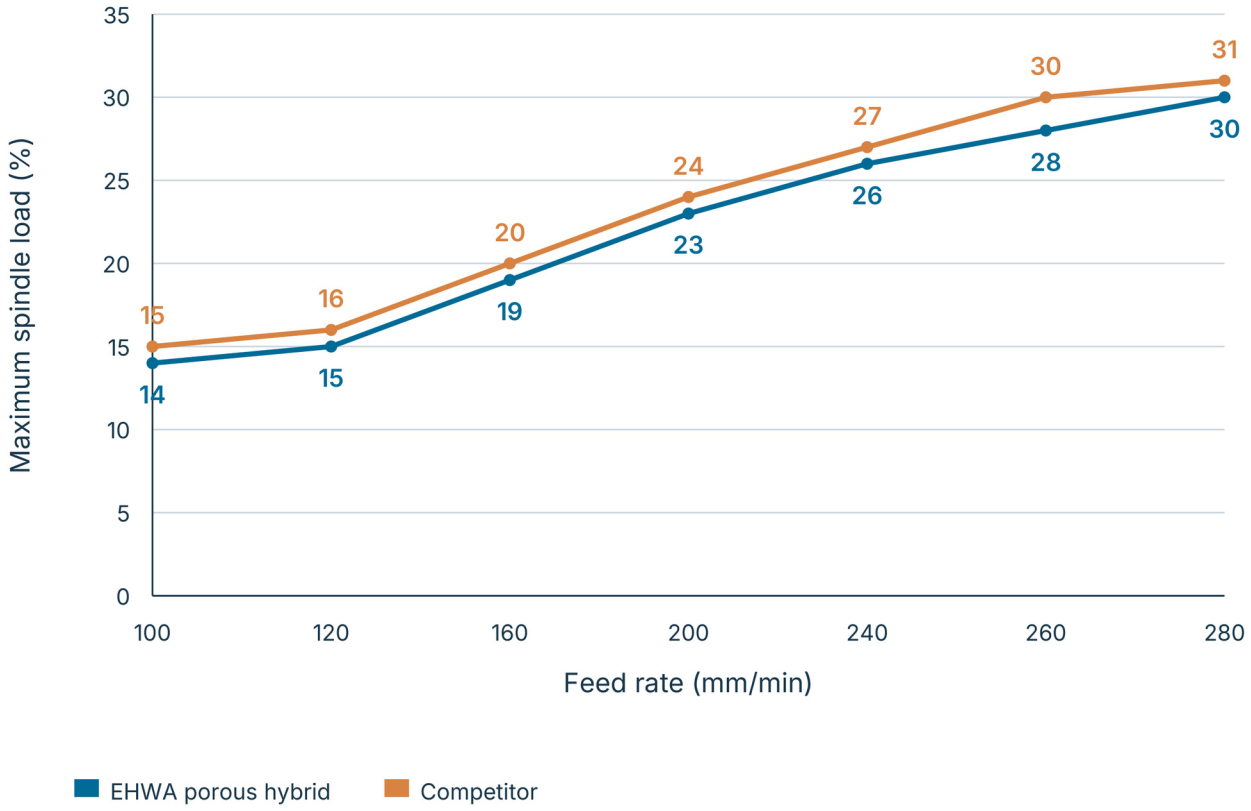
Porous hybrid bond: microstructure 1



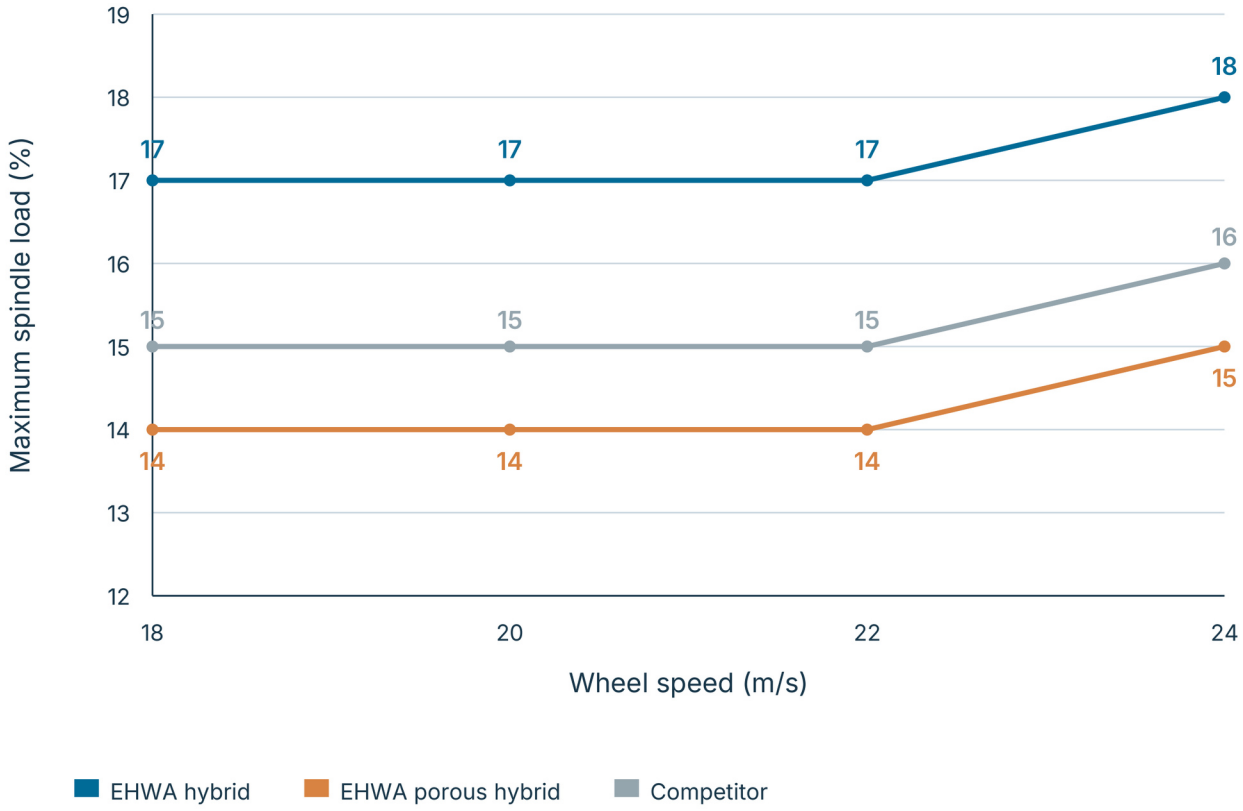
Porous hybrid bond: microstructure 2



Diamond grinding wheel, shape 1A1



Maximum spindle load and feed rate: ANCA MX7 Linear trial



Maximum spindle load and wheel speed: ANCA MX7 Linear trial

AMB supplement: rotary dressers for turbine blades

Workpiece-specific rotary dressers support precision turbine-blade manufacturing. The stated benefits are long tool life, tool precision and stable dressing performance during creep-feed grinding. Four contact arrangements show different approaches to the blade or counterprofile.

The dresser is designed for the actual workpiece contour. The schematics contain no dimension or angle values and do not define a new binding geometry. The dresser, blade component and aircraft engine remain as genuine application images.

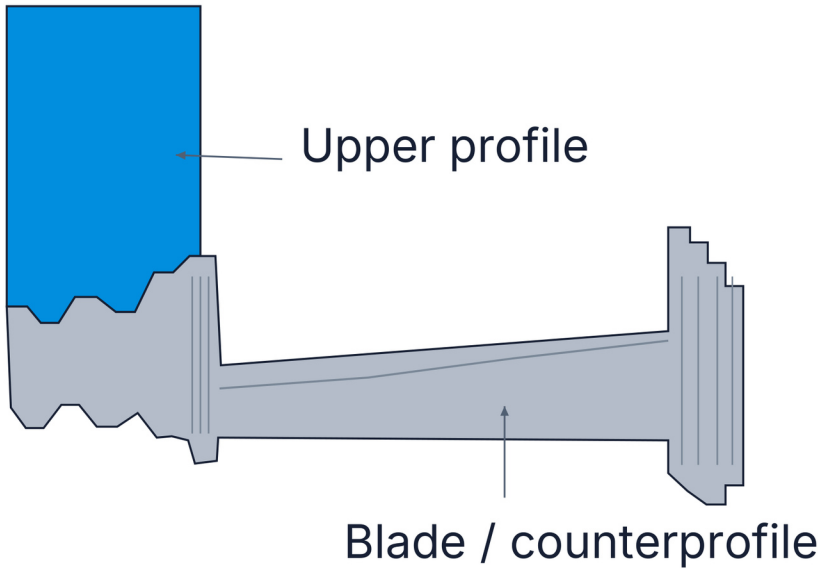


Rotary dresser and turbine blade



Aircraft engine as a turbine application

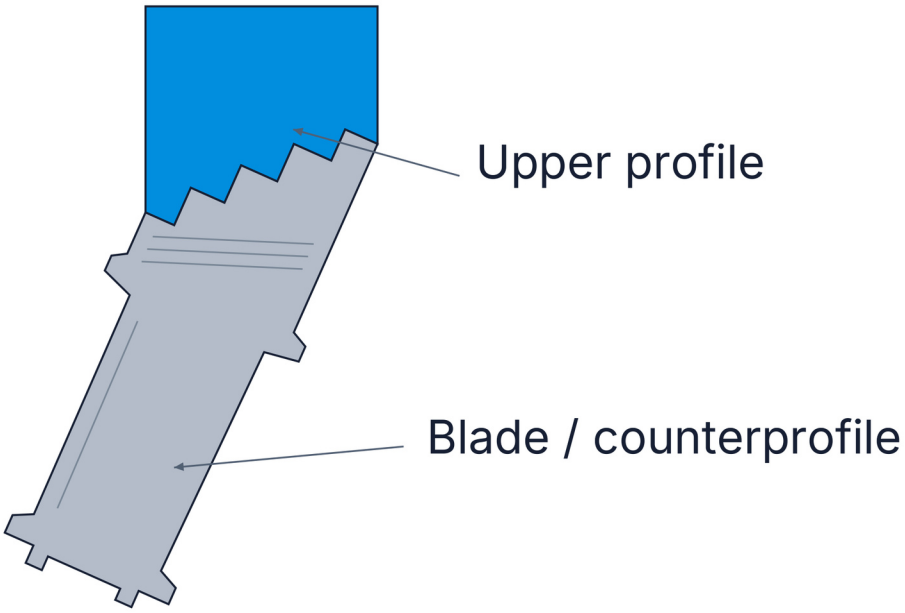
Horizontal profile contact



Schematic illustration

Profile contact for turbine blades: arrangement 1

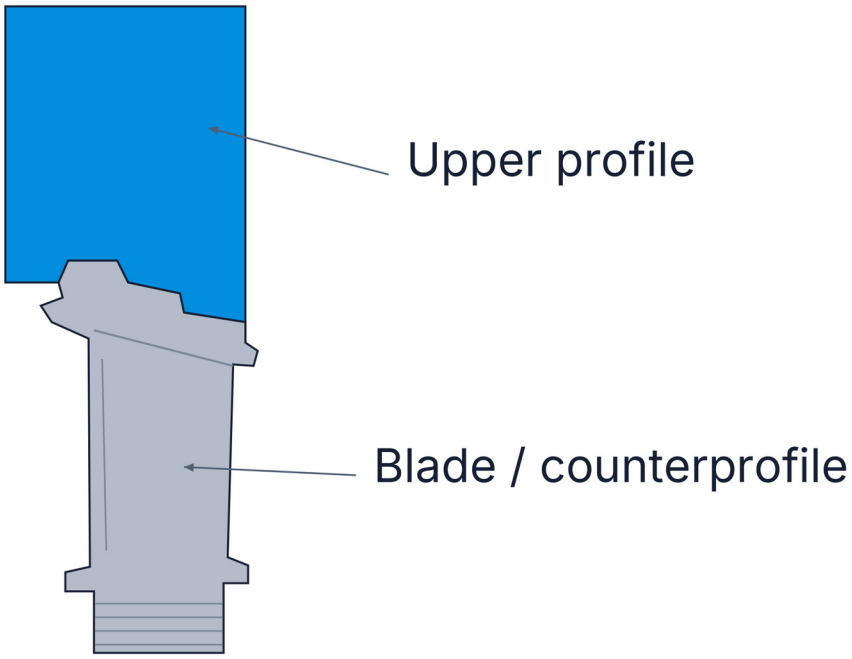
Inclined profile contact



Schematic illustration

Profile contact for turbine blades: arrangement 2

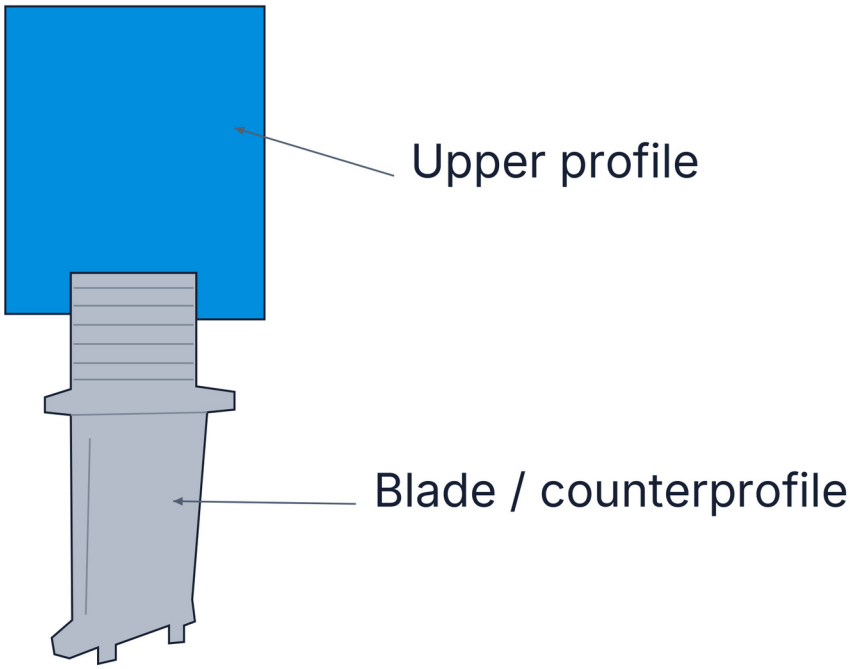
Asymmetric profile contact



Schematic illustration

Profile contact for turbine blades: arrangement 3

Central stepped contact



Schematic illustration

Profile contact for turbine blades: arrangement 4

AMB supplement: precision dressing for gear grinding

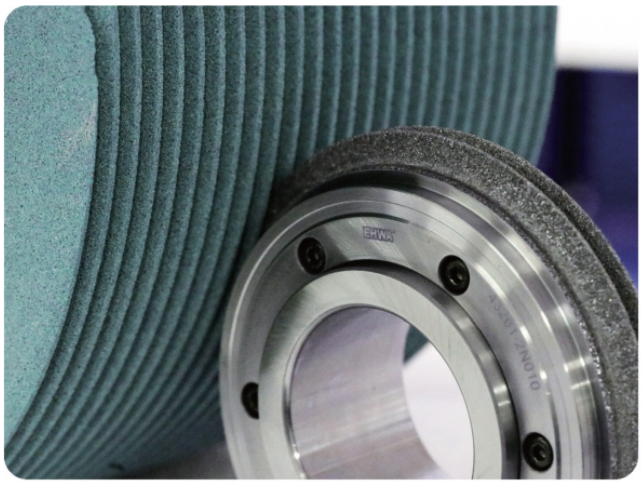
EHWA develops precision dressers to suit each customer process. Grinding simulation during design supports uniform gear-dresser quality. The sheet refers to the hob cutter and a tool it calls the “worm wheel”; in generating grinding, this is the grinding worm.

The range includes Single Cone, Double, Single & Root, Single Taper Disk and Multi Ribbed. All five tools, corresponding dressers and contact profiles are shown separately. Single & Root includes an additional lower root contour. In Single Taper Disk, the two discs are separated by a gap continuing to the base. Selection follows the profile, machine and required dressing contact.

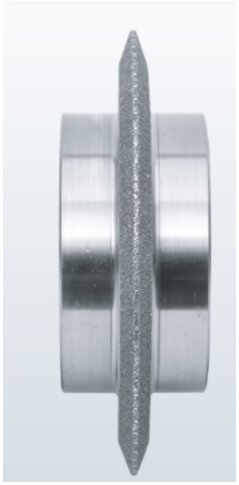
Source designation	Profile contact
Single Cone	Single contact
Double	Two contacts on a shared body
Single & Root	Tall single profile and lower asymmetric root
Single Taper Disk	Two separate profiles with a through-gap
Multi Ribbed	Multiple ribs with a shared profile body



Precision rotary dresser for gear grinding



Rotary dresser in the gear-grinding process

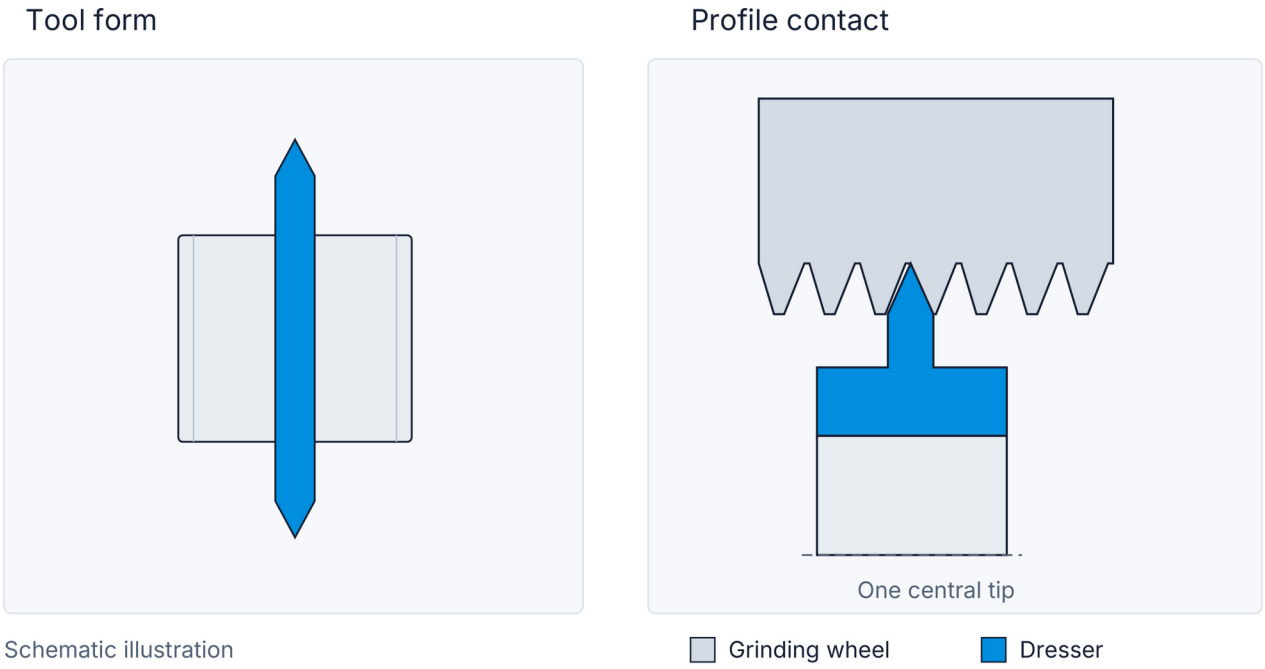


Single Cone: tool view

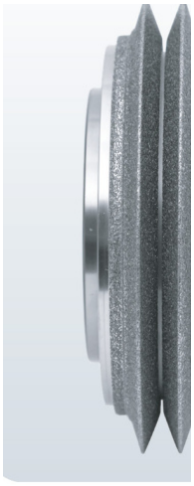


Single Cone: rotary-dresser version

Single Cone: Tool form and profile contact



Single Cone: profile contact



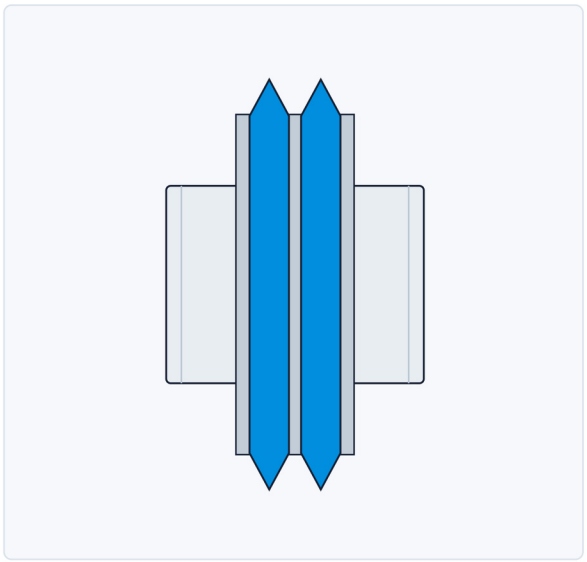
Double: tool view



Double: rotary-dresser version

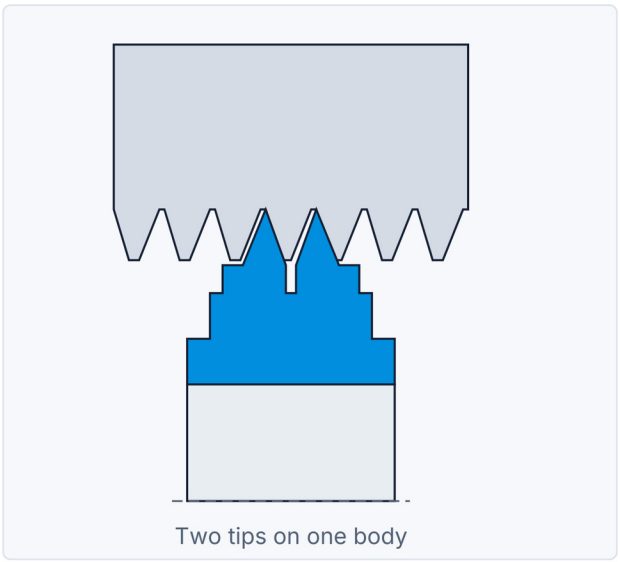
Double: Tool form and profile contact

Tool form

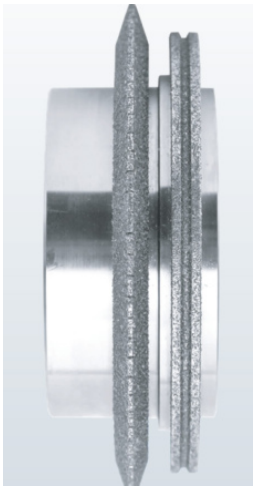


Schematic illustration

Profile contact



Double: profile contact



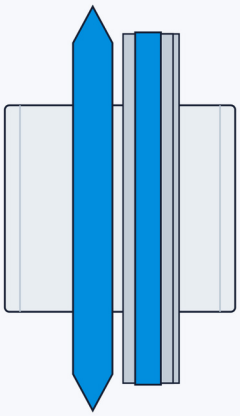
Single & Root: tool view



Single & Root: rotary-dresser version

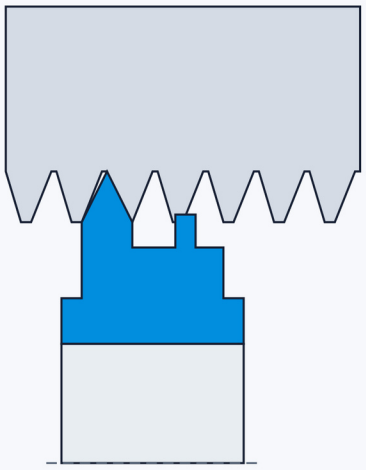
Single & Root: Tool form and profile contact

Tool form



Schematic illustration

Profile contact



Tip and lower root section

Grinding wheel Dresser

Single & Root: profile contact



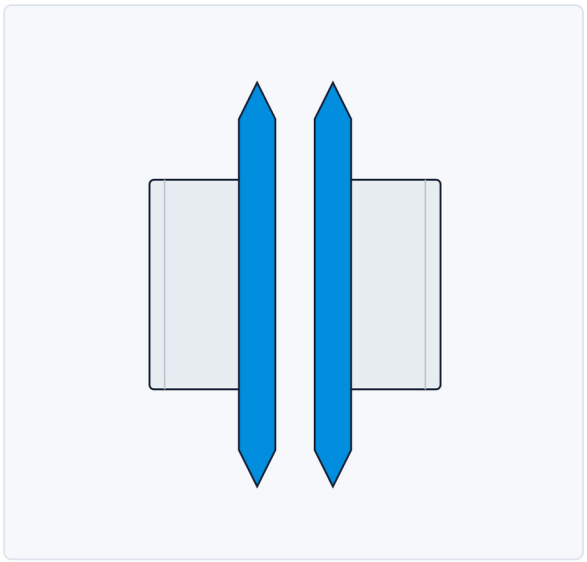
Single Taper Disk: tool view



Single Taper Disk: rotary-dresser version

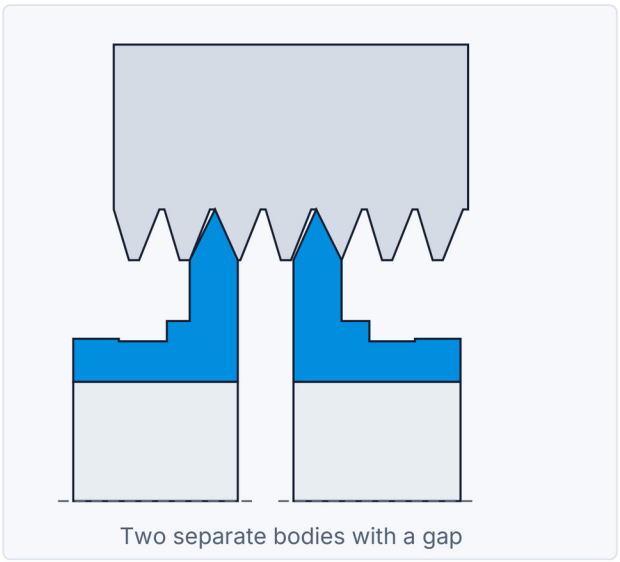
Single Taper Disk: Tool form and profile contact

Tool form

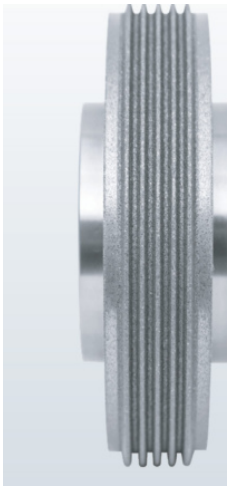


Schematic illustration

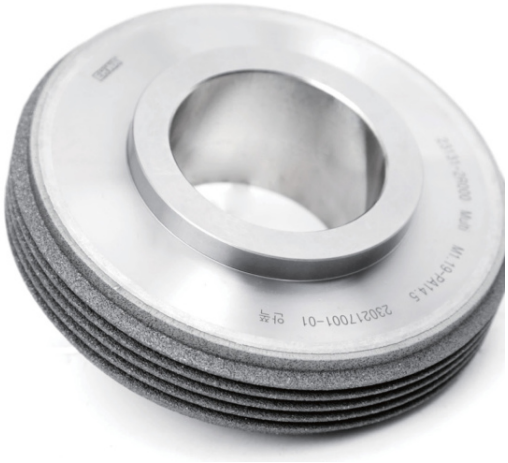
Profile contact



Single Taper Disk: profile contact

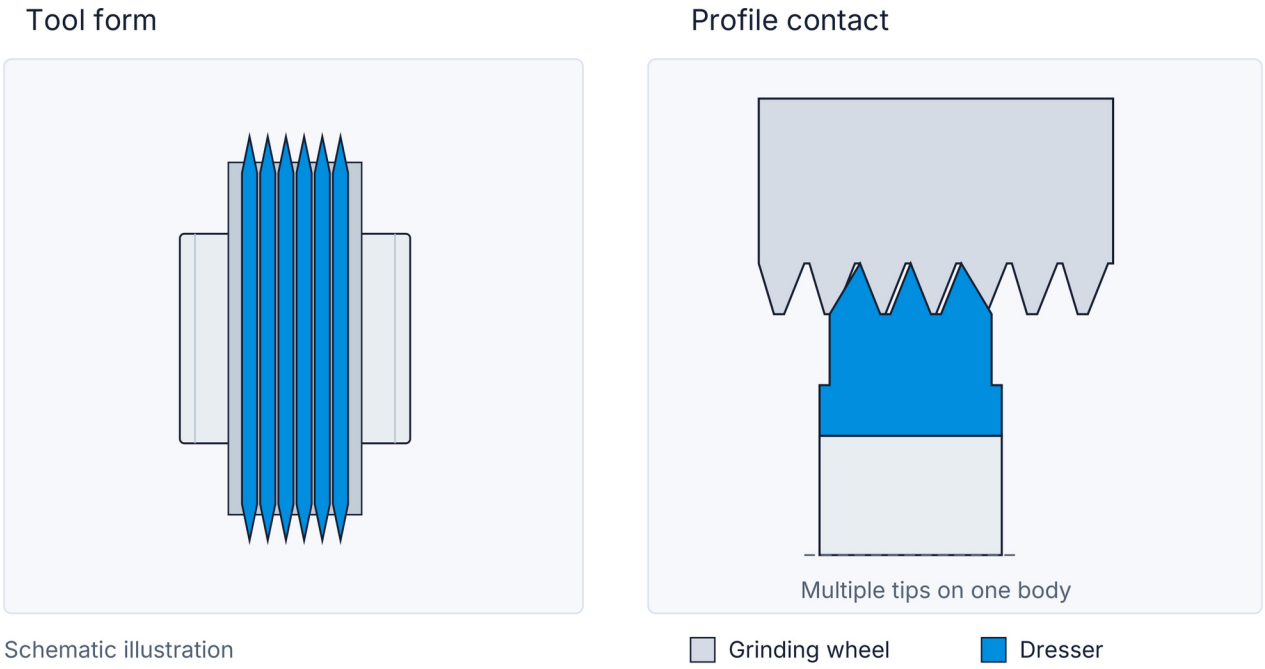


Multi Ribbed: tool view



Multi Ribbed: rotary-dresser version

Multi Ribbed: Tool form and profile contact



Multi Ribbed: profile contact

LCC: low-concentration vitrified CBN wheels

The LCC programme (Low Concentration CBN) complements vitrified CBN wheels for bearing raceways, especially inner rings, centreless grinding and suitable conventional-wheel applications. The source describes easy dressing with diamond rollers and stationary dressers, with a design intended to extend dressing intervals and reduce grinding cost.

Programme	CBN volume fraction	Source concentration designation
General CBN programme	25-50%	CON. 100-200
LCC	5-20%	CON. 20-80



Vitrified LCC grinding wheel.

The source dressing-interval chart gives 5 for the conventional wheel and 35 for EHWA LCC. Its grinding-cost chart gives 0.20 and 0.03. Axis units, workpiece, test duration and complete conditions are unspecified; these remain relative manufacturer comparisons and are not presented as times, prices or universal savings commitments.

Peripheral grinding: the D30C100 trial from the 2023 exhibition programme

A hybrid wheel for tungsten-carbide, cermet and ceramic inserts is shown in a WENDT WAC 715 QUATTRO trial. The stated values belong to this test and supplement the later D40C100 example at 21 m/s as a separate source case.

Machine	Specification	Wheel speed	Source load entry	Edge chipping
WENDT WAC 715 QUATTRO	D30C100 Hybrid bond	20 m/s	Low 0.7 kW	10 µm

The source labels the kW entry “Grinding Force”. As kW is a power unit, the value is not relabelled as a force or converted into newtons. WENDT, AGATHON and WAIDA are listed as machine examples for the peripheral-grinding programme.

Selecting a stationary dresser connects diamond material, wheel profile and holder geometry. This detailed programme supplements the dressing methods in the grinding catalogue.

Static dressers: types and materials

SDD single-point dressers use a selected diamond crystal held in a metal matrix. FDD forming dressers use a shaped diamond for defined profiles. MDD distribute the dressing contact across two or more diamonds. IDD contain fine diamond particles in a metal matrix. PCD dressers use brazed polycrystalline diamond elements for complex profiles. Select the dresser for the wheel, profile, dressing infeed and desired surface.

Material/form	Description	Application in document
Natural diamond: octahedron A	Point angle 90°	SDD / MDD
Natural diamond: dodecahedron B	Point angle 120°	SDD / MDD
Natural diamond: elongated form C	Elongated crystal	FDD cone form
Natural diamond: macle D	Triangular form	FDD chisel form
Natural diamond: shaped E	Round or flat form	FDD chisel form
Mono diamond F	Synthetic single crystal	SDD / FDD
CVD diamond G	Diamond grown by chemical vapour deposition	SDD / FDD / MDD
PCD	Polycrystalline diamond	PCD profile dresser

The material overview also labels PCD as C, while the roof-type programme identifies PCD as H. These differing source codes are not treated as an unambiguous ordering key; specify PCD by its material name.

Wheel shape	Recommendation in detailed dresser programme
Straight	SDD / MDD / IDD
Tapered	SDD / MDD / IDD
Convex	SDD / FDD / MDD
Concave	FDD / MDD
Angled	FDD / MDD
Multi-angled	FDD / MDD

For concave profiles this detailed programme recommends FDD/MDD, whereas the general grinding overview lists SDD/MDD/IDD. The differing recommendations remain tied to their source programmes. Select the dresser for the contour, width and dressing strategy.



Natural octahedral diamonds.



Natural dodecahedral diamonds.



Elongated natural diamonds.



Macle diamonds.



Shaped natural diamonds.



Mono diamond.



CVD diamond plates.



PCD elements.

Diamond-material property comparison

The figures reproduce the dresser document comparison. Test methods, material quality and variability are not specified; they are not guaranteed material limits for an individual tool design.

Property	Natural diamond	Mono	CVD	PCD	WC (K10)
Thermal conductivity [W/(m·K)]	2000	2000	1000	560	110
Hardness [GPa]	50-100	50-100	80-100	50	18
Toughness [ambiguous source unit]	3.4	3.4	5-6	8-9	10.5
Tensile strength [source heading Gpa; unconfirmed]	1000-3000	1000-3000	400-800	1260	-
Compressive strength [GPa]	9	9	16	7.6	6.1
TRS [GPa]	2.9	2.9	1.3	1.2	2.4

The tensile-strength row gives 1000-3000 under the heading Gpa; the unit is unconfirmed and is not silently converted to MPa or GPa. The printed toughness unit is also typographically ambiguous. The numerical values remain source observations.

Linear dimensions are in mm and angle values in degrees. MT1 and MK1 are taper designations. The corresponding designation controls the taper version.

SDD: single-point dressers with standard dimensions

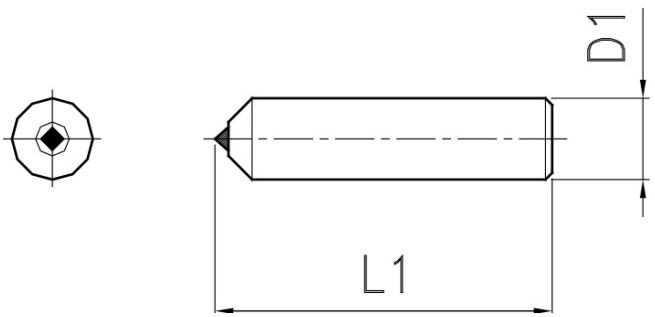
Natural-diamond A/B versions are specified from 1/30 to 1 ct in the detailed dimension programme. Synthetic F/G versions list 0.6 × 0.6 × 3, 0.8 × 0.8 × 3, 1.0 × 1.0 × 3 and 1.5 × 1.5 × 3 mm. The general grinding-programme overview separately gives a wider SDD range up to 1.5 ct; it does not establish an additional standard geometry.

Wheel grit size	Recommended source infeed [mm]
20-60	0.025-0.05
80-140	0.015-0.025
160-200	0.01-0.015

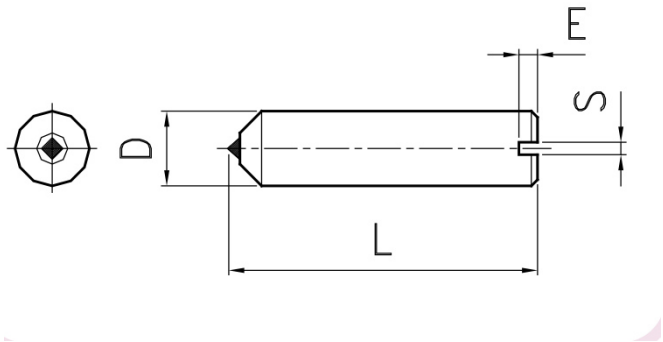
Source wheel diameter	Diamond size
100-150	1/7 ct
175-250	1/5 ct
300-350	1/4 ct
350-400	1/3 ct
400-500	1/2 ct
500-600	3/4 ct
600 and larger	1 ct

The selection ranges are taken from the source; unlisted diameter intervals are not independently interpolated. Match infeed, wheel width and diamond size to the process.

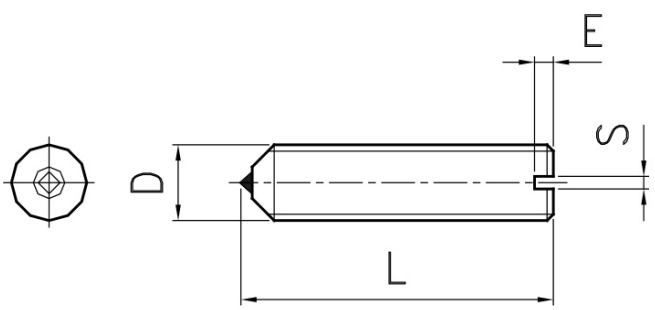
Product	Dimension labels and source values
SDD-A01	D1 = 12; L1 = 90
SDD-A02	L = 50; D = 10; S = 1.5; E = 2
SDD-A03	Pitch = M8X1.0; L = 16; S = 1.0; E = 2
SDD-A09	D1 = 18; L1 = 60; L2 = 42; D2 = 12; V = MT1
SDD-A10	D1 = 12; D2 = 8; L1 = 42; L2 = 25
SDD-A12	D1 = 10; D2 = 8; L1* = 43; L2 = 22; L3 = 8
SDD-A13	D1 = 16; D2 = 11; L1 = 37; L2 = 22; W = 14
SDD-A14	D1 = 16; D2 = 11; D3 = 8; L1 = 34; L2 = 19; L3* = 8
SDD-A18	D1 = 16; D2 = 11; L1 = 29; L2 = 15; W = 14
SDD-A20	D1 = 12.4; D2 = 12.065; L1 = 54; L2 = 41; MK# = MK1



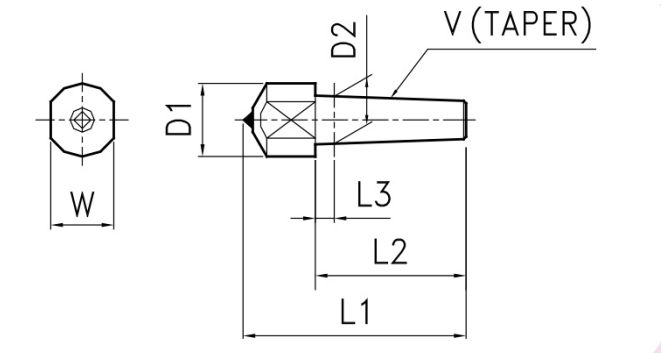
SDD-A01: dimensioned standard drawing.



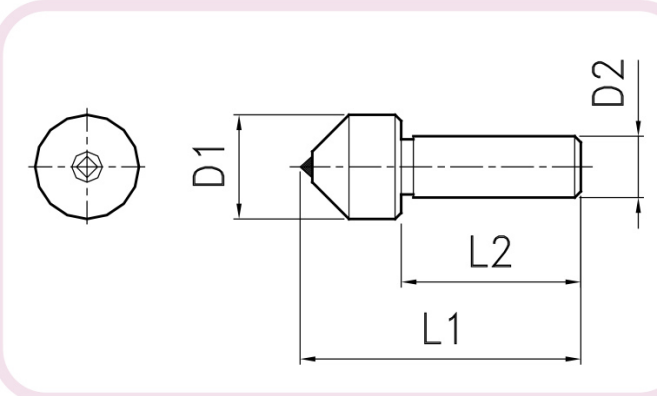
SDD-A02: dimensioned standard drawing.



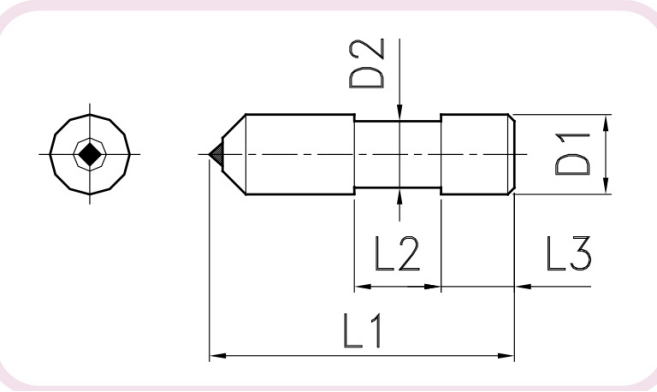
SDD-A03: dimensioned standard drawing.



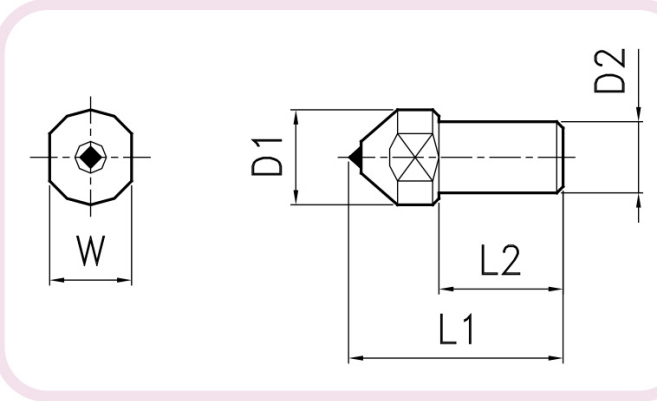
SDD-A09: dimensioned standard drawing.



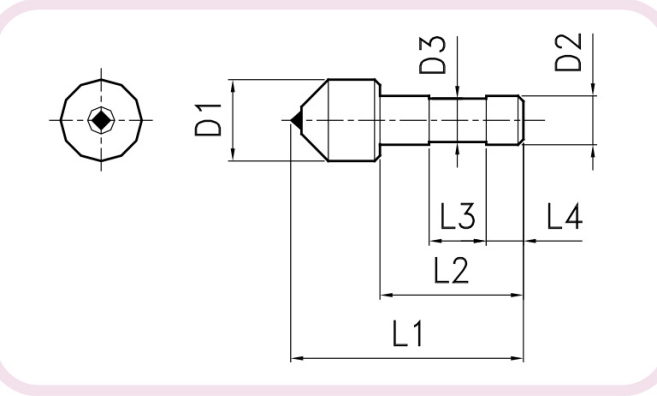
SDD-A10: dimensioned standard drawing.



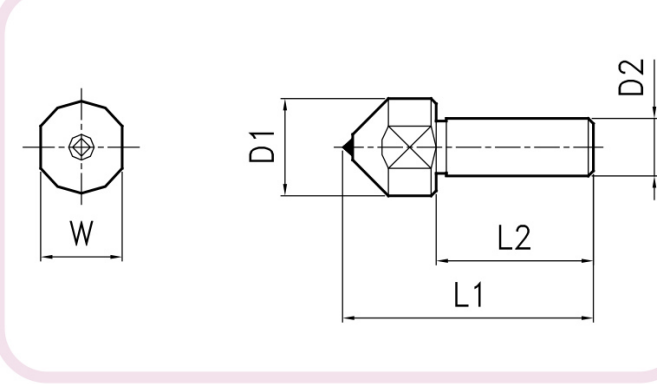
SDD-A12: dimensioned standard drawing.



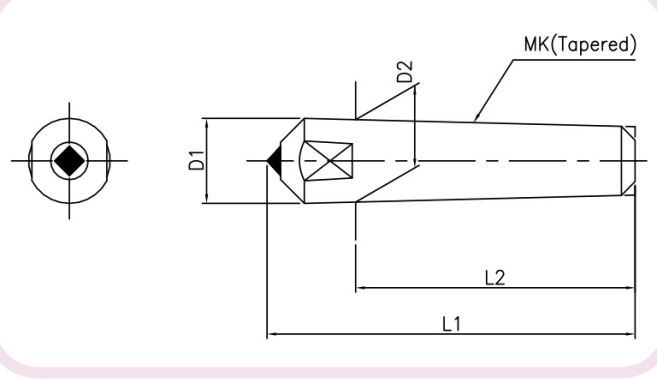
SDD-A13: dimensioned standard drawing.



SDD-A14: dimensioned standard drawing.



SDD-A18: dimensioned standard drawing.



SDD-A20: dimensioned standard drawing.

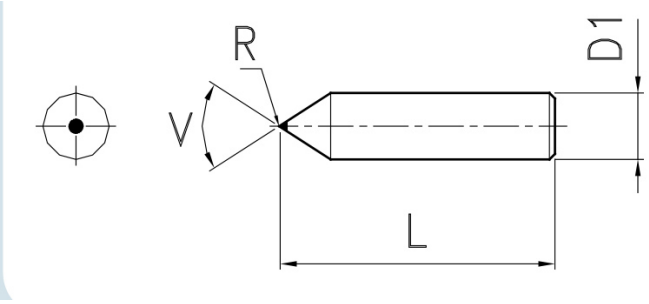
* SDD-A12: The source prints L2 twice. The 43 mm value is assigned to L1 here from the drawing; L2 = 22 and L3 = 8 are retained. SDD-A14: The table value L3 = 8 remains tied to its table label, while the drawing shows additional or differing L3/L4 references. Resolve this individual point against the drawing when ordering.

FDD: roof, chisel and cone forms

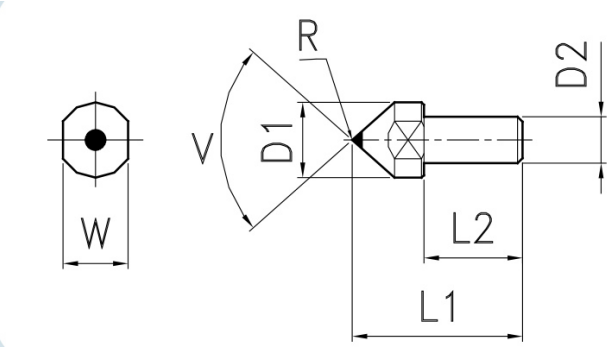
Forming diamond dressers generate defined wheel profiles. The roof form lists macle and shaped natural diamonds, mono, CVD and PCD versions from 1/4 to 3/4 ct. The chisel form lists macle and shaped natural diamonds, mono and CVD from 1/4 to 3/4 ct. The cone form lists elongated natural diamond and CVD from 1/4 to 1/2 ct. A larger dresser radius can extend tool use while changing wheel engagement; select radius and form for the surface and thermal load.

Chisel dressing	Radius R	Angle
Roughing	0.3-0.5	50-60°
Finishing	0.1-0.25	30-45°

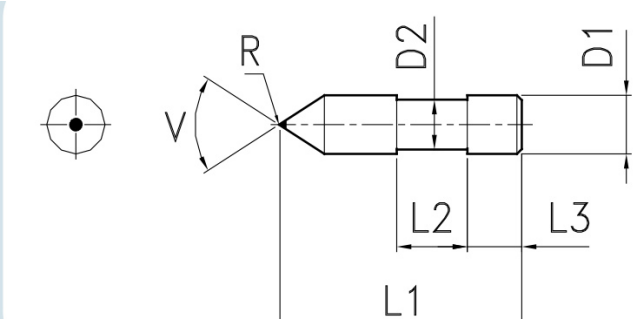
Product	Dimension labels and source values
FDD-C01	D1 = 11; L = 30; V = 90; R = 0.3
FDD-C13	D1 = 15; D2 = 11; L1 = 23; V = 90; R = 0.3
FDD-C14	D1 = 10; D2 = 8; L1 = 43; V = 90; R = 0.3
FDD-C19	D = 11; L = 46.5; V = 70; R = 0.3
FDD-D01	D = 11; L = 40; V = 55; R = 0.2
FDD-D12	D = 10; L = 45; V = 55; R = 0.2
FDD-D05	D = 11; L = 45; W = 9; V = 55; R = 0.2
FDD-D14	D1 = 12; D = 8; L = 32; V = 55; R = 0.2
FDD-D17	D = 9.5; L = 44.5; W = 6; V = 40; R = 0.25
FDD-D19	D = 11; L = 46; V = 60; R = 0.3
FDD-D20	D = 8; L = 29; V = 55; R = 0.2



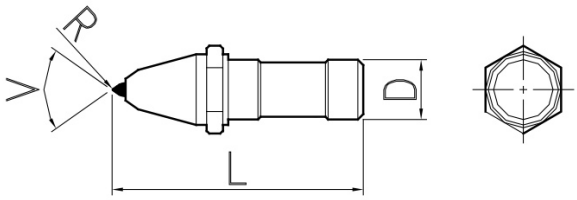
FDD-C01: dimensioned standard drawing.



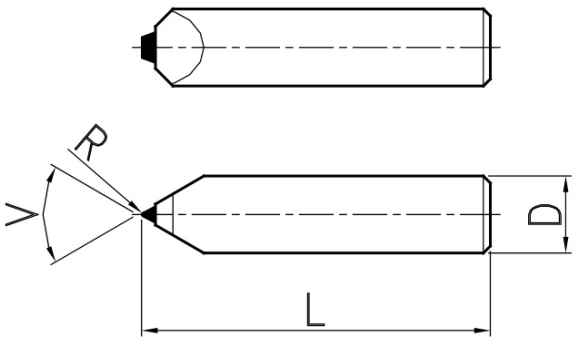
FDD-C13: dimensioned standard drawing.



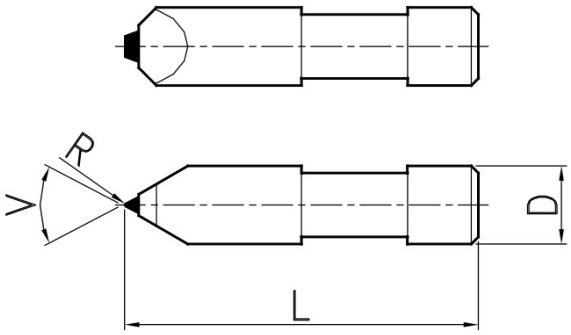
FDD-C14: dimensioned standard drawing.



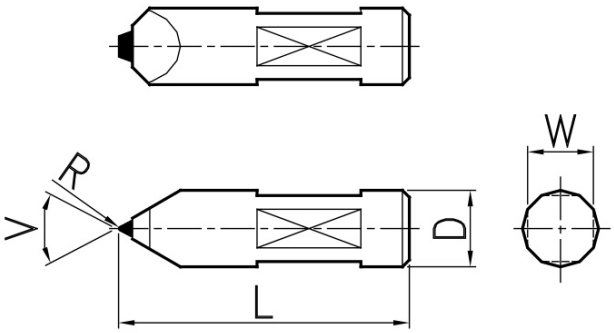
FDD-C19: dimensioned standard drawing.



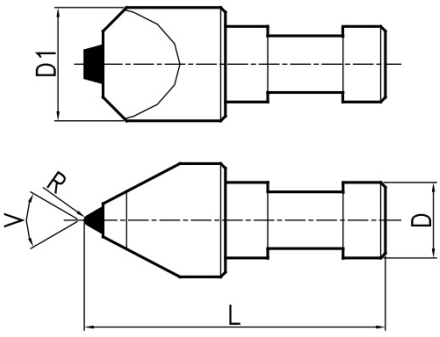
FDD-D01: dimensioned standard drawing.



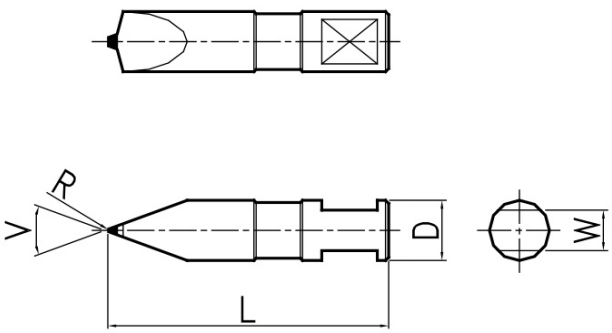
FDD-D12: dimensioned standard drawing.



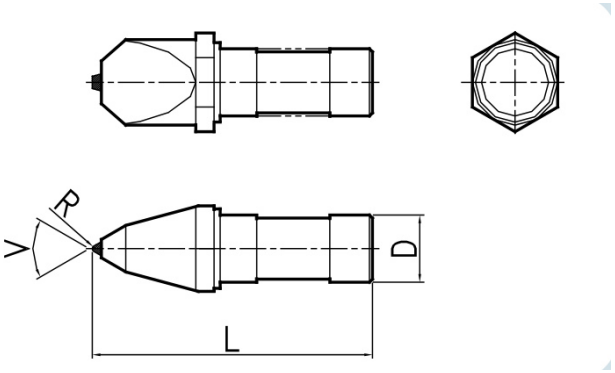
FDD-D05: dimensioned standard drawing.



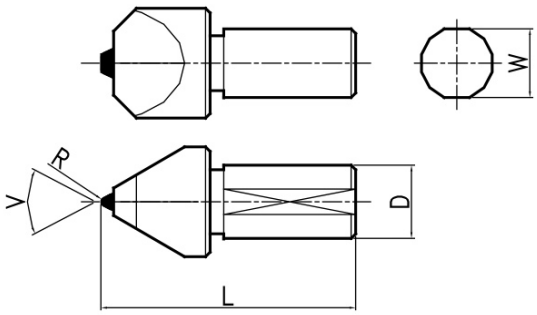
FDD-D14: dimensioned standard drawing.



FDD-D17: dimensioned standard drawing.



FDD-D19: dimensioned standard drawing.

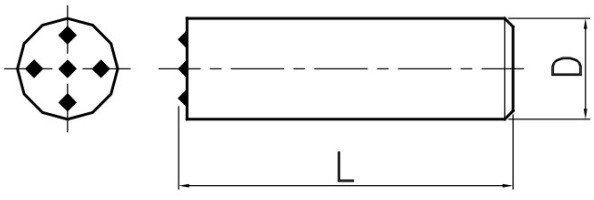


FDD-D20: dimensioned standard drawing.

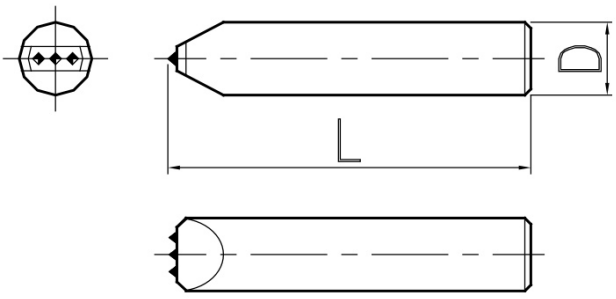
MDD: multi-point and blade dressers

Multi-point dressers distribute the dressing force across several diamonds. The general type is described for straight wheels, and the blade type for wide or profiled wheels. Natural-diamond A/B versions are specified from 1/30 to 1/3 ct. CVD rods are listed in 0.4 × 0.4 × 5, 0.6 × 0.6 × 5, 0.8 × 0.8 × 3, 0.8 × 0.8 × 6 and 1.0 × 1.0 × 3 mm. Elongated natural diamonds are listed from 1/80 to 1/20 ct. Select the quantity and arrangement for the profile and wheel width.

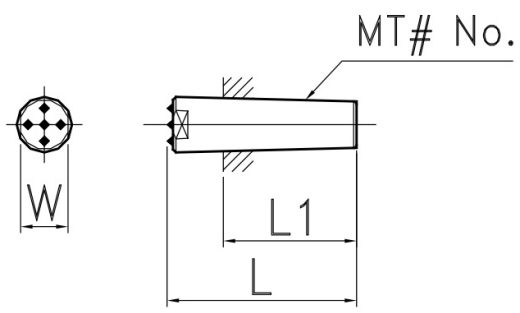
Product	Dimension labels and source values
MDD-A01	D = 11; L = 40
MDD-A05	D = 11; L = 40
MDD-A09	L = 32; L1 = 22; W = 8; Taper = MT#No.1
MDD-A10	D = 11; L = 29
MDD-G11	L = 28; T = 5; W = 10; H = 6.1
MDD-G12	L = 33; T = 5; W = 20; H = 6.1
MDD-G13	L = 28; T = 5; W = 10; H = 6.1
MDD-G14	L = 33; T = 5; W = 20; H = 6.1
MDD-G21	D = 11; L = 41; W1 = 8; W2 = 10
MDD-G22	D = 8; L = 29; V1 = 55; V2 = 10; R = 0.3
MDD-G23	D = 11; L = 33; W = 10
MDD-G24	D = 11; L = 46; V1 = 55; V2 = 5; R = 0.3
MDD-C12	L = 28; T = 5; W = 20; H = 6.1
MDD-C14	L = 33; T = 5; W = 20; H = 6.1
MDD-B13	L = 28; T = 5; W = 10; H = 10
MDD-B12	D = 8; W = 10; V = 15; T = 1.5



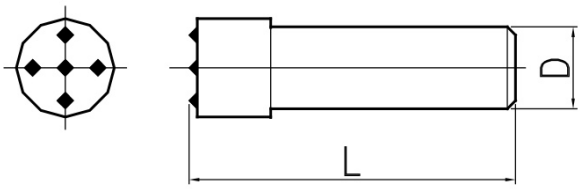
MDD-A01: dimensioned standard drawing.



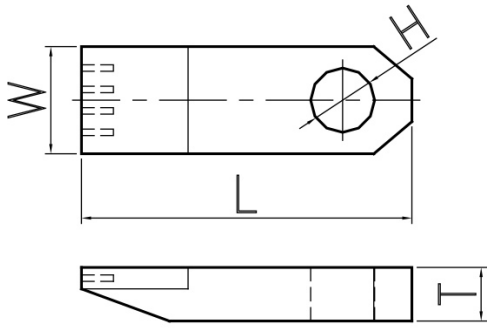
MDD-A05: dimensioned standard drawing.



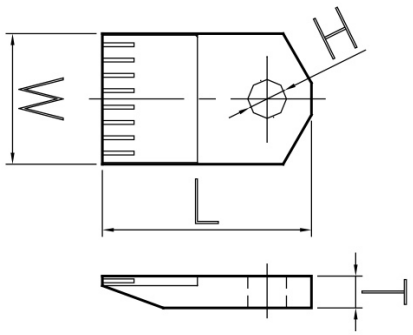
MDD-A09: dimensioned standard drawing.



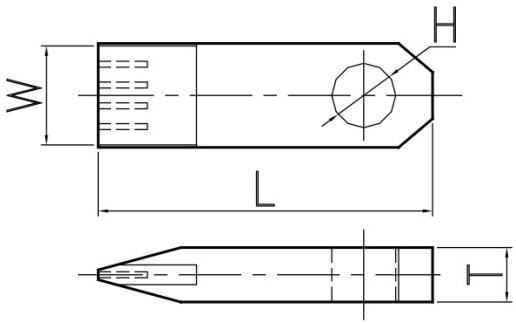
MDD-A10: dimensioned standard drawing.



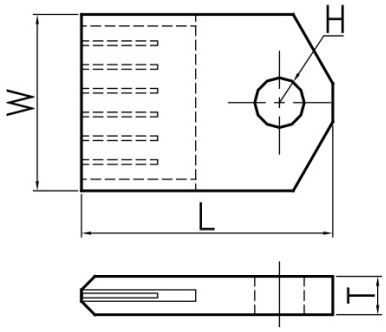
MDD-G11: dimensioned standard drawing.



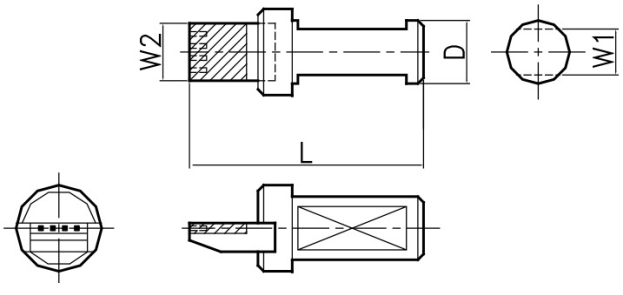
MDD-G12: dimensioned standard drawing.



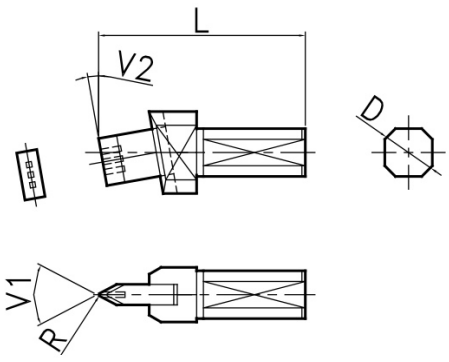
MDD-G13: dimensioned standard drawing.



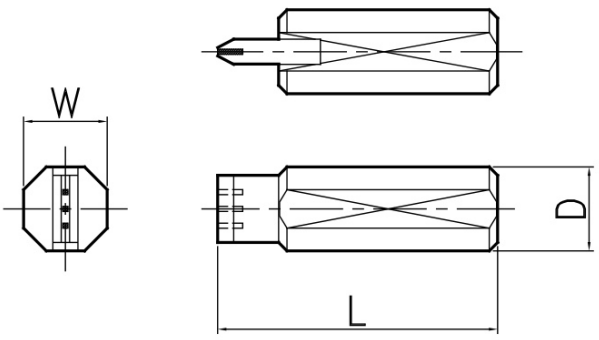
MDD-G14: dimensioned standard drawing.



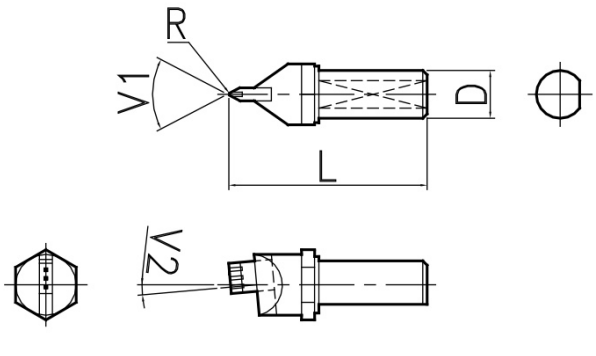
MDD-G21: dimensioned standard drawing.



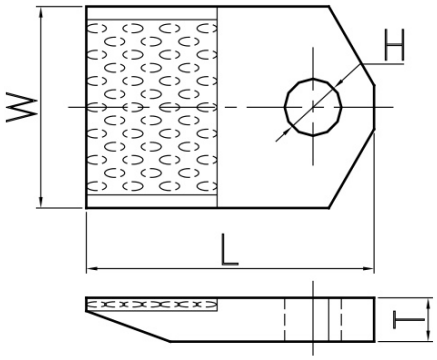
MDD-G22: dimensioned standard drawing.



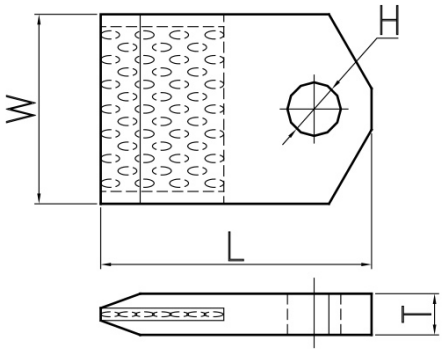
MDD-G23: dimensioned standard drawing.



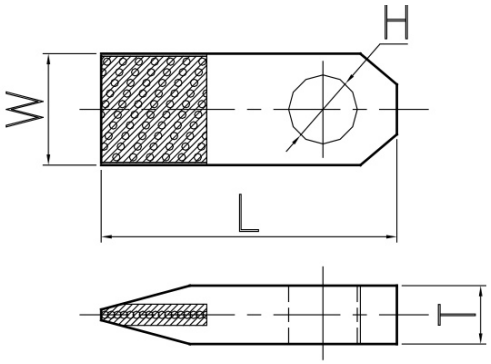
MDD-G24: dimensioned standard drawing.



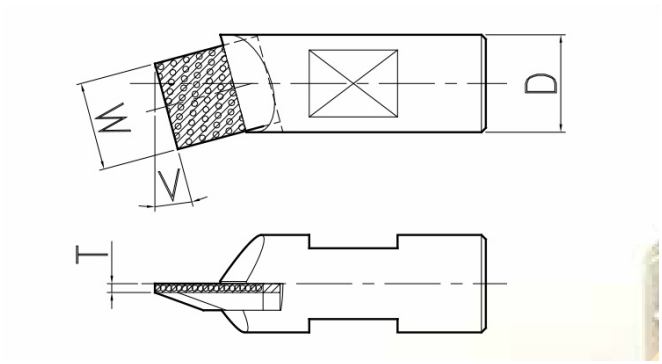
MDD-C12: dimensioned standard drawing.



MDD-C14: dimensioned standard drawing.



MDD-B13: dimensioned standard drawing.



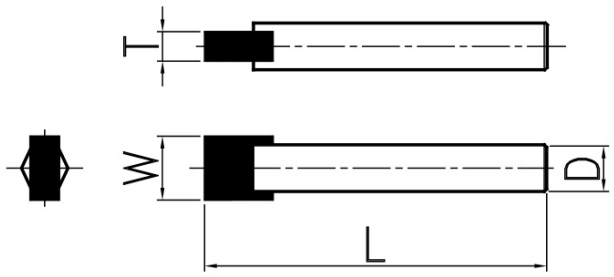
MDD-B12: dimensioned standard drawing.

IDD: impregnated diamond dressers

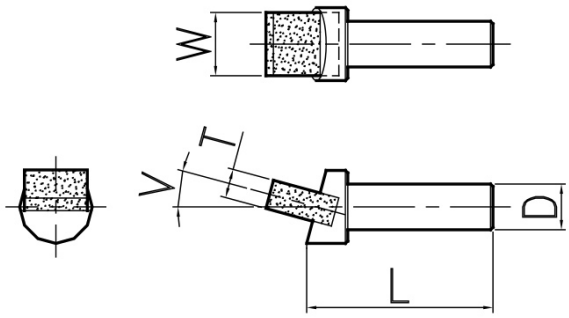
Fine diamond particles are bonded in a metal matrix and the dressing contact is distributed across many grains. The detailed programme gives #20-#140 for the conventional version and #20-#60 for patterned ZENESIS versions. The general grinding-programme overview separately lists #18-#140; these source ranges remain distinct.

The source lists patent numbers 10-0428947 and US 6626167 for ZENESIS. They are historical source references and are not a statement about current patent status.

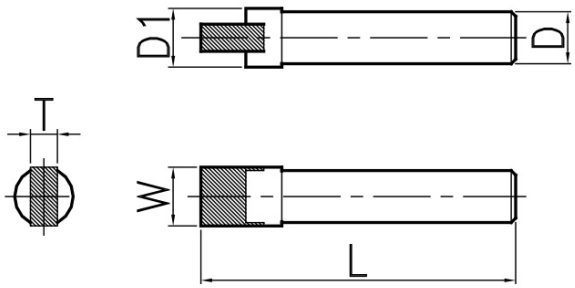
Product	Dimension labels and source values
IDD-S01	D = 11; L = 70; W = 13; T = 6
IDD-S03	D = 11; L = 38; W = 13; T = 6; V = 15
IDD-S04	D = 11; D1 = 14; L = 70; W = 13; T = 6
IDD-S05	D = 11; L = 50; L1 = 7; L2 = 10; W = 13; T = 6
IDD-R01	D = 11; D1 = 9; L = 40; LT = 8
IDD-R03	D = 11; D1 = 9; L = 38; LT = 8; V = 15
IDD-R04	D = 11; D1 = 10; L = 40; L1 = 24
IDD-R05	D = 11; D1 = 9; L = 40; LT = 24; V = 8



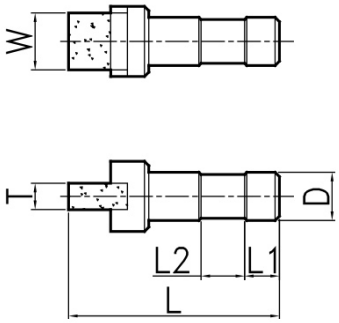
IDD-S01: dimensioned standard drawing.



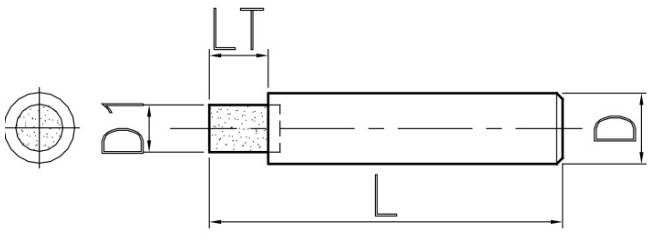
IDD-S03: dimensioned standard drawing.



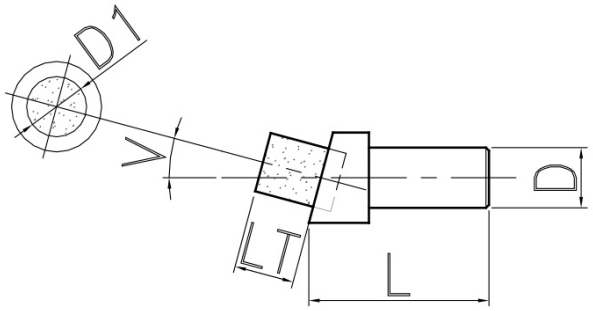
IDD-S04: dimensioned standard drawing.



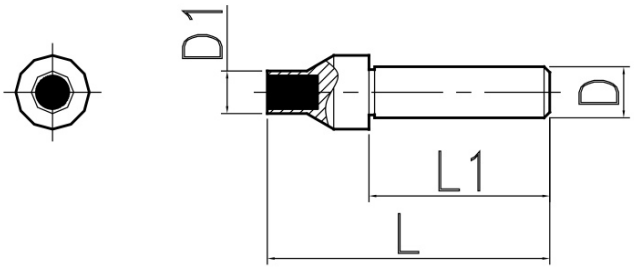
IDD-S05: dimensioned standard drawing.



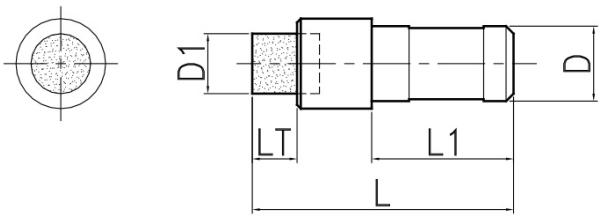
IDD-R01: dimensioned standard drawing.



IDD-R03: dimensioned standard drawing.



IDD-R04: dimensioned standard drawing.



IDD-R05: dimensioned standard drawing.

Burnishing tools, PCD profiles and contact gauges

Natural- or mono-diamond burnishing tools work the surface under pressure in a cold process without chip removal. They are aimed at fine, mirror-like surfaces and the required component dimensions. PCD profile dressers can be manufactured for complex forms and are described as an economical alternative. Diamond contact gauges use the high wear resistance of the contact material.



Diamond burnishing tools.



PCD profile dressers.



Contact gauges with diamond contact.

For natural-/PCD-diamond contact gauges, the source states almost 100 times the life of carbide or high-speed steel. Comparison conditions are not supplied; this is a manufacturer statement for the source application and is not a universal life guarantee.

Your tool specification

Dimensions remain tied to their drawing symbols. To select the dresser, provide wheel data, profile, wheel width, machine and holder, target finish and dimensional tolerances.

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Sources and application engineering

This programme combines the main catalogue's fundamentals and applications with the separately identified tool variants in the two supplements. Trial results refer to the stated conditions. Workpiece material, machine, coolant, wheel form and bond determine the choice for your process.

- EHWA: *Grinding*, printed edition 02/2022, pages 1-108 (manufacturer catalogue).
- EHWA: *Tooling*, source file Tooling_2026_QR.pdf, pages 1-6 (manufacturer publication).
- EHWA: *Grinding Wheels*, source file Grindingwheels_AMB2026_2.pdf, pages 1-4 (manufacturer publication).

Contact EHWA Europe for tool selection and application engineering at **info@ehwadia.de** or **+49 6173 997780**.