

Medical manufacturing, aerospace and optics: complete tool range

Grinding, dressing and rotating tools with complete variants, ordering designations and application data.



EHWA Europe GmbH

www.ehwadia.de

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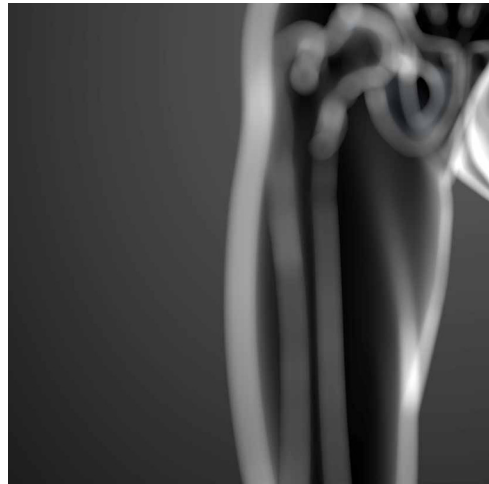
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Tools for medical manufacturing, aerospace and optics

EHWA combines diamond and CBN grinding tools with rotary dressers and rotating tools for demanding component manufacturing. The range covers artificial knee joints, medical wire and needles, contact and intraocular lenses, spectacle lenses, turbine components and lightweight parts. Metal bonds for automotive glass edges are also included. Tool selection is matched to material, component geometry, machine and the required surface.



Knee joint: anatomical application illustration.



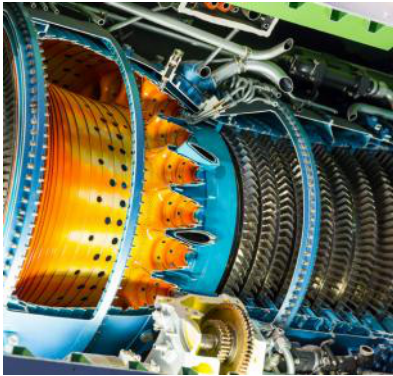
Hip and leg region: anatomical application illustration.



Knee illustration.



Aircraft as an aerospace application illustration.



Aircraft-engine assembly.



Engine component in a manufacturing environment.



Turbine rotor as an application image.



Aircraft engine as an application image.



EHWA rotating-tool range.

Knee-joint grinding: four body variants

For grinding artificial knee-joint components, the range shows vitrified tools with CFRP, aluminium-alloy or steel/aluminium bodies, and electroplated tools with steel/aluminium bodies. These variants support tool designs matched to the component profile and machine mounting. CFRP here identifies the wheel body; bond type is listed separately.

Bond	Body
Vitrified	CFRP
Vitrified	Aluminium alloy
Vitrified	Steel + aluminium
Electroplated	Steel + aluminium



Knee-joint grinding wheels with CFRP body.



Vitrified wheels with aluminium-alloy body.



Vitrified wheels with steel/aluminium body.



Electroplated wheels with steel/aluminium body.



Vitrified grinding wheels with CFRP body.



Vitrified grinding wheels with aluminium-alloy body.



Vitrified grinding wheels with steel/aluminium body.



Electroplated grinding wheels with steel/aluminium body.



Knee-joint component as a manufacturing illustration.



Knee-joint grinding wheels with CFRP body.



Vitrified grinding wheels with CFRP body.



Vitrified grinding wheels with aluminium-alloy body.



Vitrified grinding wheels with steel/aluminium body.



Electroplated grinding wheels with steel/aluminium body.



Knee-joint grinding wheels with CFRP body.

Grinding wheels and diamond rotary dressers for knee components

The knee-joint application targets high stock removal, well-balanced tools for high-speed operation, longer dressing intervals and wheel life, and strong grinding performance and surface quality. Diamond rotary dressers are matched to profiling these grinding tools. The following standard designations agree between the older medical document and the later application collection. A dash means that no specification is entered in the source.

Tool	Wheel 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



Diamond rotary dressers for knee-joint grinding tools.



Diamond rotary dresser: abrasive circumference detail.



Diamond rotary dressers in two sizes.



Profiled section of a diamond rotary dresser.

Wire grinding: two application programmes

The first programme combines low grinding pressure and free-cutting behaviour with high wire-surface quality, long wheel life, economical machining and good balance. The second programme emphasises a straight face with a sharp edge, low cutting force, free-cutting wheels and good wire surfaces. The illustrations show the two programmes with coiled and straight wire workpieces. Tool geometry and the process are matched to the particular wire.



Grinding wheels for medical wire.



Abrasive rim of a wire-grinding wheel.



Wire-grinding wheels in different sizes.



Grinding wheel of the first wire programme.



Grinding wheels of the second wire programme.



Coiled medical wire.



Straight medical wire.



Grinding wheels for medical wire: size variants.



Grinding wheel of the first wire programme.



Grinding wheels of the second wire programme.



Coiled medical wire.



Straight medical wire.



Grinding wheel of the first wire programme.



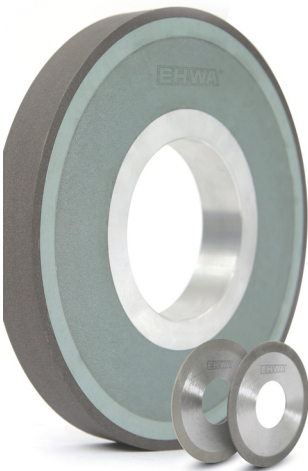
Coiled medical wire.



Grinding wheels of the second wire programme.



Straight medical wire.



Grinding wheels for medical wire: size variants.

Electrochemical needle grinding (ECG)

ECG combines abrasive grinding with electrochemical material removal. EHWA shows tools for medical needles made from SUS or SUS304. The range targets low tool or per-part costs, high stock removal, strong surface quality with burr-free needle tips, and consistent grinding performance. The comparison images show burrs after conventional grinding and burr-free tips in the illustrated ECG example; results are matched to material and process conditions. The micrograph shows the grinding-wheel bond structure.

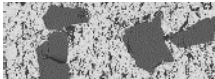
Type	Specification
MB-1A1	204D-3T ~ 15T
MB-3A1	204D-1U~2.9U



ECG grinding wheel for SUS or SUS304 needles.



Medical needle as a workpiece illustration.



Microstructure of the ECG grinding-wheel bond.



ECG grinding wheel for needles.



Needle tips after conventional grinding: burrs in the comparison image.



Needle tips after ECG grinding: burr-free comparison image.



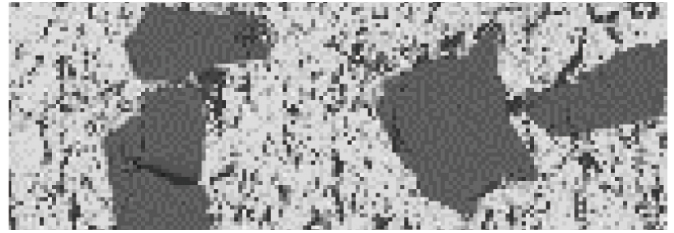
Needle and glass vial as an application illustration.



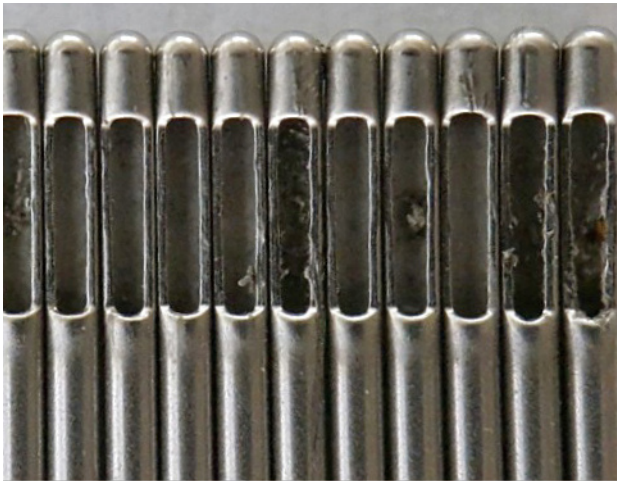
ECG grinding wheel for needles.



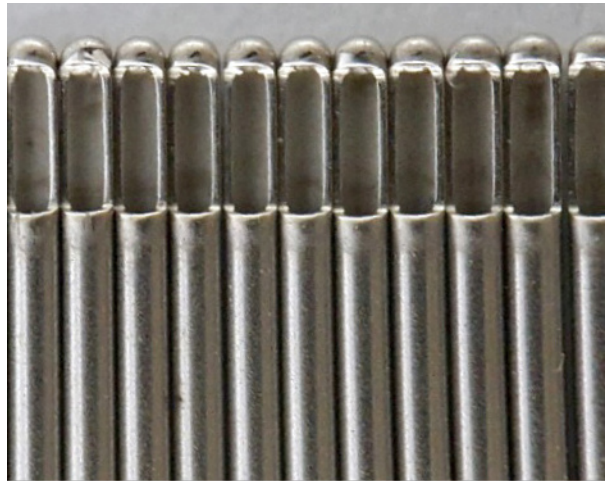
Medical needle as a workpiece illustration.



ECG grinding-wheel bond microstructure.



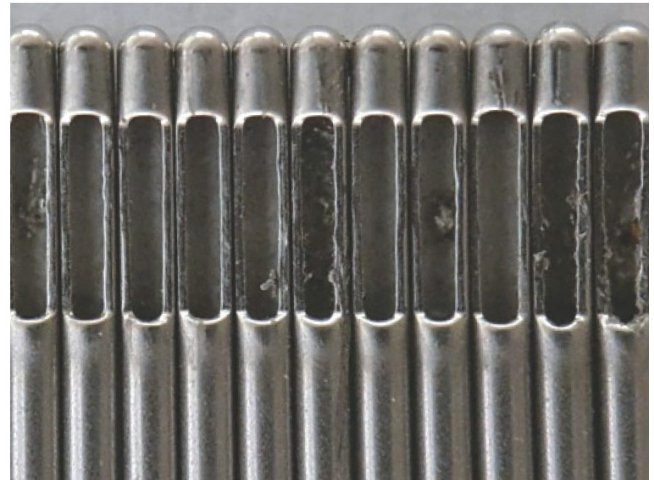
Conventionally ground needle tips with burrs.



Burr-free needle tips in the illustrated ECG comparison.



ECG grinding wheel for needles.



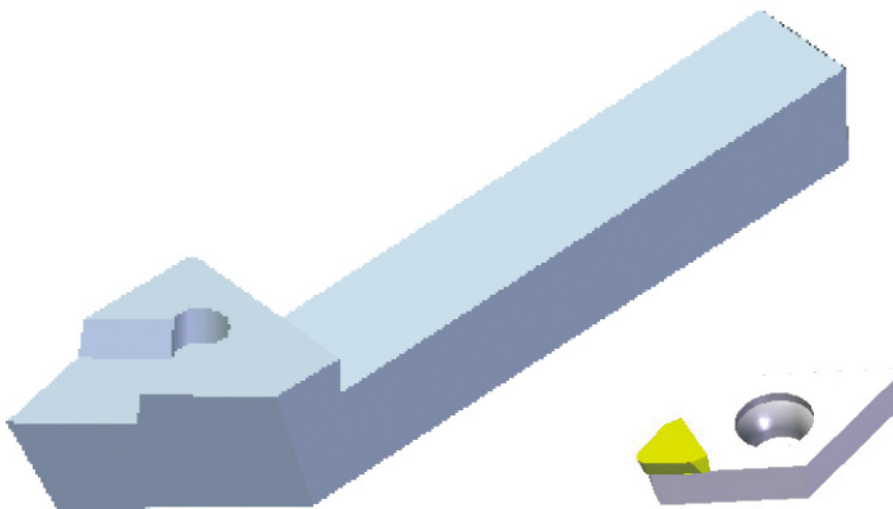
Conventionally ground needle tips with burrs.



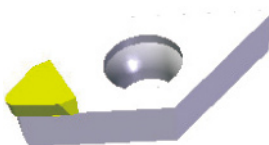
Burr-free needle tips in the illustrated ECG comparison.

Diamond tools for contact lenses

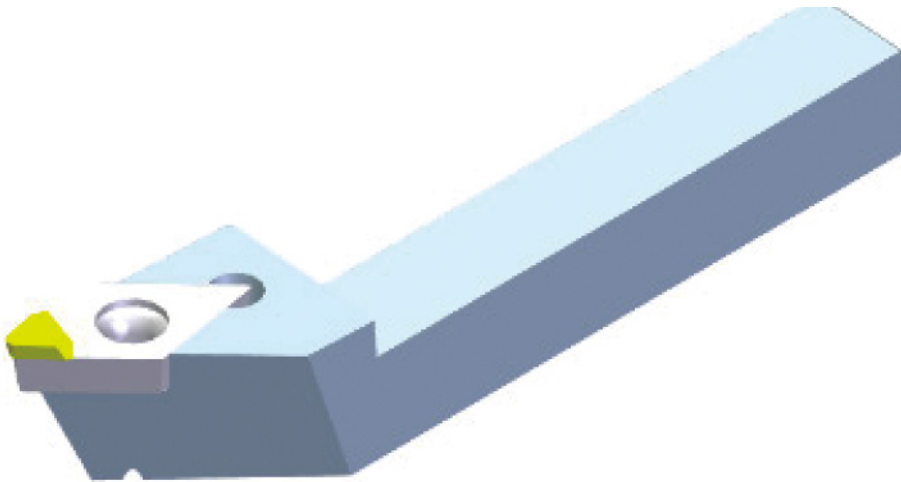
Contact-lens tools with a high-vacuum-brazed diamond tip combine consistent machining quality with long tool life. EHWA describes the cutting edge as free of chipping under 1000× microscopic inspection. The illustration shows holder and insert before assembly and the assembled tool. Cutting-edge quality is checked on the particular tool.



Holder and diamond insert before assembly.



Diamond insert for the contact-lens tool.

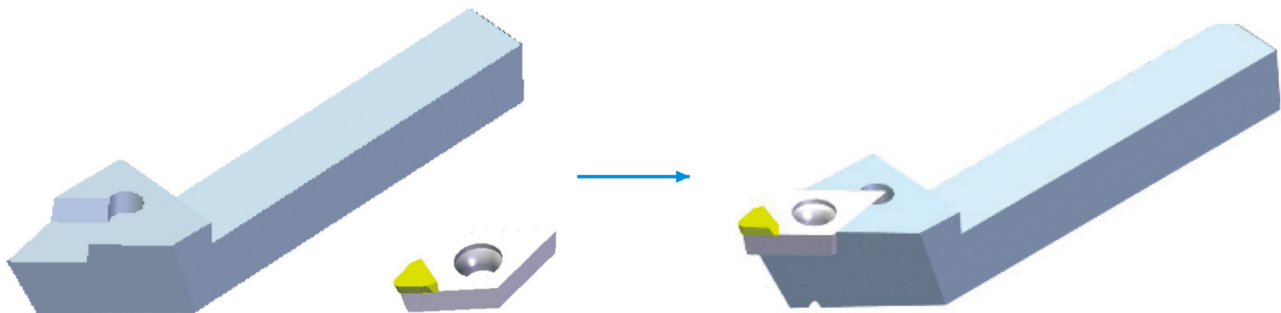


Assembled contact-lens tool.

Contact-lens tool: holder, insert and assembly

Holder and diamond insert

Assembled

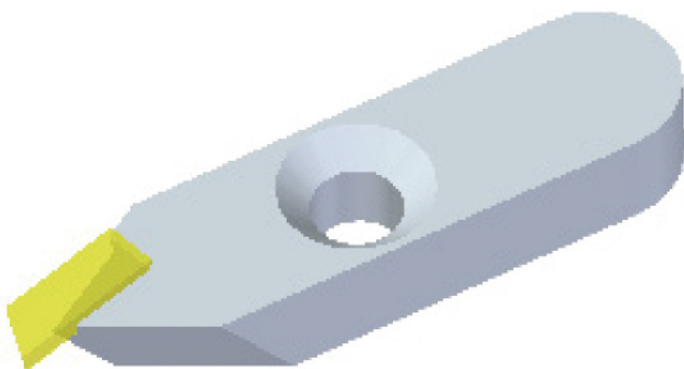


Diamond tip: high-vacuum brazed joint.

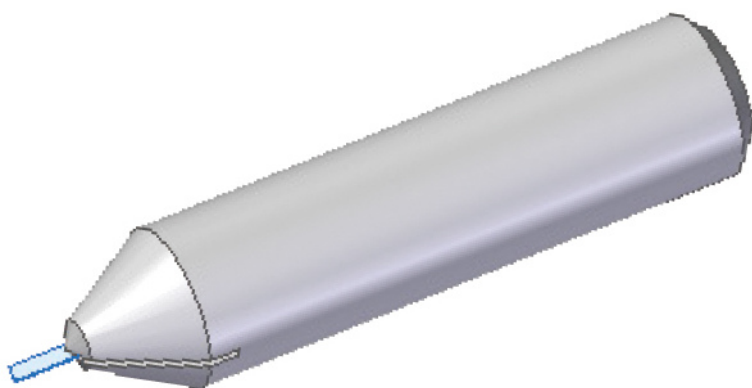
Contact-lens tool: holder, insert and assembly.

Tools for intraocular lenses (IOL)

The IOL range shows flat and cylindrical tool designs. Both belong to the high-vacuum-brazed diamond-tip tool range. EHWA lists consistent machining quality, high dimensional accuracy and a cutting edge free of chipping under 1000× microscopic inspection. These statements concern tool and manufacturing quality.



Flat diamond-tool design for IOL.



Cylindrical diamond-tool design for IOL.

Cutters for spectacle lenses

EHWA offers cutters for lens materials such as polycarbonate, CR-39 and high-index materials. The range combines strong cutting performance with long tool life and good surface finish. Designs differ in cutting-edge count and mounting. The 16Z and 15Z versions are described for higher feed. CW/CCW identifies the stated clockwise/counterclockwise designs; no rotation direction is stated for 14Z.

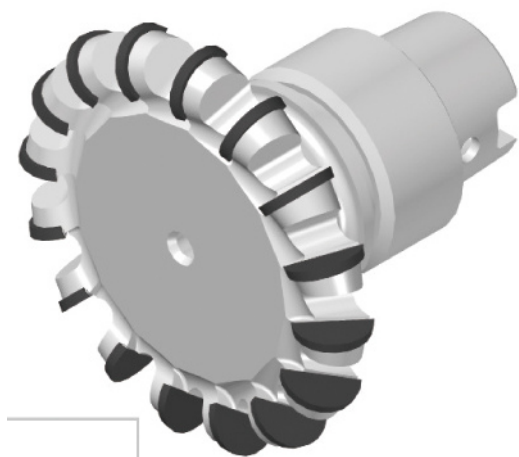
Designation	Cutting edges	Design / feature
66D-16Z-HSK32E (C)	16Z	Higher feed; CW/CCW
66D-14Z-flw	14Z	14 cutting edges
66D-15Z-HSK32E(C)	15Z	Higher feed; CW/CCW
67.5D-12Z-disc	12Z	CW/CCW
66D-12Z-HSK32E(C)	12Z	CW/CCW
45D-8Z-HSK32C	8Z	CW/CCW



Optical-lens cutter with mounting.



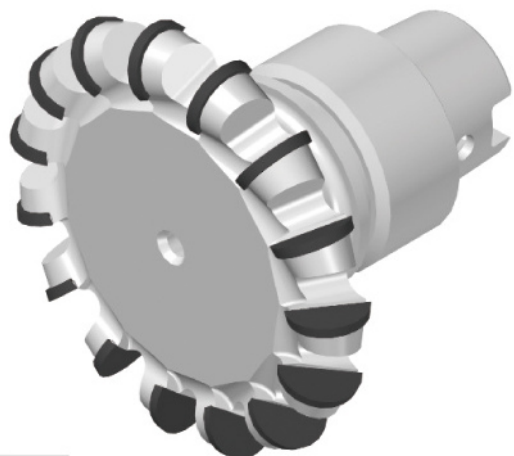
Disc-shaped cutter for optical lenses.



16Z: 66D-16Z-HSK32E (C).



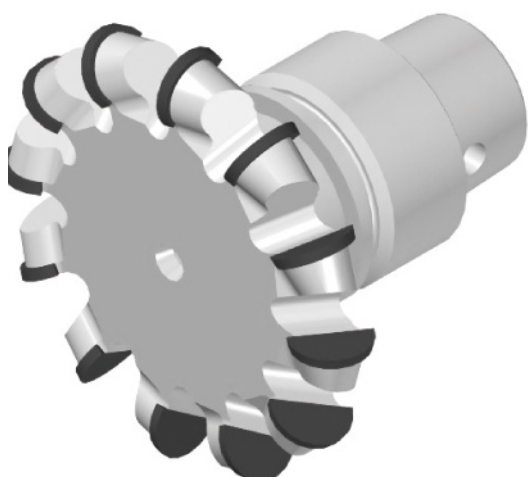
14Z: 66D-14Z-flw.



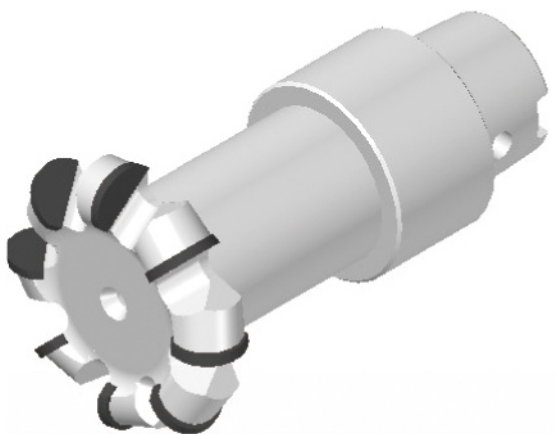
15Z: 66D-15Z-HSK32E(C).



12Z: 67.5D-12Z-disc.



12Z: 66D-12Z-HSK32E(C).



8Z: 45D-8Z-HSK32C.

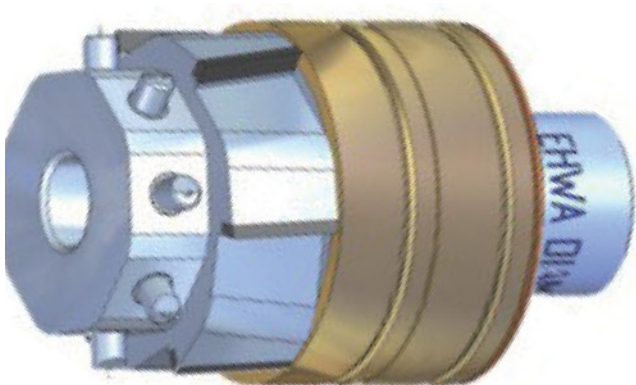
Grinding wheels for optical lenses

The grinding range covers glass, plastics, polycarbonate, high-index materials and CR39. Machining stages include roughing, finishing, polishing and grooving. The functional diagram associates the three wheel sections with roughing using BSL/metal bond, finishing using metal bond and polishing using metal bond. GL and PL are retained as application designations. The dimensions use the source document's D designation.

Application	Type	Grit size	Dimension
Roughing (GL)	MD-1A1	#80	100D, 155D
Roughing (PL)	BSL	#60	100D, 155D
Finishing	MD-1EE6Y	#400	60D, 100D, 155D
Polishing	MD-1EE6Y	#3000	60D, 100D, 155D
Grooving	MD-14F1	#270	20D



Tool engagement in optical-lens grinding.

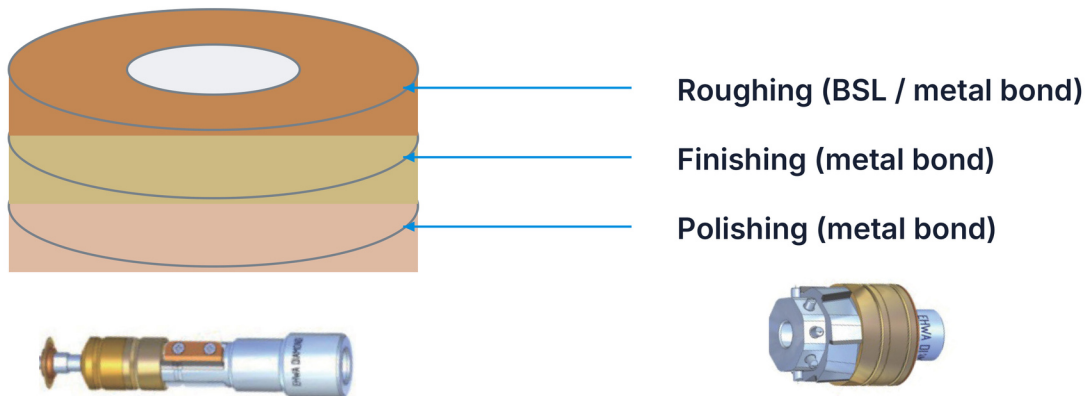


Mounted multi-stage lens-grinding tools.



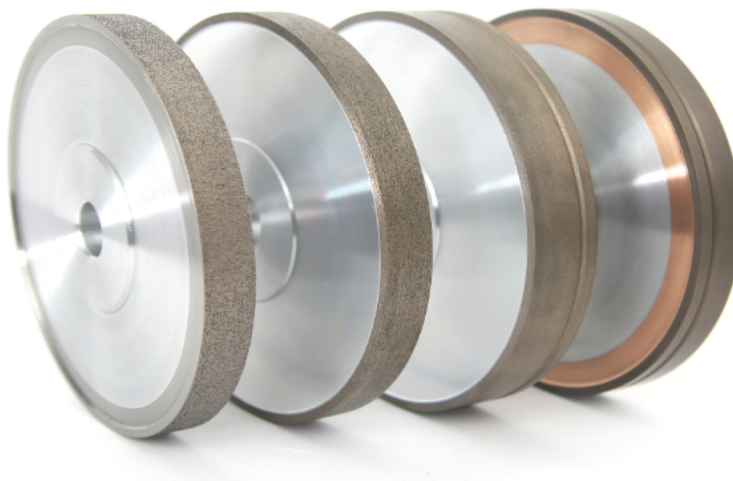
Tool spindle for lens grinding.

Optical lenses: three machining stages



Functional diagram without added dimensions.

Roughing, finishing and polishing: wheel-section relationship.



Grinding-wheel range for optical lenses.

BSL: slot and straight designs

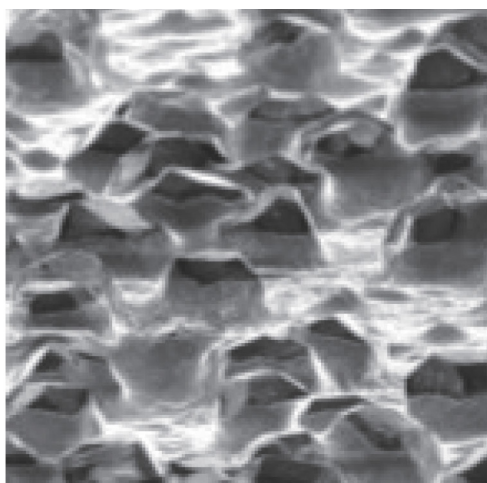
The comparison shows the competitor, EHWA #1 and EHWA #2 for CR39, PL and HI. EHWA #1 is shown as the slot design and EHWA #2 as the straight design. The micrograph complements the wheel surface. The chart preserves the printed 0 / 50 / 100 axis and bar geometry; the source states no axis unit and no individual bar labels.



EHWA #1: slot design.

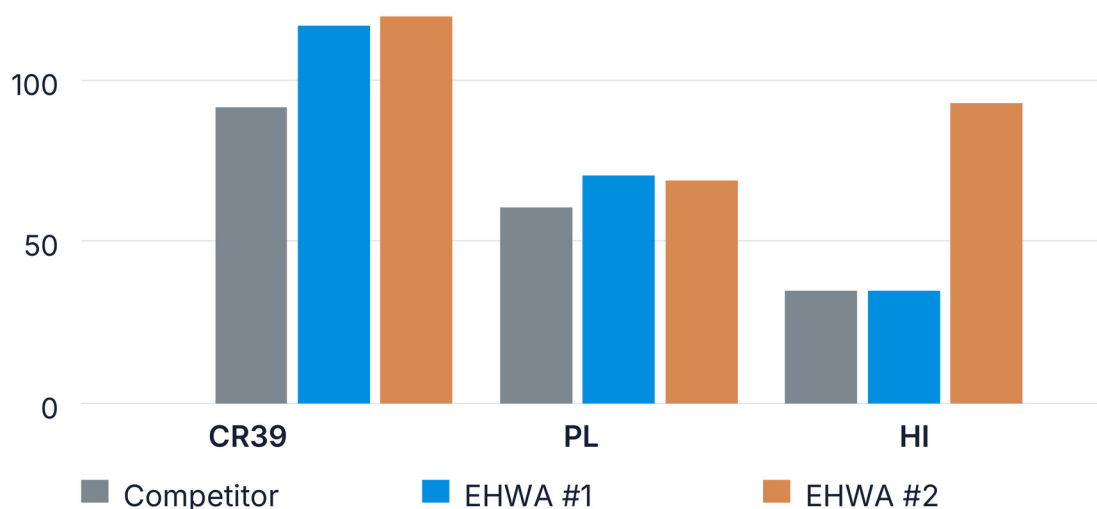


EHWA #2: straight design.



Microstructure of the lens-grinding wheel surface.

BSL grinding comparison: CR39, PL and HI



Source comparison: no axis unit or individual bar values stated.

BSL grinding comparison for CR39, PL and HI.

Metal bonds for automotive glass edges

Metal-bonded diamond wheels are used for pencil edging and seaming of automotive window glass. Bond selection is matched to glass type, grit size and the required edge quality. The B and C bond series are listed for D54~D35. The table category "High Quality G (D35~)" is retained as a source designation. Marks reproduce the stated classifications; a dash replaces an empty source field.

Bond	General (D54 or D46)	High Quality G (D35~)	Remark
MB21	-	●	Excellent grinding performance
MC6	●	●	General bond
MC9	●	-	Longer tool life and good quality
MC11	●	-	Longest tool life in the stated range

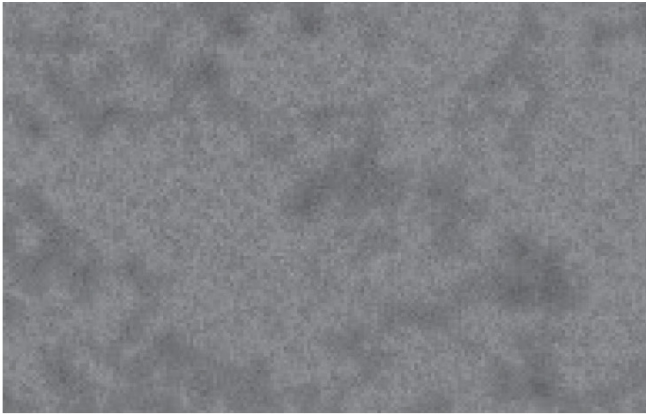


Metal-bonded diamond wheel for automotive glass edges.

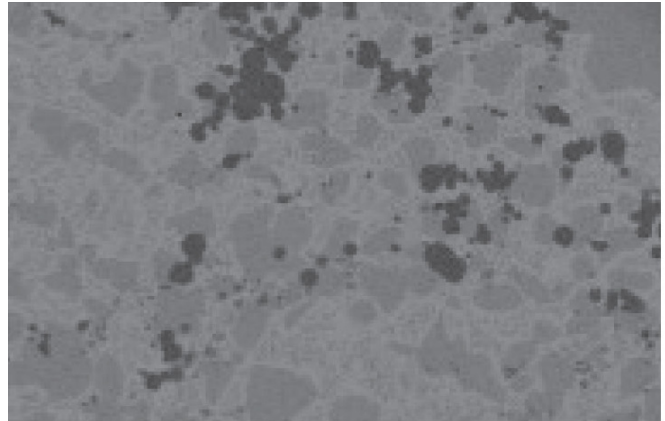
G bond series and Eagle microstructure

The G bond series is listed for D91~D76 and distinguishes tempered glass from laminated glass. The SEM images show the Eagle B, C and G bonds: B is presented as softer, C as the standard bond and G as harder. This is a qualitative relationship without added hardness values.

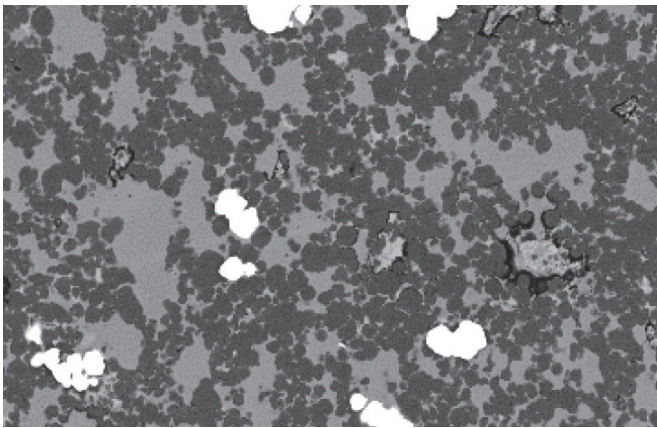
Bond	Tempered glass	Laminated glass	Remark
MG7	-	●	Excellent grinding performance
MG16C	●	●	-
MG21N	●	-	Longer tool life and good quality
MG72	●	-	Longer tool life and high grinding speed



SEM microstructure: B bond.



SEM microstructure: C bond.



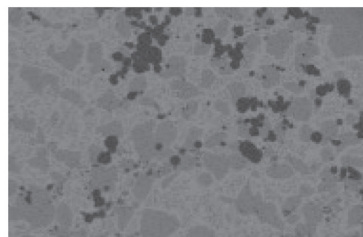
SEM microstructure: G bond.

Eagle bond: qualitative relationship



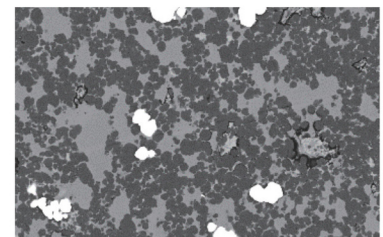
B bond

Softer bond



C bond

Standard bond



G bond

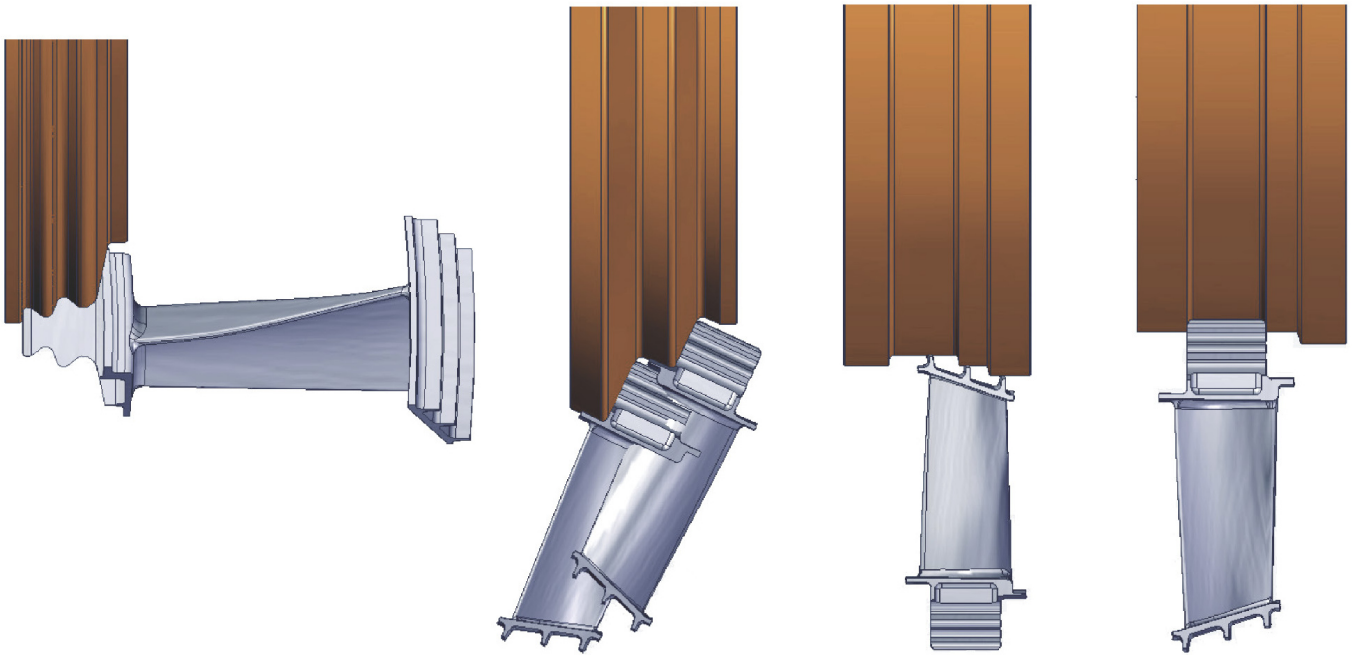
Harder bond

SEM micrographs unchanged; no numerical hardness scale stated.

Eagle bonds: B softer, C standard, G harder.

Rotary dressers for turbine blades

Workpiece-specific rotary-dresser designs combine high tool precision with long tool life. EHWA describes stable dressing performance in creep-feed grinding. Four contact positions show adaptation to different blade profiles. The dresser-and-blade illustration and aircraft-engine photograph show the application.



Four profile-contact positions for turbine blades.



Aircraft engine as an application image.



Dressing tool with a profiled turbine-blade component.

Carbide end mills and drills

EHWA matches carbide grades and coatings to the application and machining conditions. The coating supports strong toughness and wear resistance; the ultra-fine substrate combines high hardness with high breaking strength. The tool images preserve the different coated end-mill and drill designs and the small tool variants.



Coated carbide tools in three designs.



Small carbide tools with different coatings.



Coated carbide tool: blue design.



Coated carbide tool: gold design.

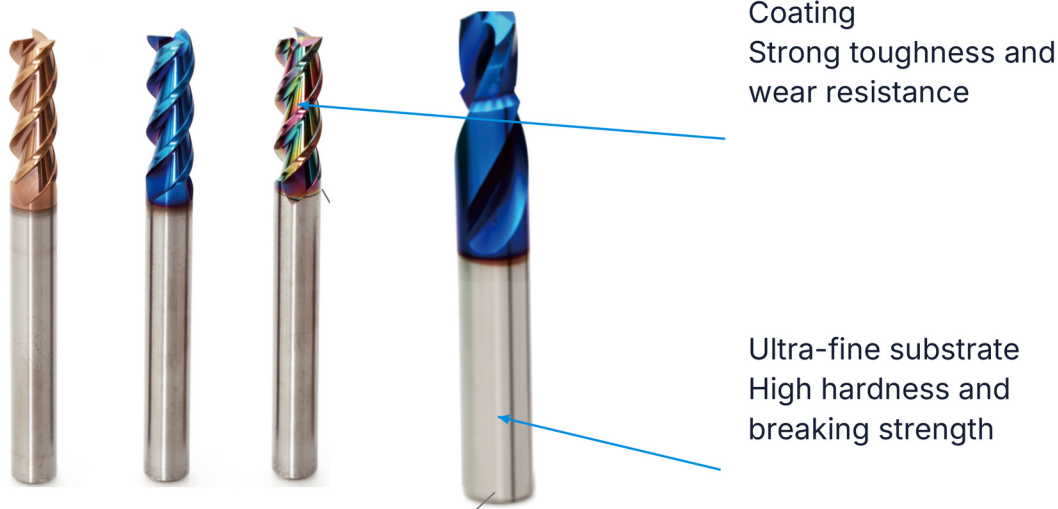


Coated carbide tool: brown design.



Coated carbide tool: multicolour design.

Carbide tools: coating and substrate



Grades and coatings matched to the application and cutting conditions.

Coating and ultra-fine carbide substrate.

Rotating tools for aluminium, CFRP and HRSA

Aluminium and CFRP support lightweight aerospace designs with a favourable strength-to-weight ratio. Abrasive fibres and the directional structure of CFRP place particular demands on cutting edges and wear resistance. EHWA offers rotating tools with sharp cutting edges and high wear resistance for these applications. Helical end mills target high feed, high material removal and reliable processes. For nickel alloys such as Inconel in turbine and jet-engine components, a helical ceramic end mill complements the HRSA range.



Coated carbide tools in four designs.



EHWA rotating-tool range.



Helical PCD end mills in different sizes.



Coated carbide tools.



Ceramic end mills for HRSA.

Product lines: TC, ceramic and PCD

The product overview distinguishes TC versions TA, H1, H2 and H3, ceramic designs 6F, BALL and 4F, and PCD versions 1Z, 2Z and 3Z. TC end mills and PCD drills are also shown as complete tool groups. The illustrations preserve the individual head designs and coating colours.

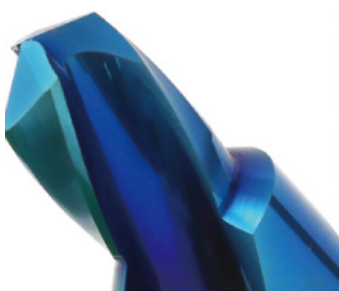
Tool group	Design
TC	TA
TC	H1
TC	H2
TC	H3
Ceramic	6F
Ceramic	BALL
Ceramic	4F
PCD	1Z
PCD	2Z
PCD	3Z



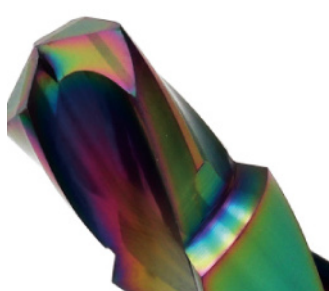
TA coating series: tool head.



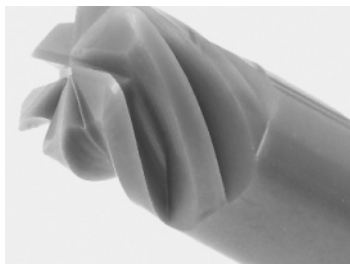
H1 coating series: tool head.



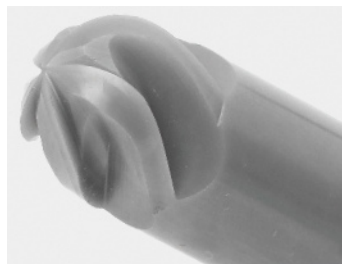
H2 coating series: tool head.



H3 coating series: tool head.



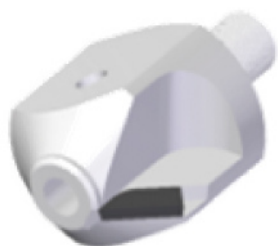
Ceramic head design 6F.



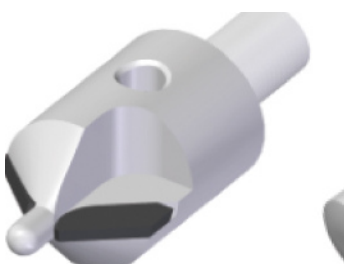
Ceramic head design BALL.



Ceramic head design 4F.



PCD design 1Z.



PCD design 2Z.



PCD design 3Z.



TA coating series: tool head.



H1 coating series: tool head.



H2 coating series: tool head.



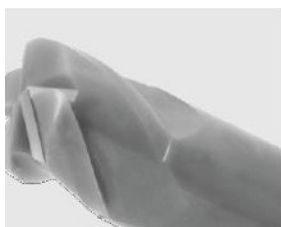
H3 coating series: tool head.



Ceramic head design 6F.



Ceramic head design BALL.



Ceramic head design 4F.



PCD design 1Z.



PCD design 2Z.



PCD design 3Z.



TC end-mill range in four tool designs.



PCD Drill

PCD drills in different sizes and views.

Helical PCD end mills

Helical PCD end mills combine high feed and material removal with geometry designed for reliable machining. A high rake angle supports low-burr cutting; further features are high speed, high efficiency and good surface finish. The shank is tungsten carbide. Tool and process are matched to the component and material.



Helical PCD end mills with tungsten-carbide shanks.

Helical PCD end mills: tungsten-carbide shank



Shank: tungsten carbide
High rake angle
High feed / material removal rate
Strong surface quality

Designed for low-burr cutting and efficient high-speed machining.

PCD end mills: carbide shank and performance features.

EC2008: ceramic end mills for HRSA

SiAlON ceramic is based on silicon (Si), aluminium (Al), oxygen (O) and nitrogen (N). The EC2008 material description emphasises high heat resistance and low thermal conductivity. These thermal properties support tool design for demanding machining conditions involving high temperatures and pressure loads, such as turbine and automotive-engine components. The large helix angle is intended to reduce cutting load and enable strong cutting performance. The asymmetric cutting-edge design is shown as A/B/C for 6F and A/B for 4F. The source states no additional angle or thermal-conductivity values.

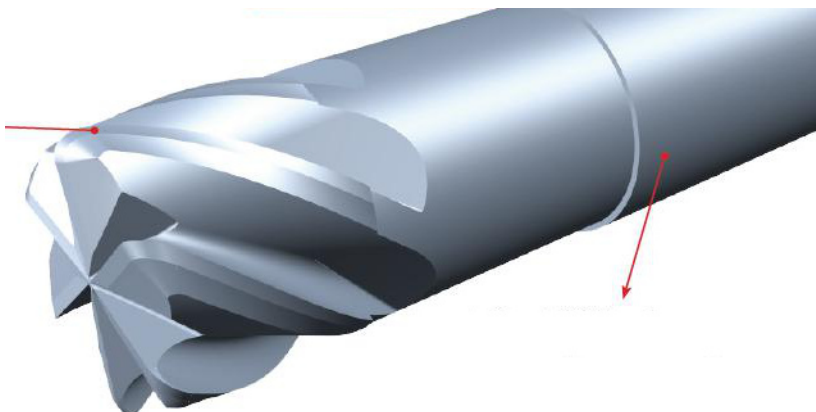
Feature	EHWA statement
Grade	EC2008
Material	SiAlON
Colour	Dark Olive Green
Workpiece	HRSA (Heat-Resistant Super Alloy)



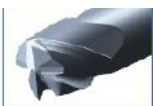
Ceramic end mills with different head designs.



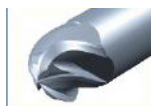
Ceramic end mills with different head designs.



Ceramic end mill: helical cutting-edge detail.



Six-flute ceramic end mill: perspective view.

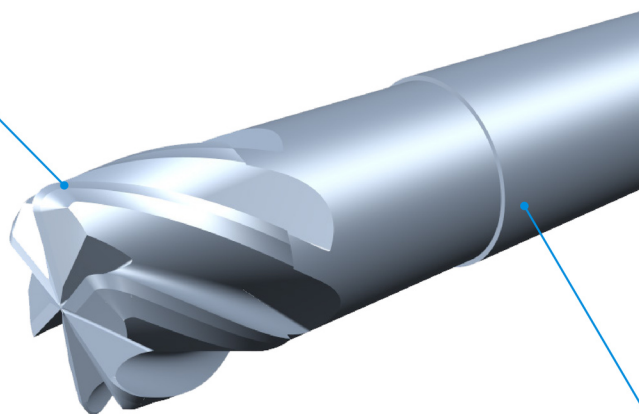


Four-flute ceramic end mill: perspective view.

Helix angle and ceramic SiAlON grade

Large helix angle

Reduced cutting load
Strong cutting performance



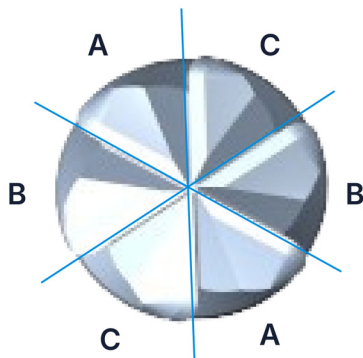
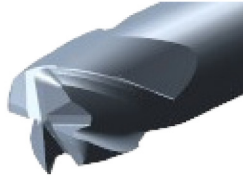
Ceramic SiAlON grade
Designed for HRSA

EC2008: SiAlON ceramic for HRSA machining.

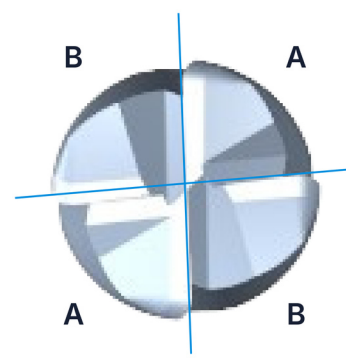
Large helix angle and SiAlON grade for HRSA.

Asymmetric cutting-edge design

6F



4F



6F: A/B/C arrangement · 4F: A/B arrangement

6F: A/B/C arrangement; 4F: A/B arrangement.

ET220: solid carbide drills for steel

ET220 is described as ultra-fine carbide with high hardness and high fracture toughness. The helix drills for steel have 2-3 coolant holes. A 30° helix angle and a flute shape designed for smooth chip evacuation complement the coating with strong toughness and wear resistance. The coating overview separates the conventional TA design from H1, H2 and H3 for interrupted cutting.

Feature	EHWA statement
Grade	ET220
Substrate	Ultra-fine; high hardness and fracture toughness
Workpiece	Steel
Coolant holes	2-3
Helix angle	30°
Flute shape	Supports chip flow
Coating	Strong toughness / wear resistance

Series	Classification
TA	Conventional coating
H1	New coating for interrupted cutting
H2	New coating for interrupted cutting
H3	New coating for interrupted cutting



Solid carbide drill: helix and flute detail.



Coated carbide tool: blue design.



Coated carbide tool: gold design.



Coated carbide tool: brown design.



Coated carbide tool: multicolour design.



TA coating series: tool head.



H1 coating series: tool head.



H2 coating series: tool head.



H3 coating series: tool head.

ET220: solid carbide drills and coatings

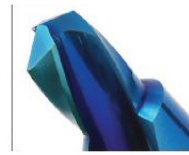


TA

Conventional



H1



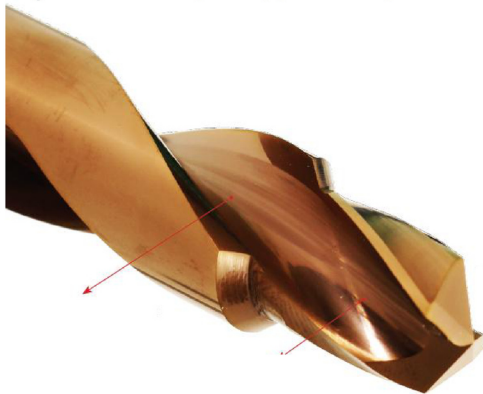
H2



H3

New coatings for interrupted cutting

30° helix angle · flute shape supports chip flow



ET220: ultra-fine, high hardness and fracture toughness

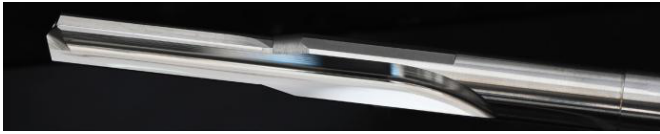
Helix drills for steel: 2–3 coolant holes.

ET220, 30° helix angle and TA/H1/H2/H3 coatings.

ET110: drills for aluminium alloys

ET110 uses fine carbide with a polished surface and is described for highly polished drills. The range shows helix and burnishing drill designs. The tool-surface statement $R_z < 0.4$ is associated with reducing built-up edge and supporting chip flow. No unit is stated for this R_z value in the source; it is not a roughness value of a machined hole.

Feature	EHWA statement
Grade	ET110
Workpiece	Aluminium alloys
Substrate	Fine carbide
Surface	Polished; $R_z < 0.4$
Designs	Helix drills / burnishing drills



Polished surface of an ET110 carbide drill.



Aluminium drills: cutting-edge and flute details.



Aluminium drills: shank and flute details.

ET110: carbide drills for aluminium alloys



Helix / burnishing type

Mirror finish: $R_z < 0.4$
Helps prevent built-up edge
Supports chip flow

ET110
Fine carbide
for highly polished drills

R_z value refers to the tool surface; the source states no unit.

ET110 and polished tool surfaces $R_z < 0.4$.

Solid carbide end mills: three designs

Ball end mills, square end mills for side and planar machining, and taper ball end mills complement the range. The application table preserves the different machining tasks. Each design is illustrated with both coating variants shown in the source.

Design	Application
Ball end mill	Curved surfaces; roughing; finishing
Square end mill	Side and planar machining; roughing; finishing
Taper ball end mill	Curved surfaces; finishing



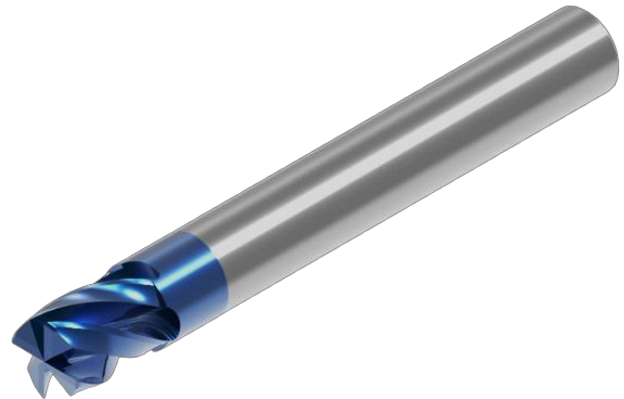
Ball end mill: brown coating variant.



Ball end mill: blue coating variant.



Square end mill for side and planar machining: brown variant.



Square end mill for side and planar machining: blue variant.



Taper ball end mill: brown coating variant.



Taper ball end mill: blue coating variant.

Match tool and process together

For selection, provide the material, drawing or component profile, machine model and mounting, machining task and required surface. EHWA Europe matches design, bond, grade and variant to these details.

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Tool-range documents

- [Medical \(Q047\)](#)
- [Aerospace / Medical \(Q283\)](#)
- [Medical / Aerospace / Optic & Glass \(Q292\)](#)
- [Rotating Tools for Aerospace \(Q296\)](#)