

Roll grinding: CBN, diamond and dressing tools

Tool design for HSS and carbide rolls, bond selection, source trials, dressing device and contact gauges.

EHWA Europe GmbH

www.ehwadia.de

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Tools and application

EHWA DIAMOND - since 1975

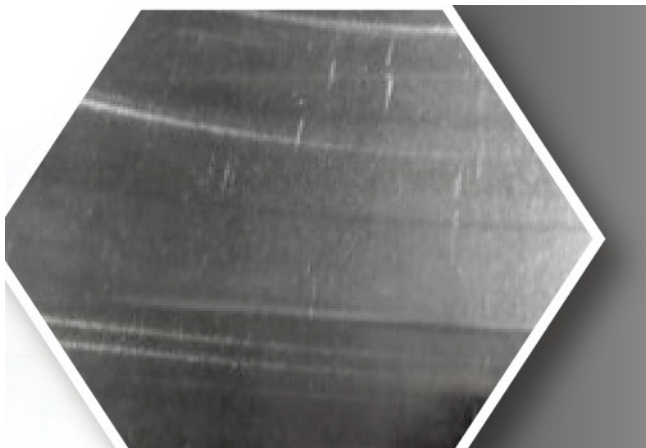
EHWA combines resin, metal and vitrified bonds with the required grinding task. CBN wheels address HSS rolls; the programme shows diamond wheels for carbide rolls. Shape, grit, grade, concentration and bond are specified with the machine, roll material and surface objective.

CBN for demanding roll materials

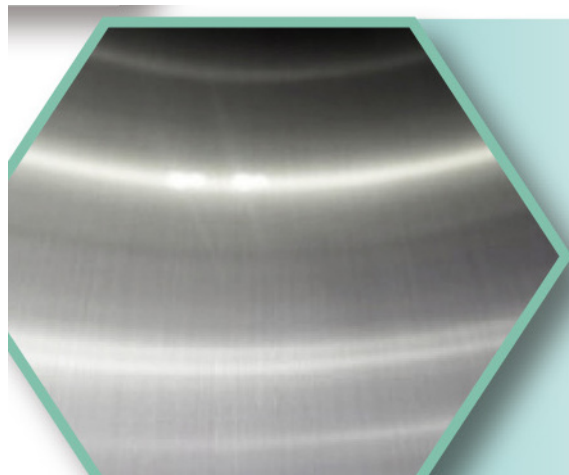
The EHWA document describes CBN wheels for hard and difficult-to-machine roll materials. Objectives include shorter grinding time, consistent surfaces, stable shape retention and longer usable wheel life. The manufacturer illustration states 5-10 times the life of conventional wheels; the actual relationship depends on material, process and wheel design. Test conditions are not stated for this general claim.

The hardness plot ranks diamond ahead of CBN, SiC and Al₂O₃. Its scale is 0-7000 kg/mm², without printed result values on the bars. The tool-life illustration places EHWA above a conventional wheel on a 0-8 scale with no stated unit. These illustrations supplement the separate, specifically described trials.

Technical source: Q246, page 3.



Surface example: conventional abrasive wheel.



Surface example: CBN wheel.

CBN: material and tool-life context

Knoop hardness: source ranking



Original plot: 0-7000 kg/mm² scale; no numerical bar-result labels.

Tool-life plot: EHWA higher than conventional wheel; original scale 0-8.

Manufacturer comparison; operating conditions determine usable tool life.

Schematic; not a dimensioned product drawing.

CBN: material and tool-life context.

Grade order and concentration selection

The sequences below retain the relative source order from softer to harder and the listed concentration classes. They are selection features rather than derived physical hardness values.

Bond family	Source order: softer to harder	Concentration classes
Resin	BA - BG - BC	75 / 100 / 125
Metal	J / K / L / M / N / P / Q / R / S / X	75 / 100 / 125 / 150 / 180
Vitrified	J / K / L / M / N / P / Q / R / S / X	100 / 125 / 150 / 180 / 200

Technical source: Q240 p6 and Q246 p2.

Bond grade and concentration

Resin	Softer	Harder
	BA - BG - BC	
	Concentration: 75 - 100 - 125	
Metal	Softer	Harder
	J K L M N P Q R S X	
	Concentration: 75 - 100 - 125 - 150 - 180	
Vitrified	Softer	Harder
	J K L M N P Q R S X	
	Concentration: 100 - 125 - 150 - 180 - 200	

Schematic; not a dimensioned product drawing.

Bond grade and concentration.

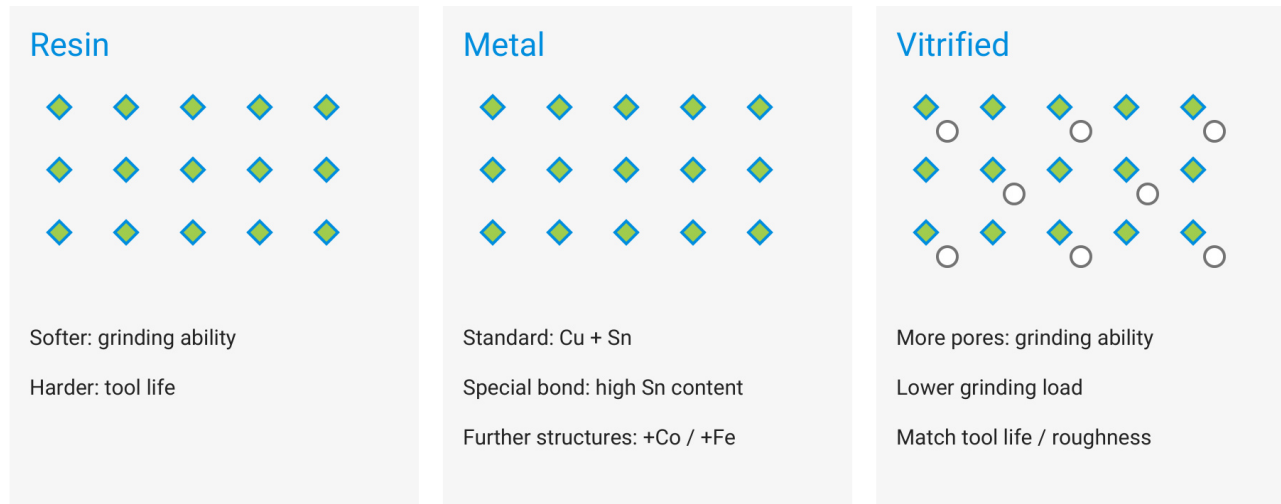
Grinding ability, tool life and structure

Resin bonds match resin and fillers to grinding ability and tool life. The source shows softer and harder structures as qualitative selection guidance. Metal bonds are based on materials including copper and tin; the source shows standard Cu+Sn structure, a special high-tin bond, and structure variants with Co and Fe.

Vitrified bonds combine rigidity with adjustable pore structure. The manufacturer illustration associates higher porosity with grinding ability and lower grinding load. Tool life and surface roughness are matched with the actual bond structure. Microstructure images and mechanism diagrams introduce no additional porosity percentages or measured relative values.

Technical source: Q240, pages 3-5.

Bond structure: qualitative design



Symbolic structure models; no measured values or specified porosity.

Schematic; not a dimensioned product drawing.

Bond structure: qualitative design.

Roll grinding: specification and bond selection

The example RB-6A2, 212D-84T-25W, B120R100BC separates shape, dimensions, CBN grit, grade, concentration and bond. The ratings below are relative catalogue ratings rather than measured results. Q240 rates MB2 tool life at four stars and Q246 at three; both source editions are retained separately.

Bond	Characteristic	Grinding ability [stars]	Tool life [stars]
BA	Good surface	4	2
BG	General	4	3
BC	High tool life	2	5
MA	General	4	3
MB2 (Q240)	General	5	4
MB2 (Q246)	General	5	3
MG	High tool life	3	5
VB	General	4	4
VBT	High feedrate	5	2
VE	High tool life	2	5

Technical source: Q240, page 6.

Wheel specification

RB-6A2	212D-84T-25W	B120	R	100	BC
Shape	Dimensions	CBN / grit	Grade	Concentration	Bond

Order example; the application example Q240 p3 uses 24W.

Schematic; not a dimensioned product drawing.

Wheel specification.

Resin bond: HSS roll application example

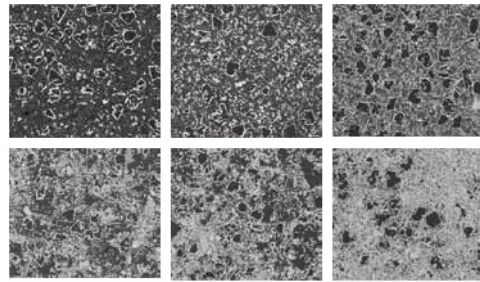
Resin bonds based on phenolic resin or polyimide are adapted through fillers. Cutting ability and straightforward truing and dressing support surface finish. This example states 24W; the separate designation example states 25W.

Parameter	Source value
Wheel size	RB-6A2, 212D-84T-24W
Specification	B120R100B
Workpiece	Finishing Mill
Material	HSS (High Speed Steel)
Machine	On-Line RSM
MPM	1000
Pressure	45-53 kgf/cm ²
Roll grinding deviation	<5 µm

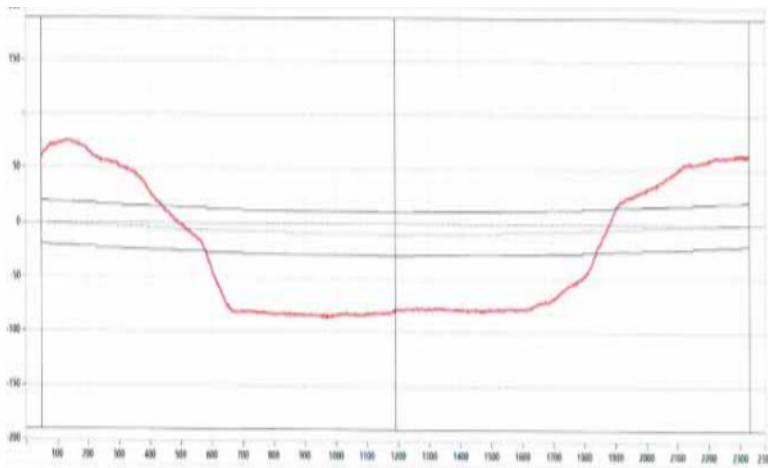
Technical source: Q240, page 3.



Resin-bonded grinding wheel.

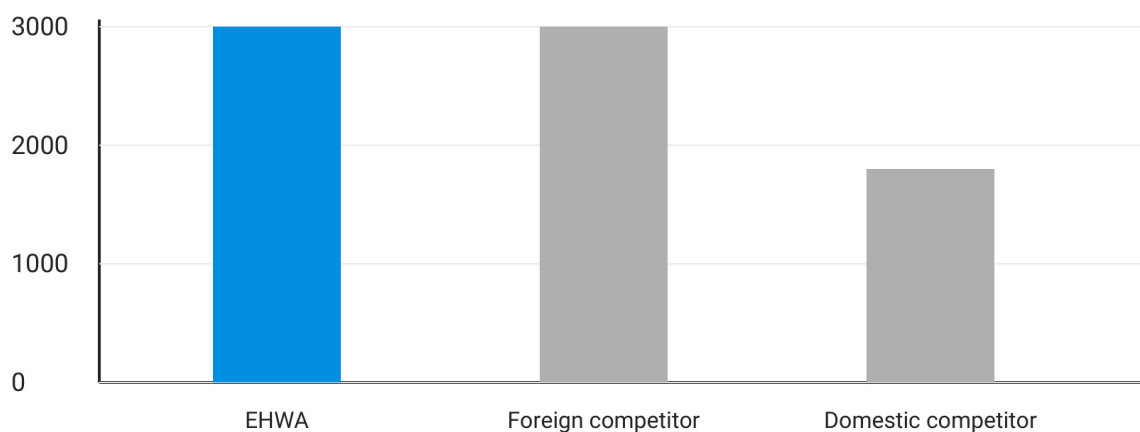


Six microstructure images from the resin-bond comparison.



Original measured profile for the source example with roll-grinding deviation <5 µm.

Resin: source tool-life illustration



Original scale without unit; bars have no printed result values.

Source comparison; the tool-life quantity is not further specified.

Schematic; not a dimensioned product drawing.

Resin: source tool-life illustration.

Metal bond: diamond for carbide rolls

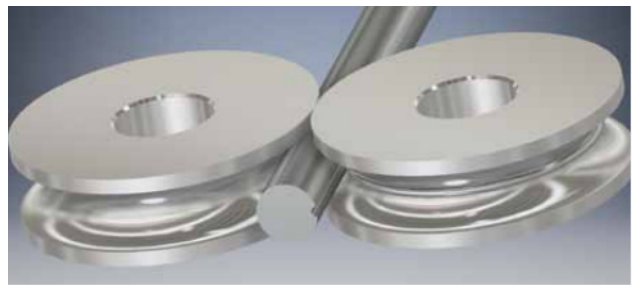
Metal bonds use a metal-powder matrix. Form retention and wear resistance support accurate profile grinding. The carbide-roll example explicitly specifies diamond; its abrasive assignment remains separate despite the CBN chapter heading.

Parameter	Source value
Wheel size	MD-14FF1, 200D-20T-15U-9R-3X-127H
Specification	D120L100MA
Workpiece	Carbide Roll
Material	Tungsten Carbide

Technical source: Q240, page 4.



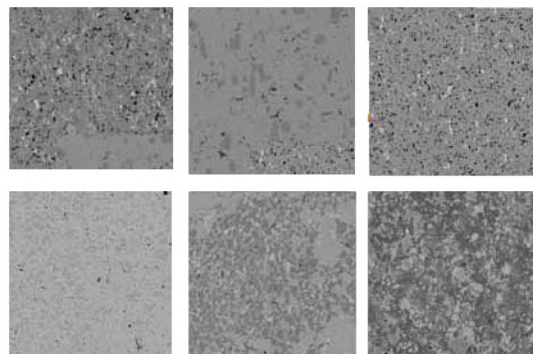
Metal-bonded diamond wheel.



Carbide rolls as a workpiece example.



Further carbide-roll designs.



Microstructure images from the metal-bond comparison.

Vitrified bond: documented B170L160VESI comparison

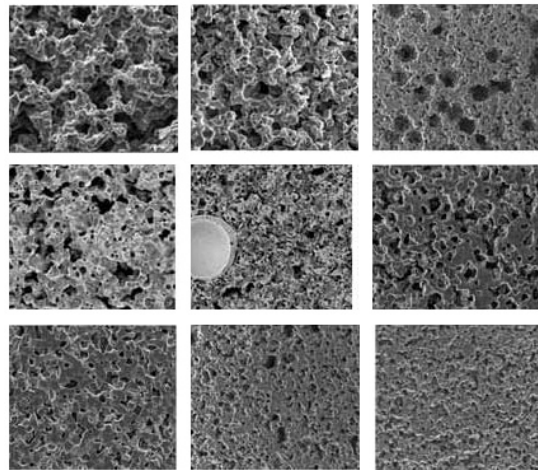
Vitrified bond combines high rigidity with an adjustable pore structure. The documented comparison relates to the roll-grinding setup below. Figures belong to this example.

Parameter	Value
Wheel size	VB-1A1, 910D-100T-5X-304.5H
Specification	B170L160VESI
Workpiece / material	Finishing Mill / HSS
Machine	WALDRICH SIEGEN
Stock removal	0.45-0.60 mm
Wheel speed	30-36 m/s
Work speed	25-30 rpm
Table feed	2300-2800 mm/min
Distance infeed	10-20 (unit not clearly printed)
Grinding time: competitor / EHWA	120 / 60 min
Current loading: competitor / EHWA	180 / 60 A

Technical source: Q240, page 5.



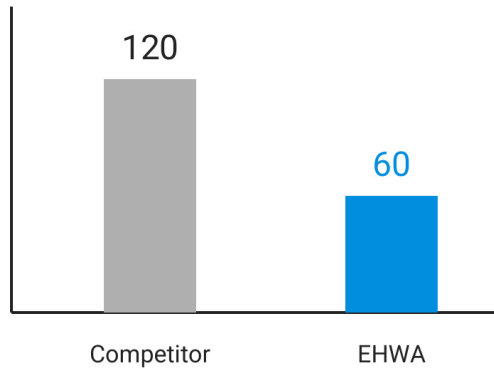
Vitrified-bond CBN wheel.



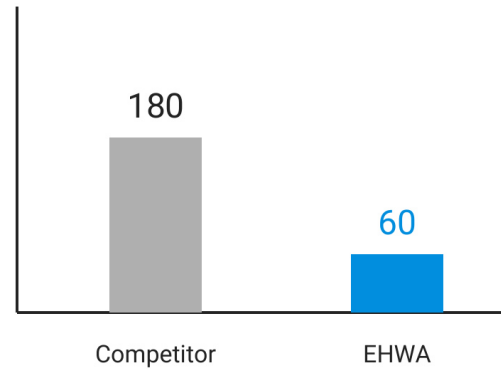
Microstructure images showing different pore structures.

B170L160VESI: source comparison

Grinding time [min]



Current loading [A]



Values apply to the described source trial.

Schematic; not a dimensioned product drawing.

B170L160VESI: source comparison.

Vitrified bond: three B80P160VESI model variants

This separate roll-grinding example uses B80P160VESI. Sources Q227 and Q246 show different E610 wheel widths: 100T and 50T respectively. These variants are not merged without manufacturer evidence.

Model	Dimensions	Source
VB-CBN WHEEL-E910	VB-1A1, 910D-100T-5X-304.5H	Q227/Q246 p6
VB-CBN WHEEL-E760	VB-1A1, 760D-100T-10X-304.8H	Q227/Q246 p6
VB-CBN WHEEL-E610	VB-1A1, 610D-50T-5X-203.2H	Q246 p6
VB-CBN WHEEL-E610	VB-1A1, 610D-100T-5X-203.2H	Q227 p6

Technical source: Q246, page 6.

B80P160VESI: operating conditions and source comparison

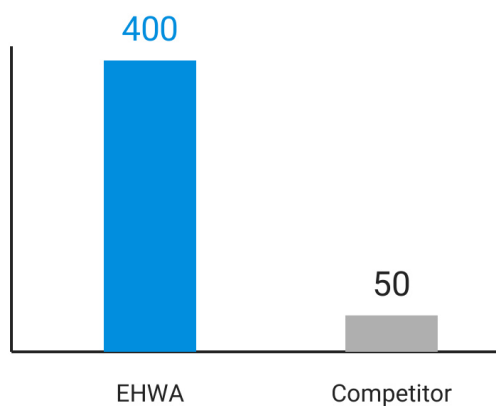
The trial remains separate from the older B170L160VESI comparison. The chart counts 400 processed rolls for EHWA versus 50 for the competitor. A separate comparison states 3.7 versus 456 kg of source-designated grinding residue over 400 processed rolls. This is not interpreted as total removed workpiece mass.

Parameter	Value
Specification	B80P160VESI
Workpiece / material	Finishing Mill / HSS
Machine	WALDRICH SIEGEN
Stock removal	0.45-0.60 mm
Wheel speed	24-36 m/s
Roll speed	26-38 rpm
Table feed	2300-2800 mm/min
Continuous infeed	1-6 μ m
Processed rolls: EHWA / competitor	400 / 50
Grinding residue: EHWA / competitor	3.7 / 456 kg

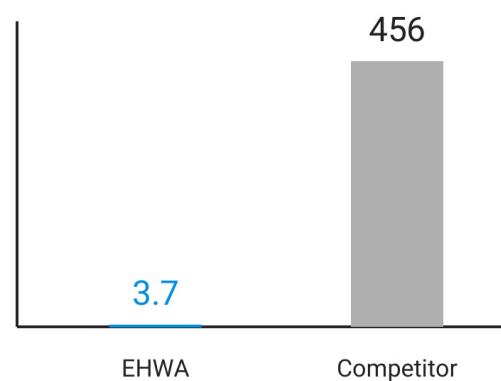
Technical source: Q246, page 6.

B80P160VESI: source comparison

Rolls processed



Source grinding residue [kg]



Values apply to the described source trial.

Residue comparison at 400 rolls; not total workpiece removal mass.
Schematic; not a dimensioned product drawing.

B80P160VESI: source comparison.

EHWA Dressing Tool 100A

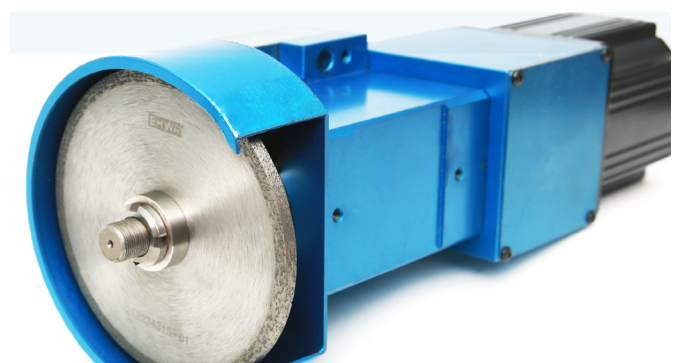
The device supports truing and dressing of vitrified CBN wheels. EHWA describes shorter setup times, stable surface quality and improved wheel utilisation. The device table preserves its printed values; power is stated as 200 W despite the column heading naming kW.

Device parameter	Source value
Input supply	DC 220 V
Drive type	Direct Coupler
Speed rating	3000 rpm
Dresser wheel diameter maximum	125D
Length	350L
Maximum workpiece size	910D-100T
Power rating	200 W (BLDC)
Model / brand	EHWA Dressing Tool 100A
Option	With Controller
Application	For Vitrified CBN Wheel

Technical source: Q246, page 7.



Dressing-device controller.



EHWA Dressing Tool 100A: device view.

Additional specified contact-gauge design

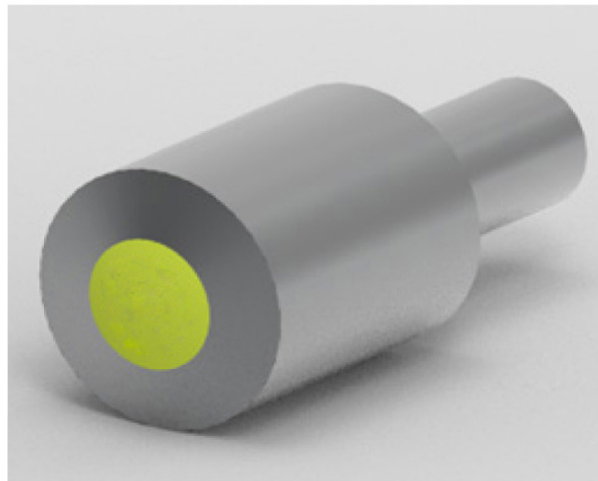
The source shows natural-diamond, PCD and carbide gauge contacts and ruby styli. The three ruby-stylus codes are already present in the full cutting-tool programme. The specific contact geometry 5D-12L-M2.5-5R is an addition.

Product	Specification	Drawing dimensions
Diamond Contact Gauge	5D-12L-M2.5-5R	Ø5; length 12; M2.5; source code 5R

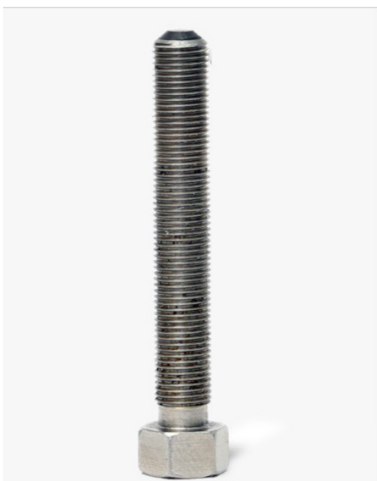
Technical source: Q246, page 9.



Diamond contact gauges in different designs.

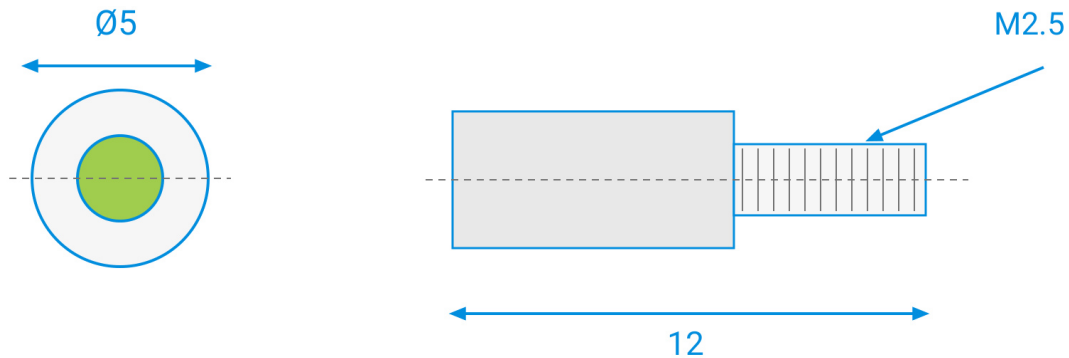


Gauge with a highlighted contact surface.



Thread-mounted contact gauge.

Contact gauge: 5D-12L-M2.5-5R



Unit not explicitly printed; code 5R remains unchanged.
Schematic; not a dimensioned product drawing.

Contact gauge: 5D-12L-M2.5-5R.

Additional stationary diamond-dresser dimensions

SDD, FDD, MDD and IDD are already explained in the general grinding programme. This source adds specific crystal forms, carat ranges and CVD rod dimensions. Sizes remain assigned to the corresponding dresser design.

Design	Diamond / form	Size or carat range
SDD Natural	A Octahedron; B Dodecahedron	1/30-1 ct
SDD Synthetic	F Mono Crystal; G CVD	0.6 x 0.6 x 3; 0.8 x 0.8 x 3; 1.0 x 1.0 x 3; 1.5 x 1.5 x 3 mm
FDD Roof	D Maccle; E Shape; F Mono Crystal; G CVD; H PCD	1/4-3/4 ct
FDD Chisel	D Maccle; E Shape; F Mono Crystal; G CVD	1/4-3/4 ct
FDD Cone	C Elongated; G CVD	1/4-1/2 ct
MDD Blade	CVD	0.4 x 0.4 x 5; 0.6 x 0.6 x 5; 0.8 x 0.8 x 3; 0.8 x 0.8 x 6; 1.0 x 1.0 x 3 mm
MDD Blade	Elongated	1/80-1/20 ct
MDD Natural	A Octahedron; B Dodecahedron	1/30-1/3 ct
IDD	Impregnated; Zenesis Pattern	Mesh #14-#140

Technical source: Q246, page 8.



SDD: single-point diamond dressers.



FDD: forming diamond dressers.



MDD: multi-point diamond dressers.



IDD: impregnated diamond dressers.

Stationary dressers: designs



SDD



FDD



MDD



IDD

Schematic; not a dimensioned product drawing.

Stationary dressers: designs.

Additional resin-bond E210 models

The newer source lists two additional model variants with B120R100B. The 210D designs and their widths remain separate from the older 212D-84T-24W example.

Model	Shape / dimensions	Specification
RB-ORG-E210	RB-6A2, 210D-37W	B120R100B
RB-ORP-E210	RB-6A2, 210D-25W	B120R100B

Further trial detail	Source value
Workpiece / material	Finishing mill / HSS
Machine	On-Line roll grinder
MPM	1000
Pressure	45-53 kgf/cm ²

Technical source: Q246, page 4.

Match your application

State roll material, hardness, profile drawing, machine and existing wheel specification. Add stock allowance, speeds, infeed, coolant and the required surface. Device interfaces, supply and gauge drawing dimensions are agreed together.

EHWA Europe: info@ehwadia.de · +49 6173 997780

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