

Precision
Diamond/CBN Grinding Wheels

Galvanic Bond



Basics of Galvanic Bond

Normally for galvanic bonds a single layer of abrasive grain is applied. The abrasive grains are usually sprinkled on the wheel body and held in place by a metallic matrix.

Since Nickel is used as the bonding material, it lends its basic properties to the wheel:

- Hardness
- Toughness
- Adhesive force
- Resistance to wear



These properties can be offered in a wide range of variants by using different metallic and non-metallic additives.

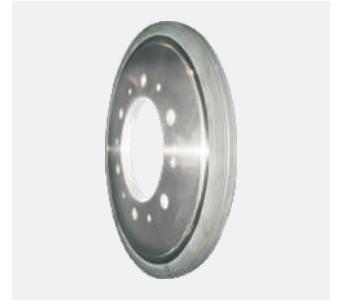
Advantages

The numerous grits projecting from the bonding matrix lend a lot of advantages for the galvanic bonded wheels.

- Ability to grip firmly
- Extremely high grinding performance
- Can grind even strong ductile materials
- Have a tool life of 15 to 100 ground meters depending on grit size and grinding conditions

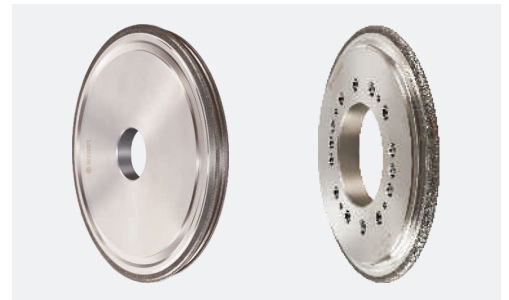
Often the finished surfaces are somewhat rougher than those ground with the same grit size in bonds such as resin bond, metal bond or vitrified bond.

An improvement of the surface comes gradually with the microcrystalline wear of the grit points and the increase of cutting edges so that the galvanic grinding tool is always characterized by the variation of the achievable surface quality over the total service life.



Characteristics

- Single grit layer in an extremely stable bond
- High geometric and proportion precision
- Extremely high grinding performance
- High abrasiveness due to high grit protrusion
- Very good dressing behavior
- Body can be re-plated several times
- Long tool life
- High geometric stability
- No dressing procedure necessary
- Statistic grit arrangement on the steel body.



Surface Finish and Material Removal Rate (Q¹) & Tool Life (Z¹)

Grit size	Layer	Rz	Rz	Flank	Performance	
	thickness	non crushed	crushed	error	Q ¹ W	tool life Z ¹
	mm	μ	μ	mm +/-	mm ³ /mm*s	mm ³ /mm*1000
B35	0.040	6	2	0.002	0,8 ... 1,5	25 ... 40
B46	0.050	8	2	0.002	1,0 ... 1,75	30 ... 45
B54	0.065	9	3	0.002	1,5 ... 2,75	35 ... 55
B64	0.075	10	4	0.002	1,75 ... 3,25	40 ... 60
B76	0.085	12	5	0.003	2,0 ... 3,75	50 ... 90
B91	0.100	14	6	0.003	3,0 ... 4,75	60 ... 120
B107	0.120	16	8	0.004	3,25 ... 5,0	80 ... 160
B126	0.145	20	10	0.005	3,5 ... 6,5	120 ... 250
B151	0.180	23	14	0.007	4,0 ... 8,0	200 ... 400
B181	0.220	25	16	0.008	4,75 ... 9,0	250 ... 500
B213	0.250	27	18	0.010	5,25 ... 9,5	320 ... 650
B252	0.315	30	20	0.012	5,5 ... 10	400 ... 750

Cases where Galvanic Bond Wheels are ideal

In case of small and complex profiles

If a stable profile geometry is demanded over a long period of time

If a high precision profile geometry is demanded

If there is no dressing possibility on the machine

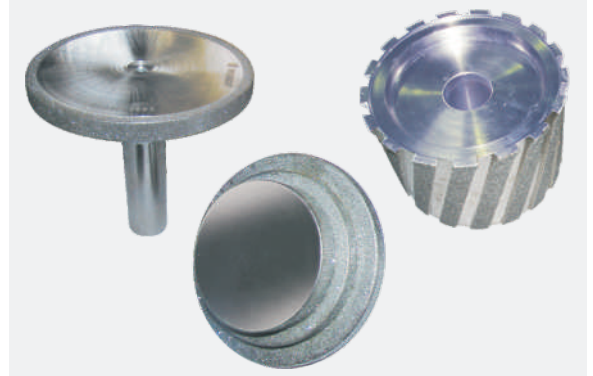
These galvanic bond grinding wheels are convenient for both roughing and finishing of grinding profiles.

How to get the best out of Galvanic Bond Wheels

Medium or high in feed rates and grinding speed

With cooling under enough pressure

Machines should be very rigid and robust



CBN tools for ferrous grindings in Automotive and Aerospace Industries

Internal grinding

Slot grinding

Profile grinding

General pre-grinding

Diamond Tools for Non-ferrous Industrial Applications

Industry	Application
Carbide	Grinding green and sintered tungsten carbide
Ceramic	Grinding ceramics like SiC, AlO ₂ , ZrO etc.
Automotive	Grinding brake liners and cutting re-enforced rubber mouldings
Pharmaceutical	Grinding factitious knee joint
Dental	Profiling rubber bonded grinding pins
Ferrite	Grinding magnetic parts
Chemical	Grinding laboratory glass
Graphite	Grinding graphite parts
Food	Cutting frozen food
Glass	Grinding tubes, automotive components etc
Oral Hygiene	Rounding of tooth brush bristles

Range of Galvanic Bond Wheels

Grinding wheels up to diameter of 650 mm
Precision grinding wheels up to a diameter of 450 mm
Diamond grit sizes from MD10 to D1182
Different types of Diamond grits like natural and synthetic, friable and blocky etc.
CBN grit sizes from B20 to B601
Different types of CBN grits like friable, blocky etc.
Surface qualities from Rz >= 2



Case Studies

Camshaft grinding - Roughing

Workpiece	: 4 cylinder camshaft
Material	: Chilled Cast Iron
Operation	: Double Cam lobe grinding
Grinding wheel	: CBN EP B252 Ø450
Wheels speed	: 120 m/sec
Work piece speed	: 50 to 200 rpm
Stock removal	: 3.5 mm on radius
Grinding fluid	: Straight oil - 70 l/min @ 10 bar
Cleaning	: 8 l/min @ 20 bar
Total cycle time	: 90 sec
Grinding time	: 60 sec
Wheel life time	: 70,000 cams



Crankshaft grinding - Roughing



Workpiece	: 4 cylinder crankshaft
Material	: Chiled cast iron or steel
Operation	: Rough grinding of pins & bearing diameters
Tolerances on Ø	: ca. 0.10 mm
Grinding wheel	: CBN EP B252 Ø600
Wheels speed	: 150 m/sec
Work piece speed	: 250 rpm
Grinding fluid	: Straight oil -2 x 250 l/min @ 2 bar
Cleaning	: 10 l/min @ 20 bar
Total cycle time	: < 90 sec
Grinding time	: 40 sec
Stock removal	: 2.5 mm on Ø
Q'w :	≤200 mm ³ /mm. sec
Wheel life time	: 16,000,000 mm ³ /mm on cast iron 9,000,000 mm ³ /mm on steel

Since continuous improvements are made, specifications are subject to change without notice.

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