

TECHNICAL INFORMATION

Polyimide and Hybrid Bonds

Why polyimide bonds — and when is a hybrid bond the better choice?

Properties, limits and fields of application at a glance.

Why polyimide bonds?

Compared with other polymers as well as with phenolic and epoxy resins, polyimides offer the highest thermal stability. Depending on the process, standard resin bonds based on phenolic resin withstand up to approximately 180 °C; polyimide-bonded wheels remain dimensionally stable into the range of 300 to 350 °C. This stability combined with extremely high strength makes polyimide the first choice for high-quality diamond and CBN grinding wheels.

For leading tool manufacturers, high production volumes, best quality and low unit costs are the decisive criteria. Polyimide bonds provide the basis for this: cool grinding, high cutting ability and an elastic grain retention that avoids edge chipping and grinding burn.

300–350 °C

THERMAL CAPABILITY
POLYIMIDE

≈ 180 °C

REFERENCE VALUE
PHENOLIC RESIN BOND

> 100 m/s

METAL BOND IN THE
HYBRID COMPOSITE

Why hybrid bonds?

Hybrid bonds combine a polyimide and a metal bond in a single bond system. They meet the high demands of modern series production and unite the advantages of both systems: the grinding characteristics and elasticity of the polyimide bond with the wear and heat resistance of the metal bond.

The result in practice: shorter cycle times with consistent profile accuracy — while requiring less dressing.

Properties compared

BOND	TEMPERATURE	ELASTICITY	WEAR RESISTANCE	TYPICAL APPLICATION
Phenolic resin	up to approx. 180 °C	high	low	Resharpener, non-critical processes
Polyimide	300–350 °C	high	medium to high	Carbide and HSS rotary tools
Hybrid (polyimide + metal)	300–350 °C	medium to high	very high	Series production with high infeed
Sintered metal	very high	low	very high	High-speed grinding > 100 m/s

Classification for guidance only. Binding values result from the specification, the cooling and the process parameters.

Your advantages with hybrid bonds

- + Best grinding characteristics and elasticity of the polyimide bond
- + Improved cycle time in production
- + Reduced dressing volume
- + Improved surface and edge quality
- + Longer tool life and profile retention
- + High wear and heat resistance of the metal bond
- + High infeed possible
- + Lower residual stress, no grinding burn
- + Reduced loading of the wheel
- + Energy-efficient process

Fields of application

ROTARY TOOLS

Drills, milling cutters and step tools made of carbide — flute, back and peripheral grinding.

HSS TOOLS

CBN specifications for high-speed steel, saws and profile tools.

CNC SERIES PRODUCTION

Long-running processes with high infeed, where dressing intervals and cycle time matter.