



Sapphire Blue Grinding Wheels for Higher Performance in Precision Grinding

Sapphire Blue Grinding Wheels

The abrasive grain used in Hermes CB grinding wheels is microcrystalline sintered aluminum oxide, "Sapphire Blue", as indicated by the letters "CB" in the specification.

CB tools considerably increase performance in the abrasive machining process. By doing so, they greatly reduce the gap between conventional fused alumina and CBN in terms of material removal and tool life.

What is the difference between Sapphire Blue sintered aluminum oxide and conventional fused alumina?

The fused alumina oxide grain generally used in abrasive machining processes today is composed of a few particles or crystals. After a fairly short period of machining the grain may break up into relatively large individual crystals, and is thereby lost for the rest of the process. CB grain is different in that it is composed of a large number of extremely small Al_2O_3 crystals. These are produced by a sintering process which is carried out well below the melting temperature of Al_2O_3 .

How does a CB grinding wheel give increased performance?

Unlike regular aluminum oxide grain, from which one or more particles may break out after the cutting edge becomes dull, CB sintered aluminum oxide will lose only a few submicroscopic particles of Al_2O_3 after minimal wear.

The CB grain thus maintains its "sharp" condition continually throughout the abrasive machining process.

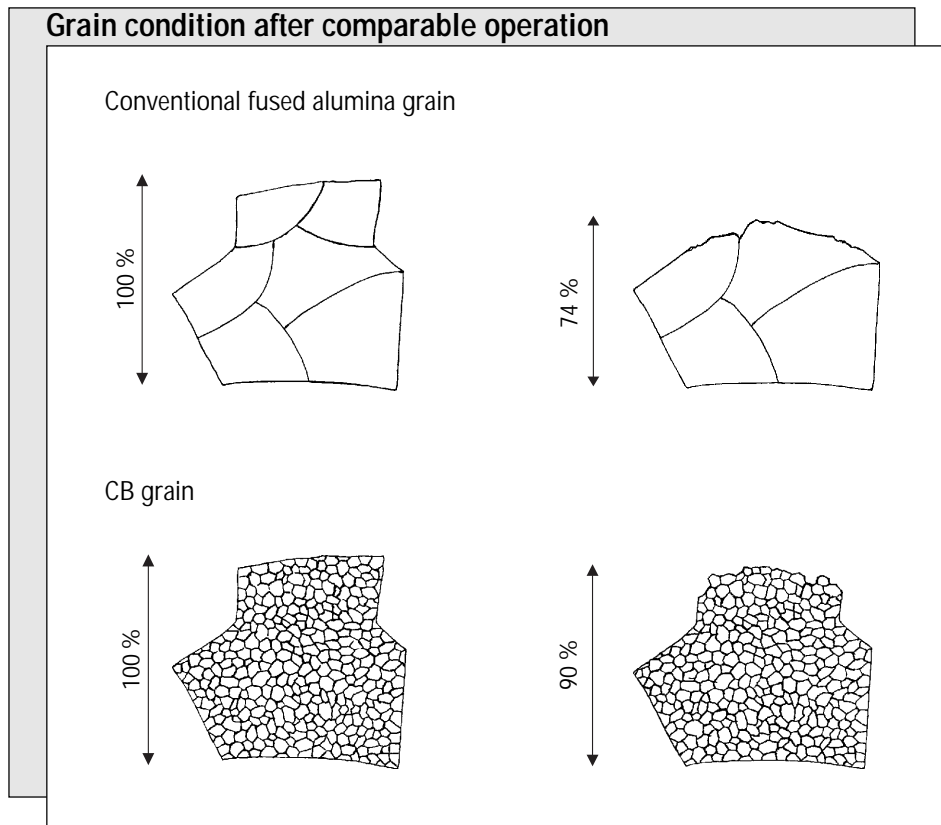
Provided that other parameters are correctly specified (e.g. CB concentration, grain size, hardness and structure), the CB material gives both longer tool life and increased cutting performance, thanks to microcrystalline grain pullout and the continuous cutting capability of the abrasive.

These benefits have been confirmed by many grinding tests, which have shown that

- CB can increase tool life up to a value of 500% for some conventional processes at normal material removal rates, and at least double tool life in practically all operations.
- It may double material removal rate in some cases, so that each workpiece can be completed in half the time. Wheel life is still at least as long as with fused alumina wheels.

In what areas can CB bonded abrasives best be applied?

CB grinding wheels are recommended for stationary machines with controlled feed, hence for precision grinding only. CB bonded abrasives are suitable for machining of non-alloyed, alloyed and high alloyed in addition to Nickel based tough steels.



CB grinding wheels are not suitable for machining ceramics, natural stone or carbide.

Neither are they recommended for operations requiring grinding wheels with hardness "P" and harder, nor for very high cutting forces.

For these applications it is advisable to use regular pink or white fused alumina.

CB grain is not suitable for off-hand grinding. Here it is advisable to use regular aluminum oxide, silicon carbide or zirconia.

Where are CB wheels cost-effective?

CB wheels can potentially improve performance in all precision grinding processes for steel or cast iron tools - whether hardened, tempered, alloyed, unalloyed or high-alloy steel.

Considerable performance improvements have been demonstrated in the following applications:

- Surface grinding
(reciprocating grinding with peripheral feed or with infeed only, face grinding with wheels or segments)
- Cylindrical grinding
(with axial feed, straight or angle approach grinding, and centerless)
- Gear grinding
- Roll grinding
- Camshaft grinding
- Crankshaft grinding
- Tool and cutter grinding

Do CB grinding wheels require special conditions?

CB grinding wheels can be handled in the same way as fused alumina oxide grinding wheels. Specific dressing techniques or specially rigid machine construction are not necessary.

To achieve maximum performance potential, it is of course necessary to optimize parameters such as grinding and dressing infeed.

Can CB abrasives replace CBN?

Specification of an abrasive is normally determined by economic considerations.

CB sintered aluminum oxide does not normally achieve the same service life as CBN. But it is often a more favorable economical solution for many grinding applications because its price is much lower than CBN, while its wear rate is much lower than fused alumina, and it can give higher material removal rates.

