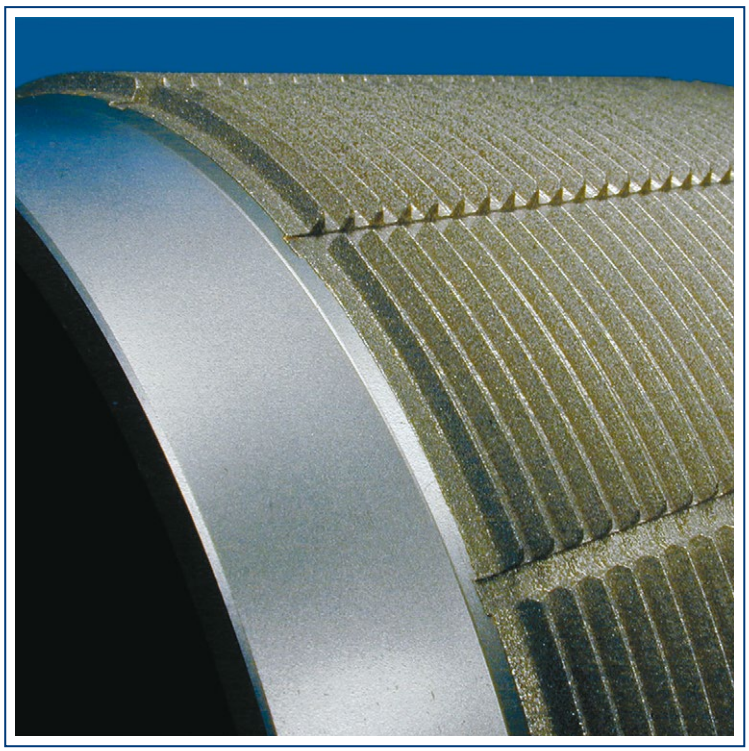
ELECTROPLATED BOND



TOP PERFORMANCE - WITHOUT DRESSING

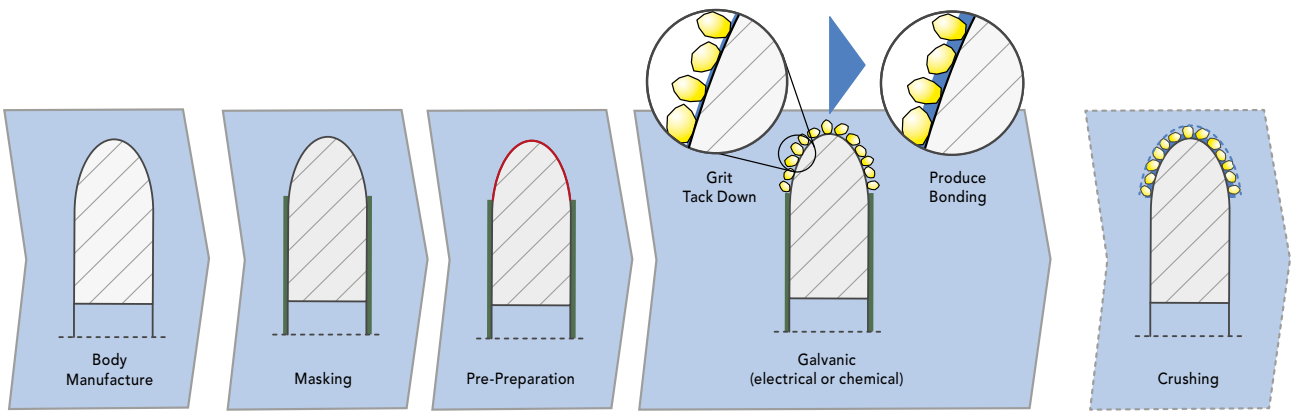
Electroplated grinding wheels with nickel bonding can achieve high stock removal rates and high-precision profiles on parts being ground.

Depending on the wheel blank design, plating technique, and post-treatment of the single-layer grit structure, many different grinding wheels can be produced using this bond system. There is no need for dressing during the life of the wheel. This avoids downtime and eliminates the need for a dressing device. Worn wheels are replated with new CBN or Diamond grit in a continuous replating cycle. Wheel bodies can generally be reused several times. As such, the tools are ideally suited to high production.

The precondition for using these wheels is sufficiently high machine rigidity, good wheel holding or alignment and, in CBN applications, high cutting speed.

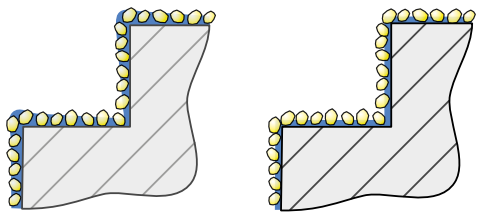
PRODUCTION PROCESSES

Tool quality starts with the production of the wheel blank. This requires absolute precision to reach the running speeds required. Subjecting the wheel blank to surface hardening treatment is one option to achieve several replating cycles without any loss of quality. The grit material is applied to unmasked areas of the wheel blank using nickel electroplating methods which are modified geometrically to the thickness of the grit layer. The function of nickel is to bond the grit to the wheel blank; the depth of nickel bonding permits grit protrusions that no other bond can achieve. The wheels can be used in rough-cutting processes without any post-treatment.



THE BOND IS DECISIVE

With precision electroplated grinding wheels, a single grit layer made of CBN or diamond is responsible for the machining action. The grit must therefore be fixed to the wheel blank in a high-strength bond that is also ductile. Besides electrolytically deposited nickel bonds, chemically generated bonds are also used. Nickel bonding based on chemical deposition processes has the advantage that the deposited layer thickness is homogeneous and there is no nickel coating on non-grinding areas of the tool.
Special treatment processes can also vary the retention force of the bond in order to respond to special requirements arising from the process.

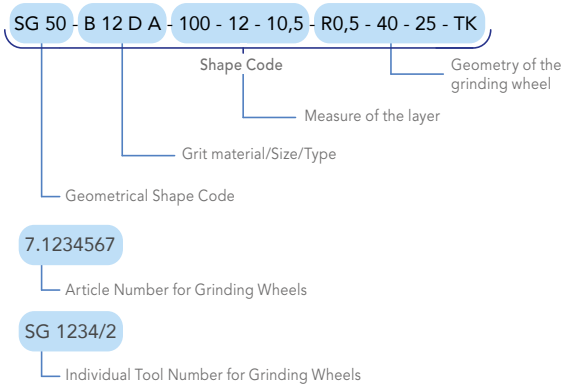


Electroplated nickel bonding

Chemical nickel bonding

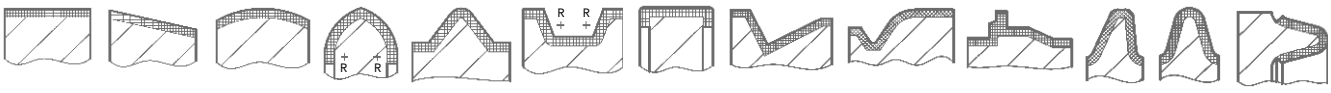
THE SHAPE CODE - WHEEL DESCRIPTION IN WRITTEN FORM

DR. KAISER has already set standards with the introduction of a shape code system for dressing tools. The same naming system is also used for electroplated grinding wheels. The grinding wheel shape specifies the grit layer, layer surface, and the main tool geometry data. This is a simple method to describe all tools and prevents any confusion. In addition, the grinding wheels are assigned an 8-digit part number (article number) to identify the tool system. The serial number permits the unique identification of each wheel. It also helps to track replating operations and repairs.

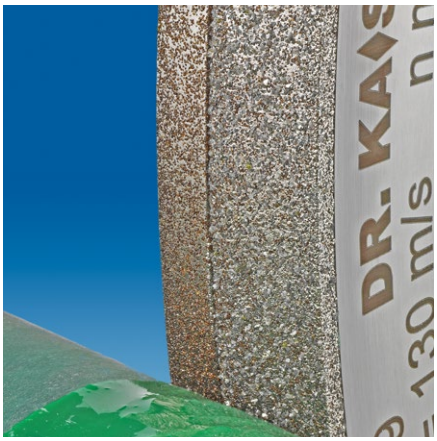


SHAPES (EXAMPLES)

The number of different geometric shapes is much larger — here are only a few standard versions.



SG10 SG20 SG30 SG32 SG50 SG70 SG80 SG120 Schulter SG190 Ventil SG212 Turbine SG300 Rotor SG301 Zahnrad SG320



ELECTROPLATED BOND

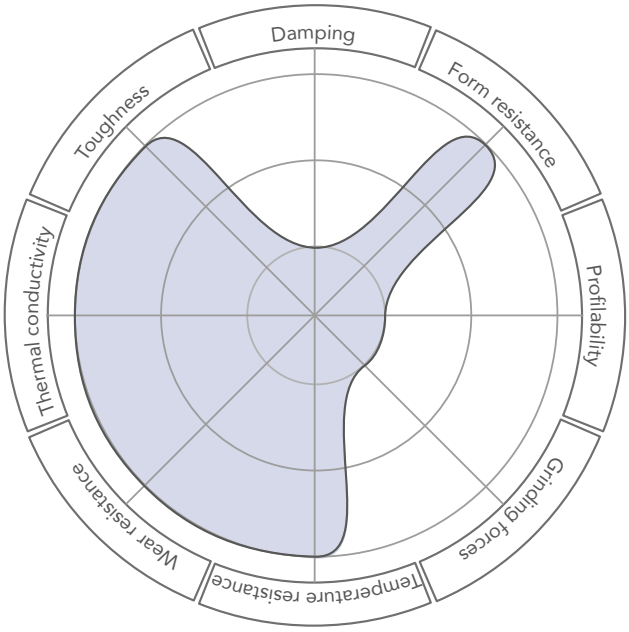
BOND CHARACTERISTICS

The electroplated nickel bond produces large grit protrusions due to high grit retention forces. CBN or diamond abrasives are the optimum solution for high cutting and stock removal rates. They can be used for rough-cutting and finishing processes. Electroplated grinding wheels achieve high efficiency without the need for dressing.

The development of different nickel bonds allows hardness and toughness characteristics to be modified to optimize wheels for a particular process.

CORE

Steel is the preferred material for the wheel core. In order to achieve a high number of replating cycles, the core is supplied in a hardened condition. Bronze or carbide cores are also possible.



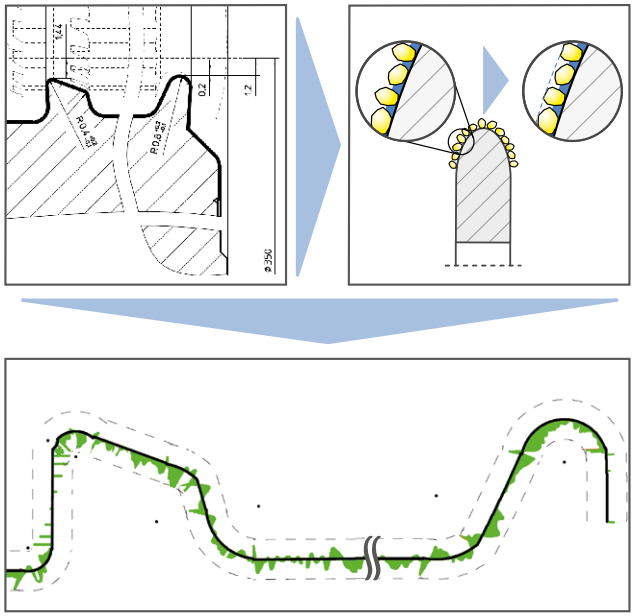
DELIVERY OPTIONS

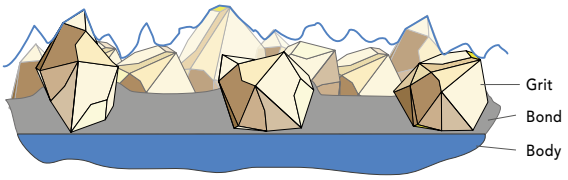
Extreme precision is required to assemble grinding wheels. Electroplated wheels must normally be aligned on the machine to achieve the required radial and axial runout in the machine. Precision-machined reference surfaces are aligned with the aid of micrometers. Grinding wheels are shipped in wooden crates for safe transportation. This transportation packaging protects the new wheels and is used to return worn wheels for the replating cycle.

ACCURACY

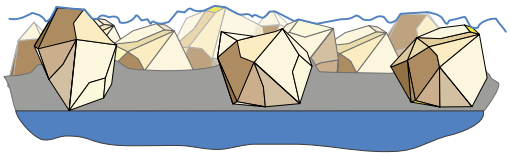
For highest surface qualities and profile accuracies, if required and and technical feasibility, the grain tips can be touched by a special special crushing process without pre-damaging the grain material. Narrow envelope curve tolerances improve accuracy and meet finish requirements of the form envelope.

Every wheel is supplied with a test report to confirm accuracy. The accuracy achieved is measured by tactile or optical measurement processes. They immediately show any deviations from the reference contour. On request, a sample test piece made by the grinding wheel can be supplied to confirm accuracy.





Normal Surface Quality without Crush Finishing



Improved Surface Quality by Crushing of the CBN Grits

REPLATING AND REPAIR

Electroplated grinding wheels can be replated several times. Here, the worn abrasive grit and plating is removed from the core by chemically releasing the bond.

Before replating, the core is tested for its geometric accuracy and repaired by re-machining if it has been damaged. A replated wheel is therefore equivalent to a new wheel but at a much lower cost.