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TOOLS and EQUIPMENT

Grinding tools from
KREBS & RIEDEL

Upgrade to precision grinding

KREBS
KREBS & RIEDEL

Innovative Grinding Technology since 1895

Tell us what you want to grind – we will supply the wheel.

Perfection for every process.

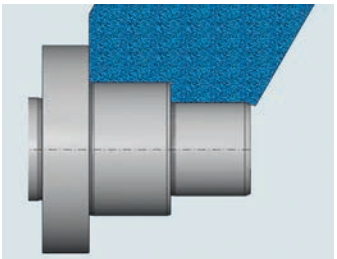
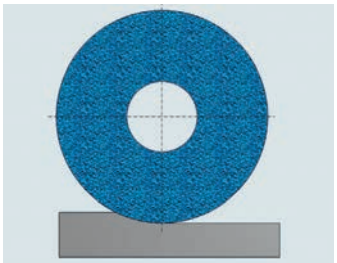
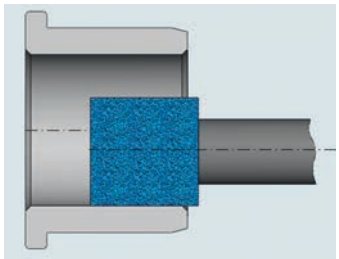
Every product demands its own particular process, and every process tends to have its own set of variables. We will supply you with precisely the wheels to match.

Cylindrical grinding, the most common process. It is used to machine rotationally symmetrical workpieces of varying sizes and materials, inside and outside. This may be anything from tiny parts for use in engines, all the way to enormous rollers, weighing tons, used in the paper industry. We can supply you with wheels in the dimensions, composition and hardness you require … and that produce ultra-precise results.

Surface grinding is used mainly in the manu-facturing of tools and moulds. Surfaces are machined plane parallel to the circumfe-rence of the wheel or its face. The growing diversity of materials involved demands effective, innovative and always lucrative solutions – all of which we have for you.

Creep feed or **deep grinding** usually produces a tool in one single procedure. We have the right tools to cope with large amounts of grinding performed in small infeed in-crements – in other words, large contact arcs between the workpiece and the grinding wheel. Highly porous and quick cutting, they make this process fast and profitable.

Profile grinding processes perimeters using profiled wheels. The workpiece, which could be a threaded or geared tool, defines the shape, structure and specifi-cations of the wheel. For example, we use grain sizes and bonds adapted to radii and profiles. We can pre-profile these quick-cutting, dresser-friendly wheels for you – which saves you time and expense when setting up your system.

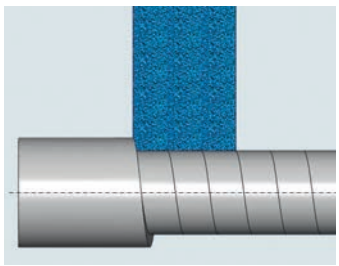

Roll grinding is a process that involves intensive levels of grinding. Different rollers made from very differ-ent materials and in different sizes always require the right wheel. What remains the same, however, is the defined surface quality that you will achieve using our tools. Our ceramic-bonded CBN wheels are often a more economical alternative for roll grinding.

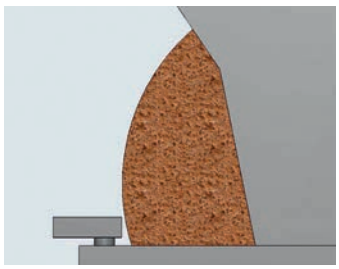
Abrasive cutting, an extremely powerful process for use on a wide range of materials and with a wide range of machinery. These very thin wheels, which may or may not be reinforced with fibres, can be used universally for wet and dry cutting. And they are always much more profitable than alternative processes such as sawing.

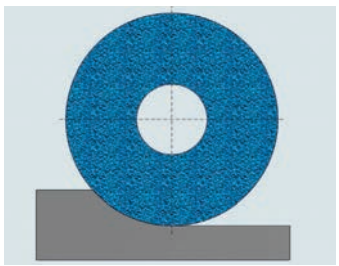
Rough grinding – the process for all things coarse. The machining speed is more important than the surface quality when it comes to deburring, grinding down and cleaning. For this application we can supply you with coarse, resin-bonded wheels – fibre reinforced if high machining speeds are involved. There's no burr our wheels can't cope with.

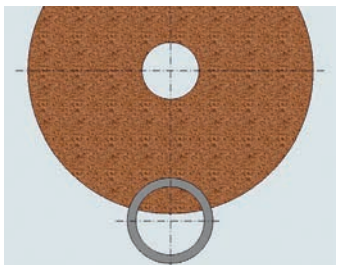
Tool grinding usually means cutting special steels into the right shape – accurately. For this purpose we can supply you with a wide range of suitable grinding cups, plates and bevelled wheels for the production of tools. Show us your tool and we will provide you with the ideal grinding solution.

Whatever you want to manufacture, and whatever process you want to use, we can make the perfect tool for it.









Conventional grinding tools
Diversity meets perfection.

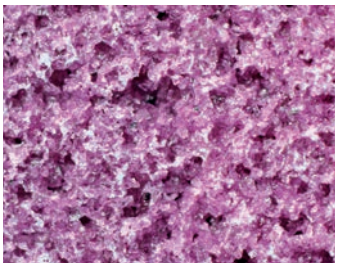
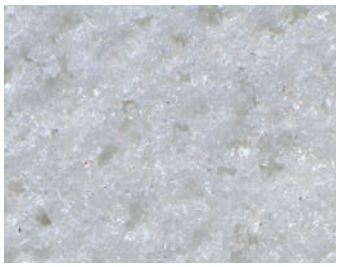
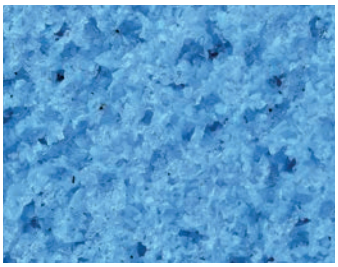
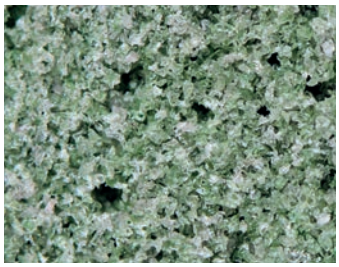
Grinding wheels in vitrified bond

Vitrified bond systems have largely prevailed in precision grinding. A major advantage of vitrified bonding is the controllable porosity. The appropriate microstructure is selected depending upon the size of the contact zone between the work piece and the grinding wheel.

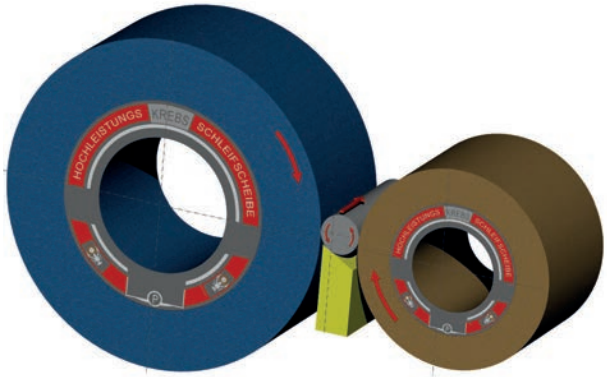
Generally speaking, the larger the contact zone, the more open and porous the grinding wheel needs to be. Highly porous grinding wheels are in particularly needed for productive deep and creep-feed grinding processes to transport the cutting fluid directly into the contact zone and to optimally remove the generated grinding chips and heat. A product of this group is for example the successful KREBS MULTO grinding wheels.

Features:

- Diameter 30 mm to 915 mm
- Grinding segments
- Granular size from F20 to F400
- Precise finishing using CNC technology
- Optimal process adjustment through:
  - » Customised grain types and combinations
  - » Modern bond systems
  - » Optimised pore space composition

Centerless grinding

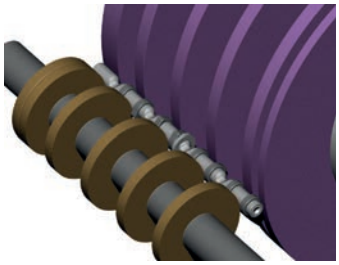


In contrast to external cylindrical grinding between centres, in centerless grinding the work piece rests on a work-rest blade. The work piece is driven and supported by a regulating wheel, which is usually rubber bonded. Centerless grinding is amongst the most complicated and difficult grinding processes.

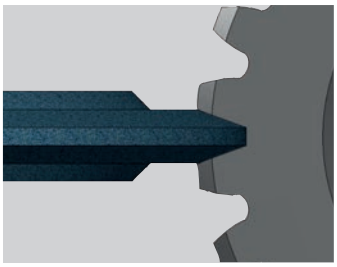
The extremely precise set-up of the machine and the careful selection of the grinding tool require great knowledge and experience. KREBS & RIEDEL provides economical solutions with vitrified and resin-bonded grinding wheels for both plunge and through-feed grinding.

Advantages:

- Free-standing workpiece
- Workpiece support linear
- Long, slim components can be sanded
- Fast workpiece change
- Predestined for mass production

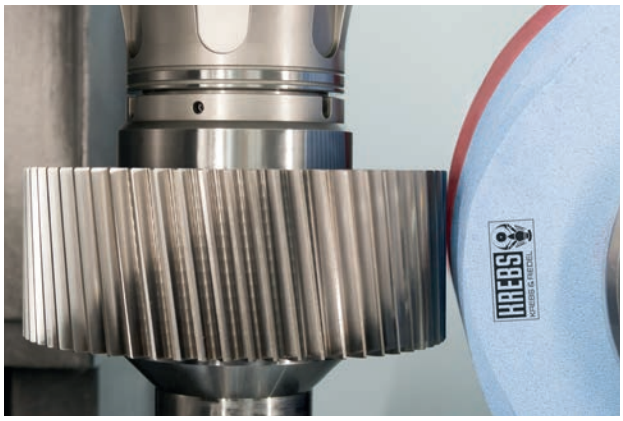



Gear Grinding
Precision – tooth for tooth.



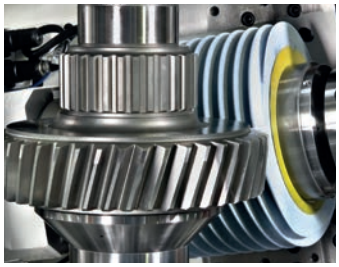
Gear Grinding

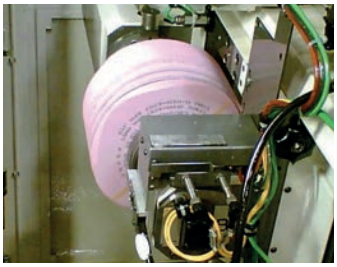
Gears are among the most important machine elements in the construction of transmissions, vehicles and machinery. The requirements placed on these products in terms of power transmission or running smoothness continue to rise steadily. Grinding is therefore one of the most important methods for fulfilling these high quality demands.

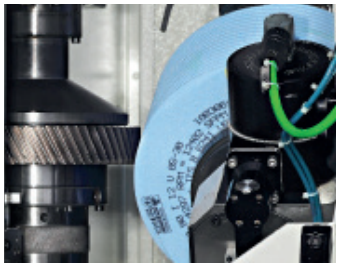


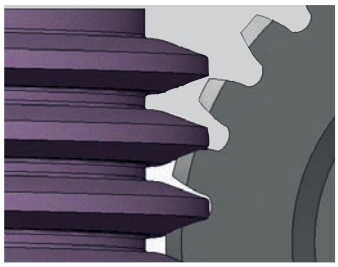
The grinding wheel dimensions are specified by the grinding machine systems being used or by the particular task. Working speeds lie between 40 – 63 m/s, on the newest machines even as high as 70 – 80 m/s.
White high-grade aluminium oxide, special aluminium oxide mixtures or sintered aluminium oxide mixtures are preferably used as the grinding media.

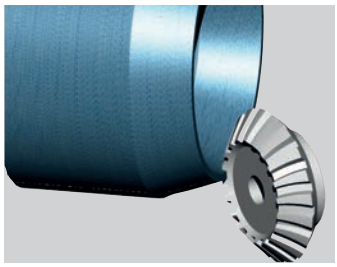
Most recently, the application of dressable vitrified CBN grinding wheels to gear grinding has also intensified. For this purpose, KREBS & RIEDEL can also offer you a product programme that we are continuously developing further and perfecting.

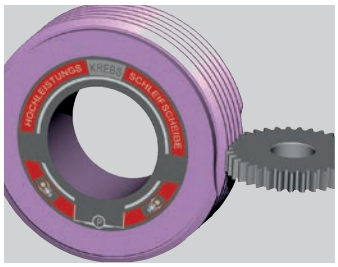


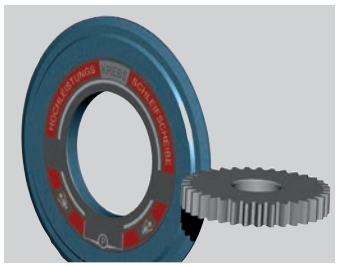


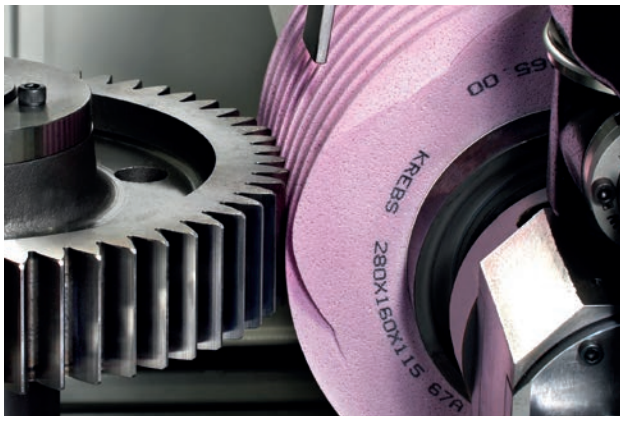










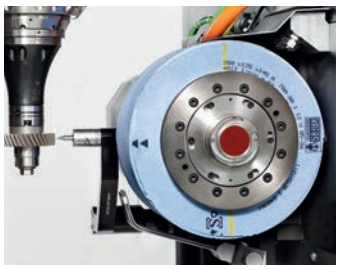


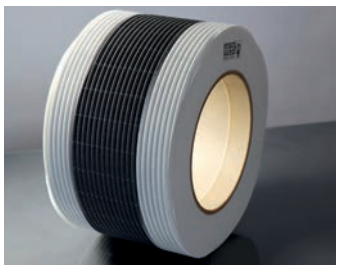
Depending on the process by which the tooth profile is generated, a differentiation is made between discontinuous and continuous generative grinding or profile grinding:

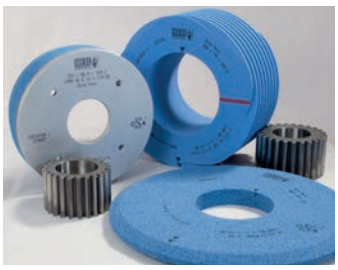
Discontinuous generative or profile grinding is characterised by the fact that complete tooth spaces, or in the case of older machines just the flanks of the teeth, are ground by means of shaped wheels that are chamfered on both sides. The kinematics of the machine are less complicated; the machining method is intended for medium-sized batches, medium-sized and large modules, and varying ranges.

In continuous generative or profile grinding, a worm grinding wheel and workpiece rotate synchronously with one another while the workpiece is simultaneously moved past the worm grinding wheel at several traverses. The requirements on the kinematics of the machine are demanding. The method is economical for the bulk production of small- and medium-sized modules.

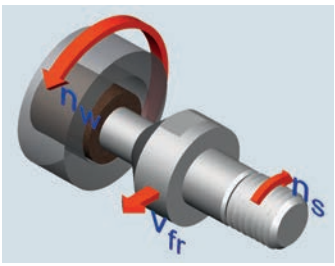
The grinding of spiral and bevel gears is a special process and is undertaken primarily with grinding rings on grinding machines by Klingelnberg and Gleason specially designed for this purpose.







Vitrified-bonded CBN and diamond tools
The ultimate in grinding.



The toughest abrasive in the world

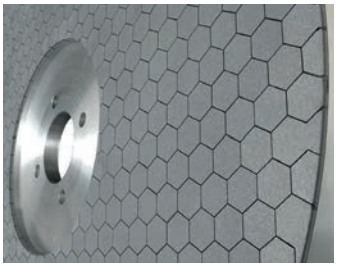
As always, the hardest materials in the world – CBN and diamond – offer the greatest precision when grinding extremely hard iron and steel alloys or hard, brittle materials, and offer the best stock removal rates and the longest wheel life.

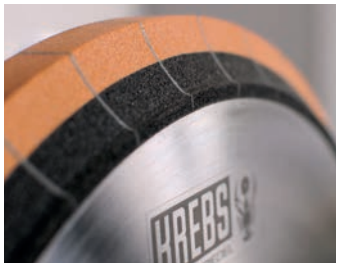
Cubic boron nitride, or CBN for short, is synthesized, similar to diamonds, from a hexagonal boron nitride at 50 to 90 kbar and 1,800 to 2,700°C. It is especially suitable for hard-to-machine or high-alloy hardened steels starting at 54 HRC, such as high-speed, tool or chrome steels, nickel-based alloys, powder metallurgical steels, or white cast iron.

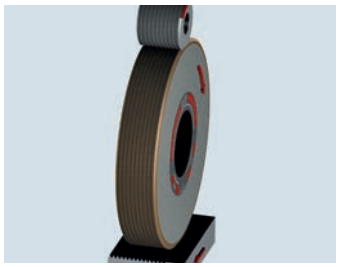
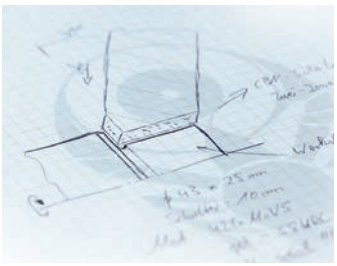
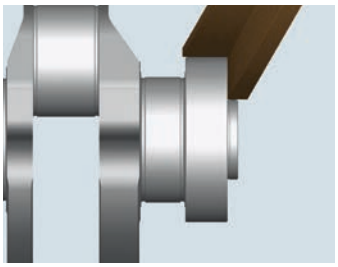
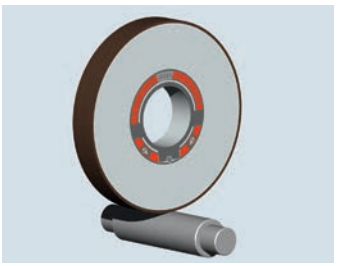
Diamonds are primarily used to machine brittle materials such as cemented carbide, ceramics, glass, granite, GFRP, semi-conductor materials, or wear coatings.

Features:

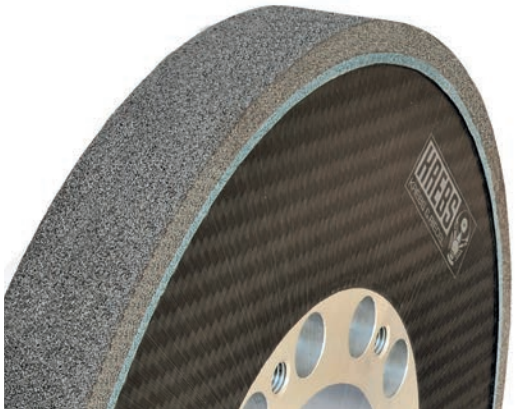
- Diameter 3 mm to 900 mm
- Operating speeds up to vc = 160m/s
- Granular size from 25 µm to 251 µm
- Process adjustment through:
  - » Various grain types
  - » Targeted introduction of porosity
  - » Tailored bond systems





High Composite



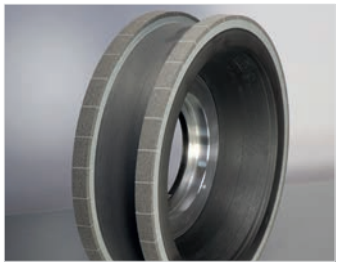
HI-COMP is a new wheel body variant for CBN and diamond abrasives. The high proportion of carbon fiber used to form the KREBS HI-COMP wheel hubs guarantees maximum strength with minimum weight. Depending on the process requirement different sizes are used and this ensures optimal and customized solutions to meet end users specific requirements.
Having been under development for over two years the HI-COMP wheel bodies are up to 75% lighter than comparable steel bodies. This not only guarantees easy handling for machine set-up personnel during installation but also dramatically decreases the load on the grinding spindle during grinding.

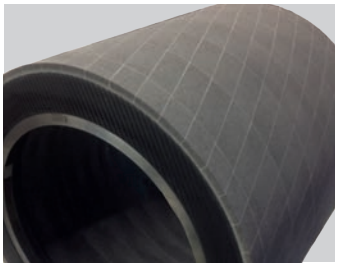
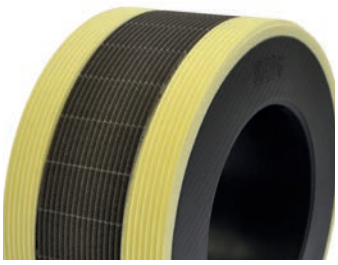
Advantages:

- Improved surface quality
- Increased part tolerances
- Reduced flaws
- Good grinding characteristics even under unstable conditions
- Improved performance of the grinding spindle
- Body can be recoated with abrasive after initial use

Application:

- Grinding zones with interruption of cut
- Grinding of smaller intricate parts
- Grinding processes with altering contact conditions
- Higher surface requirements (contact ratio Rmr)



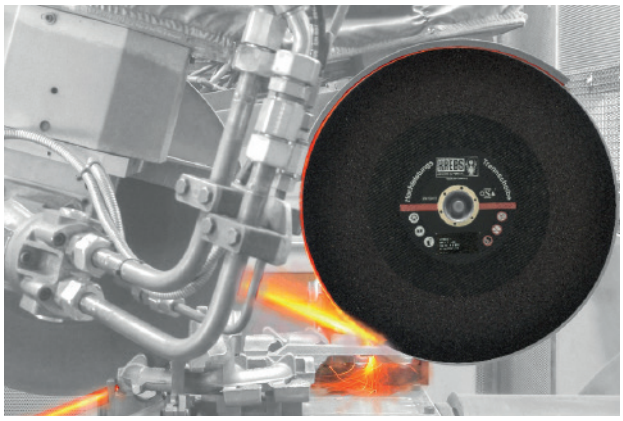
Grinding wheels in resinoid bond
Extensive product range

Cut-off wheels

The resinoid bond is a bond type well tailored to the grinding task. In resinoid bonded, resins are used as binders, into which fillers are mixed in addition to the abrasive grains. Resinoid-bonded grinding wheels are characterised by having a good cutting performance and cool grinding. Compared with vitrified bonds, resinoid bonds are known as soft, fast and cool grinding bonds. They have a very wide range of applications.

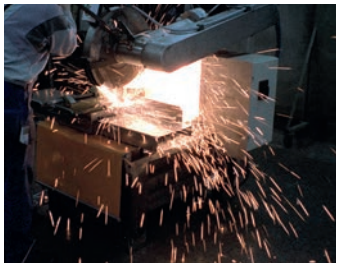
Depending upon the application, the bonds can be used for either dry or wet grinding. Based on the production methods and the low curing temperatures, grinding tools with resinoid bond are usually the least expensive among the different bond systems. Due to the low curing temperature, they can easily be used for all types of abrasives.

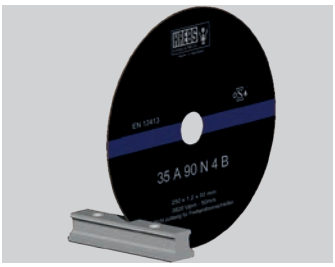
KREBS & RIEDEL offers high-performance cut-off wheels which include fiberglass reinforcing for extra strength and safety. These wheels can be produced with depressed or straight centers depending upon the application.

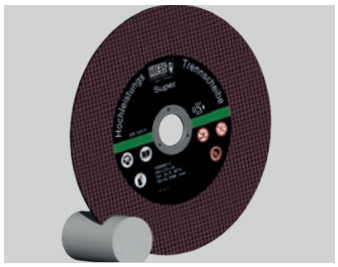


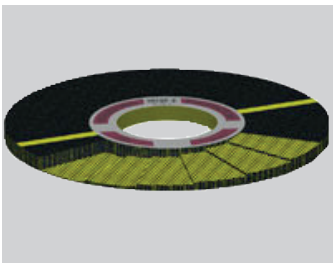
Features:

- Diameter 50 mm to 900 mm
- Granular size from F12 to F400
- Optimal process adjustment through:
  - » Customised grain types and combinations
  - » Modern synthetic resins
  - » Optimised filler selection









Rough grinding

Rough grinding wheels are commonly used in foundries and steel mill snagging operations. Almost all products produced in this sector of the metal working industry can be processed using a rough grinding wheel because of their high-removal rates.

KREBS & RIEDEL offers high performance rough grinding wheels without fiberglass reinforcement with a diameter up to 900mm and a working speed of 63 m/s. Rough grinding wheels with fiberglass reinforcement are available in diameters from 300mm to 600mm and with widths of 20mm up to 80mm and working speeds of 80m/s.

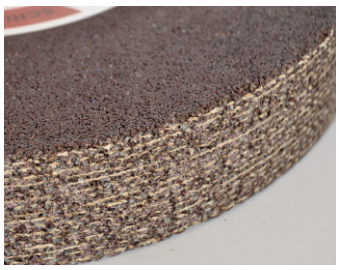
These grinding wheels are available with a variety of aluminum oxide, silicon carbide and zirconia alumina specifications.

Advantages:

- High stock removal rate
- Longer tool life
- No burnmarks
- High cutting capacity per unit time, therefore short grinding times
- Cool cutting and energy-saving work

Application:

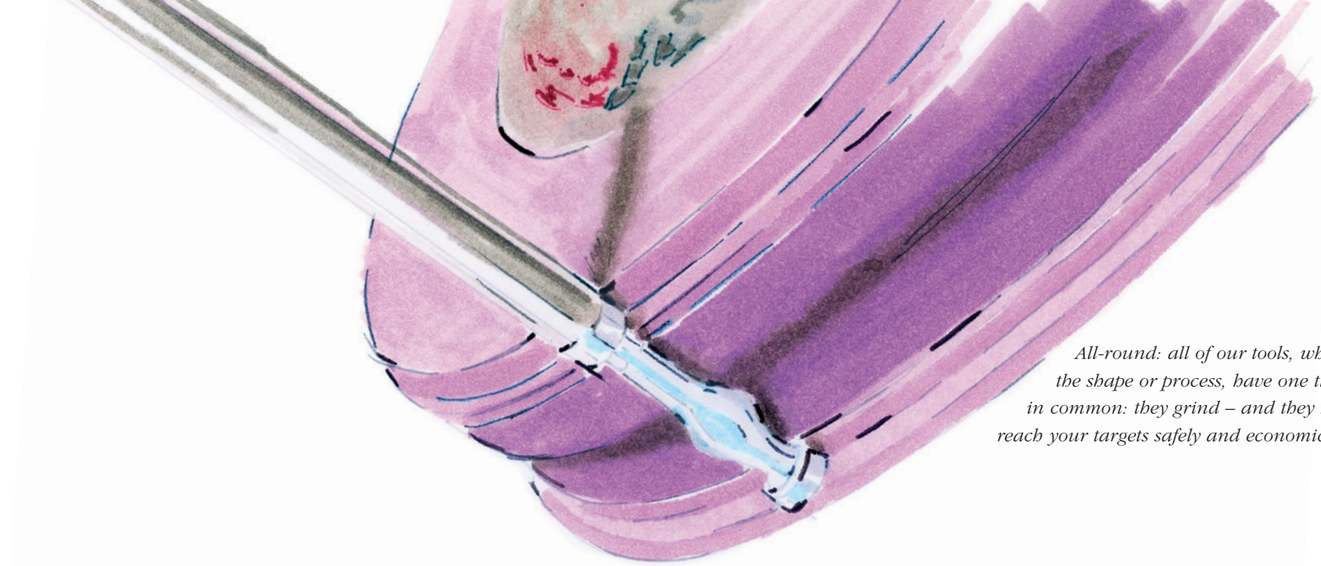
- On straight/ bi-conical hand machines
- On sanding blocks
- On pendulum grinding machines
- Grinding manipulators (ANDROMAT)



Conventional grinding tools from KREBS & RIEDEL

Diversity meets perfection.

Tell us what you want to grind – we will supply the wheel.



All-round: all of our tools, whatever the shape or process, have one thing in common: they grind – and they help you reach your targets safely and economically.

Perfection for every process.

Every product demands its own particular process, and every process tends to have its own set of variables. We will supply you with precisely the wheels to match.

Cylindrical grinding, the most common process. It is used to machine rotationally symmetrical workpieces of varying sizes and materials, inside and outside. This may be anything from tiny parts for use in engines, all the way to enormous rollers, weighing tons, used in the paper industry. We can supply you with wheels in the dimensions, composition and hardness you require … and that produce ultra-precise results.

Surface grinding is used mainly in the manufacturing of tools and moulds. Surfaces are machined plane parallel to the circumference of the wheel or its face. The growing diversity of materials involved demands effective, innovative and always lucrative solutions – all of which we have for you.

Creep feed or **deep grinding** usually produces a tool in one single procedure. We have the right tools to cope with large amounts of grinding performed in small infeed increments – in other words, large contact arcs between the workpiece and the grinding wheel. Highly porous and quick cutting, they make this process fast and profitable.

Profile grinding processes perimeters using profiled wheels. The workpiece, which could be a threaded or geared tool, defines the shape, structure and specifications of the wheel. For example, we use grain sizes and bonds adapted to radii and profiles. We can pre-profile these quick-cutting, dresser-friendly wheels for you – which saves you time and expense when setting up your system.

Roll grinding is a process that involves intensive levels of grinding. Different rollers made from very different materials and in different sizes always require the right wheel. What remains the same, however, is the defined surface quality that you will achieve using our tools. Our ceramic-bonded CBN wheels are often a more economical alternative for roll grinding.

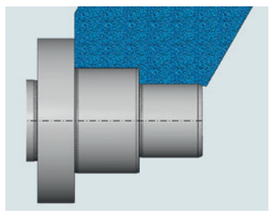
Abrasive cutting, an extremely powerful process for use on a wide range of materials and with a wide range of machinery. These very thin wheels, which may or may not be reinforced with fibres, can be used universally for wet and dry cutting. And they are always much more profitable than alternative processes such as sawing.

Rough grinding – the process for all things coarse. The machining speed is more important than the surface quality when it comes to deburring, grinding down and cleaning. For this application we can supply you with coarse, resin-bonded wheels – fibre reinforced if high machining speeds are involved. There's no burr our wheels can't cope with.

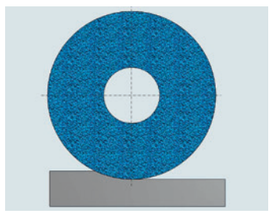
Tool grinding usually means cutting special steels into the right shape – accurately. For this purpose we can supply you with a wide range of suitable grinding cups, plates and bevelled wheels for the production of tools. Show us your tool and we will provide you with the ideal grinding solution.

Whatever you want to manufacture, and whatever process you want to use, we can make the perfect tool for it.

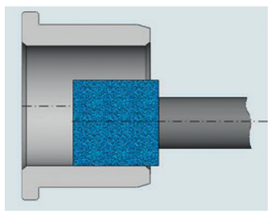
Delicate: because of the small contact zone on the end-face, angular plunge-cut grinding involves working at low pressure.



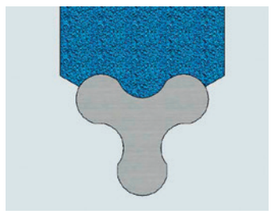
Keep in shape: with our tools your grinding will remain reliably plane-parallel, even over very large areas.



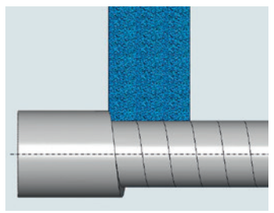
Round means round: cut using our tools, drilled holes really are round and surface finishes really are perfect.



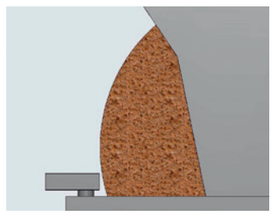
Get straight down to work: we can pre-profile your wheels for profile grinding – leaving you hardly anything to do when setting up.



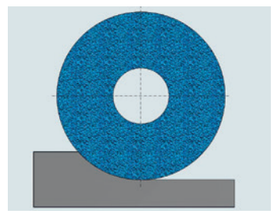
Large or small, soft or hard: we have a comprehensive, all-round range of products for a host of exterior cylindrical grinding purposes.



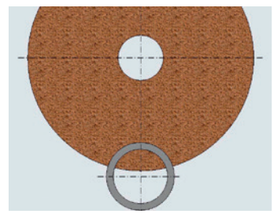
Bigger is better: at least it is in the world of rough grinding. Our wheels remove enormous amounts of material at high speed.



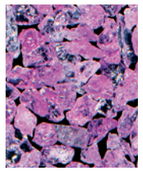
Big pores, big results: our deep-grinding wheels remove a lot of material quickly and precisely.



Thin but strong: two essentials for economical and precise abrasive cutting.



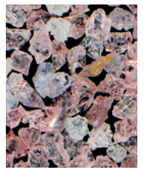
Little grains, big effect.



40A: Special fused pink aluminium oxide. Very hard and brittle, for hardened steels and alloys.

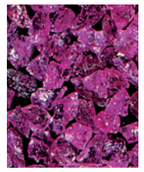
10A: Regular aluminium oxide. Hard and tough, for rough grinding and abrasive cutting of low-alloy steels.

15A: Semi-pure aluminium oxide. Less tough, very sharp, for thermally sensitive steels.



31A: Single-crystal aluminium oxide. Very hard and tough, for high-alloy hardened tool steel.

35A: Special fused white aluminium oxide. Very hard and brittle, for low- and medium-alloy steels.



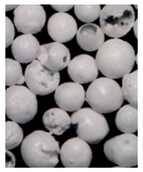
47A: Special fused ruby aluminium oxide. Hard and very tough for hardened steels and hard chrome.

50C: Silicon carbide black. Very hard, brittle, pointed, for cast iron, non-ferrous metals and mineral materials.

57C: Silicon carbide green. Very hard, brittle, pointed, for high-speed steels, glass, ceramic and brittle materials.

70A: Microcrystalline sintered aluminium oxide. Very hard and sharp, for hardened, alloyed steels. Alternative to CBN.

80A: Zirconium aluminium oxide. Extremely tough, sharp, aggressive, thermally unstable, for grey cast iron and cast steel.



33A: Hollow-ball aluminium oxide. Very hard, often used for additional pore formation. For very soft materials such as wood and rubber.

Where even regular is special.

Regular, semi-pure and special fused aluminium oxides are suitable for almost all grinding tasks. They are produced from raw materials at temperatures of more than 2,000°C. The way they are manufactured, and the way they are processed thereafter, determines the hardness, toughness and structure of the grain. When these aluminium oxides are subsequently crushed and treated thermally and mechanically, possible defects in the crystal lattice are rectified and the block-like, cuboid grains are produced. With these aluminium oxides you are ready for almost anything.

Once sharp – always sharp. Single-crystal and sintered aluminium oxide.

To produce single-crystal aluminium oxide, single grains are crystallised out, which then have a more closed structure. The speed at which the molten material is cooled controls the resulting grain size very accurately.

Sintered aluminium oxide has a very fine crystalline structure. During grinding, tiny crystals are broken away from the surface so that the grinding wheel always remains very sharp. Sintered aluminium oxide wheels generally grind at a lower temperature and for longer, and are used in situations in which CBN wheels would be uneconomical or technically impossible to use.

Silicon carbide – few things are harder.

Silicon carbide is made from coke and quartz sand at temperatures above 2,000°C – and it's green and black at the same time. The green silicon carbide is hard to beat in terms of purity and hardness, and chemical processes can also be used to improve its quality further still, enabling the grinding of substances such as glass and ceramic.

Face to face: at an angle of what is usually 30 degrees, less pressure is exerted on the workpiece. We do everything to ensure that you always have exactly the grinding wheel.

The mixture is the key.

Every grain has its own particular properties – and we know them well. We draw from the numerous varieties we have on hand, to produce precisely the grinding result you want.

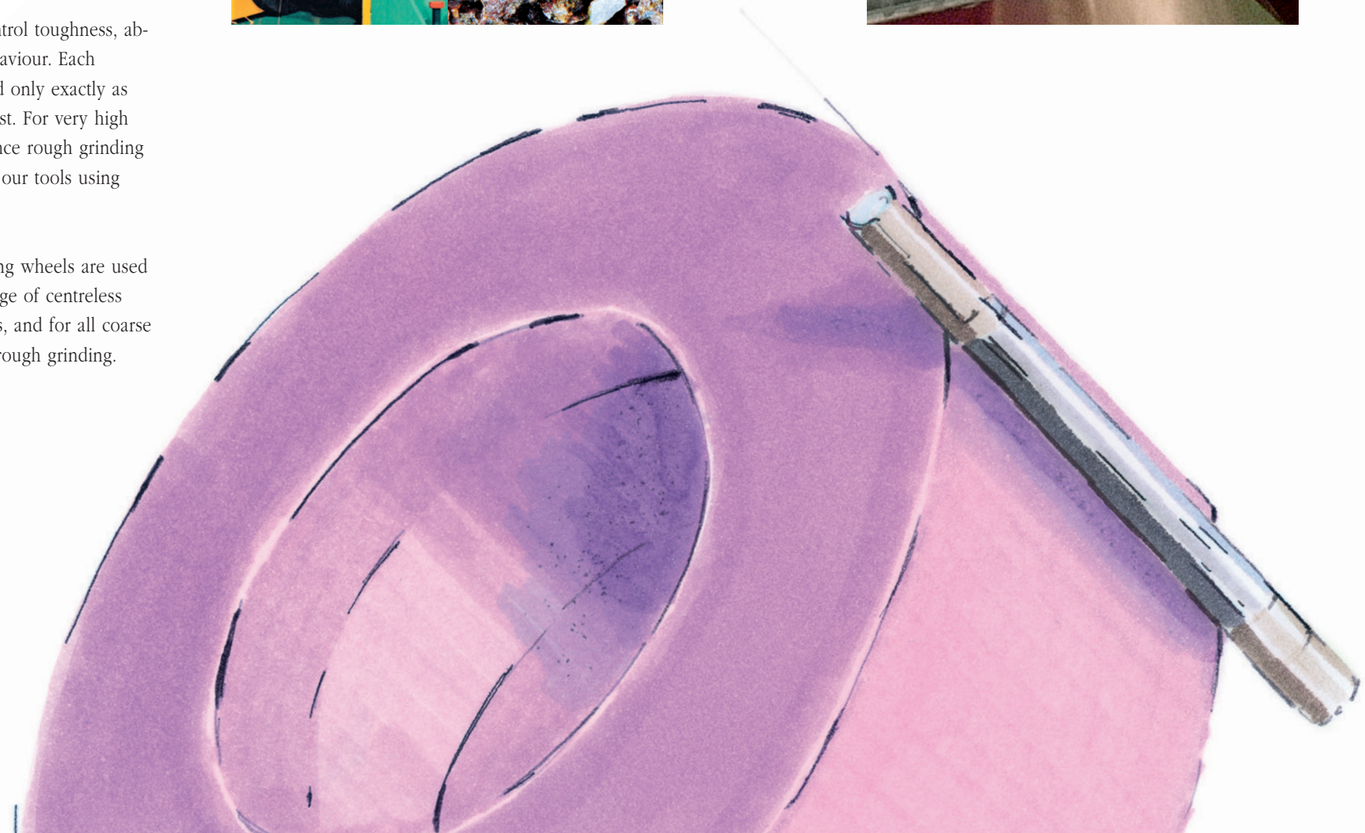
Staying connected.
A symbiosis of grain and bonding.

Elastic – and always sharp.
Synthetic-resin bonding.

Synthetic resin provides an elastic and interlocking binding for the grinding grains. This bonding also allows the wheels to be self-sharpening, which means we can produce wheels reliably using very coarse grains. This bonding hardens at 170°C to 200°C, which means we can make full use of all of the properties of every different type of grinding material. This kind of bonding is especially suitable for temperature-sensitive zirconium aluminium oxide, with its very high rough-grinding performance.

Additives are used to carefully control toughness, abrasion resistance and grinding behaviour. Each grinding grain remains in the bond only exactly as long as it is performing to its fullest. For very high cutting speeds and high-performance rough grinding and abrasive cutting, we reinforce our tools using glass fibre.

Our synthetic resin bonded grinding wheels are used for precision cutting in a wide range of centreless and cylindrical grinding operations, and for all coarse processes in abrasive cutting and rough grinding.



Brittle-hard to soft.
Ceramic bonding.

Our ceramic bonded wheels are dimensionally stable and high performance, and they are suitable for all precision grinding processes. We produce wheels with melt-vitrified bonding or sintered bonding to enable you to perfect your applications. Sintered bonding enables particularly gentle grinding of tools. Melt-vitrified bonding allows for high machining performance combined with cool, fast grinding.

And of course we have gone a long way to meeting the growing demand for faster-cutting wheels that come with exceptional machining performance, hardness and sharpness. One of our specialities in this regard is high-porosity wheels. These tools combine what appear to be contradictory properties: using a minimum of bonding we anchor a maximum of grinding grains in a very open structure. The result is tools that are excellent at grinding difficult specialised steels such as those used for making turbine blades in jet engines.

Quality + cost = economy: our equation adds up because we design our wheels precisely according to your specifications.

Customised wheels.
More than the sum of their parts.

Simple wheel – complex tool.

It all starts with the demands you place on our wheels. We use aluminium oxide or silicon carbide in a range of grain sizes, bonding types, additives and pore-forming substances to build your wheel.
Grain size and type influence the surface quality that you achieve. The bonding component, the compression level, the grain structure, the firing temperature and duration – all of these ensure the correct hardness. Pore-forming materials combined with the right amount of pressure give the wheel the structure it needs. And of course, all of these factors also interact on one another.

We can draw from all of our experience and more that 60,000 recipes in order to make the right wheel for you – and if yours is not among them, we will develop it for you.

A wheel is not always just a wheel. Depending on the process involved, a wheel can sometimes consist of segments.

Grain size, FEPA Series F	Grain group	Average nominal grain ø in µm
12	very coarse	1765
14	coarse	1470
16	coarse	1230
20	coarse	1040
24	coarse	745
36	medium	525
40	medium	438
46	medium	370
54	medium	310
60	medium	260
70	medium	218
80	medium	185
90	medium	154
100	medium	129
120	fine	109
150	fine	82
180	fine	69
220	fine	58
240	very fine	44,5
280	very fine	36,5
320	very fine	29,2
400	very fine	17,3

Coarse or fine: the grain diameter determines the quality of the surface finish. We are very careful to make sure that coarse particles do not find their way into fine.

Hardness	Category
A B C D	extremely soft
E F G	very soft
H I J K	soft
L M N O	medium
P Q R S	hard
T U V W	very hard
X Y Z	extremely hard

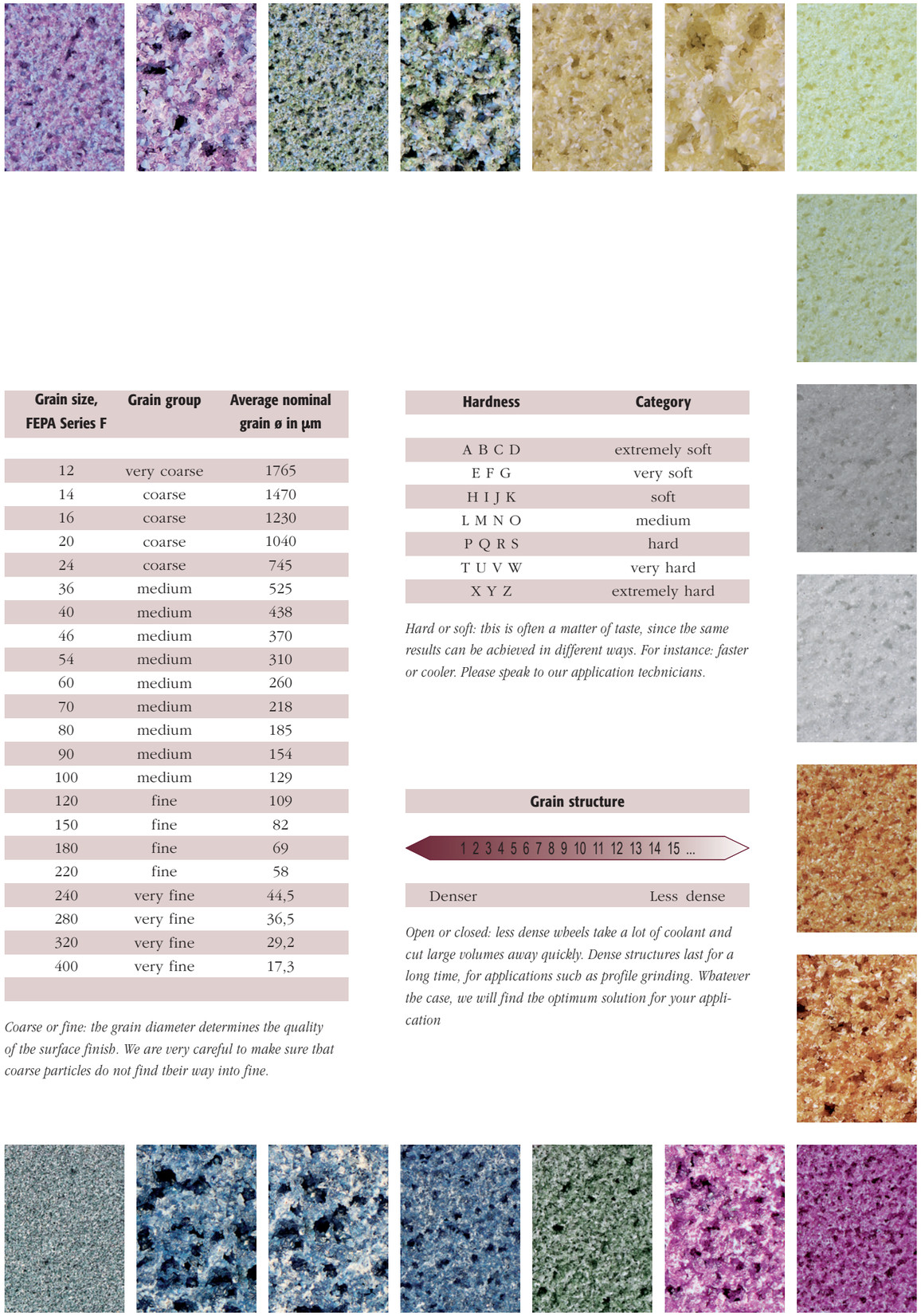
Hard or soft: this is often a matter of taste, since the same results can be achieved in different ways. For instance: faster or cooler. Please speak to our application technicians.

Grain structure

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 ...

Denser — Less dense

Open or closed: less dense wheels take a lot of coolant and cut large volumes away quickly. Dense structures last for a long time, for applications such as profile grinding. Whatever the case, we will find the optimum solution for your application



From silo to shipment.

Quality step by step.

Mixing, pressing, firing – we don't make things easy for ourselves. Of course, we begin by weighing all of our components very carefully in accordance with the recipe. When it comes to mixing we go to great lengths. The ingredients have to be distributed absolutely evenly, and every grain must be enveloped with temporary adhesive. Only that way can you produce a wheel that grinds well all round.

A precise quantity of the prepared mass is distributed completely evenly in the mould, and pressed in always using the same pressure. Irregularities would cause imbalance or differences in hardness – things you will never find in our wheels.

Gram by gram: we are fastidious even at the weighing and mixing stage.

Evenly does it: how the mould is filled determines how round the wheel will be.

Always the same: all of our tools are absolutely reproducible.

Each to their own: we know our wheels' favourite temperatures down to the degree.

In perfect shape: we can of course shape your tools exactly the way you want them.

From round to really round: precision even at extremely high speeds is essential for precise grinding results.

No debate: we don't do seconds. Our wheels are perfect – or they're not our wheels.

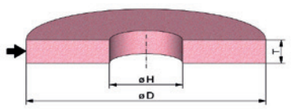
Because of our quality standards, the fired or hardened wheels are still far from finished. We balance them and give them their precise final shape on special machines, exactly in accordance with your requirements.

Not until they have been tested once again very carefully for quality may the tools be sent off to you – and always on time.

Timing: even while we are mixing, we already know when you will receive your tools.

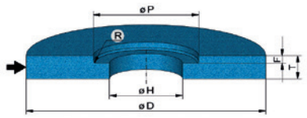
Whatever the complexity – it's a done wheel.

Shape 1



Prod. no. 100

Shape 5



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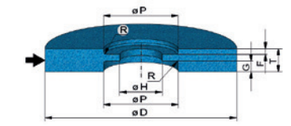
Shape 7



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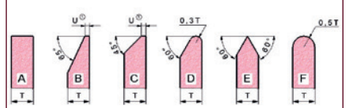
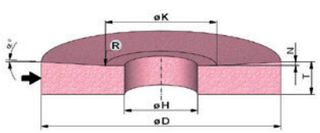
Shape 1, edge shapes



Shape 20



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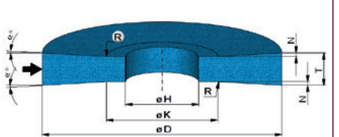
DIN ISO 525 – and much more.

Standards like DIN ISO cover many eventualities – and it's a good thing they do. That is why we have a comprehensive range of products that comply with (and often exceed) these standards in formats ranging from 50 mm to 900 mm.

Many things, however, are too specialised or unusual to fall within standards. This may include special shapes or unusual mixtures, rare structures or unique compositions.

We can naturally produce any grinding tool, even if not standard-compliant, in order to meet your challenge. The only thing that then still comes as standard across the board is precise fulfilment of your requirements, the utmost dependable quality, and punctual delivery of the right quantities.

Shape 21



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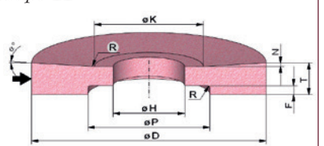
Shape 22



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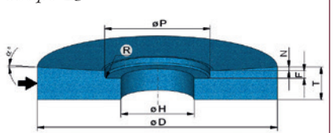
Shape 23



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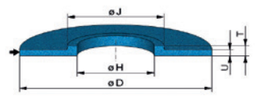
Shape 38



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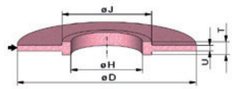

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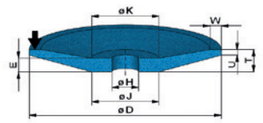
Shape 12



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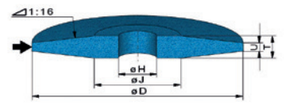
Shape 4



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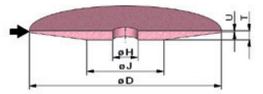
Shape 3



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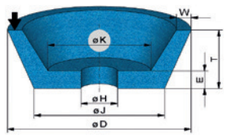
Shape 11



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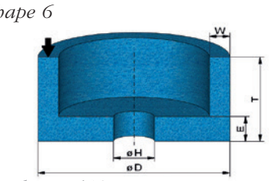
Shape 6



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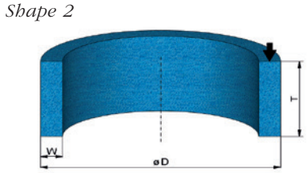
Shape 2



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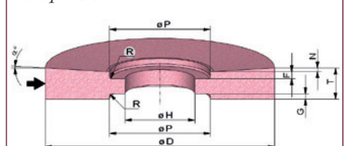
Shape 24



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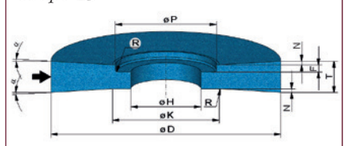
Shape 25



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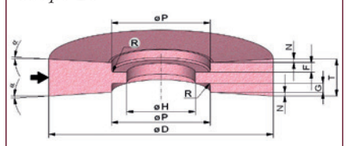
Shape 26



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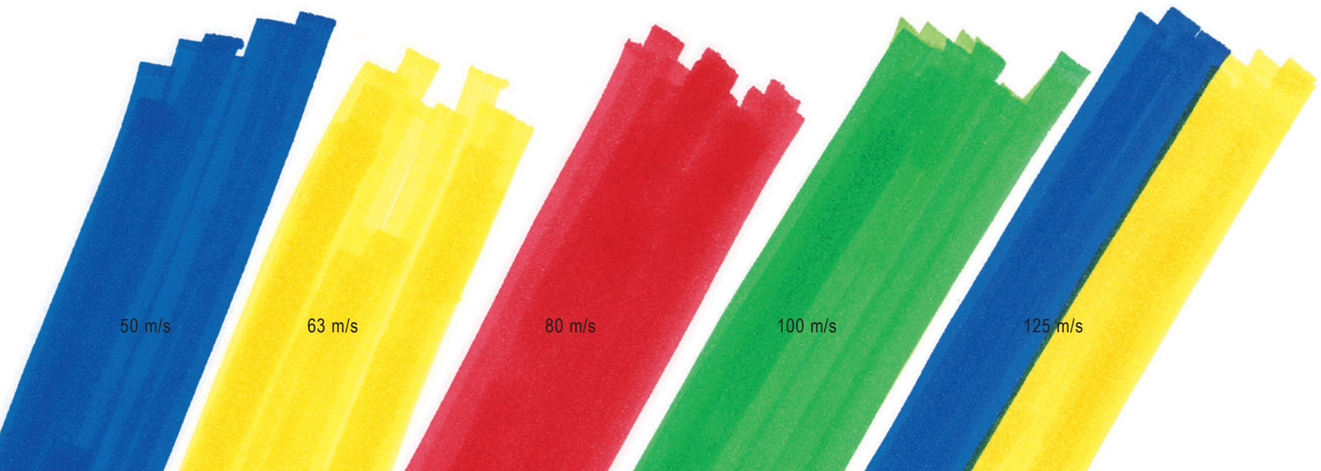
Every wheel has a business card.

Easy to recognise: our colour coding is clear to see even at high speed.



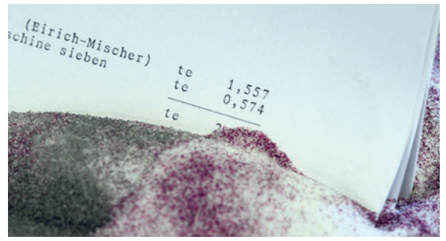
Read the signs – read the wheels.

We use a clear set of symbols and designations to ensure that every wheel performs its work perfectly on the right machine and at the right speed.

Each label includes all of the necessary information, from the dimensions to the test stamp. Maximum circumference speeds are also highlighted such that you'll even see them at 125 m/s!

This makes it almost impossible to get tools mixed up, so nothing can get in the way of perfect results.

Designation	**Grinding material mixture**
10A	Regular aluminium oxide
15A	Semi-pure aluminium oxide
23A	Semi-pure aluminium oxide blend
24A	Semi-pure aluminium oxide blend
31A	Single-crystal aluminium oxide
33A	Spherical aluminium oxide
35A	Special fused white aluminium oxide
37A	Special fused white aluminium oxide blend
38A	Special fused white aluminium oxide blend
40A	Special fused pink aluminium oxide
43A	Special fused pink aluminium oxide blend
45A	Special fused pink aluminium oxide blend
47A	Special fused ruby aluminium oxide
60A	Special fused aluminium oxide
61A	Special fused aluminium oxide blend
66A	Special fused aluminium oxide blend
67A	Special fused aluminium oxide blend
70A	Sintered aluminium oxide
71A	Sintered aluminium oxide blend
74A	Sintered aluminium oxide blend
75A	Sintered aluminium oxide blend
77A	Sintered aluminium oxide blend
78A	Sintered aluminium oxide blend
80A	Zirconium aluminium oxide
81A	Zirconium aluminium oxide blend
82A	Zirconium aluminium oxide blend
50C	Silicon carbide black
57C	Silicon carbide green
140A	
143A	
144A	
146A	
147A	
148A	
151A	
155A	
161A	
162A	
170A	
191A	



In writing: to ensure that what it says on the wheel is actually in the wheel, we are very careful about mixing – and about mixing

Using the whole potential of every wheel.

Good for the tool. Even better for your results.

OK, you've got the right tool for the right material fitted to right machine.

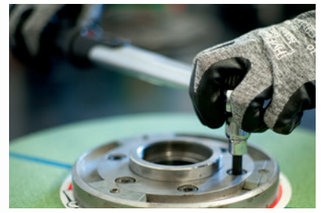
There are a few more details to watch out for in order to achieve the best possible results all round. First, check the wheels for possible transport damage before mounting them on your machine. By tapping them lightly you can hear whether they're healthy or not: defective wheels sound dull and rattle, and may on no account be used. Flange-mount the wheel between clean flanges in such a way that it is not subjected to any uneven pressure. You then check the wheel for any imbalances, using diamonds at operating speed, to check whether it is running round and plane. Now you're ready to go.

Plenty of cooling lubricant – ideally supplied in accord-ance with the wheel shape – not only achieves better results, it also significantly increases the life-span of your wheel.

As with good food, it's the interplay between carefully selected ingredients that produces a good outcome. Please ask our application technicians what they recommend.

Pays off twice over: with the right cooling lubricant you can achieve better results at lower cost.

Sounds good: your ear is the best and most reliable instrument for checking a wheel.



Well balanced: screw up crosswise using a torque wrench to avoid imbalance and damage.

Rounding off: we balance our wheels before we ship them. Only small adjustments are then required to tune them to your machine.

Getting to the point: the more carefully the wheel is dressed, the more precisely it will cut.

Shining results: a host of small factors go to produce outstanding results – an optimum surface quality in minimum time and with minimum wear.

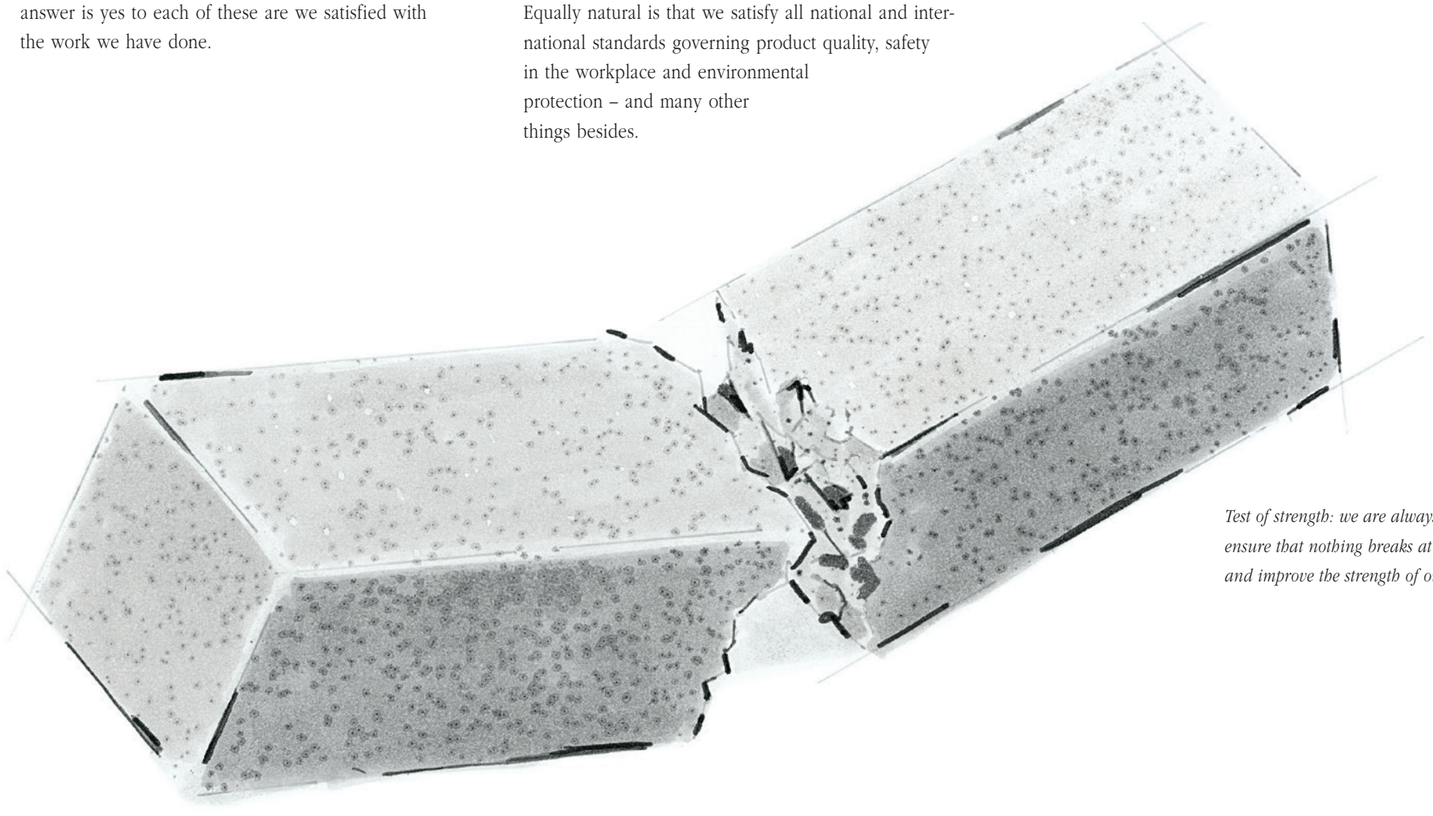
In our wheels, every grain counts.

From the raw material, to your machine.

Behind every wheel is of course the latest technology. That, however, is only any use if operated by skilled and committed people. Our staff love their work and have fun doing it, but they never take things lightly when it comes to the absolute quality of every single wheel – however small. That begins by critically testing incoming raw materials. Every single step of production is monitored uncompromisingly. Are the mixture and distribution just right? Are the pressure and firing temperature absolutely on target? Did the tools arrive in good time at the customer? Only if the answer is yes to each of these are we satisfied with the work we have done.

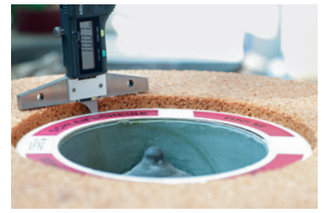
Even once your wheel is mounted on your machine, our 'Quality in Process' is still far from over. Your experience, suggestions and aims all flow continually into our work. After all, we want our range to keep getting better from your point of view. Furthermore, our application technicians don't stop advising and assisting you once you have purchased your wheels. We of that we consider a challenge: we consider it a normal part of being a partner in your production process.

Equally natural is that we satisfy all national and international standards governing product quality, safety in the workplace and environmental protection – and many other things besides.



Test of strength: we are always breaking things to ensure that nothing breaks at your end. We constantly check and improve the strength of our wheels.

Pen pushing: test results are carefully documented. Random samples are taken from large batches, special customised wheels are chekked individually.



Round alone is not enough: all of the dimension have to be just right, and are checked within narrow tolerances.

Good vibrations: the e-module checks the density and hardness of the wheel.

No one is more German than the Germans: the German TÜV testing organisation has certified our company for its quality.

Matter of course: we comply with all of the relevant international standards in every respect.

K + R = R + D.

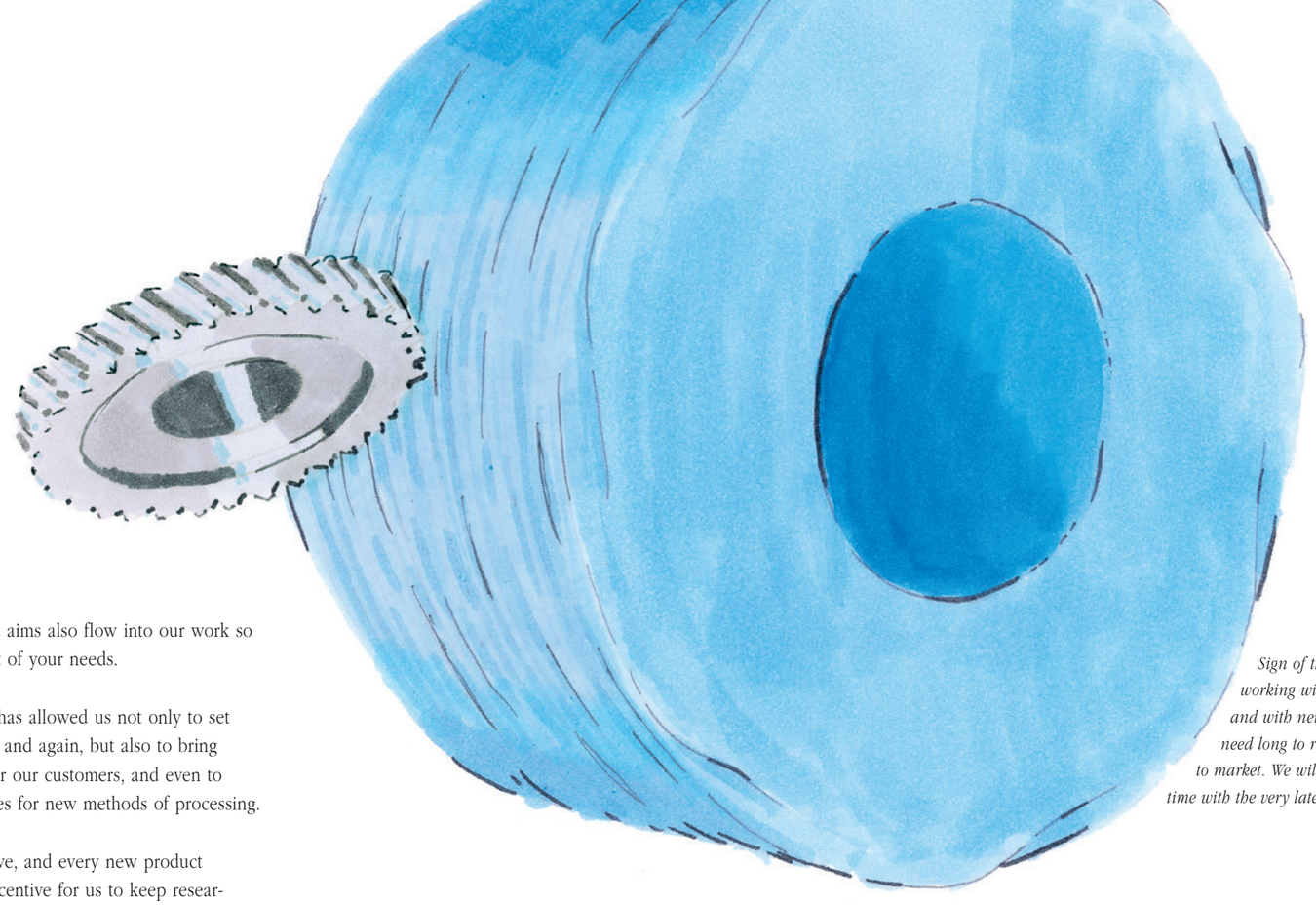
R + D = Reflection and dedication.

All of our staff are dedicated and inquisitive – but some especially so. In our laboratory and testing facilities, our development engineers not only test and modify our own existing products in order to improve them, they also get hold of every conceivable new material and work out how best to process it. This may be a new kind of special steel such as that used for turbine blades, or increasingly popular ceramic materials and plastics.

Your experience and aims also flow into our work so that we keep abreast of your needs.

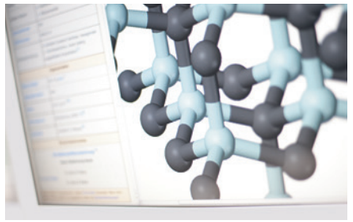
Over the years, this has allowed us not only to set new standards again and again, but also to bring increased benefits for our customers, and even to open up new avenues for new methods of processing.

Every goal we achieve, and every new product we develop, is an incentive for us to keep researching, open to every challenge that may come along.



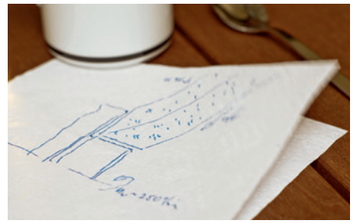
Sign of the times: we are always working with the latest materials and with new processes so that we don't need long to respond when they come to market. We will always supply you in good time with the very latest tools.

Progressing together: our development engineers are good at listening. Your experience and aims flow into their work. This means you will have exactly the right tools you need in the future to get the job done.



To achieve big things you need to look at the details: the structure of abrasive bodies provides us with clues about the performance of future grinding materials.

Ink is an important ingredient in modern abrasive materials: we work through numerous possibilities on a theoretical level in order to minimise the number of errors and arrive at a finished product as quickly as possible when it comes to trying things out in practice.



The fate of creative people: ideas don't just materialise between 9 and 5 – and they hardly ever arrive when you're at your desk. In that sense, our engineers are working for you practically around the clock, 365 days a year.

We need to know exactly: do our crystalline structures behave the way we expect them to long term and under load? We look very closely to ensure that 1 µm does not impact on a wheel measuring 900 mm across.

Theory is only the beginning: to arrive at series production, our tools first have to prove themselves in tough everyday environments by achieving the required results – or surpassing them. This we test on our specially constructed grinding wheel test machine in our factory.

Millions of wheels of experience.
And more by the day.

The future is part of our tradition.

Ever since KREBS & RIEDEL was founded in 1895, new things have always fascinated us. We have often conceived of the unthinkable, and we never automatically consider the first thing to be the best. The aim of providing you with the best tools has always been the driving force behind all the areas of our company. Some say that we pursue that aim too stubbornly and seriously, but we believe that is only natural.

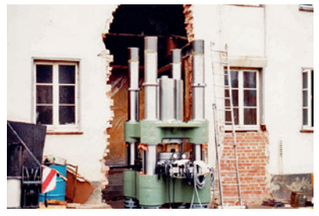
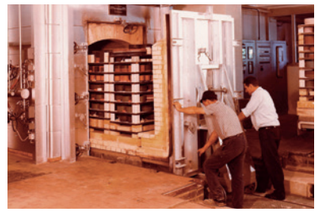
Even in hard times, we do everything to retain our staff, since it is they who guarantee that we can always deliver the perfect tools reliably, punctually and safely.

Nor do we compromise when it comes to advising you. We are there for you from the first phone call onwards, and – of course – long after the wheels have been fitted to your machines.











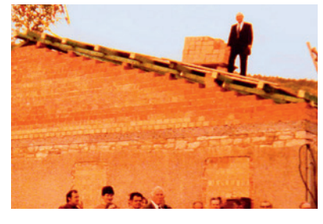






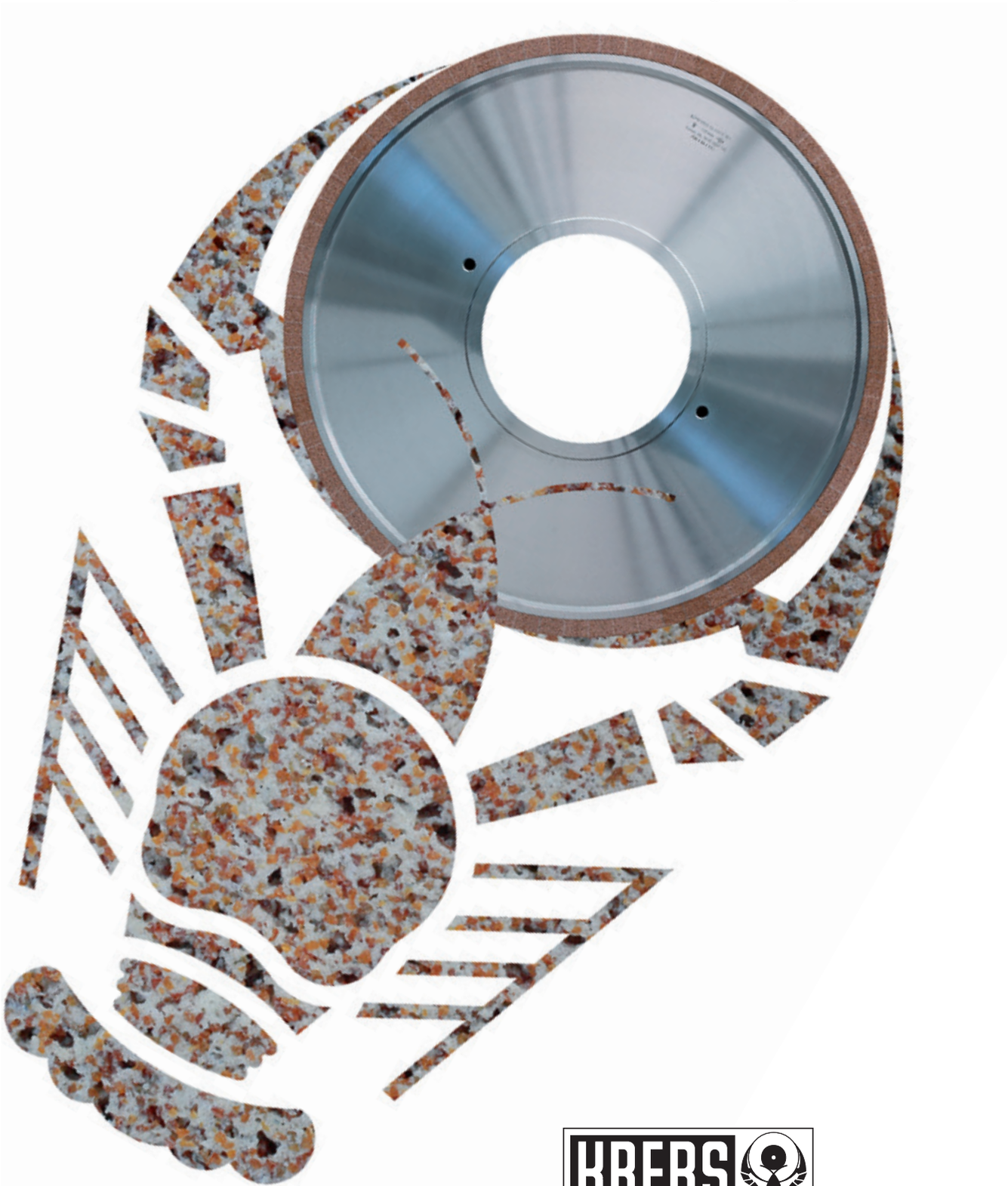






Vitrified-bonded CBN and diamond tools from KREBS & RIEDEL

The ultimate in grinding.



KREBS
KREBS & RIEDEL

Right for every application and every procedure.

Your production process – our product range.

Each procedure has its own special characteristics. And we have the right individual tools for all of them.

In **cylindrical grinding** – the most widespread process – the interior or exterior of rotationally symmetrical workpieces are machined. We offer the solution for every area – whether you need precision down to the µ for machining minute components for injection technology, combustion engines, or rollers for the paper industry that weigh tons.

Surface grinding – plane-parallel machining of surfaces with the wheel periphery or grinding face – is primarily used in the construction of tools and molds. The growing diversity of materials here is a challenge we are happy to meet, with proven and lucrative solutions for you.

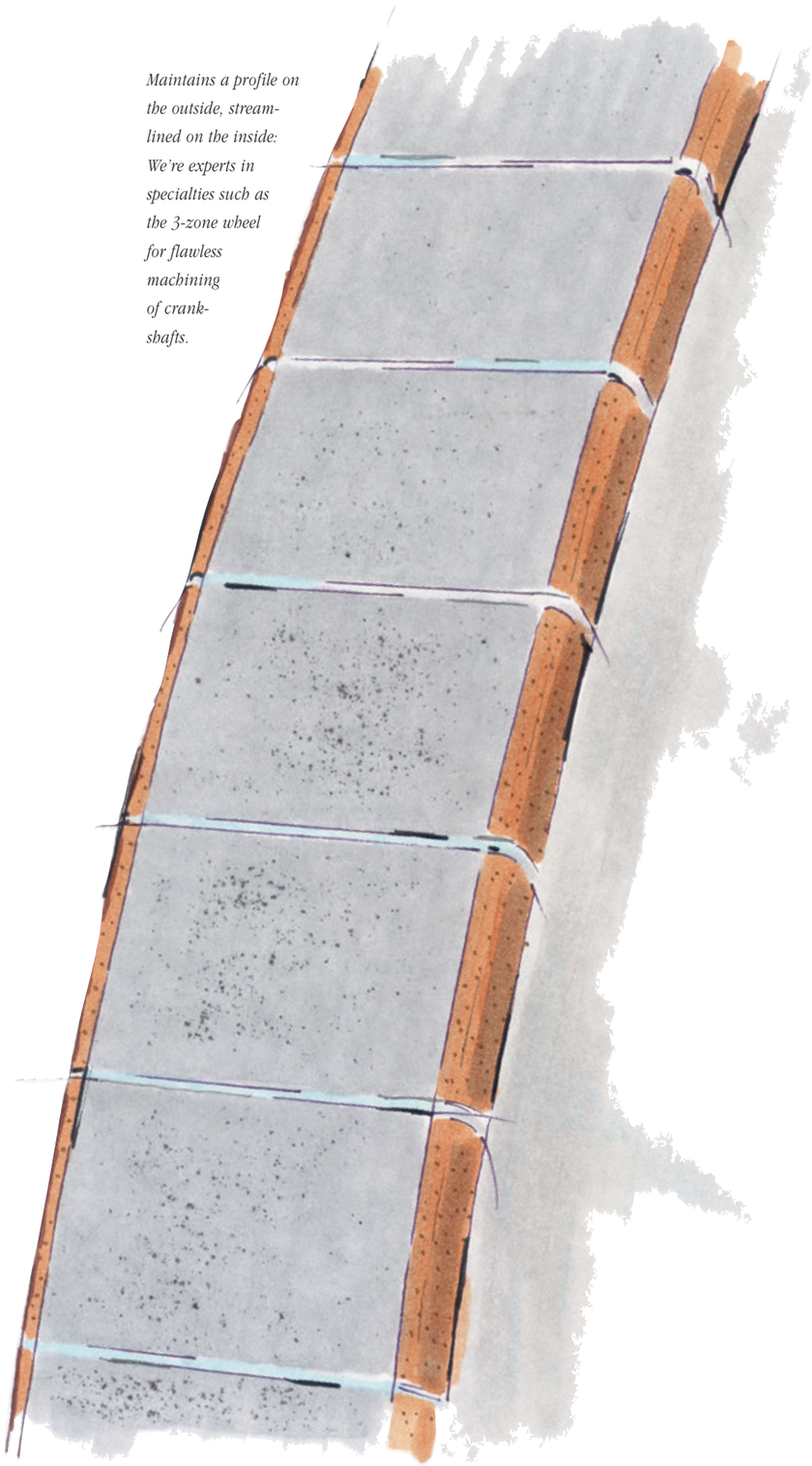
In **creep feed** or **deep grinding**, a workpiece is usually completed in a one-step procedure. This demands a high infeed motion for small workpiece feeds and thus large contact arcs between the workpiece and the grinding wheel. Our highly porous tools with very good cutting characteristics make this procedure fast and profitable.

In **profile grinding**, profiled wheels are used to machine outer peripheries. The workpiece itself determines which wheel is used, along with the wheel's specifications. We manufacture grit sizes and bonds especially adapted for specific radii and profiles, for example, to provide you with a wheel with excellent cutting characteristics, and less need for dressing and truing. We can handle the roughing of the wheel in order to save you set-up time.

Roll grinding involves workpieces that require extremely intensive grinding. The wide range of rolls are matched by an equally wide range of materials and dimensions that can be selected to produce the most suitable wheel. Vitrified-bonded CBN and diamond wheels have generally proven to be the most efficient for this.

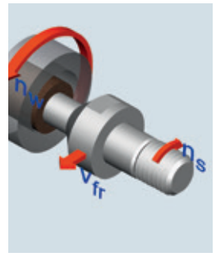
Non-round grinding of items such as camshafts or pump rings is one of the most complex of grinding tasks. The non-round contour leads to changing contact and motion ratios. Deviations from dimensional and shape tolerances are strongly influenced by the quality of the grinding tool. We match our tools precisely to these requirements.

Whatever you need to grind and whatever method you use, we can produce the perfect tool for you to get the job done.

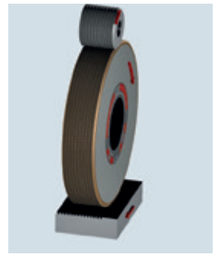


Maintains a profile on the outside, streamlined on the inside: We're experts in specialties such as the 3-zone wheel for flawless machining of crankshafts.

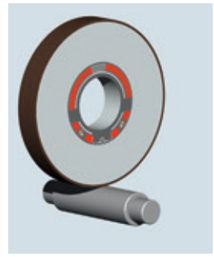
K&R for bore grinding, cone grinding, non-round grinding, jig grinding, grinding wheels with shank and threaded mandrel, tandem grinding wheels, and more.



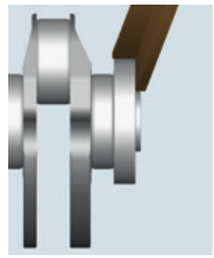
K&R for surface grinding, deep grinding, and profile grinding of hardened steels.



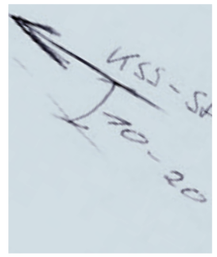
K&R for cylindrical grinding, straight and angular infeed grinding, and centerless grinding of cylinders, rolls, shafts, bolts, and more.



K&R for individual solutions for cam contours, crankshafts, gear cutting, thread profiles, and more.



K&R for the future. New procedures, materials, and machines? We're at the forefront for you!



Hard, harder . . . CBN and diamonds.

The hardest abrasive material in the world.

As always, the hardest materials in the world – CBN and diamond – offer the greatest precision when grinding extremely hard iron and steel alloys or hard, brittle materials, and offer the best stock removal rates and the longest wheel life.

Synthetic. Even better than the real thing.

Cubic boron nitride, or CBN for short, is synthesized, similar to diamonds, from a hexagonal boron nitride at 50 to 90 kbar and 1,800 to 2,700°C. It is especially suitable for hard-to-machine or high-alloy hardened steels starting at 54 HRC, such as high-speed, tool or chrome steels, nickel-based alloys, powder metallurgical steels, or white cast iron.

Learning a few tricks from Mother Nature.

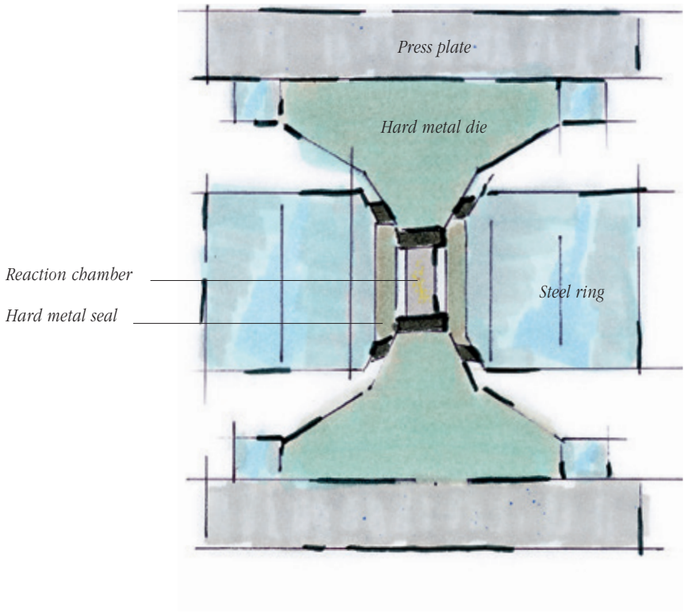
The hardest natural material in the world – the diamond – has been synthetically produced for more than 50 years now. It is synthetically produced from graphite carbon at pressures of 70 to 120 kbar and temperatures of around 2,000°C. Diamonds are primarily used to machine brittle materials such as cemented carbide, ceramics, glass, granite, GFRP, semiconductor materials, or wear coatings.

Putting our expertise to use.

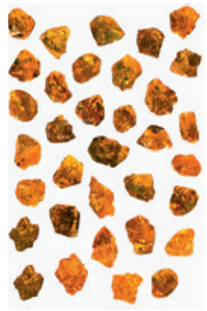
We can target specific properties for the CBN and diamond grains by selecting the crystallization conditions in special synthesis reactors, an example of this, the belt chamber.

The shape and color are signs of various grain strengths and cutting and splintering behavior. We put our knowledge of these properties to good use.

The belt chamber:
This is where the material for superb grinding results is created.



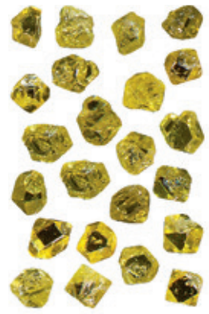
Irregularities:
The light, geometrically irregular grain of medium strength is suitable for almost any application.



Blocky:
This dark, high-strength grain is preferred for internal grinding of hardened steels.

Pointed:
Dark brown grains with high thermal stability cut hard-to-machine, hardened steels.

Diamond:
Synthetic diamond grains can be used to machine hard, brittle materials such as hard metal, ceramic, granite, and others.

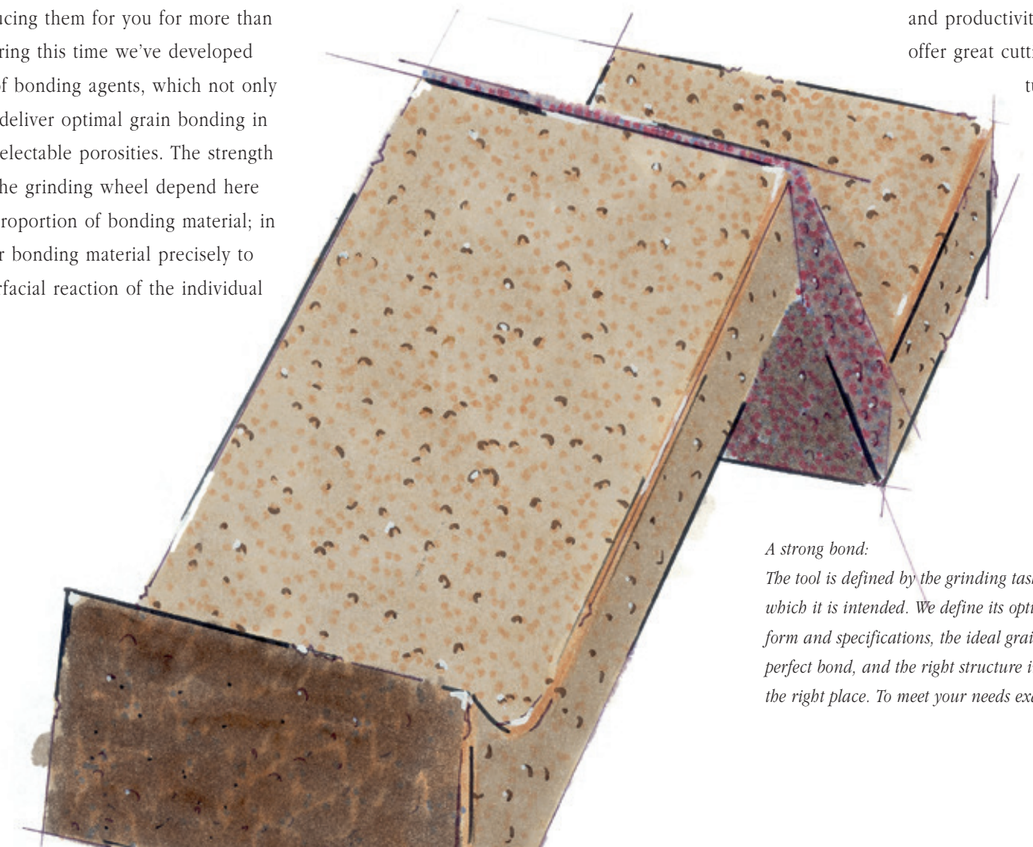


A strong bond. So that every grain does what it's supposed to do.

An abrasive material is only as good as its bond.

Outstanding wheel life, profiles that keep their profile, are easy to dress and true, with cool grinding and high cutting force. Benefits that are especially in demand in the automotive and roller bearing indus-tries, in tool design and construction, and in making cutting tools. Our ceramic-bonded grinding wheels are distinguished by these properties and more.

We've been producing them for you for more than 20 years now. During this time we've developed numerous types of bonding agents, which not only promise but also deliver optimal grain bonding in a wide range of selectable porosities. The strength and hardness of the grinding wheel depend here not only on the proportion of bonding material; in fact, we adapt our bonding material precisely to the chemical interfacial reaction of the individual abrasive grains.



A strong bond:
The tool is defined by the grinding task for which it is intended. We define its optimal form and specifications, the ideal grain, the perfect bond, and the right structure in the right place. To meet your needs exactly.

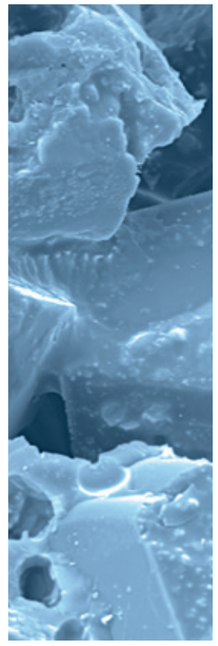
A matter of being well-adjusted: The vitrified bond and its structure.

You shouldn't have to adapt to our wheels – we ad-just the bonding and thus the properties of the wheel precisely to your needs. Whether you need less fusible, soft and brittle wheels or fusible, hard and strong ones. Or anything in between – we adjust all that for you.

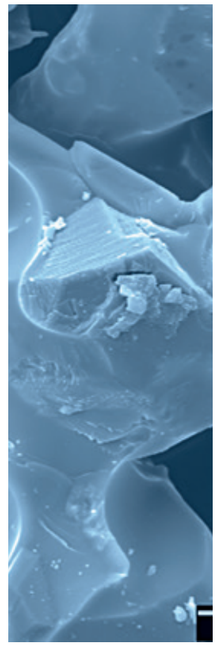
Being well-adjusted pays off: Our vitrified-bonded wheels are distinguished by their greater efficiency and productivity. Along with long wheel life, they offer great cutting performance at cool tempera-tures and without sharpening. And of course, they can also be asily trued with lasting results.

A clear result of a well-adjusted outlook: An uncompromisingly goal-oriented tool.

The sintered bond is soft and brittle and can be dressed with excellent re-sults and minimal wear to the dressing tool.



Good cutting properties. Due to the high grain protrusion with low bond content and high strength, it's one of the easiest tasks for the grinding wheel with a fusible bond.



Your KREBS & RIEDEL grinding wheel starts out as grains and bonding material.

Solidly built.
From the inside out.

To ensure this, we consider the tasks you assign to the wheel. We select the corresponding base structure and determine the appropriate active surface.

The base structure is of great importance at low cutting speeds as well. We select from a wide array of materials depending on the grinding and centrifugal forces, the heat build-up and dissipation, and the vibration of the machine and workpiece.

Grain size and concentration have a direct influence on the performance of the wheel and on the surface quality that can be achieved on the workpiece. As a rule, we use grains in the particle size range of 46–251 µm in accordance with FEPA.

Wheels according to strength ranges:

Operating speed m/sec	Machining dimensions Ømm	Base structure
bis 63	bis 900	Ceramic, aluminum, steel, composites
80	20 – 750	Ceramic, steel, ceramic-steel
125	200 – 750	Ceramic-aluminum, steel
140	200 – 750	Ceramic-steel, steel
180	200 – 750	Ceramic-steel, steel

K&R base structure versions:

Base structure	Damping	Strength
Ceramic (standard)	Good	Moderate
Aluminium	Good	Good
Resinoid	Good	Good
Steel	Low	Excellent
Steel/ Ceramic bond	Good	Excellent

CBN/DIA grain sizes (in accordance with FEPA/DIN narrow; compared to international standards):

K&R diamond according to FEPA or DIN 848 narrow	K&R CBN according to FEPA or DIN 848 narrow	Nominal machine width according to ISO 565 (µm)	US standard ASTM E 11 70 Particle size (mesh)	Japan JIS 6002-63 Designation (µm)	GUS GOST 3647-71 Designation (µm)
D251	B251	212 – 250	60 / 70	250 / 210	250 / 200
D213	B213	180 – 212	70 / 80	210 / 177	250 / 200
D181	B181	150 – 180	80 / 100		200 / 160
D151	B151	125 – 150	100 / 120	149 / 125	160 / 125
D126	B126	106 – 125	120 / 140	125 / 105	125 / 100
D107	B107	90 – 106	140 / 170		100 / 80
D 91	B 91	75 – 90	170 / 200	105 / 74	
D 76	B 76	63 – 75	200 / 230	88 / 63	80 / 63
D 64	B 64	53 – 63	230 / 270		63 / 50
D 54	B 54	45 – 53	270 / 325	53 / 44	60 / 40
D 46	B 48	38 – 45	325 / 400	44 / 37	50 / 40
	B 30	40 – 25			40 / 28
D 25		52 – 32			

K&R CBN/DIA concentrations:

Concentration	Carat/cm³	CBN volume %/ diamond, rounded
50	2,2	12,50
75	3,3	18,75
100	4,4	25,00
125	5,5	31,25
150	6,6	37,50
175	7,7	43,75
200	8,8	50,00

We manufacture grinding wheels – big and small. With outer diameters from 3 mm to 900 mm.

Naturally, we're also happy to supply you with pre-profiled wheels. This allows you save on the materials and time required for truing.

A classic: For wheels up to 400 mm with speeds of 63 m/s, we place what is usually a closed layer on a ceramic base structure.

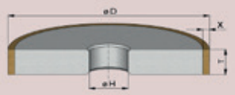
The core of the wheel: Aside from classic ceramic, we also employ aluminum or steel materials and steel/ ceramic composites.

Rough, fast or special: We produce anything that is larger than 400 mm, has speeds up to 160 m/s or has a special a shape in segments on an appropriate base structure.

Clear to see:
Even at high speeds, the color coding can be clearly distinguished.

Form follows function. A selection of wheel shapes in accordance with DIN / ISO.

1A1



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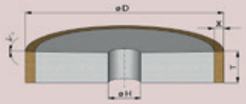

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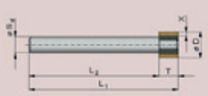

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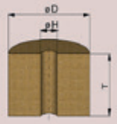

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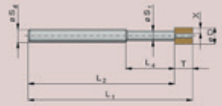

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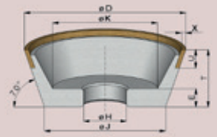

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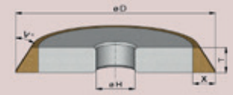

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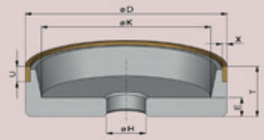

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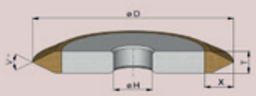

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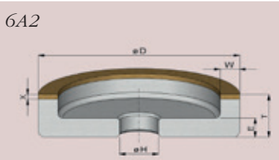

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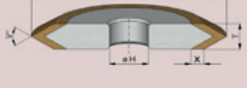

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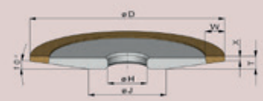

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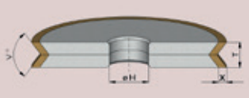

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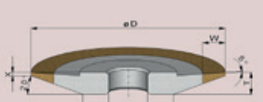

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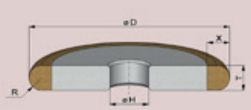

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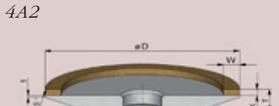

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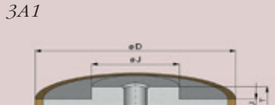

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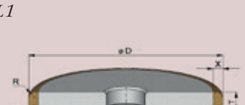

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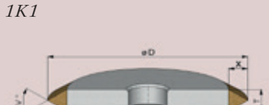


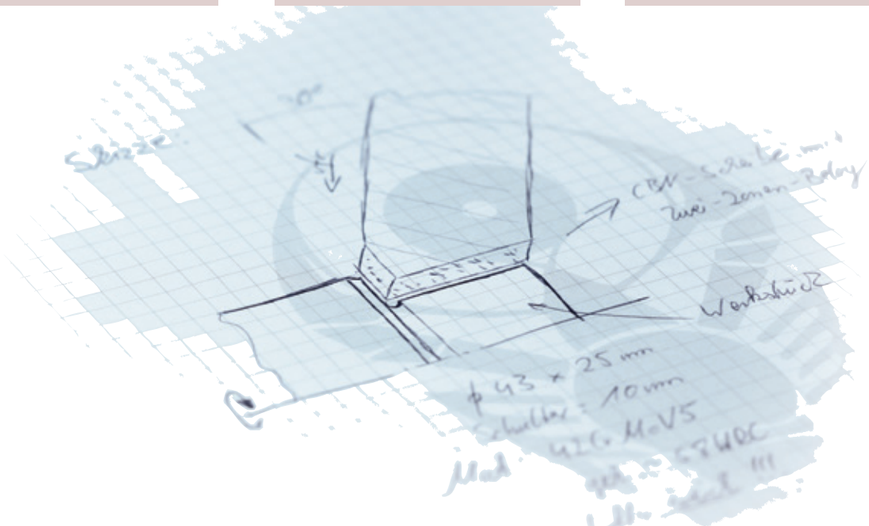
1FF1

The wheel is round.

That's the one thing that all wheels have in common. Diameters and thicknesses, base structures and coating layers, as well as compositions and profiles are at least as diverse and often just as unique as the tasks and challenges they face.

Since we began producing vitrified-bonded diamond and CBN wheels, we've developed and produced countless special shapes.

Because wheels can vary widely, we place a priority on working with you to determine exactly what your needs are. What workpiece do you need to process on which machine, and what is the goal?
Then we construct a wheel for you that not only gets you close to your goal, but that actually lets you achieve it. Safely and efficiently. No matter what the wheels of the future will look like, you'll get the one you need from us.



An idea takes form:
We offer you advice for every grinding task and work with you where needed to develop your own special grinding wheel.

Marking system and composition of the grinding layer:

4B	126	X 15	VP	7338	150
Abrasive material	Grain size in mesh	Hardness/grain structure	Type of bond	Bond code number	Concentration
B = CBN D = Diamond	36 – 252 µm	X 4 … 30	V = Ceramic (vitrified) VP = increased porosity	Internal key	Proportion of super-hard abrasive

Optimal performance, optimal benefits, and optimal efficiency.

Combined for strength: Machine, coolant, and grinding wheel.

You shouldn't use a compact car to tow a 60-foot yacht. Likewise, your machine and abrasive need to be compatible. In order to get optimal use from your CBN and diamond grinding wheel, you also need a certain amount of machine rigidity, the right guide mechanism, and spindle bearing arrangement. The ability to use a rotary dressing and truing system is a major advantage. You can use the abrasive more efficiently with the speed control of the grinding spindle and the use of oil emulsions or grinding oil as coolants.

As a rule, wet grinding is the method used, with plenty of coolant that should be fed and adapted to the contour, especially where profile wheels are involved. The influence that the amount of coolant and the feeding method used have on grinding results and efficiency should not be underestimated. While you may also use synthetic or semi-synthetic solutions, experience has shown that you can most effectively use the wheels with oil emulsions or pure grinding oil.

With dressing or truing you determine the precise geometric shape of your grinding wheel and ensure that your wheel runs perfectly true. With the correct parameters, you also achieve even better cutting properties for your wheel and can actively influence the actual surface roughness.
The infeed increments when dressing and truing are in the micrometer range. The wheels are then ready for immediate use, without further sharpening.

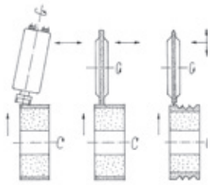
Rotary tools are ideal for dressing and truing. These tools run in the same or opposite direction depending on their task.

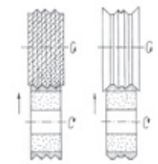
Crush dressing is a special form of dressing with steel rolls that allows tiny profile radii to be achieved. We employ a crushable bond for this purpose.

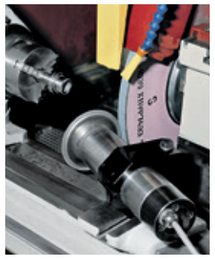
Naturally, we can also supply you with suitable dressing and truing systems for our wheels.

Please discuss your objectives with our application technology staff. That's the first step to achieving fantastic grinding results.

Cool grinding is better grinding:
We recommend the use of oil emulsions or pure oil as a coolant under all circumstances.







TÜV, DIN / ISO, OSA and Co.

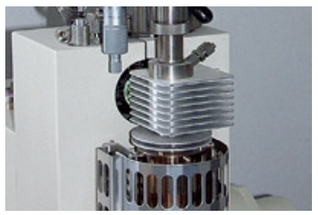
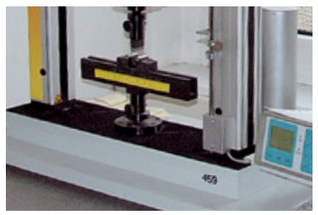
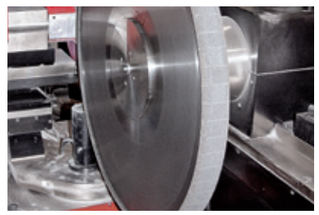
Intolerant and uncompromising.

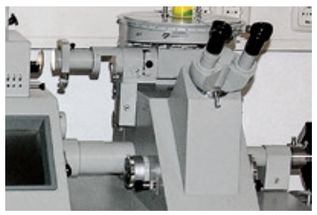
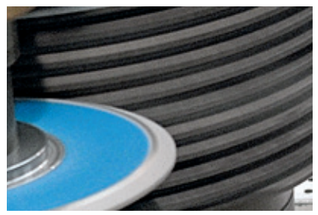
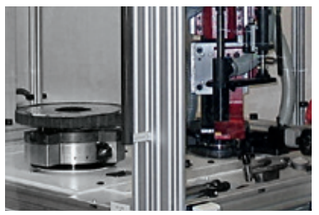
Where quality is involved, we don't kid around. And we never have. We've been producing grinding wheels for more than 100 years now, and have produced CBN and diamond grinding tools for more than 20 years. Always under uncompromising quality criteria. From the idea to the finished product, from the receipt of the raw materials to the dispatch of the balanced wheels. From your first phone call to the service and consultation lasting long beyond the sale. We critically examine each step we take, and continuously integrate your ideas, desires, and objectives. Today, this is called "quality in process". To us, it's always simply been our way of doing business.

Our way of doing business also involves fulfilling the strictest national and international standards. Not only when it comes to product quality, but also where it relates to the environment and occupational safety.

We follow these unconditional quality standards not only where our CBN and diamond tools are involved, but also throughout our entire production range:

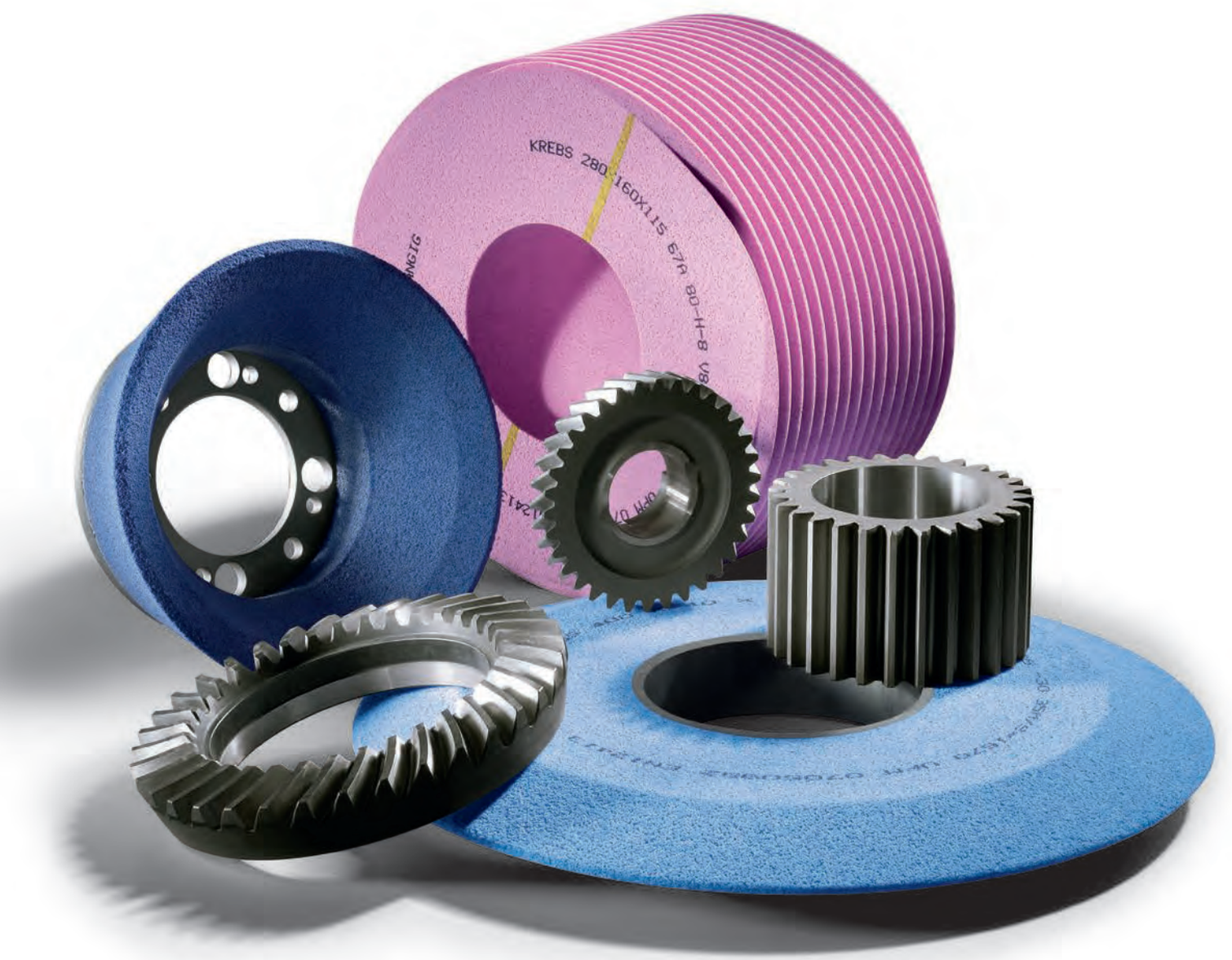
- Corundum and silicon-carbide wheels in ceramic and resinoid bonds and with outer diameters up to 900 mm for cylindrical grinding, surface grinding, tool grinding, centerless grinding, rough grinding, and more.
- Abrasive cutting wheels in a resinoid bond, with or without fiber reinforcement and up to 600 mm outer diameter for wet and dry chop cutting, for pendulum and rotary cutting, and more.
- Rough and pendulum grinding wheels with and without fiber reinforcement for contract blast cleaning and for foundries, for pendulum grinding machines, wheel stands, grinding manipulation, and more.

Gear grinding
with KREBS & RIEDEL

Precision - tooth by tooth.



KREBS
KREBS & RIEDEL

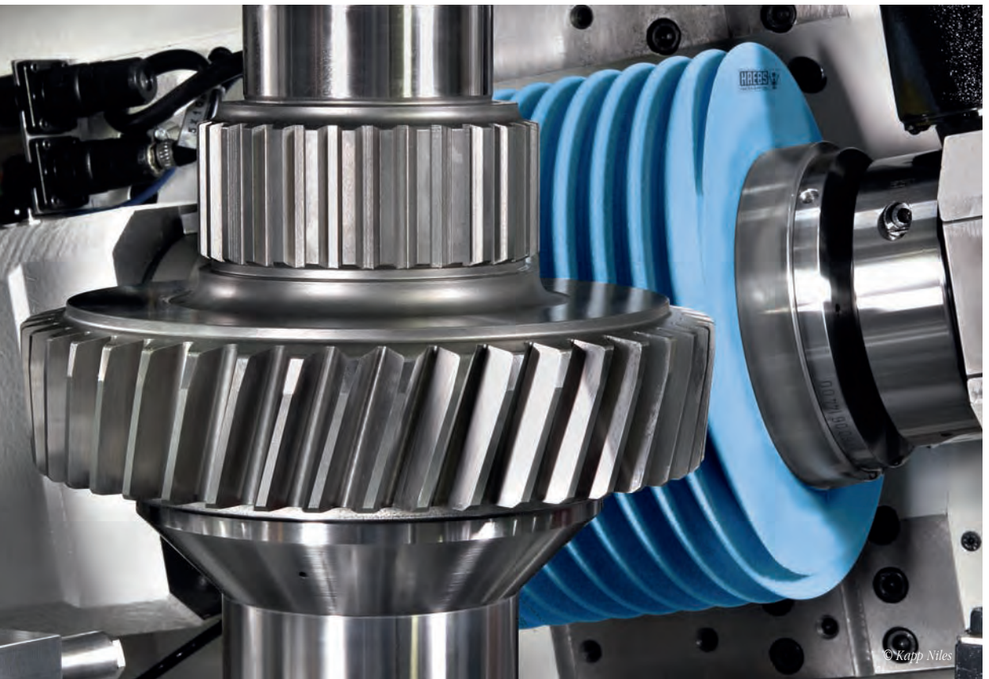
Workpiece like tool.
Complex and demanding.

The gear wheel.

For customers in the *automotive industry*, *aerospace*, *mechanical engineering*, *medical technology* and *wind power*, Krebs & Riedel offers the right tools for the perfect machining of gears in continuously reliable high quality. Our experience ranges from grinding the smallest gears in the field of medical technology to large-format planetary gears in wind turbines.

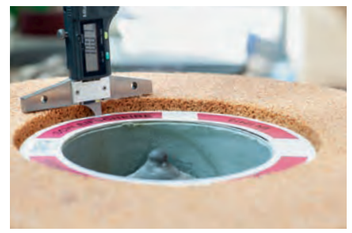
From continuous generating grinding to single-profile grinding and bevel gear grinding to power honing we naturally also offer individual grinding solutions. For example: machine bores, faces and gear rods with maximum precision and efficiency.

Whether you want to increase your productivity, improve or optimize your surface finishes: You can absolutely rely on the consistent grinding performance of Krebs & Riedel grinding tools.



Show us your workpiece, talk to us about your goals - we will provide you with the perfect grinding solution.

Perfectly adapted: The tool determines a significant part of the quality of the result. That is why we adapt our tools to your grinding processes and continuosly optimize our grinding wheels.



Part of your TQM: We manufacture our products according to your geometric tolerance specifications. In terms of density and microstructure, our products remain within half a degree of hardness.

Black on white: We document the quality of each individual grinding wheel with test reports.

Faster setup times: We pre-profile with the highest precision to shorten your setup times

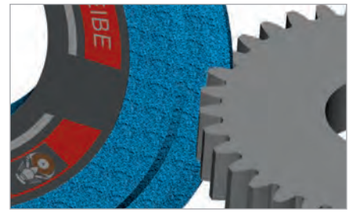
Safe shipping: We pack each grinding wheel in environmentally friendly packaging. The tools will arrive safely.

One gap like the other.
Precise internal and external toothing.

Precision for every tooth.

In profile grinding, the workpieces are machined with profiled wheels. The gear defines the recipe, shape, structure and specification of the wheel. In the machine, either the entire tooth space profile or the tooth flank is ground tooth by tooth. This process is perfect for medium and large modules.

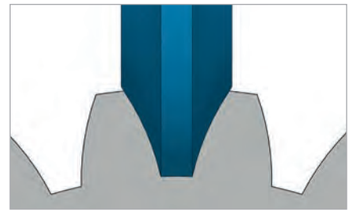
Made of high-grade corundum, microcrystalline sintered corundum, special corundum as well as CBN: We offer a comprehensive range of vitrified bonded single profile grinding wheels.



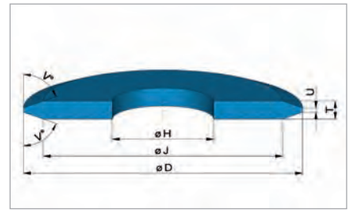
Profile grinding: Perfect teeth all over.

Perfectly combined: Grain and bond create the desired surface quality.

We have proven compounds and most common dimensions in stock. According to your order, we can pre-profile and deliver at very short notice.



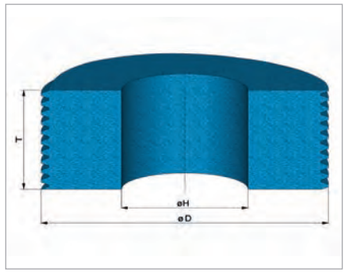
Mounting and grinding: We pre-profile our easy-cutting and dresser-friendl products - so you save time and money during setup.



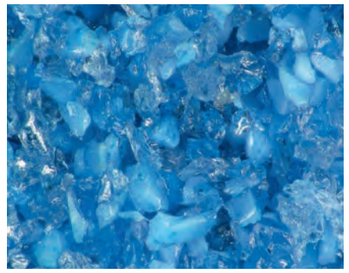
In stock: Single profile grinding wheels in most common dimensions in stock.

Grinding worms.
Grinding more and grinding faster.

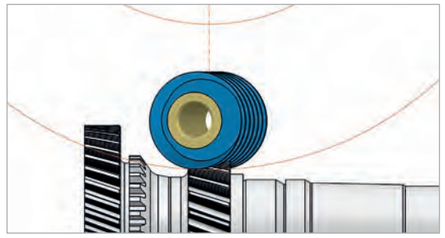
Generating grinding:
Precision on every rotation.
For external and internal gears.



Ready to go:
Up to nine starts pre-profiled for you.
Or unprofiled, if you want to keep all your options open.



Blue Moon™, Blue Moon™ T, Blue Moon™ TZ:
The specifications for perfect grinding.
We have the right solution for all grinding tasks.

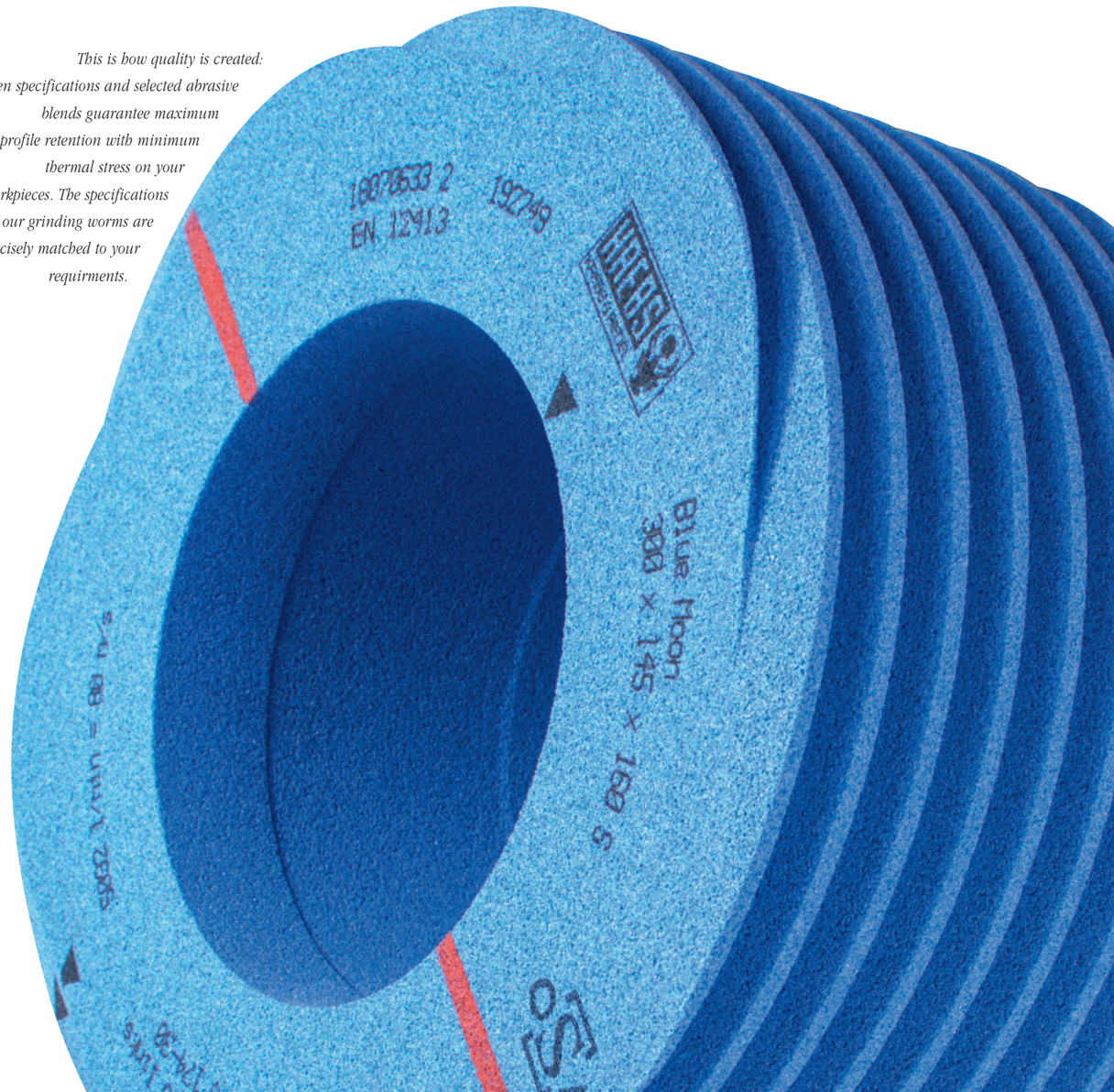


Small, but extremely powerful:
Complex workpieces cannot always be processed with grinding worms of standard dimensions.
We have the perfect solution - our baby grinding worms.
They perform just as well as the large ones.

Nonstop synchronized.

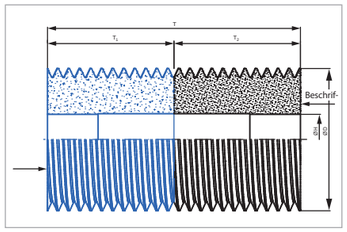
In continuous generating grinding, the grinding worm and workpiece rotate synchronously with each other. The workpiece is moving past the grinding worm in several strokes. The machine kinematics are correspondingly complex. However, the effort pays off very quickly - the production of large quantities of small to medium modules is very economical in this process. High-grade corundum and microcrystalline sintered corundum provide high stock removal rates. Our modern ceramic bonds are gentle on your dressing tools. We optimize our recipes for the respective machine types and applications.

This is how quality is created:
Proven specifications and selected abrasive blends guarantee maximum profile retention with minimum thermal stress on your workpieces. The specifications of our grinding worms are precisely matched to your requirments.

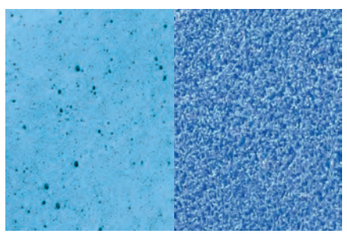


Compound grinding worms.
Grinding and polishing with one wheel.

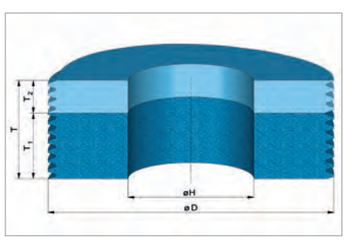
Know-how from A to Z:
Whatever you want to machine in which process, we manufacture the perfect tools exactly according to your specifications.



The same and not the same:
The profile is the same, the grinding results are different.



The material for the material:
Your workpiece defines the composition of the grinding wheel.



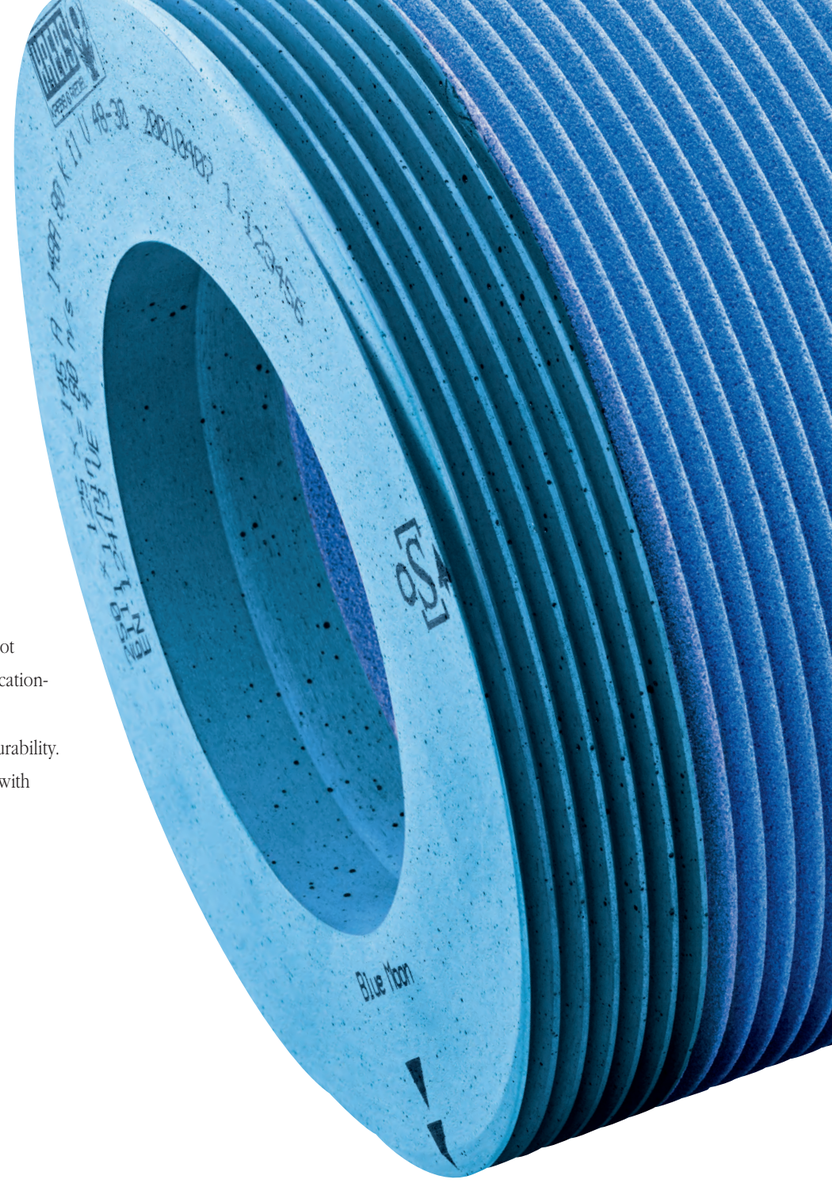
Our service:
On request, we can also pre-profile compound grinding worms.

Save time and money.

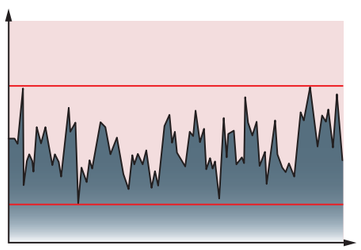
With our compound grinding worms, you not only save time for changeover, but also minimize risks for tool and workpiece. Thanks to the combination of fine grit and polishing zone, you can achieve perfect fine grinding and the desired polish on one and the same machine with only one changeover. The precise mixture of high-grade corundum, special and sintered grits in these special tools also reduces wear on your dressers and avoids heat input into your workpieces. Our compound grinding worms thus combine the required profile retention with the perfect surface finish of your workpieces and tools.

A closer look at the finish.

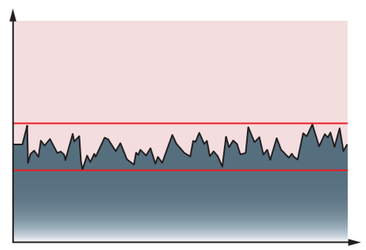
Rough is not the same as rough. And polished is not always the best, target-oriented solution. The application-specific perfect surface quality is often decisive for smoother running, more energy efficiency, more durability. You define your desired surface - we provide you with the perfect compound grinding worm.



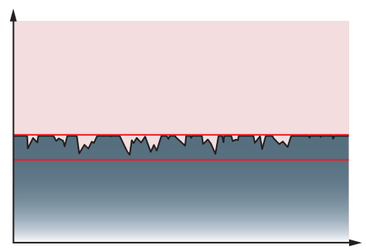
Roughness profiles



Ground:
The surface with Ra < 0.5 µm, Rz 4 can be achieved with our standard grinding worms in various compositions.



Fine ground:
For surfaces with Ra < 0.2 µm, Rz < 1.6 we produce compound grinding worms with fine grinding zones in different compositions.



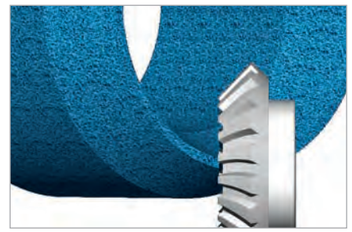
Polished:
The surface with Ra < 0.1 µm, Rz < 0.8 is characterized by its very high contact ratio for the protective lubricant. Currently, only compound grinding worms with polishing zone achieve this quality.

Cup wheels and rings.
Special tools for special processes.

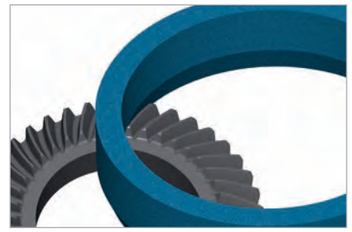
Topography accurate to the point.

Bevel gear grinding is a special form of metalworking for the production of precise bevel gears and spiders, ring gears and pinions. Mostly for *differentials* and *drives* in *vehicle construction* or *elevators*. Accuracy and reliability are the main criterias for abrasives in order to achieve required qualities. The demanding workpieces are discontinuously roll-ground or machined by the plunge grinding process. Both are very complex processes that require special tool life and dimensional stability of the tools. With our proven, individually tested cup wheels and rings, you can unlock the full potential of your precision machines.

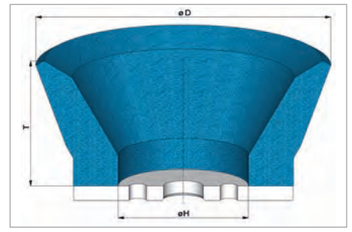
Pre-profiled and safely glued to plates: Whatever grinding machine you use - we offer the right steel plate.



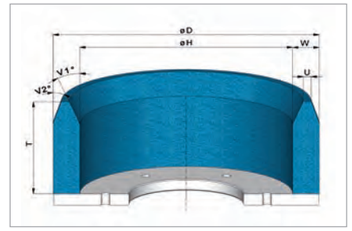
Discontinuous grinding: Both the workpiece and the process require tools of the highest quality on a continuous basis.



Eccentric: During plunge grinding of of ring gears, your workpieces remain cool despite high chip removal.



Complex: No matter how difficult the mold geometry is - the precision of our tools remains simply unmatched.

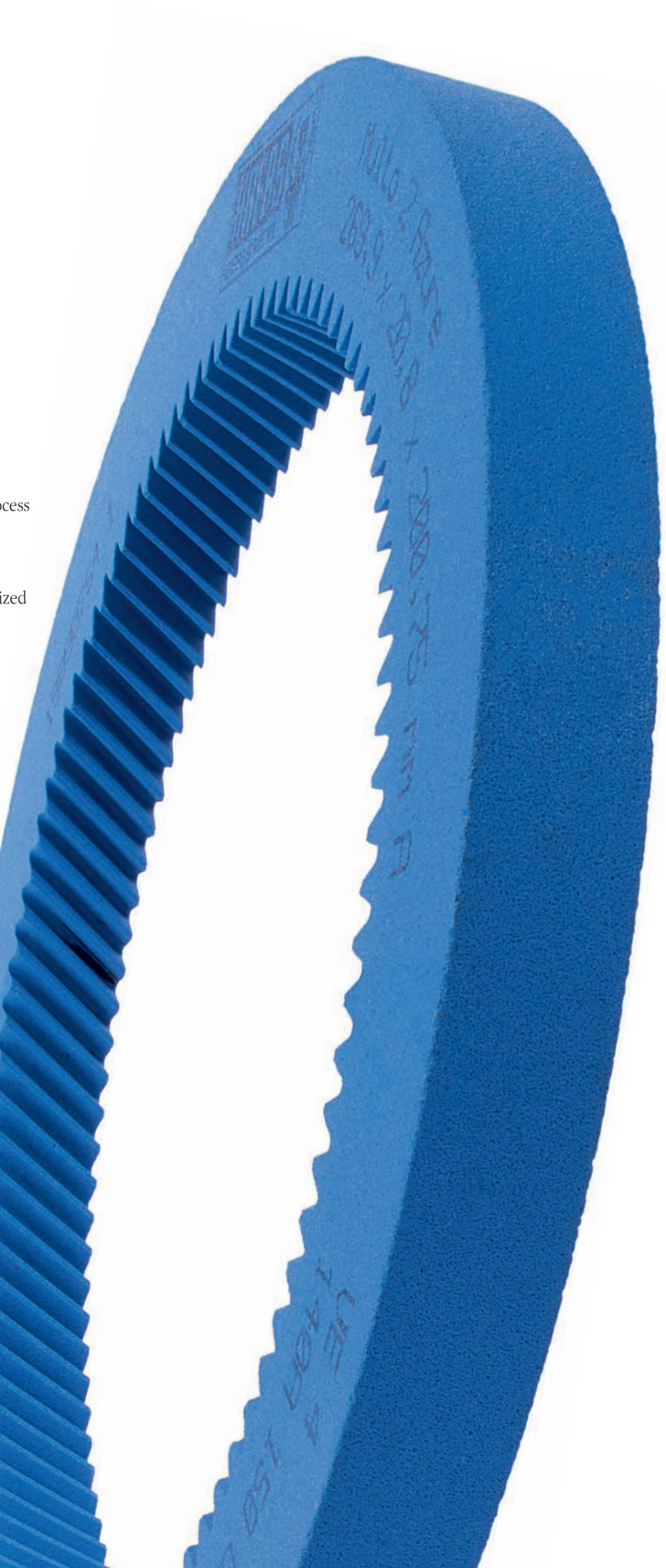


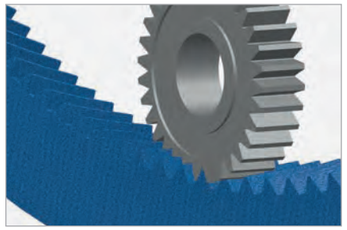
With or without: Every grinding ring, whether conical or straight, is available with or without profile and with or without a plate. Perfect suitable for your workflow.

Ceramic bonded honing rings. Economically precise.

A finished gear in one step.

Power honing is currently the most efficient process for producing low-noise and low-wear gears. It combines high productivity with excellent quality. The ceramic-bonded tools are characterized by a higher performance capability. These forward-looking tools will also make e-mobility more economical and more precise.





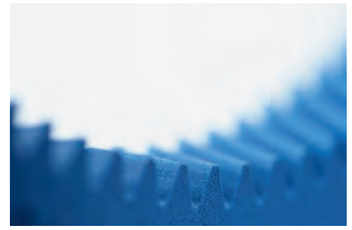
From finishing to complete machining: Thanks to advanced tools and modern plant technology, power honing has become a single-stage manufacturing process.

Cooler than grinding: The low cutting speeds during honing reliably prevent heat during the grinding process.

When things get tight: If gears with interfering contours cannot be machined with grinding worms, honing is the method of choice.

The optimal bond: You tell us which surface quality you want - we have the right recipe.

Performance: Ceramic honing rings are particularly efficient. Like all tools, we manufacture them exactly according to your requirements.



Tooth by tooth: Efficient, low-noise and low-wear gears.

The gear - more than its flanks.
The gear - more than gears.

All grinding solutions for your gearboxes from a single source.

Whether in a *sewing machine* or a *wind turbine*, the gearbox is an extremely complex structure that requires far more than excellently ground tooth flanks. Every surface, whether shaft, bore or face shoulder, etc., is precisely specified and requires the optimum surface. For minimum friction, perfectly metered lubricant adhesion, groundbreaking smoothness, sustained protection against wear and efficient productivity. From us you get grinding tools for all tasks in the highest and in constant quality.

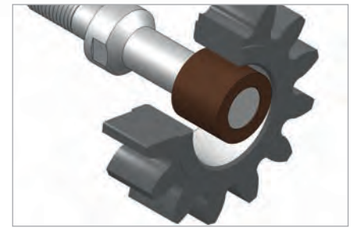
Perfection brings performance: A perfectly ground gear shaft has many different surfaces to be machined. From bearing seats with or without a face shoulder to complete gear teeth.

All around: Krebs & Riedel has individual grinding solutions for grinding all components of gearboxes.

OD cylindrical grinding: Between center and centerless, single and wheel set.

External cylindrical angular plunge grinding: Customized specifications for the best result.

Combined processing: Whether synchronous or sequential - we do it!



Internal cylindrical grinding: CBN bore grinding - with or without flat surfaces.

DOUBLE DISC GRINDING

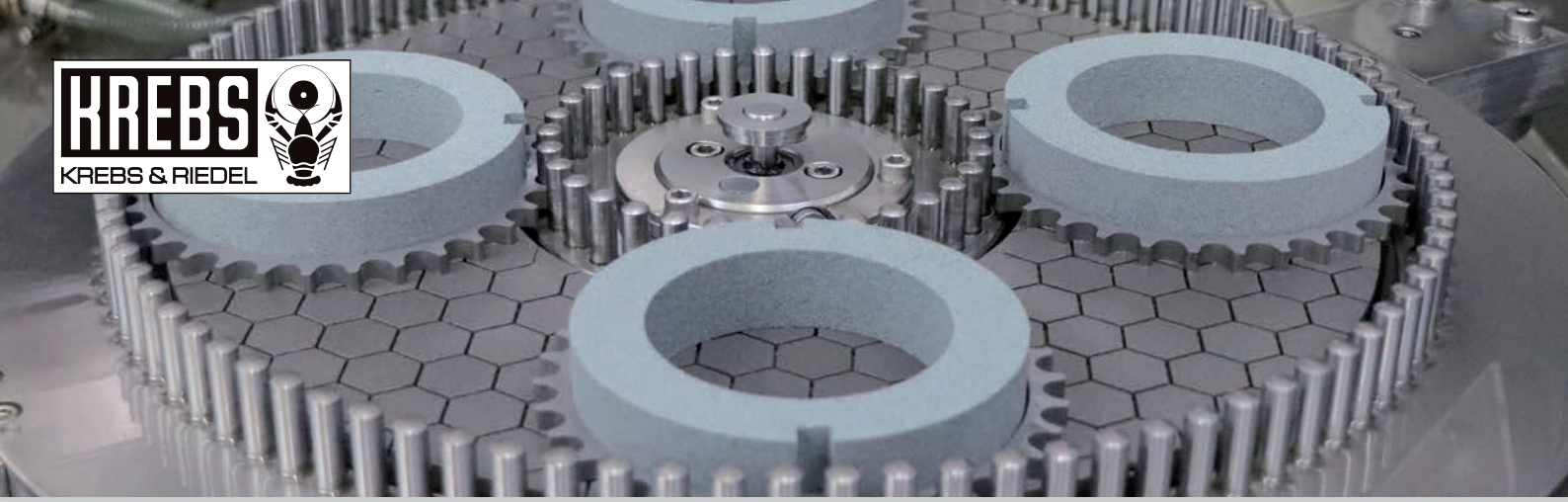
Technical solutions for double disc grinding

- Automotive
- Semiconductor industry
- Hydraulic industry
- Ceramic industry
- Aerospace
- Medical technology
- Roller bearings
- Wind energy

MADE IN GERMANY

KREBS
KREBS & RIEDEL

Innovative grinding technology since 1895



KREBS
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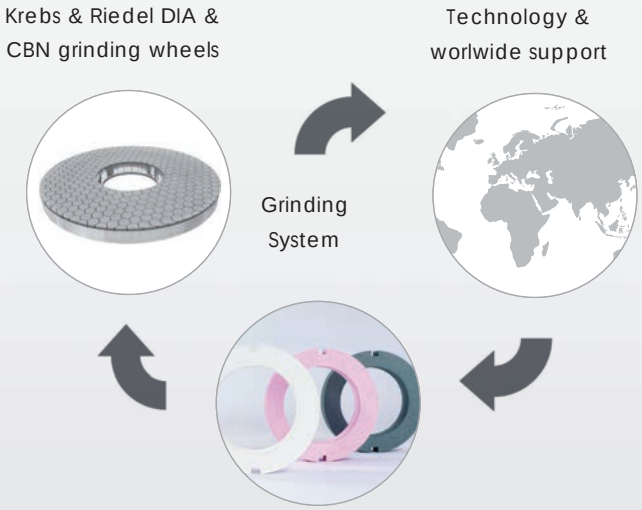
High performance DIA & CBN double disc grinding wheels for face and finegrinding

Krebs & Riedel has many years of experience and references in double disc grinding. We offer tailor-made solutions for a wide range of applications, machines and workpieces in the area of face and finegrinding. Krebs & Riedel manufactures double disc grinding wheels up to 1500 mm outer diameter made of DIA and CBN in vitrified bond for the effective creation of flat surfaces with a high surface quality and shape tolerance for a wide range of different materials. The range includes grinding tools in different segmentation for single and double disc grinding machines with and without planetary kinematics. Compared to other systems, the vitrified bond system by Krebs & Riedel allows the production of very free cutting and porous coating structures. This results in a significant increase in productivity.



Your advantages

- Many years of experience and strong references
- Bespoke solutions with quality tools
- Pellet dimensions possible from 12 to 30mm
- Solutions for roughing applications with high stock removal rates
- Pre- and finish-grinding with one machine concept
- Customer service and application support worldwide
- Fast delivery times and flexibility
- All products are „Made in Germany“
- Highest precision and excellent tool life
- Finest workpiece surface qualities
- Disc diameters up to 1500 mm
- Continuous development of specifications

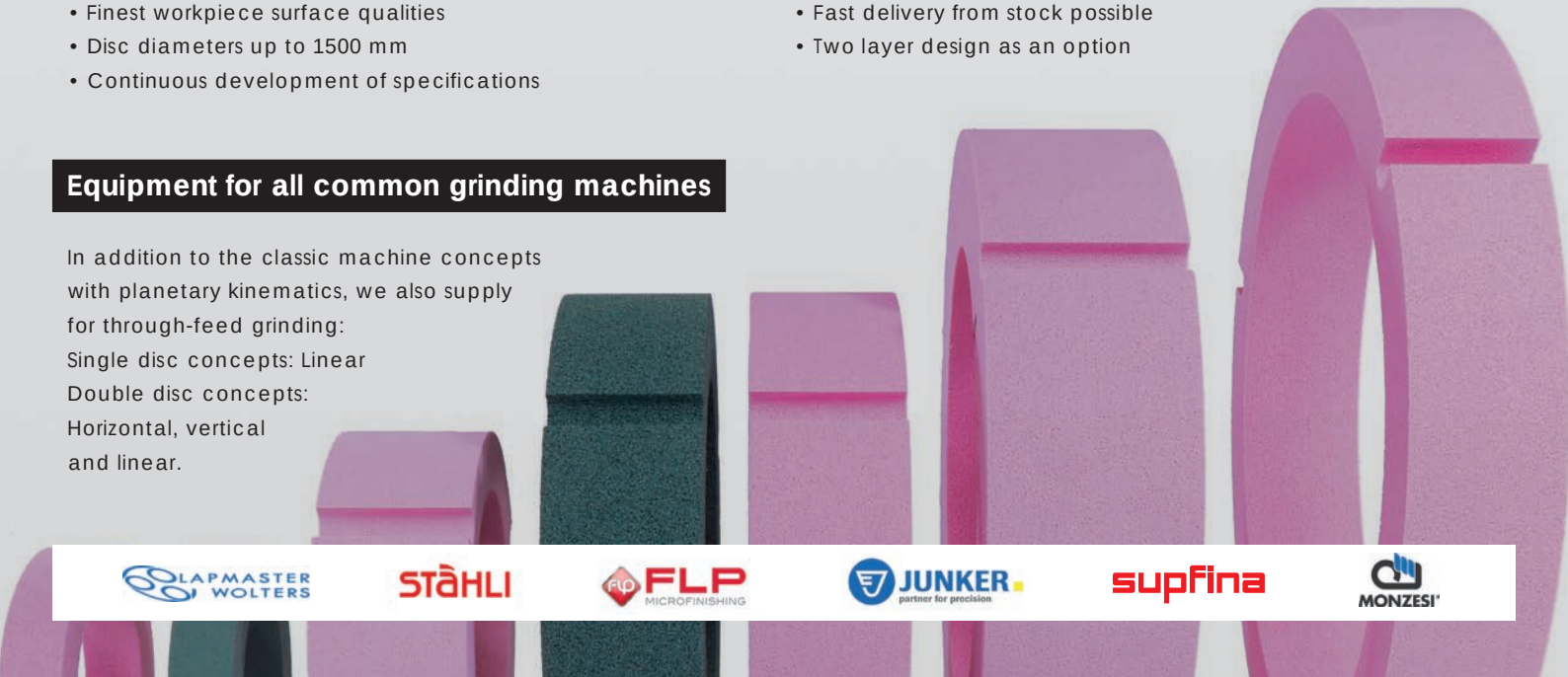
One system for tailored solutions

In addition to an intensive process analysis, we supply you with grinding, dressing and sharpening tools that are tailored to your production processes and your requirements.

- AL_2O_3 white, AL_2O_3 pink and SiC
- From 100 mm to 600 mm ring diameter
- Grain sizes from 80 to 600 mesh
- Fast delivery from stock possible
- Two layer design as an option

Equipment for all common grinding machines

In addition to the classic machine concepts with planetary kinematics, we also supply for through-feed grinding:
Single disc concepts: Linear
Double disc concepts: Horizontal, vertical and linear.



LAPMASTER WOLTERS · STÄHLI · FLP MICROFINISHING · JUNKER partner for precision · supfina · MONZESI

KREBS
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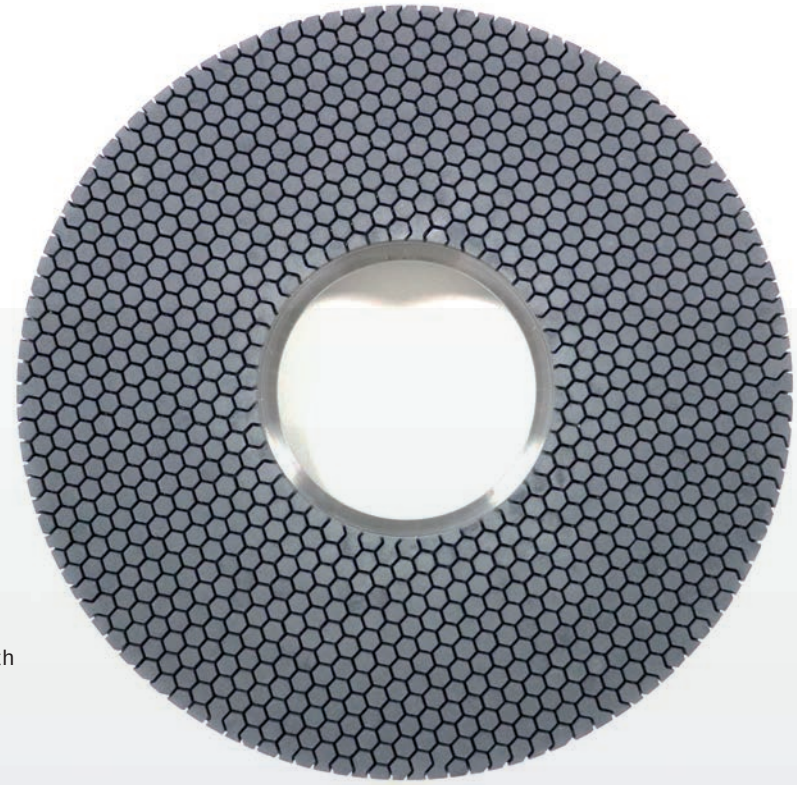
Finest surface results for metal, ceramics and plastics

Our bonding systems have proven particularly effective in the machining of a wide variety of ceramics, cast materials, sintered metals, hardened steels and hard metal products. E.g. for sealing discs, valve plates, pump rings and housings, rolling bearing rings, knives and carbide cutting tools. High stock removal rates and long tool live for bearing steel such as 100Cr6 characterize our specifications.

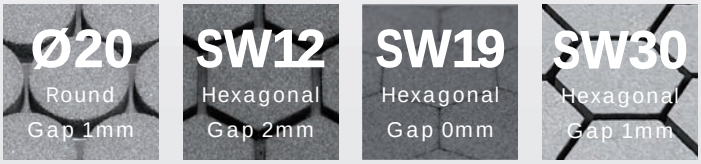


Bespoke wheel layouts

The grain size of the DIA and CBN bonds used is adapted to the application as well as the required surface quality. Workpiece-specific and flexible wheel layouts, optionally with edge protection or gap filling and wear-resistant bonds with suitable sharpening technology.

Our service

- Selection of the optimal specification
- Pre-tests with own laboratory machine minimizes risk
- Production of customer specific grinding tool type
- Recommendation of the appropriate dressing strategy
- Recommendation for appropriate process parameters
- Recommendation for appropriate cooling lubricants
- Coordination & solution for the specific application
- Dilligent process documentation
- Continuous optimisation
- Application-oriented usertraining
- Repair of segments / replacement
- Recoating of base bodies
- Close cooperation with machine manufacturers



Metals	Plastics	Glass & ceramics
Steel: Soft, hard, hardened, tempered	Hard/Soft	Al2O3
Tungsten	Fiber reinforced	ZrO2, SiC, Si3N4

FEPA	US-Mesh	Size in µm	Application
126	120 / 140	125 / 106	Pre grinding
107	140 / 170	106 / 90	Pre grinding
91	170 / 200	90 / 75	Pre grinding
76	200 / 230	75 / 63	Finish grinding
64	230 / 270	63 / 53	Finish grinding
54	270 / 325	53 / 45	Finish grinding
46	325 / 400	45 / 38	Finish grinding

Segment-details	mm	Height mm	Gap mm	Geometry
SW	12	5-10	0-5	Hexagonal
SW	19	5-10	0-5	Hexagonal
SW	30	5-10	0-5	Hexagonal
Diameter	20	5-10	0-5	Round

Particularly small segment dimensions result in a higher number of cutting edges and cause a higher stock removal rate.

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Laboratory machine AC 500

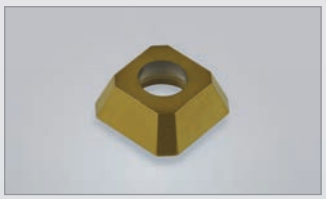
- Double side face grinding with planetary kinematics
- Machine for pre-tests and quick tests
- Single side operation possible (Quick-Test)
- Workpiece holder max. D120 mm
- Working wheels Ø 356/156 mm (ring width 100 mm)
- Speeds top and bottom 400/min infinitely variable
- Power of both drives 3kW
- Contact pressure max. 250daN
- Working area encapsulated

Risk minimisation through preliminary tests

- Preliminary tests in own test field
- Grinding test on request
- Sample components: 2mm to 50mm, maximum 20mm high
- Solutions for both oil & water based coolants
- Better performance predictions possible
- High accuracy machine, stable wheel bearing
- Risk minimization through pre-testing with sample components
- Better performance predictions possible

Worpiece examples & references

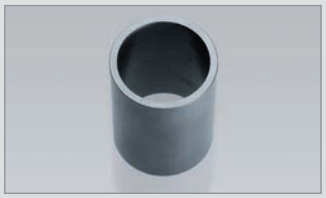

Sleeve ø24×28mm


Insert 14×14×7mm


Bearings ø23×7mm

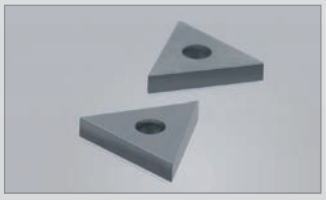

Sealing washer ø160×2mm

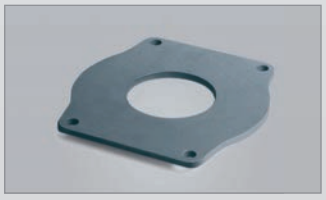

Spring washer ø60×4mm


Spacer tube ø45×18mm


Pliers 52×26×2mm


Bearing ring ø130×24mm


Cutting plate 9×9×2mm


Sliding plate 300 × 220 × 8mm


Ceramic Workpieces


Control plate ø160×2mm


Gears ø14×3mm


Roller bearing rings ø160×26mm


Gear rings ø32×7mm


Valves ø20×7mm

KAE-121/2022

Innovative grinding technology since 1895

KREBS & RIEDEL Schleifscheibenfabrik GmbH & Co. KG • Bremer Straße 44 • 34385 Bad Karlshafen • Tel.: +49 5672 184-0 • Fax: +49 5672 184-218 • mail@krebs-riedel.de • www.krebs-riedel.de

The right tool.
Always and everywhere.

With over 30 locations around the globe and subsidiaries in China and India you get the same high quality grinding wheels at all of your production sites worldwide:

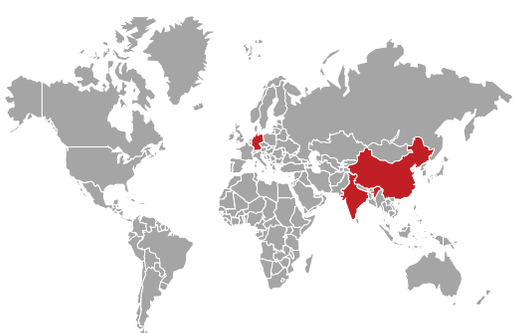
Highly qualified advice from our application experts, excellent service from shipping to production optimization and, last but not least, excellent product quality. Take advantage of our entire production program:

Ceramic and resin bonded discs up to 900 mm outer diameter for all grinding operations and processes.

Cut-off wheels in resin bond with and without fiber reinforcement up to 800 mm outside diameter for laboratory cuts and everything that requires precision.

Rough grinding wheels and pendulum grinding wheels with and without fiber reinforcement for contract fettling and the casting industry.

Diamond and CBN tools with operating speeds up to 160 m/s for surface, cylindrical and internal grinding. Also with carbon base bodies.



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