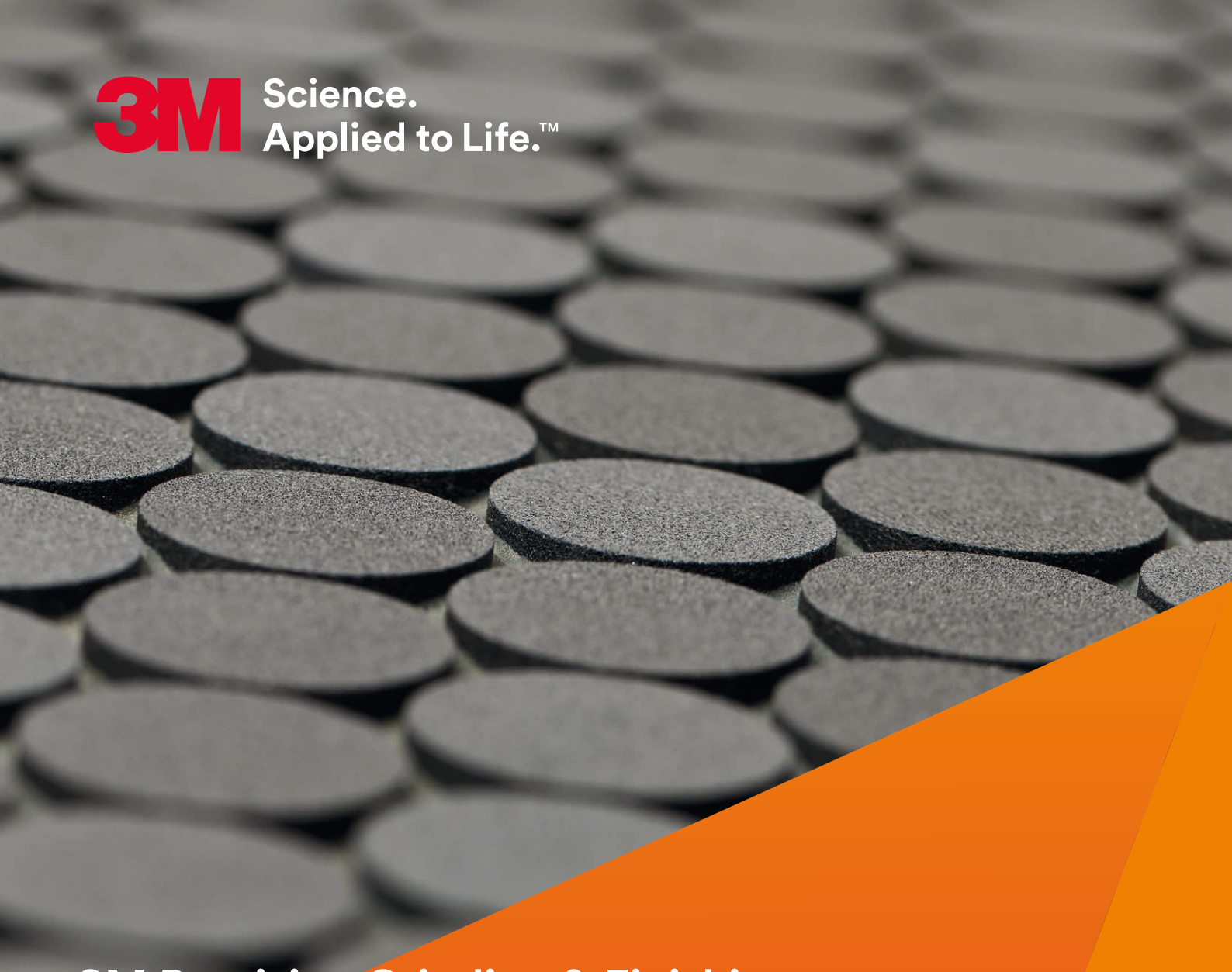


3M Science. Applied to Life.™

3M Precision Grinding & Finishing

Diamond and CBN Face and Fine Grinding

english

Your partner with a century of grinding experience

As a part of the 3M Abrasive Systems Division, 3M Precision Grinding & Finishing is your committed and competent supplier for abrasives, tools, service and support.

A SYSTEM FOR CUSTOM-TAILORED SOLUTIONS 4

DIAMOND AND CBN FACE GRINDING WHEELS 6

DIAMOND AND CBN FINE GRINDING WHEELS 8

DRESSING TOOLS FOR DIAMOND AND CBN FINE GRINDING WHEELS 9

DRESSING TOOLS FOR DIAMOND AND CBN FACE GRINDING WHEELS 10

YOUR BENEFITS – OUR SERVICE CONCEPTS 11

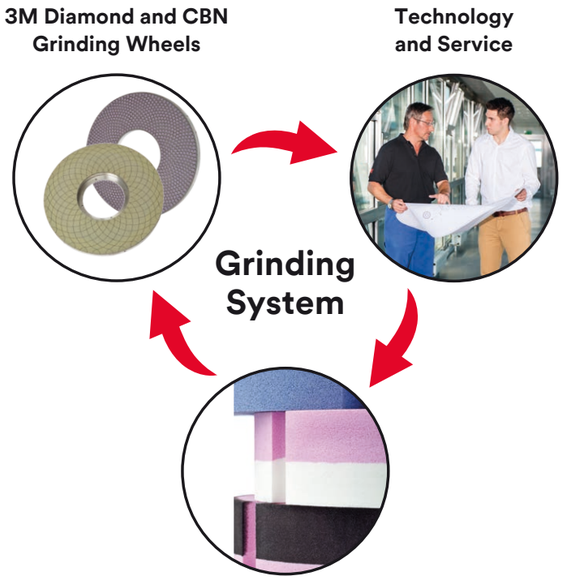


A System for Custom-tailored Solutions

Complex Solutions with a System
3M Abrasive Systems offers many years of experience, references and custom-tailored solutions with a system designed for a broad diversity of precision and surface grinding applications, machines and workpieces.

In addition to extensive process analysis, we supply you with grinding, truing and dressing tools from a single source – all matched to your production processes and custom-tailored to your requirements.



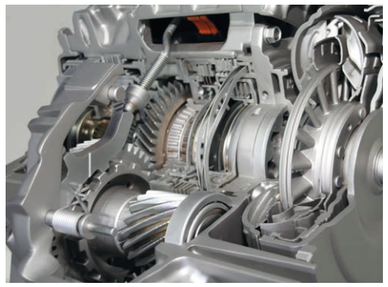


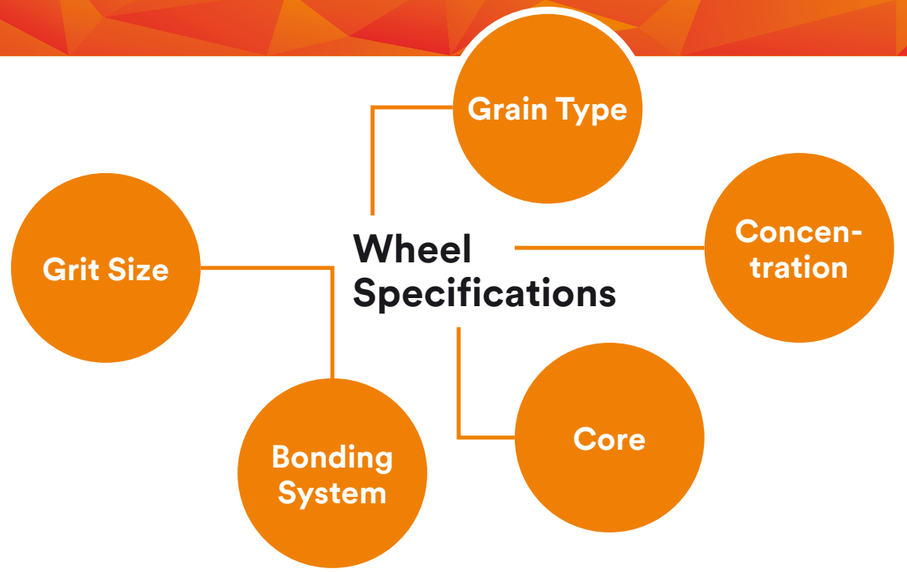
Our Service Package for Your Specific Needs

- Selection and creation of the ideal specifications and type of grinding tool
- Definition and implementation of the perfectly matching dressing strategy
- Recommendations for appropriate process parameters and coolant/lubricating fluids fitting to your particular application
- Process documentation (Precision Grinding LOG)
- Comprehensive customer service requirements

Innovation Close to the Customer

- Development of customer-specific solutions
- Innovative bond systems
- Innovative abrasive grains
- Reference tests
- Quality assurance
- LEAN Six Sigma



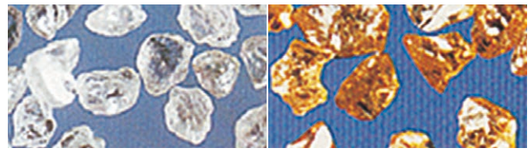


Grit Size (FEPA)
The grit size of the diamond and CBN abrasive grains used in the wheels is based on the application and the required surface quality.

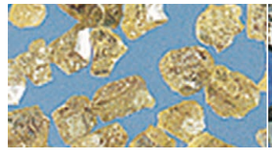
FEPA	US-Mesh	Size in µm	Application
181*	80 / 100	180 / 150	roughing
151*	100 / 120	150 / 125	roughing
126	120 / 140	125 / 106	roughing
107	140 / 170	106 / 90	roughing
91	170 / 200	90 / 75	roughing
76	200 / 230	75 / 63	finishing
64	230 / 270	63 / 53	finishing
54	270 / 325	53 / 45	finishing
46	325 / 400	45 / 38	finishing
Micro-grains (for fine grinding)			
M 40	600**	40 / 30	lap grinding
	700**	36 / 22	lap grinding
M 25	800**	30 / 20	lap grinding
	1100**	22 / 12	lap grinding
M 16	1200**	20 / 10	lap grinding
M 10	1800**	12 / 6	lap grinding
M 6.3	3000**	8 / 4	lap grinding

* for face grinding
** approximate equivalent mesh size

Grain Type / Cutting Material
Depending on the application, we use different grain types/grain qualities in diamond and CBN. The types differ in their characteristics (friable, blocky, free cutting, etc.).

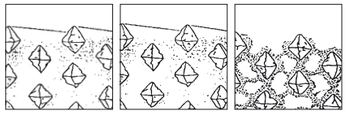

Diamond

CBN


Diamond


CBN

Bond
We use the following bonds for our fine grinding wheels:


Resin bond, multilayer

Metal bond, multilayer

Vitrified bond, multilayer

Wheel Body
For fine finishing, we recommend wheel bodies that have been matched to the application.

AL
Aluminum

ST
Steel

Concentration (C)
With multilayer bonding **(R, M, V),** a grain concentration is chosen such that the greatest possible tool life and required surface quality are achieved.


C 100
Diamond / CBN


C 150
Secondary grain

C	Carat/cm³
25	1,1
50	2,2
75	3,3
100	4,4
150	6,6
175	7,7

Diamond and CBN Face Grinding Wheels for Roughing and Finishing

Face grinding in through-feed processes with diamond and CBN grains has firmly established itself in the market. Grinding wheels with porous bonding systems have gained acceptance due to their technological advantages such as high stock removal, continual heat dissipation and reduced wear. New bonding systems now make it possible to achieve significant improvements in service life as well as greatly reduced machining times.

Benefits of Face Grinding:

- Reduced cutting forces
- Increased removal rates
- Highest part quality
- Ideally profiled dressed wheels work in the self-dressing range of the machine
- Increased precision
- Easy repairs simply by replacing individual abrasive segments
- Reduced machine downtime

More detailed information available on request.

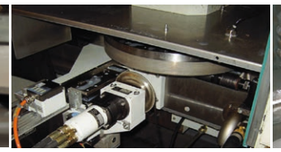
Workpiece Examples



Application Examples



Face Grinding of a Connection Rod



CBN Wheel Dressing



Face Grinding of TC Blades

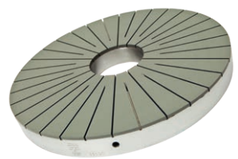
Grinding Wheel Examples



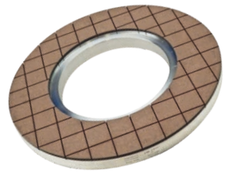
Vitrified Bond / CBN
D = 340 mm



Vitrified Bond / CBN
D = 500 mm



Resin Bond / CBN
D = 457 mm



Resin Bond / Diamond
D = 457 mm

Typical Face Grinding Machines

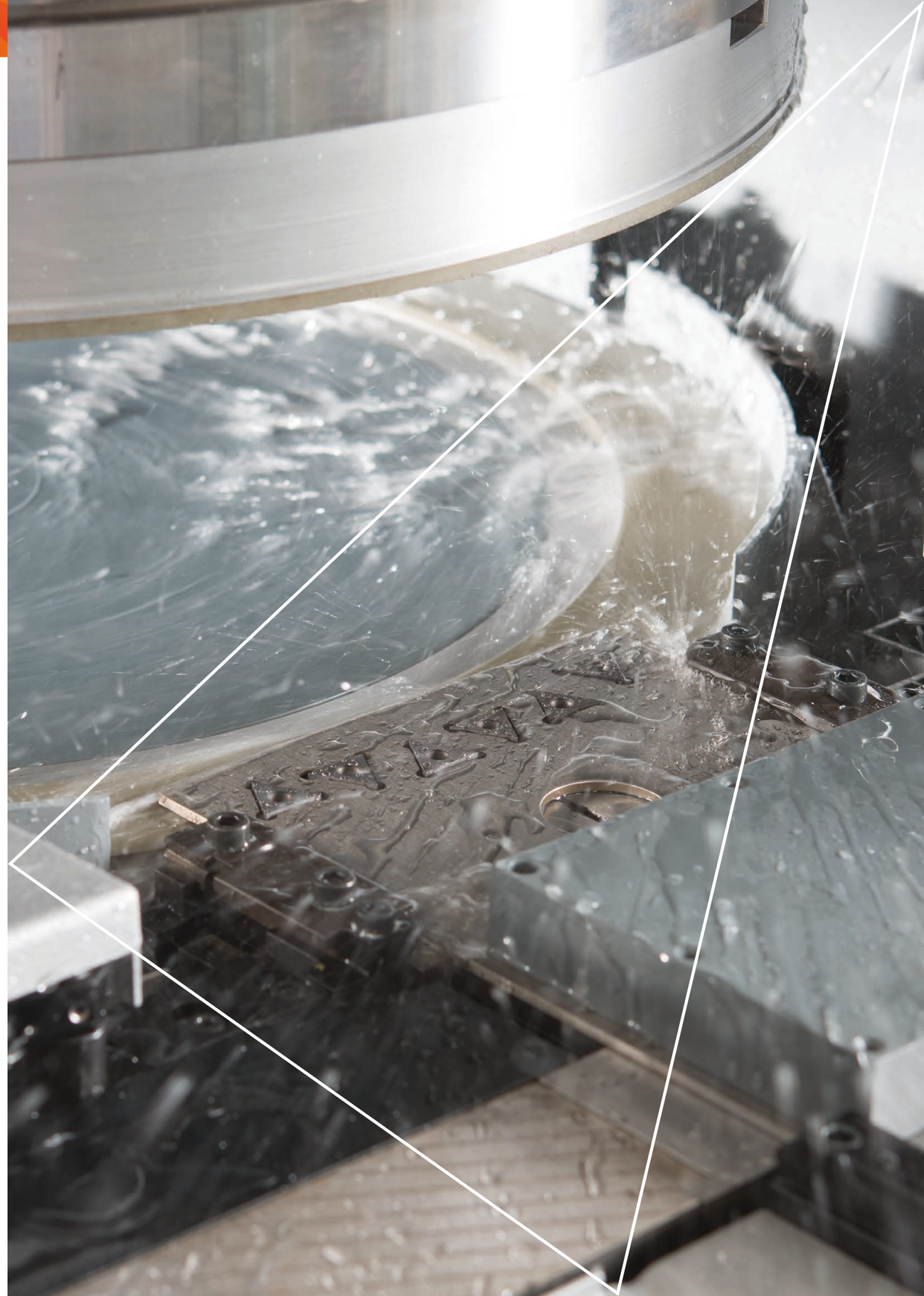
- Junker
- Diskus
- Linear Abrasive
- Viotto











Diamond and CBN Fine Grinding Wheels for Roughing and Finishing

Wheel cores made of cast material, steel and aluminum with CBN or diamond grains guarantee first-rate grinding results for all small and large surface area parts. Regardless of whether steel or aluminum, hard metal, ceramic or plastic: our range includes the fitting solution for every application.

Advantages of Fine Grinding Compared to Conventional Grinding and Lapping Processes:

- Reduced cutting forces
- Increased removal rates
- Reproducible sharpening with dressing rings and stones
- Reduced tool wear
- Increased precision
- Easy repairs simply by replacing individual abrasive segments/ pellets
- Reduced disposal costs (no lapping sludge)
- Reduced machine downtime

Product Benefits:

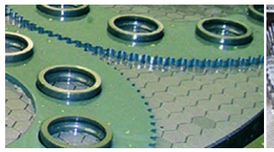
- Flexible layouts tailored specifically to the workpieces
- Optionally available with edge protection or filling
- Trained wear-resistant bonding with the appropriate dressing technology
- Customer-specific, high-precision coolant drainage systems
- Layouts adapted to the load for uniform wheel wear make it possible to achieve high-precision parts

More detailed information available on request.

Workpiece Examples



Application Examples



Machining of Roller Bearing Rings



Machining of Steel Rings

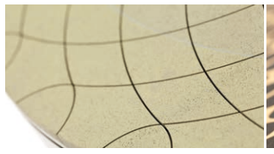


Machining of Sealing Disks



Machining of Circular Blades

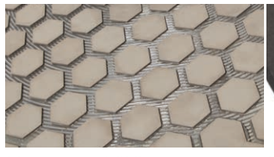
Fine Grinding Wheels – Various Layouts



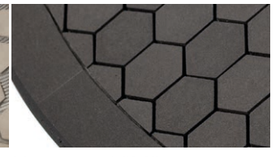
Segmented



Coordinate “S”



Hexagonal “L”



Hexagonal “M”

Typical Fine Grinding Machines

- Peter Wolters
- Melchiorre
- Stähli
- Lapmaster
- AM Technology





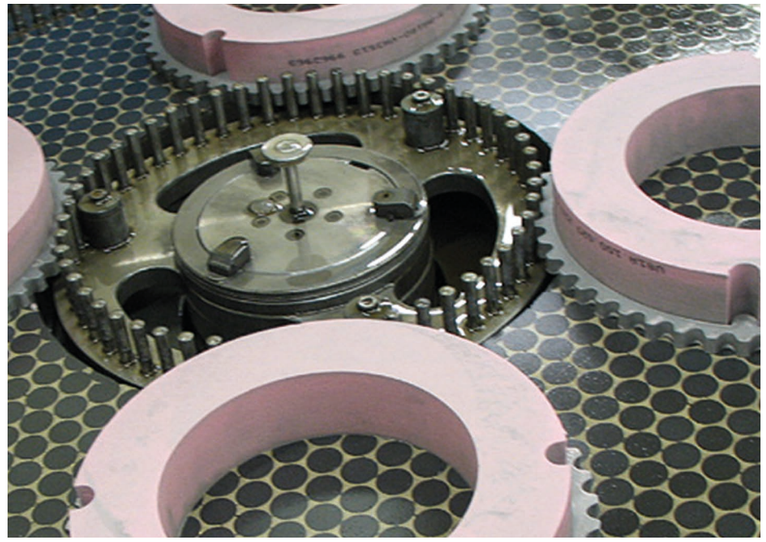






Dressing Tools for Diamond and CBN Fine Grinding Wheels

Cost-effective fine grinding with reproducible grinding and dressing processes requires the right dressing tools.
We supply sharpening stones and rings matched to the specifications of the particular precision grinding wheel.



Sharpening Stones

- Stones are inserted loosely
- Various grain types and bonds available
- Easy dressing

Sharpening Rings

- Two-layer versions available to adapt to different upper and lower wheel specifications
- Different colors of the layers ensure that the rings are inserted correctly

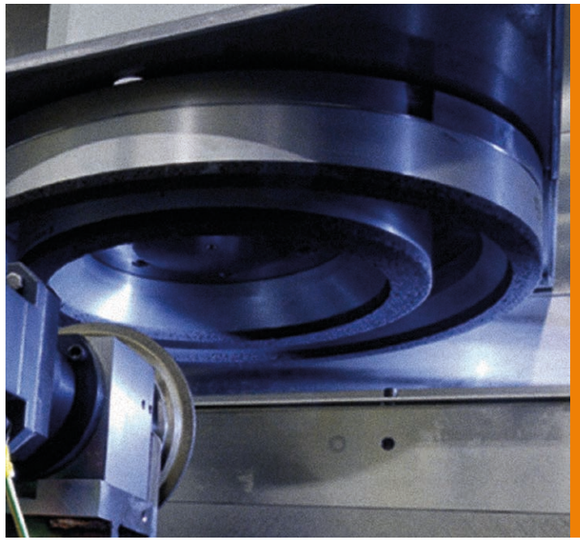
Sharpening Ring Benefits

- Rings are inserted loosely into the carrier ring
- Rings are suitable for maintaining the flatness and sharpness of the grinding wheel
- Optimized to grinding wheel width

More detailed information on dressing technology available on request.



Dressing Tools for Diamond and CBN Face Grinding Wheels



3M offers various types of Dressers for Face Grinding Wheels.

Please find further information in catalogue **“3M™ Diamond Dressing Rollers”** or contact us. You can find contact information on the back of this brochure.



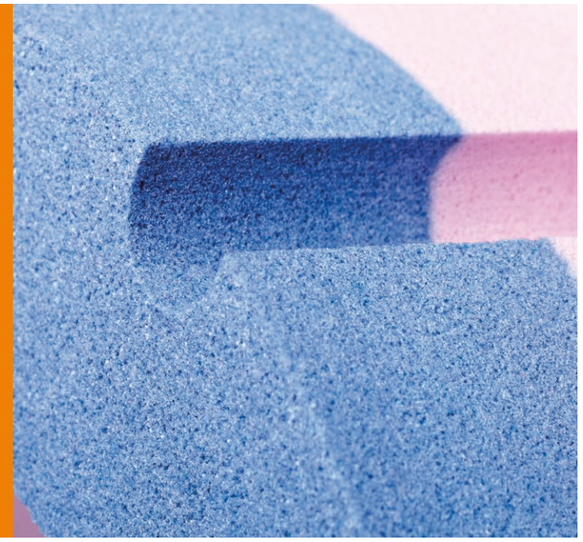
Your Benefits – Our Service Concepts

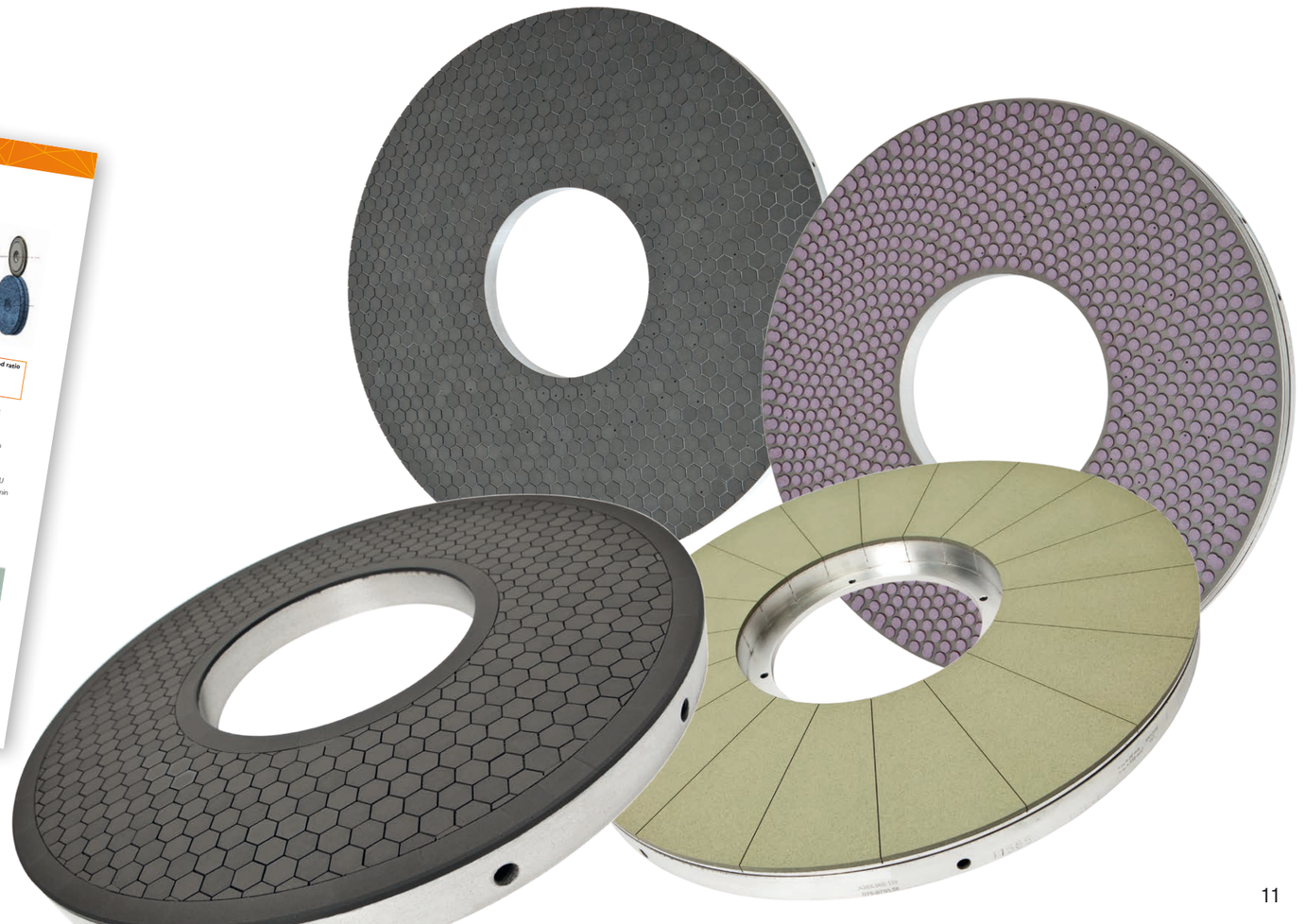
Your Benefits

- Our multifaceted experience with customer-specific applications worldwide
- Customer-specific solutions with highest quality tools
- Worldwide technical support

Our Service Concept

- Close cooperation with machine manufacturers (OEM)
- Continual further development of existing tool concepts with corresponding dressing and truing technologies
- Application-focused customer training
- Worldwide availability of service and application specialists





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