DR. MÜLLER DIAMANTMETALL®

PRODUCT CATALOGUE

DIAMOND- AND CBN TOOLS FOR THE OPTICAL INDUSTRY

Our quality is your success!

YOUR CUSTOMER NUMBER:

- Order by Email
- Order by Fax

ORDER QUICKLY, RELIABLY AND AROUND THE CLOCK

vertrieb@muedia.de

+49 (0)881 / 90 11 55 - 100

- Questions about your deliveries and returns

+49 (0)881 / 90 11 55 - 108

Dr. Müller DIAMANTMETALL®
Chairman of the board of management: Michael Schulze
Chairman of the Board Dr. Claudius Schikora
Leprosenweg 34 · D-82362 Weilheim

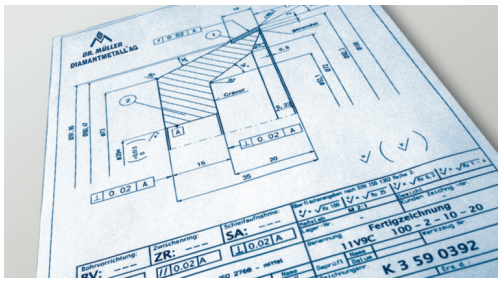
Telephone: +49 (0)881 / 90 11 55-0
Fax: +49 (0)881 / 90 11 55-100
Email: vertrieb@muedia.de
Internet: www.muedia.de

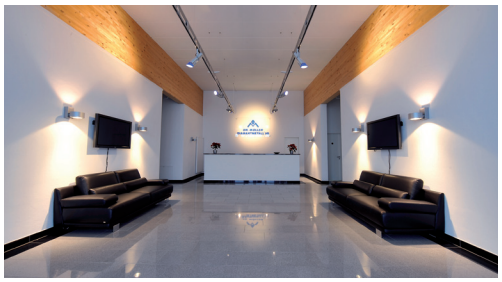
Bank details
Vereinigte Sparkassen Weilheim i.OB.
ACCT: 927 8888 · BLZ: 703 510 30
IBAN: DE 37703510300009278888
SWIFT/BIC: BYLADEM1WHM

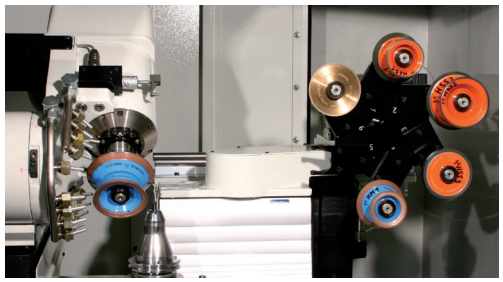
Place of jurisdiction:
District court of Weilheim i.OB.
HRB 168843
VAT ID No.: DE255272026
Tax no.: 119/120/09906

Your personal contact partner

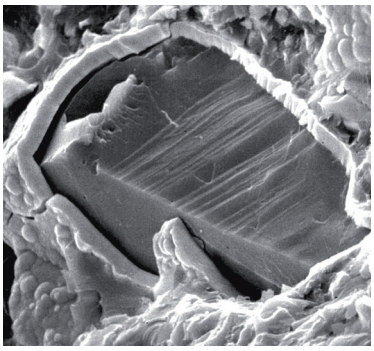
DR. MÜLLER
DIAMANTMETALL®

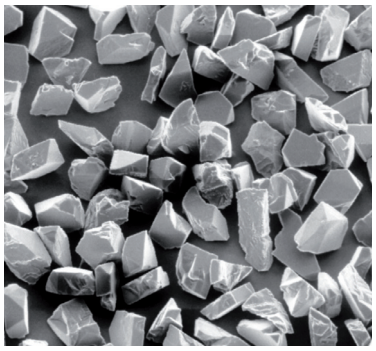


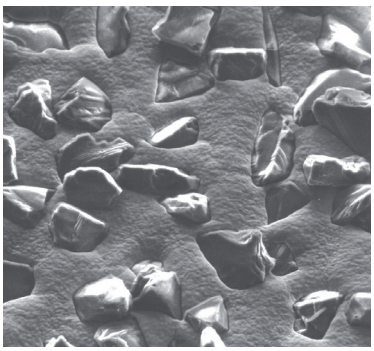


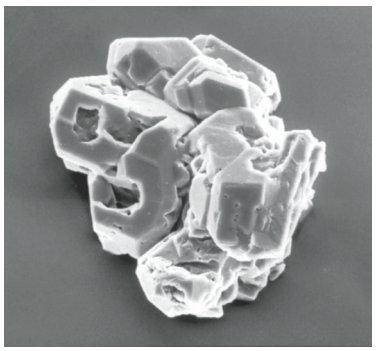


PRODUCT CATALOGUE
DIAMOND- AND CBN TOOLS FOR THE OPTICAL INDUSTRY









The company

Dr. Müller DIAMANTMETALL® AG is a company with remarkable tradition. Its founder, Dr. Wilhelm Müller, invented the metal-bonded diamond grinding wheel in 1935, laying the foundation stone for the company, and to the present day Dr. Müller DIAMANTMETALL® AG remains an owner-operated enterprise, with the third generation of the family in charge of its operations.

At our level the continued success of a supplier of technical solutions stands and falls with the ability to understand and anticipate the specific requirements of a wide range of customers from different industries. Your requirements are our challenge – a challenge we have met from the very earliest days.

Know-How

Thanks to the use of cutting-edge database technology we are today able to draw on expert knowledge acquired over more than 80 years of diamond tool production. Our own R&D department develops innovative solutions to meet the most complex requirements, while countless innovations and patents highlight our creativity when it comes to developing ingenious technical solutions.

This extensive competence in the development of solutions for all application areas guarantees added value from close cooperation with the customer – ensuring the added value that leads to outstanding customer products.

COMPANY HISTORY

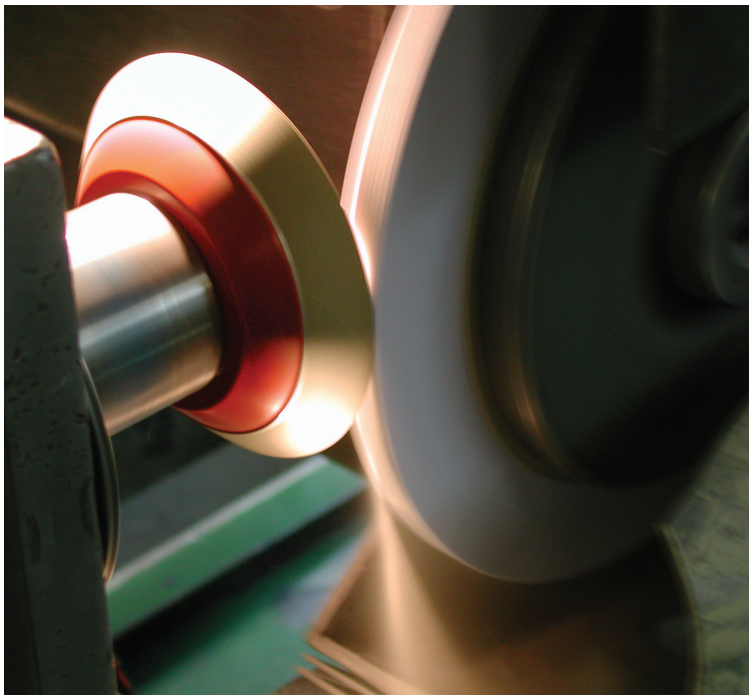
1935
Founding of the company by Dr. Wilhelm Müller in Berlin. Patent registration and production of metal-bonded diamond grinding wheel.

1944
Destruction of the company in the war.

1947
Resumption of production in the greater Munich area.

1955
Relocation to our own production facilities in Feldafing on the Starnberger See.

1962
Continuation of the company by the second generation after the death of the company founder.



Flexibility

Whether it's a matter of best possible quality or optimum technical reliability, productive processes, long product life, investment security you can rely on, outstanding grinding performance, continuous optimisation or fast new developments.

Your requirements are our challenge, regardless of batch size. And if needed we can provide you with support services on the spot.

These support services range from training and operator instruction by our experts with experience of a range of industries, right down to backup in the launch phase for new products provided by our applications specialists in order to ensure trouble-free production.

Products

Our product portfolio contains more than 155.000 articles for precision grinding, supported by a powerful database which ensures that each individual serial number can be traced back.

The ongoing development of our products by our R&D department ensures that our customers receive maximum efficiency in their grinding operations.

We act as your partners not only for standard products but also for complete new developments with outstanding depth of production.

1963
Start of production of diamond dressing tools.

1965
Start of production of resin-bonded diamond grinding wheels.

1969
Start of production of resin- and metal bonded CBN grinding wheels.

1970
Start of production and sales of diamond dressing rolls.

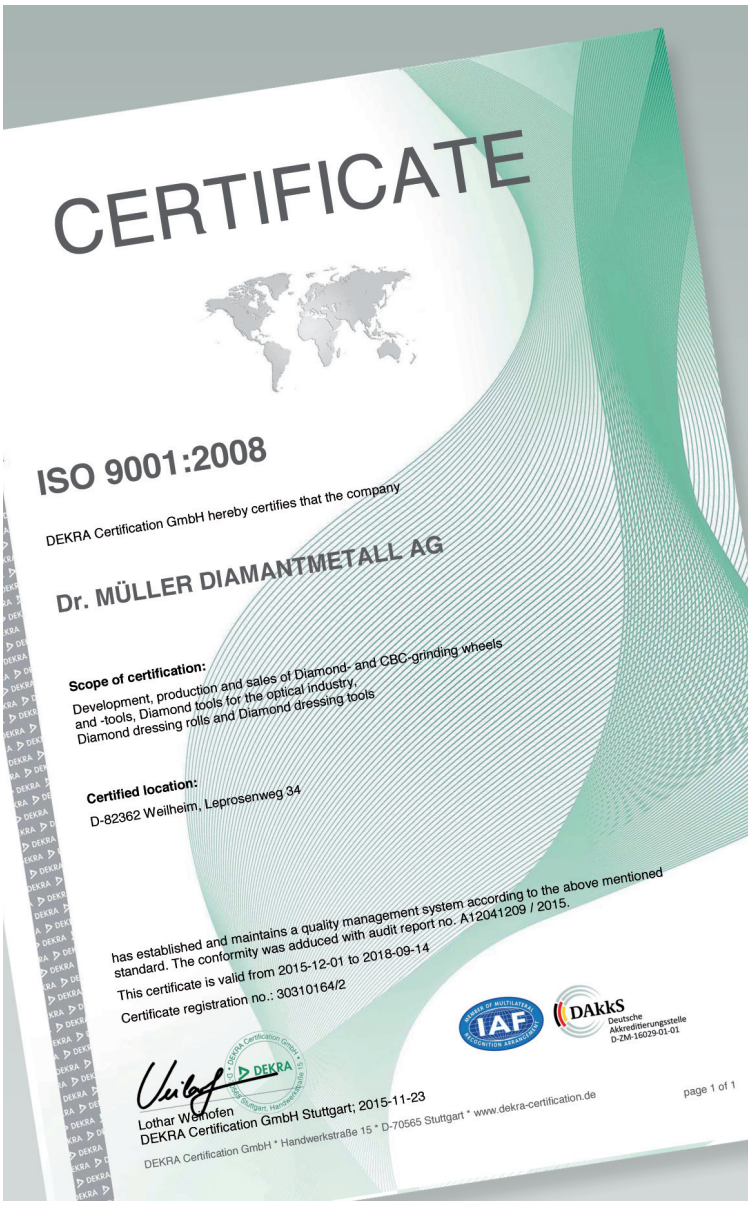
1982
Production floor doubled at the Feldafing facility.

1989
Start of production of vitrified-bonded diamond and CBN grinding wheels.

1991
The third generation assumes leadership of the company.

Quality

For more than 80 years now we have been guaranteeing our customers the highest standards of quality and precision. Our expertise was confirmed by the granting of DIN EN ISO 9001 certification in the 2000, with quality assurance all along the line guaranteeing the success of your products.


CERTIFICATE

ISO 9001:2008

DEKRA Certification GmbH hereby certifies that the company

Dr. MÜLLER DIAMANTMETALL AG

Scope of certification:
Development, production and sales of Diamond- and CBC-grinding wheels and -tools, Diamond tools for the optical industry, Diamond dressing rolls and Diamond dressing tools

Certified location:
D-82362 Weilheim, Leprosenweg 34

has established and maintains a quality management system according to the above mentioned standard. The conformity was adduced with audit report no. A12041209 / 2015.
This certificate is valid from 2015-12-01 to 2018-09-14
Certificate registration no.: 30310164/2

Lothar Wennofen
DEKRA Certification GmbH Stuttgart; 2015-11-23

DEKRA Certification GmbH * Handwerkstraße 15 * D-70565 Stuttgart * www.dekra-certification.de

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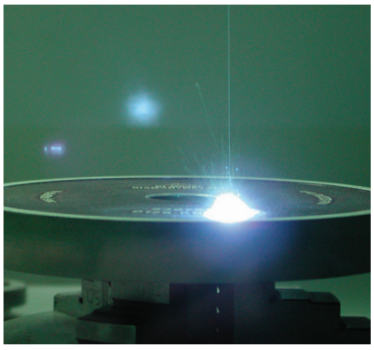
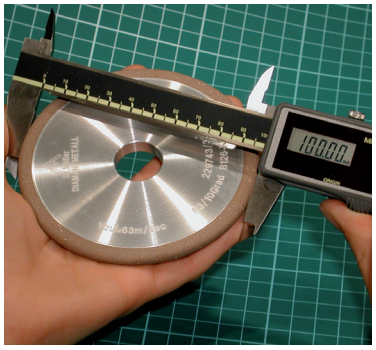




2002
Expansion of the production floor by the addition of a second factory in Weilheim/Obb.

2006
Acquisition and continuation of the company by its founder's grandson, Michael Schulze.

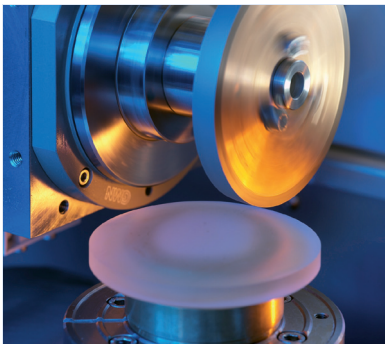
2007
The company Dr. Wilh. Müller DIAMANTMETALL, Propr. M. Schulze e.K. becomes Dr. Müller DIAMANTMETALL AG.

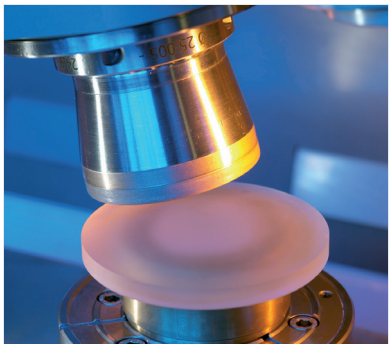
2008
Relocation of production and administration to the new premises of the third factory in Weilheim/Obb.

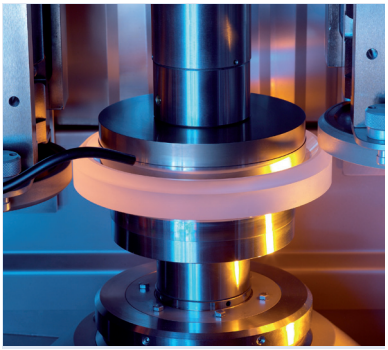
2011
Expansion of digital production control and expansion of the company management team.

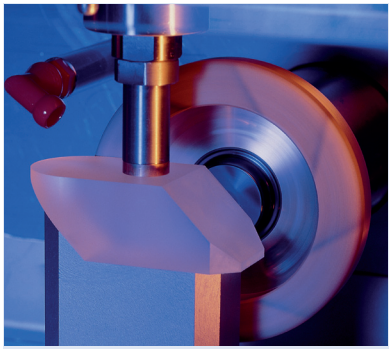
2014
An improvement for work safety. Pleasant reduction of the permanent grinding sound through our product innovation SilencePro.

Contents









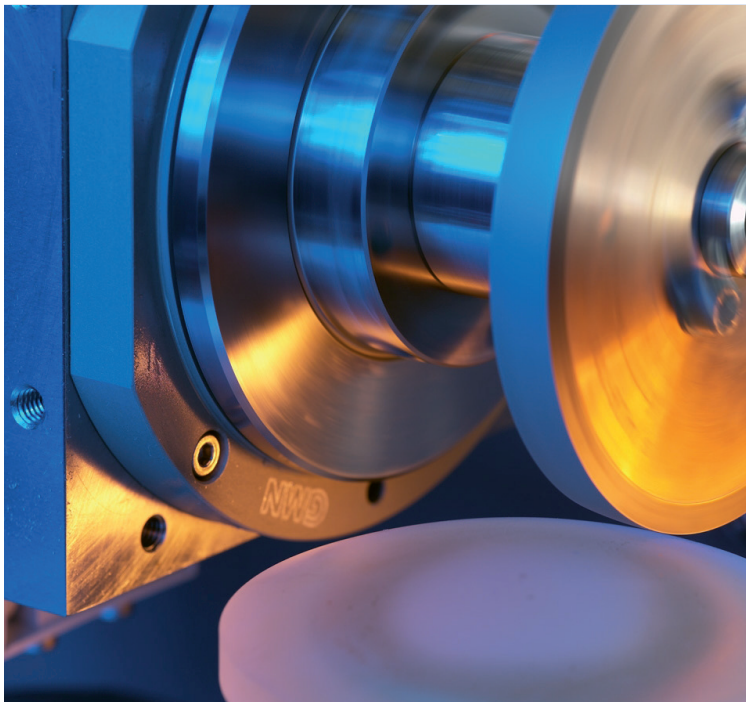
added value.

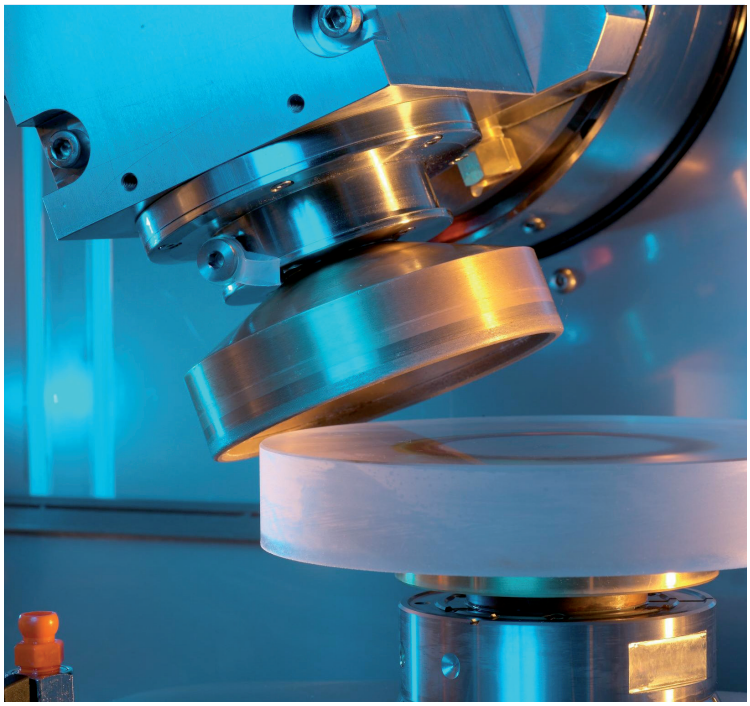
thanks to industry expertise

Skilled partners to the optical industry

A company with our exacting technological standards can only be sure of continued success if it possesses an outstanding skills base for the customer's specific industry. On the basis of our longstanding expertise in the requirements of the optical industry we have an in-depth insight into your requirements. The result is grinding tools for the manufacture of the most demanding products, tools which are calibrated for the highest precision, reliable reproducibility and perfect surface finish.

In addition to many top quality standard tools we provide you with the necessary scope for the configuration of your products, together with a high level of individualisation. Simply tell us what products you manufacture and wish to finalise. Our field sales staff will advise you, drawing on their long-standing, industry-specific technical know-how. In close cooperation with you we will develop a solution which is made-to-measure for your requirements and in line with your production processes - on the basis of efficient process orientation and countless successfully implemented reference projects specifically for the optical industry.





The diamond

THE IDEAL GRINDING MEDIUM

Diamond is a material of extreme hardness. This makes it the ideal grinding medium for the optical industry. Optical lenses for cameras, microscopes, telescopes and measuring systems can be ground just as flawlessly as technical or spectacle lenses. Depending on the required grinding process, either natural diamonds or synthetically manufactured diamonds of varying qualities and grain size are applied. The binding systems consist primarily of metal, synthetic resin and electroplated or vitrified materials. If you place your trust in our diamond tools you will be integrating decades of experience into your production processes.

The optimum solution

FOR OUTSTANDING GRINDING PROCESSES

Diamond grinding discs and diamond pellets from Dr. Müller Diamantmetall AG are the ideal solution for optimum results in your production. Our grinding tools guarantee excellent value in the processing of all materials used in the optical industry, not only quartz, sapphire and crystal but also infrared, calcium fluoride, plate glass or optical glass. Our tools are high-performance instruments for outstanding grinding results involving prisms, complex geometries and free-form surfaces, as well as in the lithography, space technology, endoscopy and defence industries.

The entire product portfolio

FOR CRISTAL-CLEAR APPLICATIONS

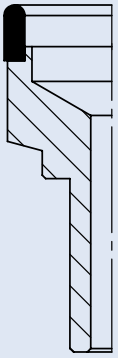
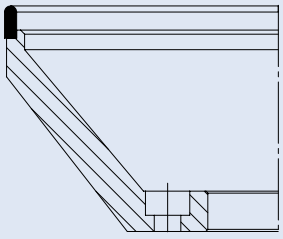
For many years now Dr. Müller Diamantmetall AG has provided outstanding expertise to the optical industry. We can offer you a full spectrum of leading-edge grinding tools for the efficient and reliable design of your future production processes. Our supply programme covers centering wheels, radius mills for pre and fine grinding, combination tools, correction tools, scooping tools, pellets, cutting discs, hollow drills, beveling shells and cones.

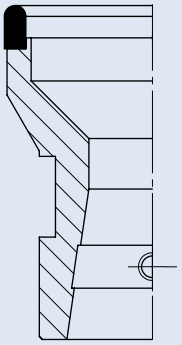
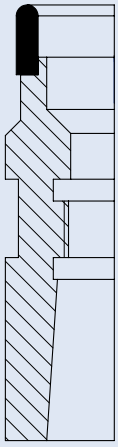
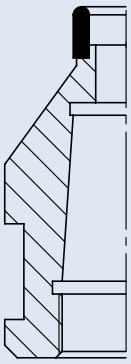
The unique benefit

TO YOU

In what ways does Dr. Müller Diamantmetall AG offer you unique benefits and added value? We supply prestigious manufacturing companies in the optical industry. At the same time we provide indepth consulting services to machine producers and institutes within your industry and know the vital importance of homogeneous surface structures, high abrasion rates, low wear and tear and a long service life. This know-how qualifies us as the ideal partner to provide you with peak technical performance and an optimum end product!

Table of wheel shapes

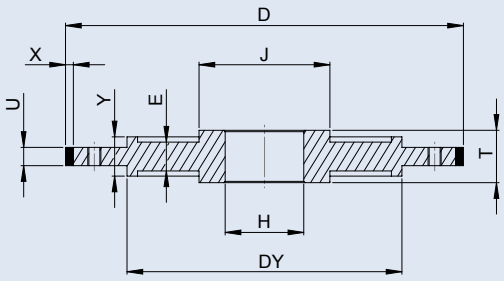
SHAPE	PAGE	FIGURE
Mounting for RF	32	
Mounting for RF	32	
Mounting for RF	32	

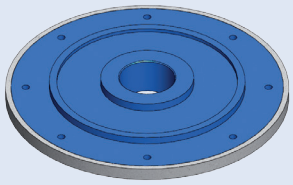
SHAPE	PAGE	FIGURE
Mounting for RF (with bayonet connector)	33	
Mounting for RF	33	
Mounting for RF	33	

DIAMOND TOOLS

For the optical industry

E





SPECIFICATIONS	**DIMENSIONS:**	D 60-210mm; U 4-60mm; X 2-4mm
	BONDS:	MDX (metal), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)
	DIN:	58742

STANDARD-DIMENSIONS

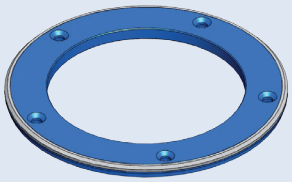
SHAPE	D	U	X	H
E	100	4	2	20
E	100	5	2	20
E	100	6,3	2	20
E	100	8	2	20
E	100	10	2	20
E	100	12	2	20
E	100	16	2	20
E	160	4	2	30
E	160	5	2	30
E	160	6,3	2	30
E	160	8	2	30
E	160	10	2	30
E	160	12	2	30
E	160	14	2	30
E	160	15	2	30
E	160	16	2	30
E	160	18	2	30
E	160	20	2	30
E	160	25	2	30
E	160	30	2	30
E	160	32	2	30

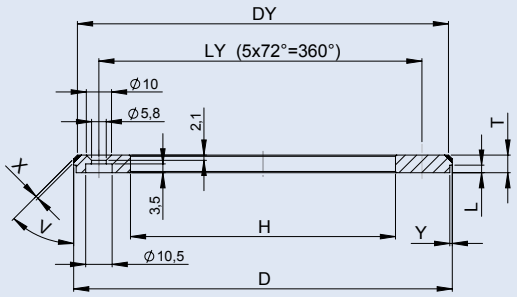
SAMPLE ORDER

SHAPE	D	U	X	T	H	E	J	Y	DY	BOND	GRIT	CONCENTRATION
E	100	8	2	25	25	15	45	20	55	MDX	D64	C90

Individual tool configuration on request

F





SPECIFICATIONS

DIMENSIONS:	D 90-225mm; X 2-4mm
BONDS:	MDX (metal), MDS (electroplated)
COOLANT:	O (Oil), E (Emulsion)
DIN:	58742

STANDARD-DIMENSIONS

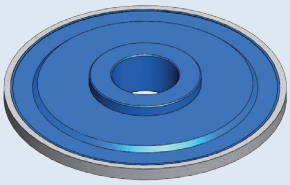
SHAPE	D	DY	BEVEL HEIGHT	X	V
F	100	101	0,5	2	
F	100	102	1,0	2	
F	100	103	1,5	2	30°, 45°
F	100	104	2,0	2	60°, 90°
F	100	105	2,5	2	
F	100	106	3,0	2	
F	160	161	0,5	2	
F	160	162	1,0	2	
F	160	163	1,5	2	30°, 45°
F	160	164	2,0	2	60°, 90°
F	160	165	2,5	2	
F	160	166	3,0	2	

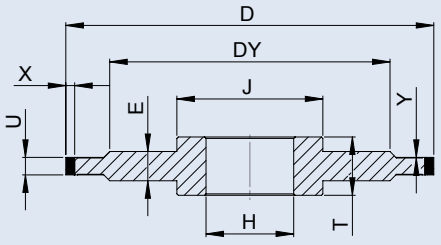
SAMPLE ORDER

SHAPE	D	X	V	T	H	L	Y	LY	DY	BOND	GRIT	CONCENTRATION
F	101	1	45°	6	65	2	0,5	80	100	MDX	D64	C90

Individual tool configuration on request

D





SPECIFICATIONS

DIMENSIONS:	D 50-250mm; U 2-50mm; X 2-15mm
BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
COOLANT:	O (Oil), E (Emulsion)
DIN:	58742

STANDARD-DIMENSIONS

SHAPE	D	U	X	H
D	100	4	2	20
D	100	5	2	20
D	100	6,3	2	20
D	100	8	2	20
D	100	10	2	20
D	100	12	2	20
D	100	16	2	20

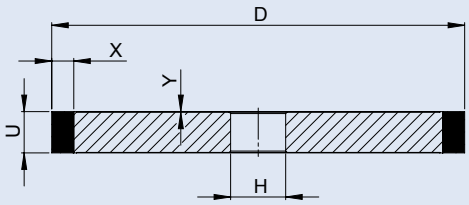
Table continued on next page

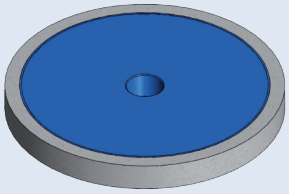
STANDARD-DIMENSIONS	SHAPE	D	U	X	H
	D	160	4	2	30
	D	160	5	2	30
	D	160	6,3	2	30
	D	160	8	2	30
	D	160	10	2	30
	D	160	12	2	30
	D	160	14	2	30
	D	160	15	2	30
	D	160	16	2	30
	D	160	18	2	30
	D	160	20	2	30
	D	160	25	2	30
	D	160	30	2	30
	D	160	32	2	30

SAMPLE ORDER	SHAPE	D	U	X	T	H	E	J	Y	DY	BOND	GRIT	CONCENTRATION
	D	160	8	2	35	20	20	30	1	90	MDX	D64	C90

Individual tool configuration on request

1A1





SPECIFICATIONS		
	DIMENSIONS:	D 10-600mm (MDX up to max. D 400mm); U 4-100mm; X 2-30mm
	BONDS:	MDT (resin), MDX (metal), MDR (vitrified), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)

STANDARD-DIMENSIONS	SHAPE	D	U	X (BOND)		H
				METAL (MDX)	(MDT)	
	1A1	20	4, 6, 8, 10, 12	2,3	2, 3, 4, 5	
	1A1	25	4, 6, 8, 10, 12	2,3	2, 3, 4, 5	
	1A1	30	4, 6, 8, 10, 12	2,3	2, 3, 4, 5, 6	
	1A1	40	4, 6, 8, 10, 12	2,3	2, 3, 4, 5, 6	
	1A1	50	4, 6, 8, 10, 12	2,3	2, 3, 4, 5, 6, 8	
	1A1	75	6, 8, 10, 12	2,3	2, 3, 4, 5, 6, 8, 10	
	1A1	100	6, 8, 10, 12	2,3	2, 3, 4, 5, 6, 8, 10	
	1A1	125	8, 10, 12, 15	2,3	2, 3, 4, 5	
	1A1	125	8, 10, 12, 15	2,3	6, 8, 10, 12,5	
	1A1	150	8, 10, 12, 15, 20	2,3	2, 3, 4, 5, 6	Please specify
	1A1	150	8, 10, 12, 15, 20	2,3	6, 8, 10, 12,5	
	1A1	175	10, 12, 15, 20	2,3	2, 3, 4, 5	
	1A1	200	10, 12, 15, 20, 25, 30	2,3	2, 3, 4, 5, 6	
	1A1	225	12, 15, 20	2,3	2, 3, 4, 5	
	1A1	250	15, 20, 25, 30	2,3	2, 3, 4, 5	
	1A1	250	15, 20, 25, 30, 40, 50	2,3	2, 3, 4, 5	
	1A1	250	15, 20, 25, 30	2,3	2, 3, 4, 5	
	1A1	300	15, 20, 25, 30	2,3	2, 3, 4, 5, 6	
	1A1	300	15, 20, 25, 30, 40, 50	2,3	2, 3, 4, 5, 6	
	1A1	300	15, 20, 25, 30, 40	2,3	2, 3, 4, 5, 6	

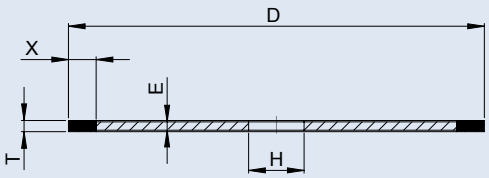
Table continued on next page

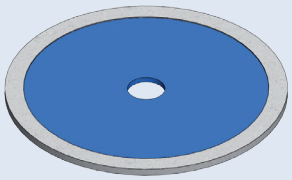
STANDARD-DIMENSIONS	SHAPE	D	U	X (BOND)		H
				METAL (MDX)	RESIN (MDT)	
	1A1	350	20, 25, 30	2,3	2, 3, 4, 5, 6	
	1A1	350	20, 25, 30, 40, 50	2,3	2, 3, 4, 5, 6	
	1A1	350	20, 25, 30, 40	2,3	2, 3, 4, 5, 6	
	1A1	400	20, 25	2	2, 3, 4, 5, 6	
	1A1	400	20, 25, 30, 40, 50	2	2, 3, 4, 5, 6	
	1A1	400	20, 25, 30, 40	2	2, 3, 4, 5, 6	
	1A1	450	25, 30, 40, 50		2, 3, 4, 5, 6	
	1A1	450	25, 30		2, 3, 4, 5, 6	
	1A1	500	30		2, 3, 4, 5, 6	
	1A1	600	35		3, 5	

SAMPLE ORDER	SHAPE	D	U	X	H	Y	BOND	GRIT	CONCENTRATION
	1A1	300	20	3	127	0,2	MDT	D126	C75

Individual tool configuration on request

1A1R





SPECIFICATIONS		
	DIMENSIONS:	D 50-350mm; X 5-10mm; T 0,8-2,5mm
	BONDS:	MDT (resin), MDX (metal)
	COOLANT:	O (Oil), E (Emulsion)

STANDARD-DIMENSIONS	SHAPE	D	T	X	E
	1A1R	50	0,4	5	0,3
	1A1R	50	0,5	5	0,4
	1A1R	50	0,6	5	0,5
	1A1R	50	0,8	5	0,7
	1A1R	50	1,0	5	0,9
	1A1R	75	0,5	5	0,4
	1A1R	75	0,6	5	0,5
	1A1R	75	0,8	5	0,7
	1A1R	75	1,0	5	0,9
	1A1R	100	0,4	5	0,3
	1A1R	100	0,6	5	0,5
	1A1R	100	0,8	5	0,7
	1A1R	100	1,0	5	0,9
	1A1R	100	1,2	5	1,1
	1A1R	100	1,5	5	1,4
	1A1R	125	0,8	10	0,65
	1A1R	125	1,0	10	0,8
	1A1R	125	1,2	10	0,9
	1A1R	125	1,5	10	1,1
	1A1R	150	0,8	10	0,65
	1A1R	150	0,9	10	0,7
	1A1R	150	1,0	10	0,8
	1A1R	150	1,5	10	1,1
	1A1R	200	1,0	10	0,8
	1A1R	200	1,2	10	0,9

Table continued on next page

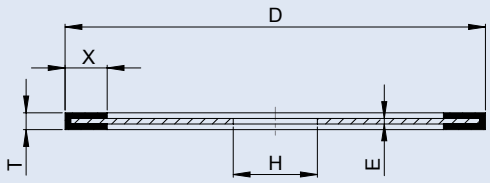
STANDARD-DIMENSIONS

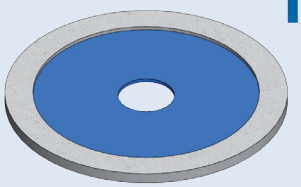
SHAPE	D	T	X	E
1A1R	200	1,5	10	1,1
1A1R	200	1,8	10	1,4
1A1R	250	1,5	10	1,1
1A1R	250	2,0	10	1,75

SAMPLE ORDER

SHAPE	D	X	T	H	E	BOND	GRIT	CONCENTRATION
1A1R	150	8	1	20	1	MDT	D126	C75

Individual tool configuration on request





1A1R(S)

SPECIFICATIONS

DIMENSIONS: D 50-400mm; X 5-10mm
BONDS: MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

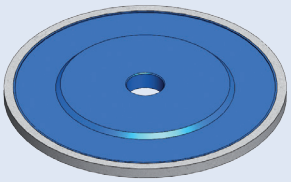
SHAPE	D	T	X	E
1A1R(S)	50	0,4	5	0,3
1A1R(S)	50	0,5	5	0,4
1A1R(S)	50	0,6	5	0,5
1A1R(S)	50	0,8	5	0,7
1A1R(S)	50	1,0	5	0,9
1A1R(S)	75	0,5	5	0,4
1A1R(S)	75	0,6	5	0,5
1A1R(S)	75	0,8	5	0,7
1A1R(S)	75	1,0	5	0,9
1A1R(S)	100	0,4	5	0,3
1A1R(S)	100	0,6	5	0,5
1A1R(S)	100	0,8	5	0,7
1A1R(S)	100	1,0	5	0,9
1A1R(S)	100	1,2	5	1,1
1A1R(S)	100	1,5	5	1,4
1A1R(S)	125	0,8	10	0,65
1A1R(S)	125	1,0	10	0,8
1A1R(S)	125	1,2	10	0,9
1A1R(S)	125	1,5	10	1,1
1A1R(S)	150	0,8	10	0,65
1A1R(S)	150	0,9	10	0,7
1A1R(S)	150	1,0	10	0,8
1A1R(S)	150	1,5	10	1,1
1A1R(S)	200	1,0	10	0,8
1A1R(S)	200	1,2	10	0,9
1A1R(S)	200	1,5	10	1,1
1A1R(S)	200	1,8	10	1,4
1A1R(S)	250	1,5	10	1,1
1A1R(S)	250	2,0	10	1,75
1A1R(S)	300	1,5	10	1,1
1A1R(S)	300	1,8	10	1,4
1A1R(S)	300	2,0	10	1,75

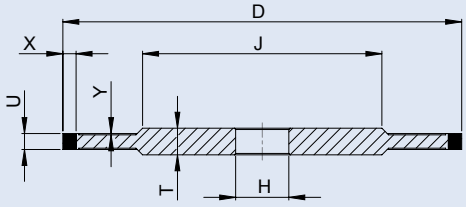
SAMPLE ORDER

SHAPE	D	X	T	H	E	BOND	GRIT
1A1R(S)	150	10	0,8	20	0,65	MDS	D126

Individual tool configuration on request

14A1





SPECIFICATIONS

DIMENSIONS: D 10-600mm (MDX up to max. D 400mm); U 0,6-35mm; X 2-20mm
BONDS: MDT (resin), MDX (metal), MDR (vitrified)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

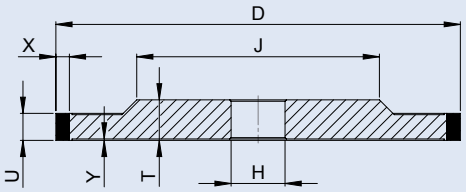
SHAPE	D	U	X (BOND)			H	T	J
			METAL (MDX)	RESIN (MDT)	VITRIFIED (MDR)			
14A1	75	1,2	3, 6	3, 6			6	50
14A1	75	3, 4, 5	2, 3	2, 3, 4, 6			6	50
14A1	100	1,2	3, 6	3, 6			6	80
14A1	100	3, 4, 5	2, 3	2, 3, 4, 6, 8, 10			6	70
14A1	125	1,2	3, 6	3, 6			7	105
14A1	125	3, 4, 5, 6	2, 3	2, 3, 4, 6, 8, 10			7	100
14A1	150	1,2	3, 6	3, 6	By request		8	130
14A1	150	3, 4, 5, 6	2, 3	2, 3, 4, 6, 8, 10			8	120
14A1	175	1,2	3, 6	3, 6			10	150
14A1	175	3, 4, 5, 6, 8	2, 3	2, 3, 4, 6, 8, 10			10	140
14A1	200	1, 2	6	6		Please specify	12	175
14A1	200	3, 4, 5, 6, 8	2, 3	2, 3, 4, 5, 6			12	160
14A1	200	3, 4, 5, 6, 8	2, 3	8, 10, 15			12	160
14A1	225	6, 8, 10	2, 3, 4	2, 3, 4, 5			12	180
14A1	250	6, 8, 10, 12	2, 3	2, 3, 4, 5	5, 6, 8, 12, 20		15	200
14A1	300	8, 10, 12	2,3	2, 3, 4, 5, 6	6, 9, 14		15	250
14A1	350	10, 12, 15	2, 3	2, 3, 4, 5, 6	5, 7, 10		20	300
14A1	400	10, 12, 15, 20	2, 3	2, 3, 4, 5, 6	5, 9, 14		25	350
14A1	450	10, 12, 15, 20		2, 3, 4, 5, 6	5		25	400
14A1	500	15, 20, 25		2, 3, 4, 5, 6	4, 10		30	450
14A1	600	15, 20, 25, 30		3, 5	4		35	550

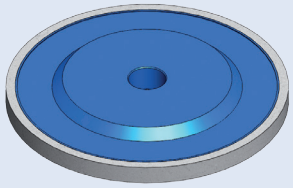
SAMPLE ORDER

SHAPE	D	U	X	T	H	J	Y	BOND	GRIT	CONCENTRATION
14A1	300	10	2	20	170	170	1,5	MDT	D126	C75

Individual tool configuration on request

3A1





SPECIFICATIONS

DIMENSIONS: D 10-600mm (MDX up to max. D 400mm); U 0,6-35mm; X 2-20mm
BONDS: MDT (resin), MDX (metal), MDR (vitrified), MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

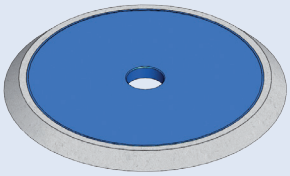
SHAPE	D	U	X (BOND)			H	T	J
			METAL (MDX)	RESIN (MDT)	VITRIFIED (MDR)			
3A1	75	1,2	3, 6	3, 6	By request	Please specify	6	50
3A1	75	3, 4, 5	2, 3	2, 3, 4, 6			6	50
3A1	100	1,2	3, 6	3, 6			6	80
3A1	100	3, 4, 5	2, 3	2, 3, 4, 6, 8, 10			6	70
3A1	125	1,2	3, 6	3, 6			7	105
3A1	125	3, 4, 5, 6	2, 3	2, 3, 4, 6, 8, 10			7	100
3A1	150	1,2	3, 6	3, 6			8	130
3A1	150	3, 4, 5, 6	2, 3	2, 3, 4, 6, 8, 10			8	120
3A1	175	1,2	3, 6	3, 6			10	150
3A1	175	3, 4, 5, 6, 8	2, 3	2, 3, 4, 6, 8, 10			10	140
3A1	200	1, 2	6	6			12	175
3A1	200	3, 4, 5, 6, 8	2, 3	2, 3, 4, 5, 6			12	160
3A1	200	3, 4, 5, 6, 8	2, 3	8, 10, 15			12	160
3A1	225	6, 8, 10	2, 3, 4	2, 3, 4, 5			12	180
3A1	250	6, 8, 10, 12	2, 3	2, 3, 4, 5	5, 6, 8, 12, 20		15	200
3A1	300	8, 10, 12	2,3	2, 3, 4, 5, 6	6, 9, 14		15	250
3A1	350	10, 12, 15	2, 3	2, 3, 4, 5, 6	5, 7, 10		20	300
3A1	400	10, 12, 15, 20	2, 3	2, 3, 4, 5, 6	5, 9, 14		25	350
3A1	450	10, 12, 15, 20		2, 3, 4, 5, 6	5		25	400
3A1	500	15, 20, 25		2, 3, 4, 5, 6	4, 10		30	450
3A1	600	15, 20, 25, 30		3, 5	4		35	550

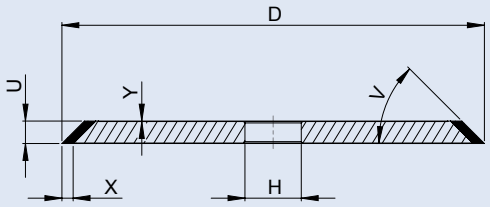
SAMPLE ORDER

SHAPE	D	U	X	T	H	J	Y	BOND	GRIT	CONCENTRATION
3A1	300	10	3	15	127	250	0,2	MDT	D126	C75

Individual tool configuration on request

1V1





SPECIFICATIONS

DIMENSIONS: D 40-500mm (MDX up to max. D 400mm); U 4-35mm; X 2-20mm
BONDS: MDT (resin), MDX (metal), MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

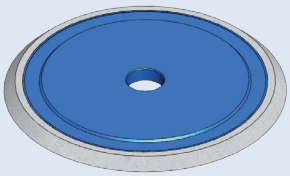
SHAPE	D	U	X (BOND) (Depending on angle)		V	H	T	J
			METAL (MDX)	PLASTIC (MDT)				
1V1	50	3, 4, 5, 6, 8	2 or 3	2 - 10	20° - 89°	Please specify	6	30
1V1	75	3, 4, 5, 6, 8, 10					6	45
1V1	100	4, 5, 6, 8, 10					8	70
1V1	125	4, 5, 6, 8, 10					8	100
1V1	150	4, 5, 6, 8, 10					8	120
1V1	175	4, 5, 6, 8, 10					10	140
1V1	200	4, 6, 8, 10, 12, 15					12	160
1V1	250	4, 6, 8, 10, 12, 15, 20					15	200
1V1	300	4, 6, 8, 10, 12, 15, 20					15	250

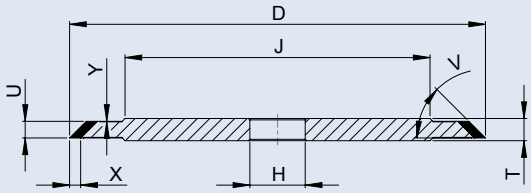
SAMPLE ORDER

SHAPE	D	U	X	V	H	Y	BOND	GRIT	CONCENTRATION
1V1	125	6	4	70°	20	0,5	MDT	D126	C75

Individual tool configuration on request

14V1





SPECIFICATIONS

DIMENSIONS: D 40-500mm (MDX up to max. D 400mm); U 2-20mm; X 2-15mm
BONDS: MDT (resin), MDX (metal), MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

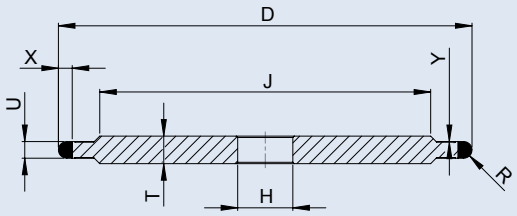
SHAPE	D	U	X (BOND) (Depending on angle)		V	H	T	J
			METAL (MDX)	PLASTIC (MDT)				
1V1	50	3, 4, 5, 6, 8	2 or 3	2 - 10	20° - 89°	Please specify	6	30
1V1	75	3, 4, 5, 6, 8, 10					6	45
1V1	100	4, 5, 6, 8, 10					8	70
1V1	125	4, 5, 6, 8, 10					8	100
1V1	150	4, 5, 6, 8, 10					8	120
1V1	175	4, 5, 6, 8, 10					10	140
1V1	200	4, 6, 8, 10, 12, 15					12	160
1V1	250	4, 6, 8, 10, 12, 15, 20					15	200
1V1	300	4, 6, 8, 10, 12, 15, 20					15	250

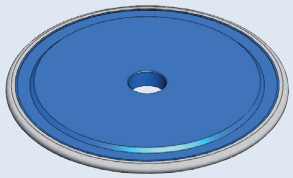
SAMPLE ORDER

SHAPE	D	U	X	V	T	H	J	Y	BOND	GRIT	CONCENTRATION
14V1	175	6	2	60°	10	32	140	0,5	MDT	B126	C100

Individual tool configuration on request

14F1





SPECIFICATIONS

DIMENSIONS: D 20-500mm (MDX up to max. D 400mm); U 0,6-30mm; X 2-20mm
BONDS: MDT (resin), MDX (metal), MDR (vitrified), MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

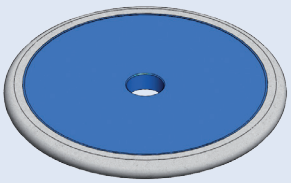
SHAPE	D	U	X	R	H	T	J
14F1	40	2		1		6	25
14F1	40	3		1,5		6	25
14F1	40	4		2		6	25
14F1	40	5		2,5		6	25
14F1	50	2		1		6	30
14F1	50	3		1,5		6	30
14F1	50	4		2		6	30
14F1	50	5		2,5		6	40
14F1	75	2		1		6	50
14F1	75	3		1,5		6	50
14F1	75	4		2		6	50
14F1	75	5		2,5		6	50
14F1	100	2		1		6	70
14F1	100	3		1,5		6	70
14F1	100	4		2		6	70
14F1	100	5	4 - 6	2,5	Please specify	6	70
14F1	125	2		1		8	100
14F1	125	3		1,5		8	100
14F1	125	4		2		8	100
14F1	125	5		2,5		8	100
14F1	150	2		1		8	120
14F1	150	3		1,5		8	120
14F1	150	4		2		8	120
14F1	150	5		2,5		8	120
14F1	175	2		1		10	150
14F1	175	3		1,5		10	150
14F1	175	4		2		10	150
14F1	175	5		2,5		10	150
14F1	200	2		1		10	175
14F1	200	3		1,5		10	175
14F1	200	4		2		10	175
14F1	200	5		2		10	175

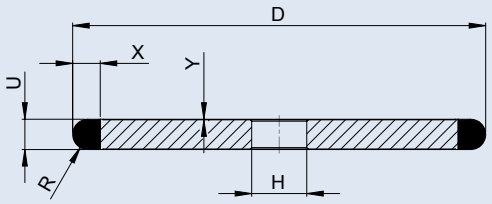
SAMPLE ORDER

SHAPE	D	U	X	R	T	H	J	Y	BOND	GRIT	CONCENTRATION
14F1	100	2	3	R1	4	10	75	0,05	MDT	D91	C100

Individual tool configuration on request

1F1





SPECIFICATIONS

DIMENSIONS: D 25-200mm; U 6-12mm; X 4-6mm
BONDS: MDT (resin), MDX (metal), MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

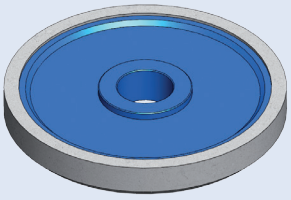
SHAPE	D	U	X	R	H
1F1	100	6	4 - 6	3	Please specify
1F1	100	7		3,5	
1F1	100	8		4	
1F1	100	9		4,5	
1F1	100	10		5	
1F1	100	11		5,5	
1F1	100	12		6	
1F1	125	8		4	
1F1	125	9		4,5	
1F1	125	10		5	
1F1	125	11		5,5	
1F1	125	12		6	
1F1	150	8		4	
1F1	150	9		4,5	
1F1	150	10		5	
1F1	150	11		5,5	
1F1	150	12		6	
1F1	175	10		5	
1F1	175	11		5,5	
1F1	175	12		6	
1F1	200	10		5	
1F1	200	11		5,5	
1F1	200	12		6	

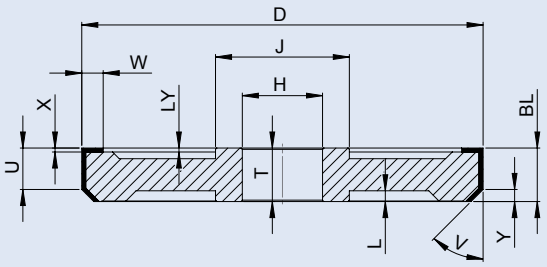
SAMPLE ORDER

SHAPE	D	U	X	R	H	Y	BOND	GRIT	CONCENTRATION
1F1	100	2	3	R1	10	0,2	MDT	D91	C100

Individual tool configuration on request

EZ3





SPECIFICATIONS

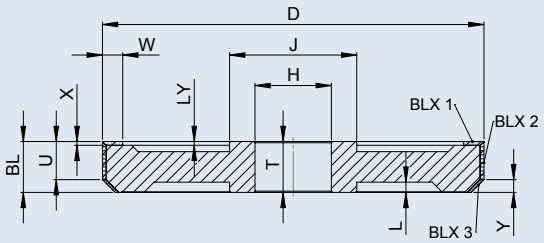
DIMENSIONS: D 48-200mm; W 1,5-22mm; U 3,5-45mm; X 1-6mm
BONDS: MDT (resin), MDX (metal), MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

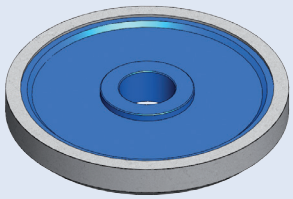
SAMPLE ORDER

SHAPE	D	W	U	X	V	T	H	J	L	Y	LY	BL	BOND	GRIT	CONCENTRATION
EZ3	100	5	15	1	45°	20	20	40	2	5	1	20	MDX	D46	C125

Individual tool configuration on request

EZ3/A





SPECIFICATIONS

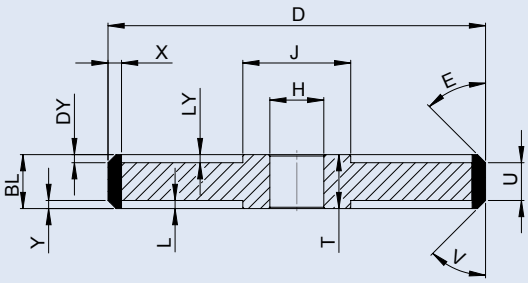
DIMENSIONS: D 48-200mm; W 1,5-22mm; U 3,5-45mm; X 1-6mm
BONDS: MDT (resin), MDX (metal)
COOLANT: O (Oil), E (Emulsion)

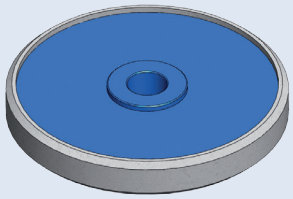
SAMPLE ORDER

SHAPE	D	W	U	X	T	H	J	L	LY	BL	BOND	GRIT			CONCENTRATION		
												LAYER					
												BLX1	BLX2	BLX3	BLX1	BLX2	BLX3
EZ3/A	100	5	15	1	20	20	40	2	1	20	MDX	D25	D46	D35	C125	C90	C125

Individual tool configuration on request

EZ4





SPECIFICATIONS

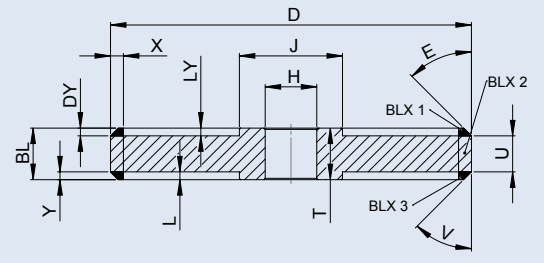
DIMENSIONS: D 48-200mm; W 1,5-22mm; U 3,5-45mm; X 2-6mm
BONDS: MDT (resin), MDX (metal)
COOLANT: O (Oil), E (Emulsion)

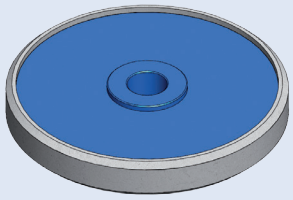
SAMPLE ORDER

SHAPE	D	U	X	V	E	T	H	J	L	Y	DY	BL	BOND	GRIT	CONCENTRATION
EZ4	100	6	2,5	45°	30°	20	20	40	2	2	2	10	MDX	D46	C125

Individual tool configuration on request

EZ4/A





SPECIFICATIONS

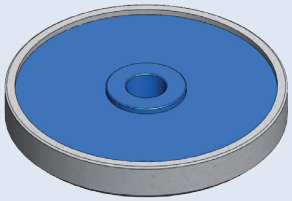
DIMENSIONS: D 48-200mm; W 1,5-22mm; U 3,5-45mm; X 2-6mm
BONDS: MDT (resin), MDX (metal)
COOLANT: O (Oil), E (Emulsion)

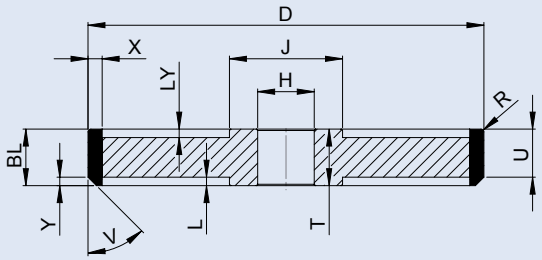
SAMPLE ORDER

SHAPE	D	U	X	V	E	T	H	J	L	Y	LY	BL	BOND	GRIT			CONCENTRATION		
														LAYER					
														BLX1	BLX2	BLX3	BLX1	BLX2	BLX3
EZ4/A	100	6	2,5	45°	30°	20	20	40	2	2	2	10	MDX	D25	D46	D35	C125	C90	C125

Individual tool configuration on request

EZ5



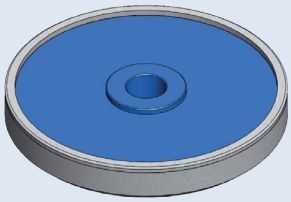


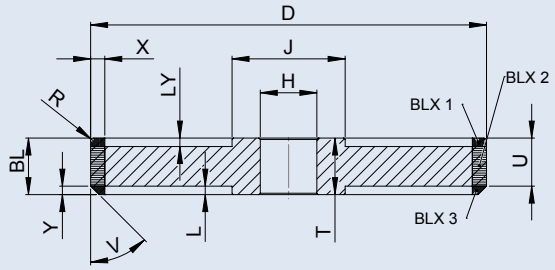
SPECIFICATIONS		
	DIMENSIONS:	D 48-200mm; W 1,5-22mm; U 3,5-45mm; X 2-6mm
	BONDS:	MDT (resin), MDX (metal)
	COOLANT:	O (Oil), E (Emulsion)

SAMPLE ORDER	SHAPE	D	U	X	V	T	H	J	L	Y	LY	BL	BOND	GRIT	CONCENTRATION
	EZ5	100	6	2,5	45°	20	20	40	0,5	1,5	0,5	7,5	MDX	D46	C125

Individual tool configuration on request

EZ5/A



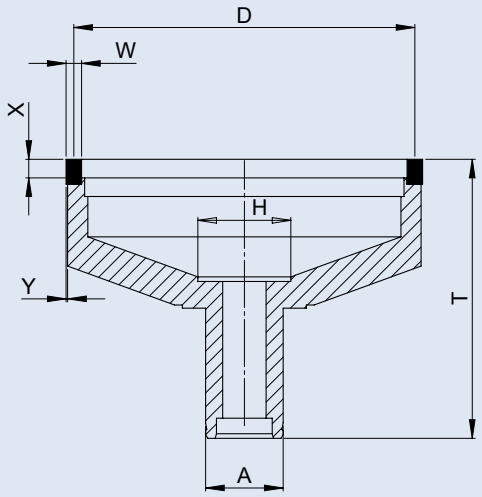


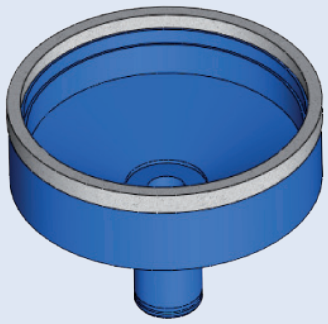
SPECIFICATIONS		
	DIMENSIONS:	D 48-200mm; W 1,5-22mm; U 3,5-45mm; X 2-6mm
	BONDS:	MDT (resin), MDX (metal)
	COOLANT:	O (Oil), E (Emulsion)

SAMPLE ORDER	SHAPE	D	U	X	V	R	T	H	J	L	Y	LY	BL	BOND	GRIT			CONCENTRATION		
															LAYER					
	EZ5/A	100	6	2,5	45°	0,5	20	20	40	0,5	1,5	0,5	7,5	MDX	BLX1	BLX2	BLX3	BLX1	BLX2	BLX3
															D25	D46	D35	C125	C90	C125

Individual tool configuration on request

PF





SPECIFICATIONS		
	DIMENSIONS:	D 3-450mm (MDX up to max. D 400mm); W 1-30mm; X 6-10 mm
	BONDS:	MDT (resin), MDX (metal)
	COOLANT:	O (Oil), E (Emulsion)
	DIN:	58741

STANDARD-DIMENSIONS

SHAPE	D	W	X
PF	3	1	6, 10
PF	4	1	6, 10
PF	4,5	1,5	6, 10
PF	5	2	6,, 10
PF	5,6	2	6, 10
PF	6,3	2	6, 10
PF	7,1	2	6, 10
PF	8	2	6, 10
PF	9	2	6, 10
PF	10	2	6, 10
PF	11	2,5	6, 10
PF	12	2,5	6, 10
PF	12,5	2,5	6, 10
PF	14	2,5	6, 10
PF	16	2,5	6, 10
PF	18	2,5	6, 10
PF	20	2,5	6, 10
PF	22	3	6, 10
PF	25	3	6, 10
PF	28	3	6, 10
PF	30	3	6, 10
PF	32	3	6, 10
PF	35	3	6, 10
PF	36	3	6, 10
PF	40	3	6, 10
PF	45	3	6, 10
PF	50	3	6, 10
PF	50	4	6, 10
PF	55	4	6, 10
PF	56	4	6, 10
PF	60	4	6, 10
PF	63	4	6, 10
PF	71	4	6, 10
PF	75	4	6, 10
PF	80	4	6, 10

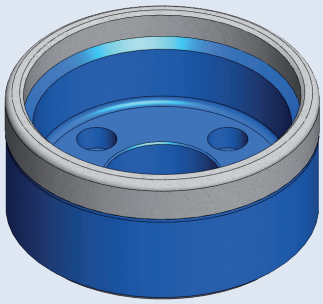
Table continued on next page

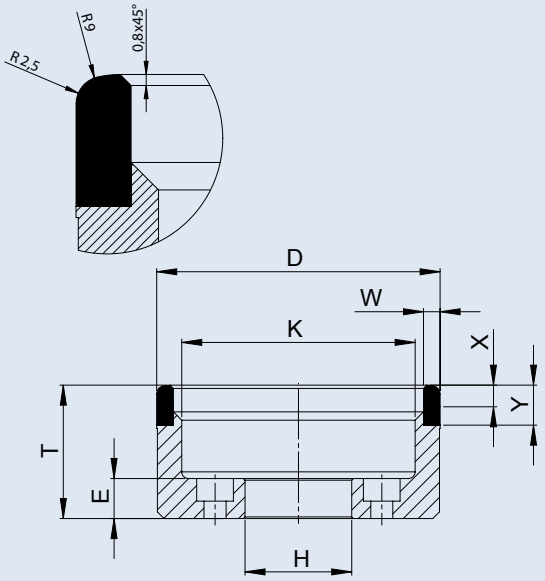
STANDARD-DIMENSIONS	SHAPE	D	W	X
	PF	90	4	4, 6, 10
	PF	100	5	4, 6, 10
	PF	110	5	4, 6, 10
	PF	125	5	4, 6, 10
	PF	140	5	4, 6, 10
	PF	160	5	4, 6, 10
	PF	180	5	4, 6, 10
	PF	200	5	4, 6, 10
	PF	225	5	4, 6, 10
	PF	250	5	4, 6, 10
	PF	300	5	4, 6, 10

SAMPLE ORDER	SHAPE	D	W	X	T	H	E	Y	A	BOND	GRIT	CONCENTRATION
	PF	75	3	6	105	30	5	0,5	Z25	MDX	D76	C75

Individual tool configuration on request

PF/R





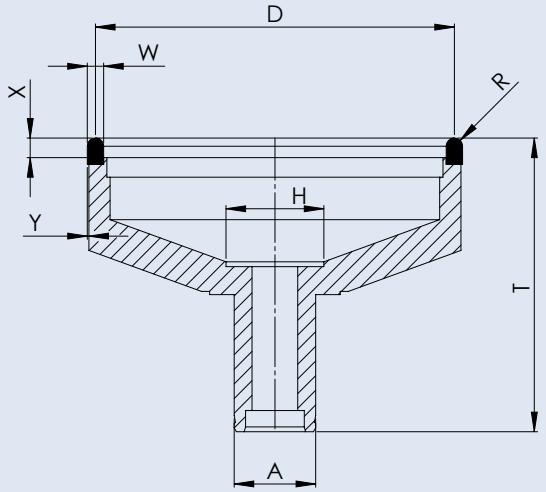
SPECIFICATIONS		
	DIMENSIONS:	D 3-350mm; W 1-15mm; X 4-10mm
	BONDS:	MDT (resin), MDX (metal)
	COOLANT:	O (Oil), E (Emulsion)

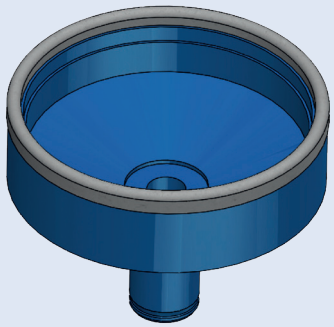
STANDARD-DIMENSIONS	SHAPE	D	W	X
	PF/R	45	5	6
	PF/R	55	5	6
	PF/R	65	5	6
	PF/R	75	5	6
	PF/R	85	5	6
	PF/R	100	5	6
	PF/R	100	15	6
	PF/R	105	5	6
	PF/R	115	5	6
	PF/R	125	5	6
	PF/R	155	5	6
	PF/R	185	5	6

SAMPLE ORDER	SHAPE	D	W	X	T	H	E	K	Y	BOND	GRIT	CONCENTRATION
	PF/R	100	5	6	25	35	12	76	6	MDX	D76	C75

Individual tool configuration on request

RF





SPECIFICATIONS

DIMENSIONS: D 3-350mm; W 1-10mm; X 4-10mm
BONDS: MDT (resin), MDX (metal)
COOLANT: O (Oil), E (Emulsion)
DIN: 58741

STANDARD-DIMENSIONS

SHAPE	D	W	R	X
RF	3	1	0,5	6, 10
RF	4	1	0,5	6, 10
RF	4,5	1,5	0,75	6, 10
RF	5	2	1	6, 10
RF	5,6	2	1	6, 10
RF	6,3	2	1	6, 10
RF	7,1	2	1	6, 10
RF	8	2	1	6, 10
RF	9	2	1	6, 10
RF	10	2	1	6, 10
RF	11	2,5	1,25	6, 10
RF	12	2,5	1,25	6, 10
RF	12,5	2,5	1,25	6, 10
RF	14	2,5	1,25	6, 10
RF	16	2,5	1,25	6, 10
RF	18	2,5	1,25	6, 10
RF	20	2,5	1,25	6, 10
RF	22	3	1,5	6, 10
RF	25	3	1,5	6, 10
RF	28	3	1,5	6, 10
RF	30	3	1,5	6, 10
RF	32	3	1,5	6, 10
RF	35	3	1,5	6, 10
RF	36	3	1,5	6, 10
RF	40	3	1,5	6, 10
RF	45	3	1,5	6, 10
RF	50	3	1,5	6, 10
RF	50	4	2	6, 10
RF	55	4	2	6, 10
RF	56	4	2	6, 10
RF	60	4	2	6, 10
RF	63	4	2	6, 10
RF	71	4	2	6, 10
RF	75	4	2	6, 10
RF	80	4	2	6, 10

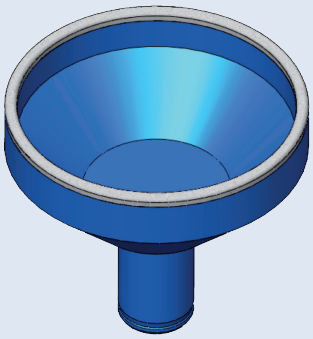
Table continued on next page

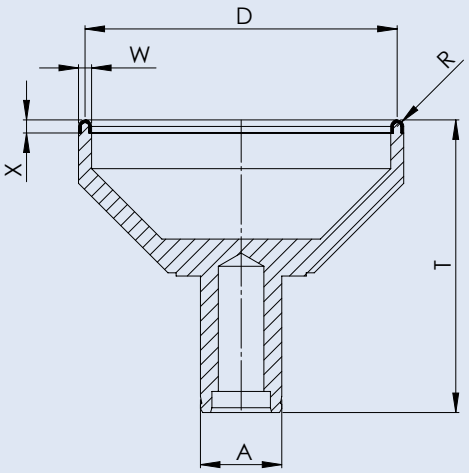
STANDARD-DIMENSIONS	SHAPE	D	W	R	X
	RF	90	4	2	6, 10
	RF	100	5	2,5	6, 10
	RF	110	5	2,5	6, 10
	RF	125	5	2,5	6, 10
	RF	140	5	2,5	6, 10
	RF	160	5	2,5	6, 10
	RF	180	5	2,5	6, 10
	RF	200	5	2,5	6, 10
	RF	225	5	2,5	6, 10
	RF	250	5	2,5	6, 10
	RF	300	5	2,5	6, 10

SAMPLE ORDER	SHAPE	D	W	X	R	T	H	E	Y	A	BOND	GRIT	CONCENTRATION
	RF	100	5	6	2,5	90	30	6	0,5	HD-25SR	MDX	D64	C50

Individual tool configuration on request

RF(S)





SPECIFICATIONS

DIMENSIONS: D 3-300mm; W 1-10mm; X 2-4mm
BONDS: MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

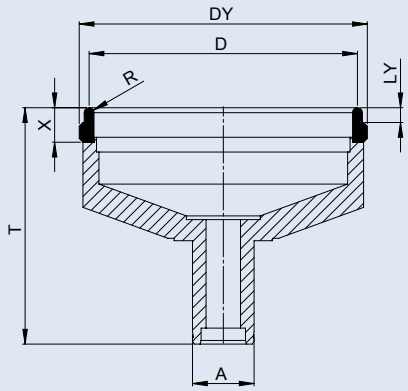
STANDARD-DIMENSIONS	SHAPE	D	W	R	X
	RF(S)	3	1	0,5	4
	RF(S)	4	1	0,5	4
	RF(S)	4,5	1,5	0,75	4
	RF(S)	5	2	1	4
	RF(S)	5,6	2	1	4
	RF(S)	6,3	2	1	4
	RF(S)	7,1	2	1	4
	RF(S)	8	2	1	4
	RF(S)	9	2	1	4
	RF(S)	10	2	1	4
	RF(S)	11	2,5	1,25	4
	RF(S)	12	2,5	1,25	4
	RF(S)	12,5	2,5	1,25	4
	RF(S)	14	2,5	1,25	4
	RF(S)	16	2,5	1,25	4
	RF(S)	18	2,5	1,25	4

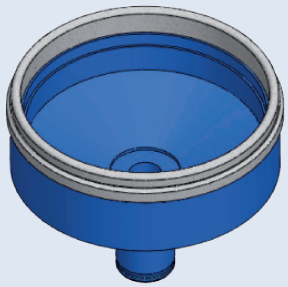
STANDARD-DIMENSIONS	SHAPE	D	W	R	X
	RF(S)	20	2,5	1,25	4
	RF(S)	22	3	1,5	4
	RF(S)	25	3	1,5	4
	RF(S)	28	3	1,5	4
	RF(S)	30	3	1,5	4
	RF(S)	32	3	1,5	4
	RF(S)	35	3	1,5	4
	RF(S)	36	3	1,5	4
	RF(S)	40	3	1,5	4
	RF(S)	45	3	1,5	4
	RF(S)	50	3	1,5	4
	RF(S)	50	4	2	4
	RF(S)	55	4	2	4
	RF(S)	56	4	2	4
	RF(S)	60	4	2	4
	RF(S)	63	4	2	4
	RF(S)	71	4	2	4
	RF(S)	75	4	2	4
	RF(S)	80	4	2	4
	RF(S)	140	5	2,5	4
	RF(S)	160	5	2,5	4
	RF(S)	180	5	2,5	4
	RF(S)	200	5	2,5	4
	RF(S)	225	5	2,5	4
	RF(S)	250	5	2,5	4
	RF(S)	300	5	2,5	4

SAMPLE ORDER	SHAPE	D	W	X	R	T	A	BOND	GRIT
	RF(S)	20	3	4	1,5	40	HD-25SR	MDS	D64

Individual tool configuration on request

KW



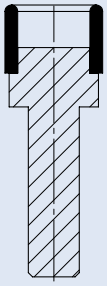


SPECIFICATIONS		
	DIMENSIONS:	D 6,3-240mm; X 2-25mm
	BONDS:	MDT (resin), MDX (metal)
	COOLANT:	O (Oil), E (Emulsion)

SAMPLE ORDER	SHAPE	D	X	T	R	LY	DY	A	BOND	GRIT	CONCENTRATION
	KW	20	12	88	1,25	5	22,5	25	MDX	D46	C90

Individual tool configuration on request

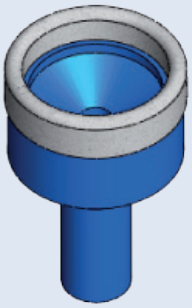
Mounting
for RF

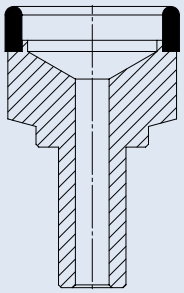


SPECIFICATIONS		
	MACHINE TYPE:	Satisloh, OPTO-TECH, Schneider, Z6
	DIN:	58741

Individual tool configuration on request

Mounting
for RF

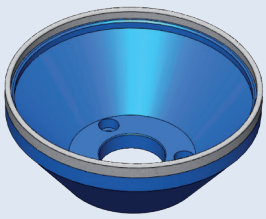


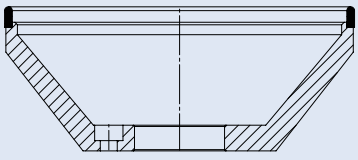


SPECIFICATIONS		
	MACHINE TYPE:	Satisloh, OPTO-TECH, Schneider, Z12, Z25, Z40
	DIN:	58741

Individual tool configuration on request

Mounting
for RF

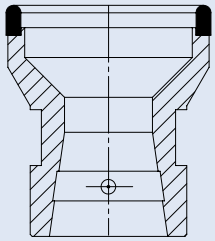


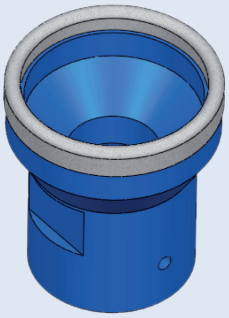


SPECIFICATIONS		
	MACHINE TYPE:	Satisloh RF2, Satisloh RF2 (von D40 – 225)
	DIN:	58741

Individual tool configuration on request

Mounting
for RF (with bayonet connector)

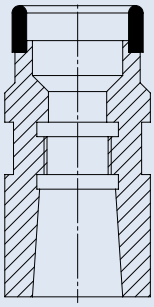


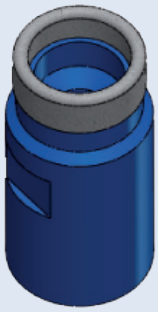


SPECIFICATIONS		
	MACHINE TYPE:	Satisloh RF 3A (Bajonett), Satisloh RXT, Satisloh SPM 100
	DIN:	58741

Individual tool configuration on request

Mounting
for RF

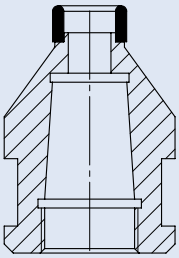


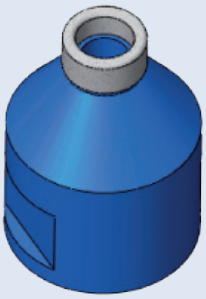


SPECIFICATIONS		
	MACHINE TYPE:	Satisloh RF1, Satisloh RF1 <= Ø25, Shape C
	DIN:	58741

Individual tool configuration on request

Mounting
for RF

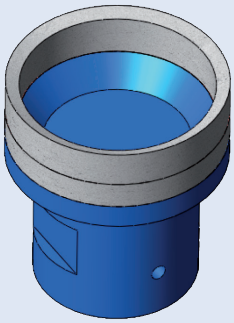


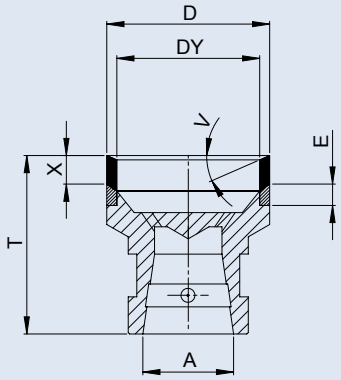


SPECIFICATIONS		
	MACHINE TYPE:	Satisloh RF1S, RX-SPH
	DIN:	58741

Individual tool configuration on request

TF





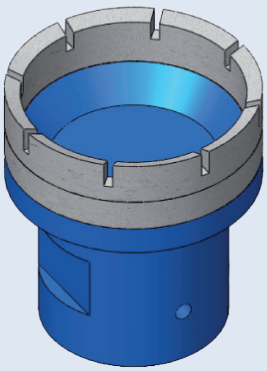
SPECIFICATIONS		
	DIMENSIONS:	D 60-112mm; X 8-10mm
	BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)

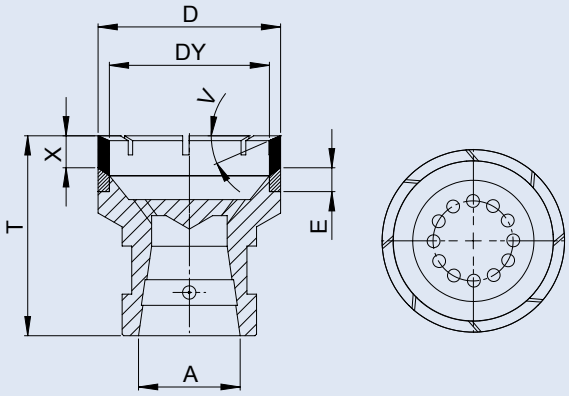
SAMPLE ORDER	SHAPE	D	X	V	T	E	DY	A	BOND	GRIT	CONCENTRATION
	TF	90	8	15°	78	11	77	80	MDX	D181	C35

Individual tool configuration on request

TF/S

with flushing slots



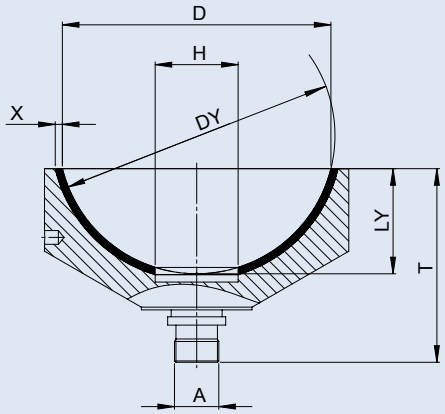


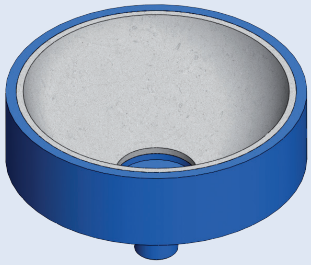
SPECIFICATIONS		
	DIMENSIONS:	D 60-112mm; X 8-10mm
	BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)

SAMPLE ORDER	SHAPE	D	X	V	T	E	DY	A	BOND	GRIT	CONCENTRATION
	TF/S	90	8	15°	78	7	77	-	MDX	D181	C35

Individual tool configuration on request

A





SPECIFICATIONS		
	DIMENSIONS:	D 3,6-235mm; X 1-15mm
	BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)
	DIN:	58723
	WARNING:	LYmax = DY x 0,35mm

STANDARD-DIMENSIONS

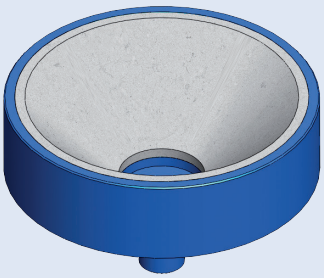
SHAPE	DY	H	LY	D
A	4	1	1,5	3,8
A	5	1,5	1,9	4,8
A	6,3	2	2,4	6,1
A	8	2,5	3	7,7
A	10	3	3,8	9,7
A	12,5	3,5	4,7	12,1
A	16	4,5	6	15,5
A	20	6	7,5	19,4
A	25	7,5	9,4	24,2
A	32	9,5	12	31
A	40	12	15	38,7
A	50	15	19	48,5
A	63	18	24	61,2
A	80	24	30	77,4
A	100	30	38	97
A	125	37	47	121
A	160	48	60	1155
A	200	60	75	193,6

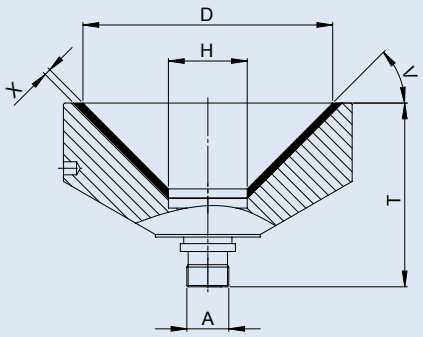
SAMPLE ORDER

SHAPE	D	X	T	H	LY	DY	A	BOND	GRIT	CONCENTRATION
A	83	1	70	20	30,5	87	-	MDX	D25	C50

Individual tool configuration on request

B





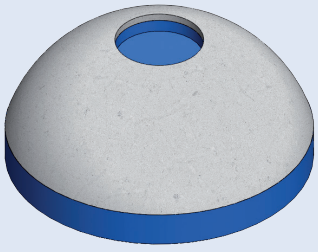
SPECIFICATIONS		
	DIMENSIONS:	D 10-200mm; X 1-1,5mm
	BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)
	DIN:	58723

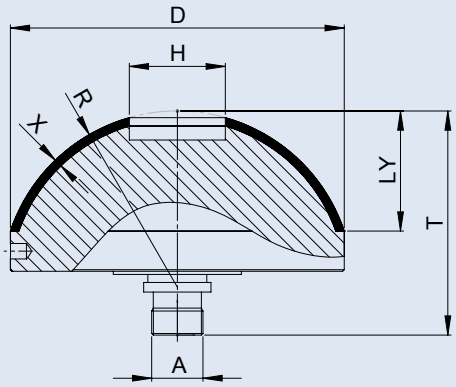
STANDARD-DIMENSIONS	SHAPE	D	H	V
	B	12,5	2	45°, 60°
	B	25	8	45°, 60°
	B	50	16	45°, 60°
	B	100	40	45°, 60°
	B	200	80	45°, 60°

SAMPLE ORDER	SHAPE	D	X	V	T	H	A	BOND	GRIT	CONCENTRATION
	B	12,5	1	45°	40	2	-	MDX	D15	C50

Individual tool configuration on request

FK





SPECIFICATIONS		
	DIMENSIONS:	D 5,2-200mm; X 1-15mm
	BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)
	DIN:	58723
	WARNING:	LY = DY x 0,35 mm

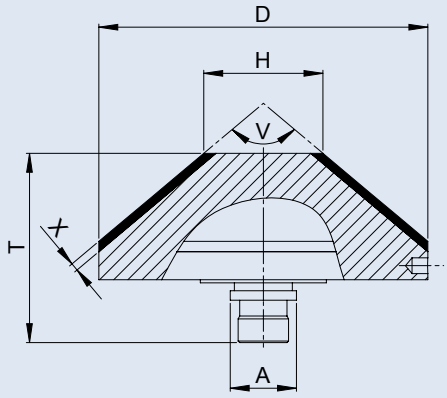
Table continued on next page

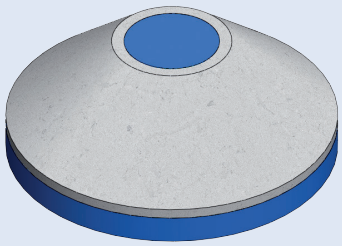
STANDARD-DIMENSIONS	SHAPE	R	LY	Ø	H
	FK	2	1,4	3,8	-
	FK	2,5	1,7	4,7	-
	FK	3	2,1	5,7	-
	FK	4	2,8	7,6	-
	FK	5	3,5	9,5	-
	FK	8	5,6	15,3	-
	FK	10	7	19	-
	FK	16	11	30,4	-
	FK	25	17,5	47,7	-
	FK	40	28	76,3	-
	FK	50	35	95	-
	FK	65	45	115	30

SAMPLE ORDER	SHAPE	D	X	R	T	H	LY	A	BOND	GRIT	CONCENTRATION
	FK	50	1	30	39	10	13	-	MDX	D25	C50

Individual tool configuration on request

FKE



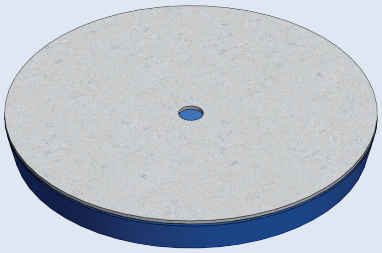


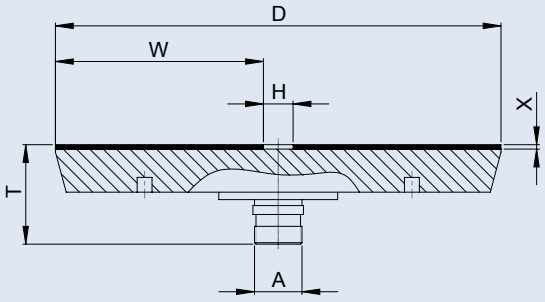
SPECIFICATIONS		
	DIMENSIONS:	D 3-200mm; X 1-6mm
	BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
	COOLANT:	O (Oil), E (Emulsion)
	DIN:	58723

STANDARD-DIMENSIONS	SHAPE	D	H	V
	FKE	12,5	2	60°, 90°, 120°
	FKE	25	8	60°, 90°, 120°
	FKE	50	16	60°, 90°, 120°
	FKE	100	40	60°, 90°, 120°
	FKE	200	80	60°, 90°, 120°

SAMPLE ORDER	SHAPE	D	X	V	T	H	A	BOND	GRIT	CONCENTRATION
	FKE	70	1	90°	90	40	-	MDX	D15	C50

C





SPECIFICATIONS	
DIMENSIONS:	D 35-410mm; W 28-185mm; X 2-5mm
BONDS:	MDT (resin), MDX (metal), MDS (electroplated)
COOLANT:	D (Dry), O (Oil), E (Emulsion)
DIN:	58723

STANDARD-DIMENSIONS

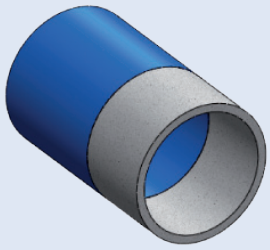
SHAPE	D	H	V
C	40	12	14
C	50	15	17,5
C	63	18	22,5
C	75	20	27,5
C	80	24	28
C	100	30	35
C	125	37	44
C	150	40	55
C	160	48	56
C	175	50	62,5
C	200	60	70

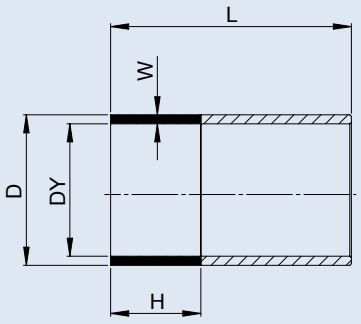
SAMPLE ORDER

SHAPE	D	W	X	T	H	A	BOND	GRIT	CONCENTRATION
C	200	55	3	32	90	-	MDX	D15	C50

Individual tool configuration on request

HB1





SPECIFICATIONS	
DIMENSIONS:	D 2,5-100mm; W 1-2mm; X 5-10mm
BONDS:	MDX (metal), MDS (electroplated)
COOLANT:	O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

SHAPE	D	W	X	L
HB1	2,5	1	10	
HB1	3	1	10	
HB1	4	1	10	
HB1	5	1	10	
HB1	6	1	10	

Table continued on next page

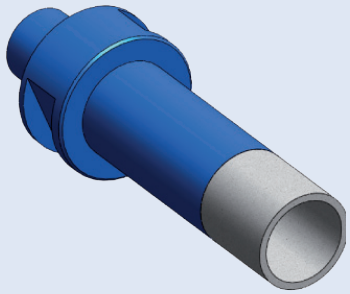
STANDARD-DIMENSIONS	SHAPE	D	W	X	L
	HB1	7	1	10	As specified
	HB1	8	1	10	
	HB1	9	1	10	
	HB1	10	1	10	
	HB1	11	1	10	
	HB1	12	1	10	
	HB1	13	1	10	
	HB1	14	1	10	
	HB1	15	1	10	
	HB1	16	1	10	
	HB1	17	1	10	
	HB1	18	1	10	
	HB1	19	1	10	
	HB1	20	1	10	
	HB1	bis	1	10	
	HB1	30	1	10	
	HB1	bis	1	10	
	HB1	40	1	10	
	HB1	bis	1	10	
	HB1	50	1	10	
	HB1	55	1	10	
	HB1	60	1	10	
	HB1	70	1	10	
	HB1	80	1	10	
	HB1	90	1	10	
	HB1	100	1	10	

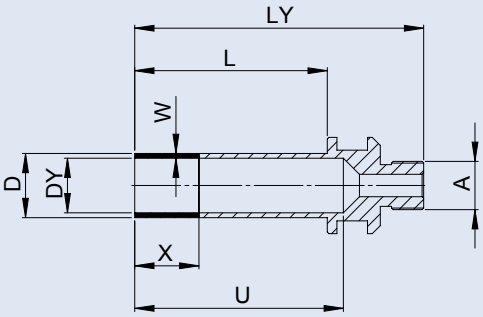
STANDARD-DIMENSIONS	ELECTROPLATED BOND (MDS)				
	SHAPE	D	W	X	L
	HB1	0,9	0,20	5	12
	HB1	1,0	0,25	5	15
	HB1	1,1	0,30	5	15
	HB1	1,2	0,30	5	18
	HB1	1,3	0,35	5	18
	HB1	1,4	0,40	5	18
	HB1	1,5	0,45	5	18
	HB1	1,6	0,50	5	18
	HB1	1,7	0,55	5	18
	HB1	1,8	0,50	5	20
	HB1	1,9	0,50	5	20
	HB1	2,0	0,50	5	20
	HB1	2,5	0,50	5	22
	HB1	3,0	0,50	5	25
	HB1	3,5	0,50	5	28
	HB1	4,0	0,50	5	30
	HB1	4,5	0,50	5	30
	HB1	5,0	0,50	5	35
	HB1	6,0	0,55	5	35
	HB1	7,0	0,60	5	40
	HB1	8,0	0,65	5	40
	HB1	9,0	0,70	5	40
	HB1	10,0	0,80	5	45
	HB1	12,0	0,90	5	47
	HB1	14,0	1,00	5	47
	HB1	16,0	1,00	5	52

SAMPLE ORDER	SHAPE	D	W	H	L	DY	BOND	GRIT	CONCENTRATION
	HB1	5	1	10	50	3	MDX	D126	C50

Individual tool configuration on request

HB2





SPECIFICATIONS

DIMENSIONS: D 2,5-100mm; W 1-2mm; X 5-10mm
BONDS: MDX (metal), MDS (electroplated)
COOLANT: O (Oil), E (Emulsion)

STANDARD-DIMENSIONS

METAL BONDS (MDX)				
SHAPE	D	W	X	L
HB2	2,5	1	10	As specified
HB2	3	1	10	
HB2	4	1	10	
HB2	5	1	10	
HB2	6	1	10	
HB2	7	1	10	
HB2	8	1	10	
HB2	9	1	10	
HB2	10	1	10	
HB2	11	1	10	
HB2	12	1	10	
HB2	13	1	10	
HB2	14	1	10	
HB2	15	1	10	
HB2	16	1	10	
HB2	17	1	10	
HB2	18	1	10	
HB2	19	1	10	
HB2	20	1	10	
HB2	bis	1	10	
HB2	30	1	10	
HB2	bis	1	10	
HB2	40	1	10	
HB2	bis	1	10	
HB2	50	1	10	
HB2	55	1	10	
HB2	60	1	10	
HB2	70	1	10	
HB2	80	1	10	
HB2	90	1	10	
HB2	100	1	10	

Table continued on next page

STANDARD-DIMENSIONS

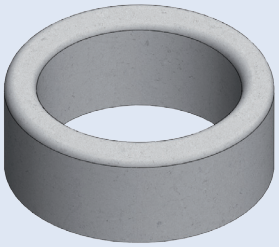
ELECTROPLATED BOND (MDS)				
SHAPE	D	W	X	L
HB2	0,9	0,20	5	12
HB2	1,0	0,25	5	15
HB2	1,1	0,30	5	15
HB2	1,2	0,30	5	18
HB2	1,3	0,35	5	18
HB2	1,4	0,40	5	18
HB2	1,5	0,45	5	18
HB2	1,6	0,50	5	18
HB2	1,7	0,55	5	18
HB2	1,8	0,50	5	20
HB2	1,9	0,50	5	20
HB2	2,0	0,50	5	20
HB2	2,5	0,50	5	22
HB2	3,0	0,50	5	25
HB2	3,5	0,50	5	28
HB2	4,0	0,50	5	30
HB2	4,5	0,50	5	30
HB2	5,0	0,50	5	35
HB2	6,0	0,55	5	35
HB2	7,0	0,60	5	40
HB2	8,0	0,65	5	40
HB2	9,0	0,70	5	40
HB2	10,0	0,80	5	45
HB2	12,0	0,90	5	47
HB2	14,0	1,00	5	47
HB2	16,0	1,00	5	52

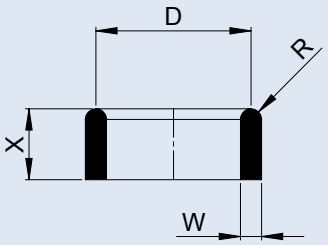
SAMPLE ORDER

SHAPE	D	W	U	X	L	LY	DY	BOND	GRIT	CONCENTRATION
HB2	6,2	1	45	10	40	75	4,2	MDX	D126	C50

Individual tool configuration on request

SR





SPECIFICATIONS

DIMENSIONS: D 3-200mm; W 1-20mm; X 6-15mm
BONDS: MDT (resin), MDX (metal)
COOLANT: O (Oil), E (Emulsion)
D AFTER DIN: 58741

STANDARD-DIMENSIONS

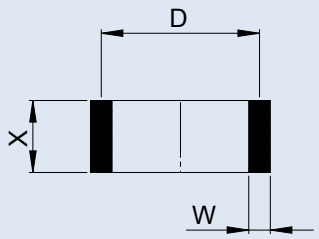
METAL BONDS (MDX)				
SHAPE	D (AFTER DIN 58741)	W	R	X
SR	3	1	0,5	6
SR	4	1	0,5	6
SR	4,5	1,5	0,75	6
SR	5	2	1	6
SR	5,6	2	1	6
SR	6,3	2	1	6
SR	7,1	2	1	6
SR	8	2	1	6
SR	9	2	1	6
SR	10	2	1	6
SR	11	2	1	6
SR	12	2	1	6
SR	12,5	2	1	6
SR	14	2	1	6
SR	16	2,5	1,25	6
SR	18	2,5	1,25	6
SR	20	2,5	1,25	6
SR	22	3	1,5	6
SR	25	3	1,5	6
SR	28	3	1,5	6
SR	30	3	1,5	6
SR	32	3	1,5	6
SR	35	3	1,5	6
SR	36	3	1,5	6
SR	40	3	1,5	6
SR	45	3	1,5	6
SR	50	3	1,5	6
SR	56	4	2	6
SR	60	4	2	6
SR	63	4	2	6
SR	71	4	2	6
SR	80	4	2	6
SR	90	4	2	6
SR	100	5	2,5	6

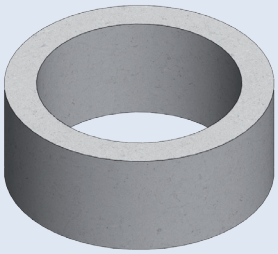
SAMPLE ORDER

SHAPE	D	W	X	R	BOND	GRIT	CONCENTRATION
SR	10	2	6	1	MDX	D46	C75

Individual tool configuration on request

SP





SPECIFICATIONS

DIMENSIONS: D 3-200mm; W 1-20mm; X 6-15mm
BONDS: MDT (resin), MDX (metal)
COOLANT: O (Oil), E (Emulsion)
D AFTER DIN: 58741

STANDARD-DIMENSIONS

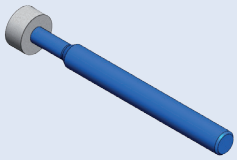
METAL BONDS (MDX)			
SHAPE	D (AFTER DIN 58741)	W	X
SP	3	1	6
SP	4	1	6
SP	4,5	1,5	6
SP	5	2	6
SP	5,6	2	6
SP	6,3	2	6
SP	7,1	2	6
SP	8	2	6
SP	9	2	6
SP	10	2	6
SP	11	2	6
SP	12	2	6
SP	12,5	2	6
SP	14	2	6
SP	16	2,5	6
SP	18	2,5	6
SP	20	2,5	6
SP	22	3	6
SP	25	3	6
SP	28	3	6
SP	30	3	6
SP	32	3	6
SP	35	3	6
SP	36	3	6
SP	40	3	6
SP	45	3	6
SP	50	3	6
SP	56	4	6
SP	60	4	6
SP	63	4	6
SP	71	4	6
SP	80	4	6
SP	90	4	6
SP	100	5	6

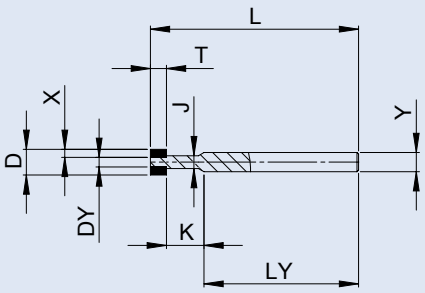
SAMPLE ORDER

SHAPE	D	W	X	BOND	GRIT	CONCENTRATION
SP	50	3	6	MDX	D46	C75

Individual tool configuration on request

1A1W-1





SPECIFICATIONS

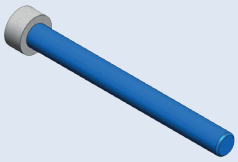
DIMENSIONS: D 2-55mm; X 0,25-13mm; T 0,6-200mm
BONDS: MDX (metal), MDR (vitrified), MDT (resin)
COOLANT: D (Dry), O (Oil), E (Emulsion)
MINIMUM ORDER QUANTITY: 5 pcs

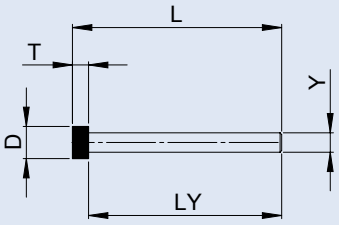
SAMPLE ORDER

SHAPE	D	X	T	E	K	J	L	Y	LY	DY	BOND	GRIT	CONCENTRATION
1A1W-1	6,5	1,75	3	30	7	4	45	6	35	3	MDT	D76	C125

Individual tool configuration on request

1A1W-2





SPECIFICATIONS

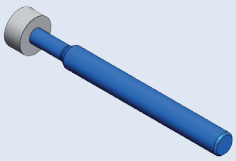
DIMENSIONS: D 3-55mm; U 1-10mm; T 0,6-200mm
BONDS: MDX (metal), MDR (vitrified), MDT (resin)
COOLANT: D (Dry), O (Oil), E (Emulsion)
MINIMUM ORDER QUANTITY: 5 pcs

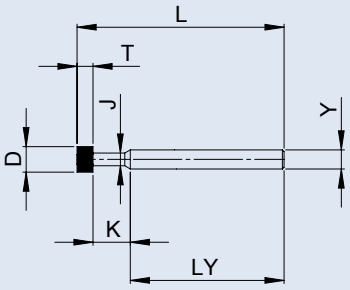
SAMPLE ORDER

SHAPE	D	X	T	E	J	L	Y	DY	BOND	GRIT	CONCENTRATION
1A1W-2	6,5	1,75	3	30	4	45	6	3	MDT	D76	C125

Individual tool configuration on request

1A1W-1(S)





SPECIFICATIONS

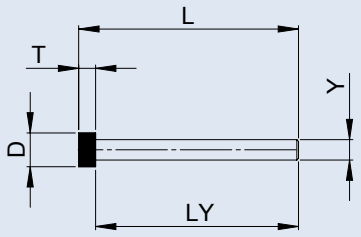
DIMENSIONS: D 0,5-6mm; T 2-29mm
BONDS: MDS (electroplated)
COOLANT: D (Dry), O (Oil), E (Emulsion)
MINIMUM ORDER QUANTITY: 5 pcs

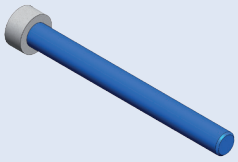
SAMPLE ORDER

SHAPE	D	T	K	J	L	Y	LY	BOND	GRIT
1A1W-1(S)	8	5	10	4	45	6	30	MDS	D76

Individual tool configuration on request

1A1W-2(S)



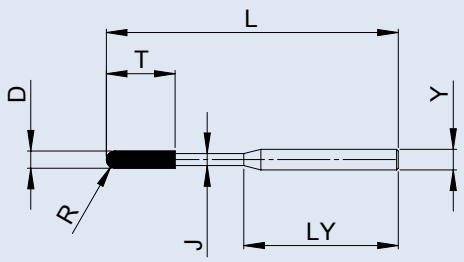


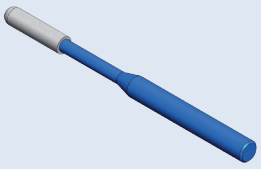
SPECIFICATIONS	
DIMENSIONS:	D 3,5-60mm; T 5-55mm
BONDS:	MDS (electroplated)
COOLANT:	D (Dry), O (Oil), E (Emulsion)
MINIMUM ORDER QUANTITY:	5 pcs

SAMPLE ORDER	SHAPE	D	T	L	Y	LY	BOND	GRIT
	1A1W-2(S)	8	10	70	6	60	MDS	D76

Individual tool configuration on request

1A1W-ZR(S)



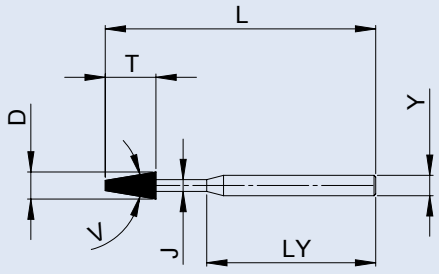


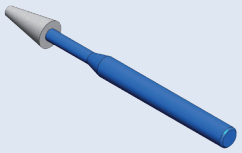
SPECIFICATIONS	
DIMENSIONS:	D 0,5-6mm; T 2-29mm
BONDS:	MDS (electroplated)
COOLANT:	D (Dry), O (Oil), E (Emulsion)
MINIMUM ORDER QUANTITY:	5 pcs

SAMPLE ORDER	SHAPE	D	R	T	J	L	Y	LY	BOND	GRIT
	1A1W-ZR(S)	4	2	20	3,5	60	6	30	MDS	D126

Individual tool configuration on request

1A1W-PS(S)





SPECIFICATIONS	
DIMENSIONS:	D 2,8-38mm; T 3-16mm
BONDS:	MDS (electroplated)
COOLANT:	D (Dry), O (Oil), E (Emulsion)
MINIMUM ORDER QUANTITY:	5 pcs

SAMPLE ORDER	SHAPE	D	V	T	J	L	Y	LY	BOND	GRIT
	1A1W-PS(S)	8	50°	10	2,5	30	3	20	MDS	D126

Individual tool configuration on request

GENERAL INFORMATION

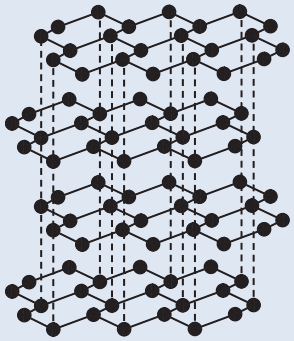
Diamond

Due to its hardness, diamond is an ideal abrasive for very hard materials. Almost 90% of the diamonds nowadays used in grinding tools are manufactured synthetically. The basic material is graphite which is transformed into the crystal lattice of the diamond with the aid of pressure and temperature in the presence of catalysts. On account of the controlled synthesis it is possible to produce diamonds with specific grinding properties for the most diverse bonding systems and grinding operations.

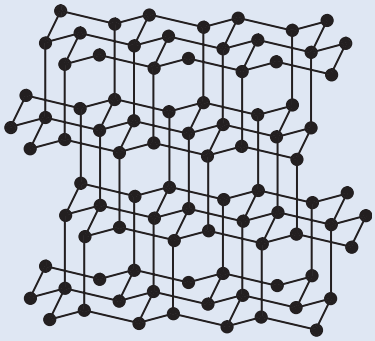
While the diamonds in metal bonds are typically used without a coating, diamonds coated in nickel and copper are used for resin bonds in the majority of cases. It is primarily the uneven surface of these coats which reinforces the fixation of the diamonds in the bonds and quickens the heat dissipation.

Synthetic diamonds are produced in diverse qualities and grit sizes.

CRYSTAL LATTICE OF GRAPHITE



CRYSTAL LATTICE OF DIAMOND



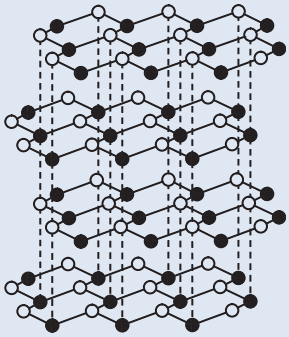
● = Carbon atoms

CBN

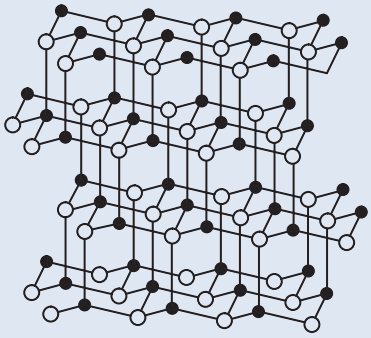
Cubic crystalline boron nitride presently is the second hardest material after diamonds. It is synthesized from the hexagonal boron nitride (a nitrogen boron compound) under pressure and temperature in the presence of catalysts, in a manner similar to the synthesis of diamonds

Cubic crystalline boron nitride is also available in diverse qualities and grit sizes and with a nickel coating. The preferred application of CBN is the grinding of HSS grades and of hardened steels.

CRYSTAL LATTICE OF HEXAGONAL BORON NITRIDE



CRYSTAL LATTICE OF CUBIC BORON NITRIDE



● = Boron atoms ○ = Nitrogen atoms

Application ranges

For diamond and CBN wheels

DIAMOND WHEELS ARE USED FOR THE GRINDING OF:

- carbide
- cermet
- carbide/steel combinations
- glass
- sapphire
- quartz
- vitrified materials of all kinds
- ferrotitanite
- carbide-based powder coatings
- graphite
- polycrystalline diamond and CBN blanks
- vitrified magnetic materials
- glass-fibre and carbon-fibre reinforced synthetic
- materials tungsten carbide

CBN WHEELS ARE USED FOR THE GRINDING OF:

- hardened high-speed steels (HSS)
- high-alloyed tool steels with at least 55 HRC
- case-hardened steels
- iron-based powder coatings
- chilled casting
- soft steels in certain applications
- stellite
- surgical steel
- PM steels

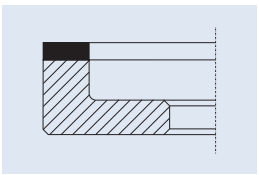
Selection criteria

For diamond and CBN wheels

Below, we have compiled the most important selection criteria for diamond and CBN wheels.

1. Shape

The shape of the various diamond/CBN wheels is expressed by a combination of figures and letters. (e.g. 6 A 2)



The basis for this designation system is the FEPA standard (Fédération Européenne des Fabricants de Produits Abrasifs / cf. also DIN standard 69800 and following). First choose the wheel shape suited for your grinding job. In the chart for wheel shapes on pages 10–17 the standard shapes are compiled; if you require different shapes, this can be done anytime. In that event, please let us have your sketch or drawing.

As a rule, the shape is determined by the workpiece, the machine, and the grinding method. We recommend using a wheel shape which is as stable as possible to avoid oscillations during grinding. The carriers for the grinding wheels are made of different materials, depending on the bonds.

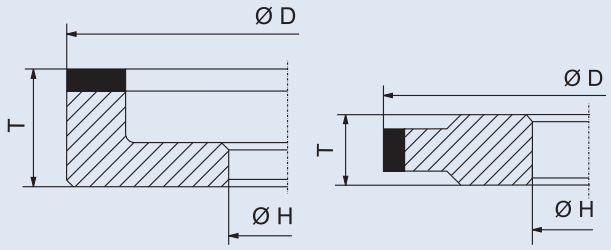
BOND	BODY MATERIAL
Resin bond (MDT)	Aluminium
	Aluminium synthetic resin
	Graphite synthetic resin
Metal bond (MDX)	Steel
	Bronze
Vitrified bond (MDR)	Aluminium
	Steel
Electroplated bond (MDS)	Aluminium
	Steel

We select the suitable wheel carrier, corresponding to the wheel shape as well as to thermal stress and mechanical load.

2. DIMENSIONS

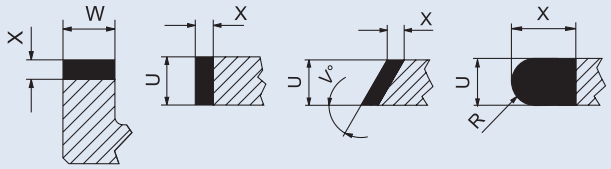
THE MOST IMPORTANT DIMENSIONS FOR A DIAMOND/CBN WHEEL ARE:

- the diameter **D**
- the total height **T**
- the hole **H**



AND THE DIMENSIONS OF THE DIAMOND/CBN LAYER:

- the width of the layer **W** or **U**
- the layer depth **X**
- the profile angle **V°**
- the radius **R**



2A. DIAMETER D

Determine the diameter in accordance with the grinding operation you have to perform, with your machine, and with our cutting speed operations on page 70. The larger the wheel diameter, the more economically you will grind, thanks to the then more favourable thermal and kinematic conditions. You will find the possible dimensions among the individual shapes.

2B. TOTAL HEIGHT T

This dimension, in general, is determined in response to diameter and layer dimensions. Deviations are possible, however, for cases of limited space in the machine or of the workpiece. When placing your order, please point this out by providing exact space requirements.

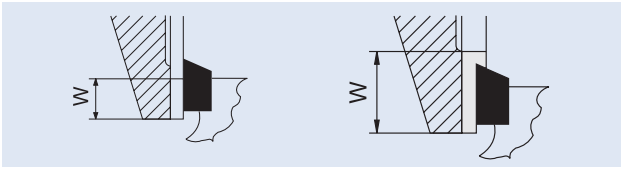
2C. BORE H

We manufacture the bores of our diamond- and CBN wheels conforming to quality H6. Against extra charge, we are also prepared to deliver our wheels with individual bore dimensions.

2D. LAYER WIDTH W AND U

The layer widths W for front end layers and U for peripheral layers depend on the grinding operation to be performed. On principle, when grinding with diamond or CBN wheels, the contact surfaces should be as small as possible. Small layers allow faster and cooler grinding with cup wheels and plate-shaped wheels. The chip flow is better, and the wheel gives a feeling of improved performance. A broader layer is preferable in off-hand grinding, as a better guidance is provided.

The layer width should always be smaller than the workpiece to be ground.



If the layer width is larger than the workpiece to be ground, a shoulder is formed in the layer, which damages the cutting edges.

2E. LAYER DEPTHS X

Always choose a big X-dimension. The manufacturing costs are almost the same - whether the wheel has a layer depth of, e.g., X = 2 or 4 or 6 mm. The price difference then results solely from the different diamond or CBN content. Bigger layer depths thus are considerably more economical.

2F. PROFILE ANGLE V°

Please consider the angle position with wheel type 1V1 respectively 14V1. The angle indication always relates to the angle formed – cf. drawing on page 29.

2G. RADIUS R

For the wheel shapes 1FF1 and 14F1 (p. 28) we have restricted ourselves to the most common radii. However, particularly with type 14F1 almost all wheel diameters and intermediate radius sizes can be manufactured.

3. DIAMOND AND CBN GRIT SIZES

In order to meet the various grinding requirements, there are available a great number of sizes. These sizes have been compiled in a standard by the FEPA (Fédération Européenne des Fabricants de Produits Abrasives).

For diamond and CBN the same grit sizes apply. Diamond grit is identified by a preceding D (e.g. D 126), CBN by a B (e.g. B 126).

The sizes shown in table are mesh sizes. For comparison, we have also included the American standard ASTM E11.

For finer grit sizes than D46/B46, the above range is continued by the fine grit sizes. Grading is essentially done by charging with water.

The grit size both determines the abrasive performance of diamond and CBN wheels as well as the surface quality achieved thereby on the workpiece. Higher abrasive performance is generally obtained with coarser grit sizes. With finer grit sizes the grinding quality is improved, but the abrading performance is reduced.

MESH GRIT SIZES*)

FEPA / DIN STANDARD						U.S. STANDARD ASTM E11 (MESH)	
DIAMOND		CBN		NOMINAL MESH WIDTH IN µm ISO R565 - 1990		DIAMOND AND CBN	
NARROW	WIDE	NARROW	WIDE	NARROW	WIDE	NARROW	WIDE
D1181	D1182			1180/1000	1180/850	16/18	16/20
D1101				1000/850		18/20	
D851	D852			850/710	850/600	20/25	20/30
D711	D711			710/600		25/30	
D601	D602			600/500	600/425	30/35	30/40
D501	500/425	35/40					
D426	D427	B426	B427	425/355	425/300	40/45	40/50
D356		B356		355/300		45/50	
D301		B301		300/250		50/60	
D251	D252	B251	B252	250/212	250/180	60/70	60/80
D213		B213		212/180		70/80	
D181		B181		180/150		80/100	
D151		B151		150/125		100/120	
D126		B126		125/106		120/140	
D107		B107		106/90		140/170	
D91		B91		90/75		170/200	
D76		B76		75/63		200/230	
D64		B64		63/53		230/270	
D54		B54		53/45		270/325	
D46		B46		45/38		325/400	

FINE GRIT SIZES*)

DIAMOND		CBN	
DR. MÜLLER DESIGNATION	AVERAGE GRIT SIZE RANGE IN µm	DR. MÜLLER DESIGNATION	AVERAGE GRIT SIZE RANGE IN µm
D35	30 – 40		
D30	25 – 35	B30	25 – 35
D20	15 – 25		
D15	10 – 20	B15	10 – 20
D9	6 – 12	B9	6 – 12
D6	4 – 8		
D5	4 – 6		
D3	2 – 4		

*) Sometimes there is a deviation between the grit size ordered and the grit size confirmed. This is caused by our IT system, which automatically calculates the grit size for the technical definition of the tool. Since the fine grit sizes consist of different grit size classes, our IT system calculates and confirms the average value of the corresponding grit size class. As a result, our confirmed grit sizes will sometimes deviate from those in your order. However, we assure you with 100% certainty that we will produce and supply your product with the grit sizes you have requested. Please consider the fact that not every grit size is available. And also that not every grit goodness is available for all of our bonds.

4. BONDS

The grinding behaviour of diamond and CBN wheels essentially depends on the bond. The bond is to keep the grinding grit at an optimal condition at the grinding temperatures and forces occurring, whilst simultaneously providing enough space for the chips so as to permit an easy discharge of the abraded material. In view of the great number of grinding problems occurring a large spectrum of bonds is required.

4A. RESIN BONDS (MDT)

More than 50% of all grinding operations can be carried out by means of resin bonds, as these allow many bonding variants and high abrading performance on the workpiece.

4B. METAL BONDS (MDX)

Metal bonds excel by very high grit holding forces. For the continuous self-sharpening of diamond tips that have become blunt, high infeed forces are required, generating an increased heat amount. Therefore, metal bonds always have to be used in wet grinding. Only for small contact areas and light cuts, Dry grinding is possible.

4C. VITRIFIED BONDS (MDR)

These bonds excel by porosity and profiling. At present, we are manufacturing only a choice of the shapes and dimensions contained in this catalogue and will therefore appreciate your inquiry in case of need.

4D. ELECTROPLATED BOND (MDS)

In the nickel bond deposited by electro-plating usually only one grit layer of diamond or CBN is held firm (2 or 3 layers are contingently possible). The electroplated S-bond with diamond as abradant is particularly suited for machining less hard materials which are subject to wear, however, such as graphite, mineral or glass-fibre reinforced synthetic materials, and the like. A special field of application of the S-bond with CBN as abrasive is the grinding of profiles in the construction of turbines.

5. HARDNESS

5A. RESIN BOND (MDT)

Listed from soft to hard:
MDT-822 – MDT-252 – MDT-629

5B. METAL BONDS (MDX)

Listed from soft to hard:
MDX-246 – MDX-681 – MDX-468 – MDX-475 – MDX-471 – MDX-286 – MDX-267

6. CONCENTRATION

According to international agreement, the basis for indicating concentration is the value C100, corresponding to 25% by volume of pure diamond or CBN within the abrasive layer.

Thus, the following formula applies to diamond and CBN:
C100 = 25%vol = 4,4 carats/cm3 of layer; 1 ct = 0,2 g.

We manufacture diamond and CBN wheels in the following common concentrations:

CONCENTRATION	PROCESSED CARAT WEIGHT / cm^3 OF GRINDING WHEEL LAYER	VOLUME %
C200	8,8 ct	50
C175	7,7 ct	43,75
C165	7,3 ct	41,25
C150	6,6 ct	37,5
C135	5,9 ct	33,75
C125	5,5 ct	31,75
C115	5,1 ct	28,75
C100	4,4 ct	25,0
C90	4,0 ct	22,5
C85	3,7 ct	21,25
C80	3,5 ct	20,0
C75	3,3 ct	18,75
C68	3,0 ct	17,0
C65	2,8 ct	16,25
C60	2,6 ct	15,0
C55	2,4 ct	13,75
C50	2,2 ct	12,5
C45	2,0 ct	11,25
C38	1,7 ct	9,5
C35	1,5 ct	8,75
C25	1,1 ct	6,25
C20	0,9 ct	5,0
C15	0,7 ct	3,75
C10	0,4 kt.	2,5

The concentration, on the one hand, definitely determines the price of the wheel, but on the other hand also the entire grinding behaviour thereof. Of decisive relevance is an optimal interaction between wheel dimension, grit size, bond and concentration. Higher concentrations (C100-C125-C150 / V240-V360) are suited if high profile stability is required, for narrow layer widths, for high bonding hardness, and in deep cutting. Average concentrations (C50-C75 / V120 - V180) are recommended with cup wheels and peripheral wheels having larger layer widths and finer grit sizes. Lower concentrations (C38-C50 / V120) primarily are used with very fine grit sizes.

7. ORDER INFORMATION

OUR LABEL FOR YOUR TOOL:

Since the introduction of our slogan, "We personalise your grinding tools!", on 1 August 2011, our focus has been on achieving improved reliability, greater transparency and easier communication between you and Dr. Müller DIAMANTMETALL®. All of our tools now feature a new and unique label. The high level of quality of our grinding tools is not affected by this change.

OUR LABEL BRINGS THE FOLLOWING BENEFITS FOR OUR CUSTOMERS:

- FULL TRANSPARENCY with the grinding wheel configuration
- CLEAR TRACEABILITY of technical improvements
- HIGH RELIABILITY for order items
- EASY COMMUNICATION due to clear identification

MDR-319 ES / B126 / C150 / DOE
1 2 3 4 5

1. The letters "MD" stand for a genuine Dr. Müller DIAMANTMETALL® grinding tool
2. The combination of numbers and letters which stands for the type of bond and the mixture of grit goodness and grit quality
3. The combination of numbers and letters defines the size of the cbn or diamond grit*)
4. The combination of numbers and letters defines the concentration of the cbn or diamond grit*)
5. The possible letter combinations define the cooling for your grinding tool:
   D= Dry; O = Oil; E = Emulsion

LETTER COMBINATIONS FOR GRIT GOODNESS AND GRIT QUALITY		
GRIT GOODNESS	GRIT QUALITY	COMBINATIONS
G(enius)	S(tandard) or P(rofessional)	GS or GP
C(uda)	S(tandard) or P(rofessional)	CS or CP
A(tlantis)	S(tandard) or P(rofessional)	AS or AP
T(esla)	S(tandard) or P(rofessional)	TS or TP
R(azor)	S(tandard) or P(rofessional)	RS or RP
E(dison)	S(tandard) or P(rofessional)	ES or EP

*) Our label, which is automatically and electronically generated, contains the „grain goodness" and „grain quality" factors. These two factors can individually affect the specified grain size and concentration. This may result in a differing technical description of our tool, as compared to your order or request. We ensure you with 100% certainty, however, that we always manufacture and deliver your product with your desired configuration.

The "Dr. Müller DIAMANTMETALL® CARD" provides you with an overview of the new label's structure. In this handy format, you always have the new label design close at hand!

PLEASE FEEL FREE TO ORDER THIS CARD FROM US!

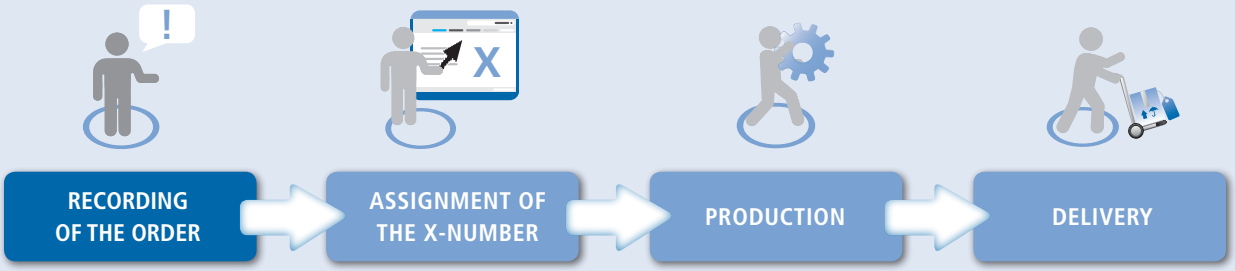
Tel.: +49 (0) 881 / 90 11 55-0
Fax: +49 (0) 881 / 90 11 55-100
vertrieb@muedia.de

THE BIOMETRY OF YOUR ORDER IS YOUR X NUMBER.

The nice thing about an x-number order is that it saves you time!
We would like to briefly explain how.

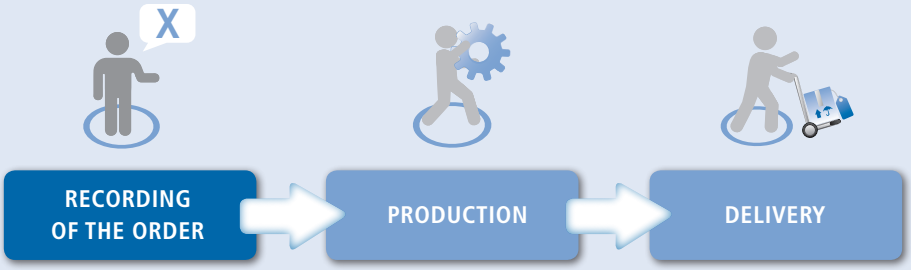
YOUR FIRST ORDER

We engrave your unique x-number in addition to our tool label on every one of your tools. All of the technical details and the manufacturing process which our technician worked out for you with your first order of this tool are stored behind this x-number.



YOUR SECOND ORDER WITH YOUR X-NUMBER

Enter your X-number to order the same tool again today. This tool is then sent directly to the production department without any detours. The time-intensive processing by our technical department and a calculation by our sales department are not required in this case. This saves you time!



YOUR ORDER OF ITEMS BOTH WITH AND WITHOUT X-NUMBERS

We have once more improved on ourselves here! Effective immediately, we will be using our new splitting process to divide any orders received having items both with and without x-numbers to ensure the fastest possible processing. This enables us to supply your x-numbered tools considerably faster than those tools still needing to be defined. And you save time here as well!

INFORMATION FOR ENGRAVING YOUR TOOL

1. Technically defined tool labeling
2. Brand name of a Dr. Müller DIAMANTMETALL® HighTec bond
3. Your X-number / Serial number
4. Customer material number (at customer request)
5. Technical safety requirements

8. GUIDELINES FOR USING DIAMOND AND CBN WHEELS

8A. MACHINE

All of the grinding machines for diamond and CBN wheels should be of a highly sturdy design, be equipped with properly running grinding spindles and wheel mounts, and be set up for vibration-free operation. Diamond and CBN wheels operated without a proper peripheral and transversal concentricity achieve only low abrading performance and a poor surface finish since only a portion of the diamond or CBN layer makes contact, and this portion is then quickly overloaded. The motor output must be adjusted in such a way that higher cutting speeds can also be used and that no substantial loss of speed occurs, even when infeed is high. All of the machine guides must operate without backlash. During deep grinding, so at low feed speed but high surface pressure, the bench must operate without jolting.
Coolant pumps, the inlet nozzle, and the amount must be designed in a way that ensures a strong coolant flow especially for deep grinding.

8B. MOUNTING OF DIAMOND AND CBN WHEELS

Diamond and CBN wheels should have proper concentricity and axial run-out to ensure superior abrading performance and a high quality surface finish. The wheels that are ground to a concentricity and axial run-out of 0,01 - 0,02 mm are supplied in balanced form, and they should be attached to the wheel mount as follows:

- Check wheel mount on the spindle with a dial gauge for true running in the peripheral and transversal directions. Correct any errors.
- Slide the diamond or CBN wheel onto the mount. Tighten the mount slightly and check the wheel running with a dial gauge.
- Eliminate any radial runout due to bore clearance by lightly pounding on a piece of wood placed on the mount. Tighten the mount firmly and check it again with the dial gauge.

In case of large diamond and CBN wheels, and especially of profile wheels, we recommend that you send us the mount and the matching grinding or balancing mandrel so that we can grind the wheels directly on the mount, keeping true running deviations within the tightest limits. All diamond and CBN wheels should remain on their mounts until they completely wear out to avoid errors in concentricity due to the change of mounts.

8C. COOLING

Wet grinding:

Wet grinding is to be preferred for almost all grinding operations using diamond and CBN wheels. A sufficient amount of coolant should be fed to the grinding point directly and under pressure, thereby assuring dissipation of the cutting heat generated during grinding, flushing the debris away and increasing the service life of the wheel.

For diamond wheels the best abrading performances and lifetimes are achieved with Emulsions at a mixing ratio of 1:50 to 1:100. CBN wheels, in contrast thereto, yield the best values with low viscosity Oils (viscosity ~ 4).

Often the necessity arises to use both the diamond and the CBN wheel on one machine. In this case, a low viscosity grinding Oil is recommended, but it has to be reckoned with slightly lower infeed rates an short lifetime.

Special attention should be paid to optimal filtering of the coolant, which greatly influences the service life and surface quality of the workpiece.
Particular attention should also be paid to the temperature when grinding oils are used. If necessary, additional cooling should be provided, as the oil not only needs to have a lubricating effect, but also a cooling one.

It is worthwhile to pay sufficient attention to the choice of coolant, as considerable costs for the grinding wheel can be saved by using a good coolant. Diamond and CBN wheels whose bond is designed for wet grinding should be used for dry grinding only in exceptional cases, and then with reduced rotational speed and infeed.

Dry grinding:

Due to their characteristics, grit quality, and bond composition, diamond and CBN wheels engage well and keep their soft grinding capacity even in dry grinding. The applied contact pressures and infeeds, however, should be lower than those used for wet grinding. Those diamond and CBN wheels with bonds designed for dry grinding may also be used for wet grinding.

8D. DRESSING AND SHARPENING DIAMOND AND CBN WHEELS

Dressing involves the restoration of the running accuracy of a diamond or CBN wheel.

THE FOLLOWING OPTIONS EXIST:

Dressing of cup wheels

Pulverized silicon carbide of 80-120 mesh is strewn onto a steel plate, and the diamond or CBN wheel is moved over it under slight pressure, thereby partially removing the bond and releasing the grinding grit.

Dressing of peripheral wheels

There are several methods for achieving this:

- Dressing by centrifugal force braking device
- Dressing with ST37 workpieces
- Dressing with electro-plated diamond stripping tools.

Following application of the dressing methods described above, it is imperative that the diamond or CBN wheel still be sharpened, i.e. that the bond be retracted so as to release the grinding grit.

The best way to do this:

- in the case of resin-bonded wheels: by means of our whetstone No. 2 or No. 5
- and in the case of metal-bonded wheels: by means of our whetstone No. 6.
- Stone no. 8 is to be used for fine grit sizes.

The wheels have reached an optimal degree of sharpness if your finger nail catches on the grinding grit („finger nail test").

8E. CUTTING SPEEDS FOR DIAMOND AND CBN WHEELS

The cutting speeds indicated in the table below are values from practical experience which should be observed as far as possible. Please ask our field staff as to which methods are suited best for you. With special materials or grinding methods different cutting speeds may give optimal results. Thus, a variable speed adjustment is of advantage for obtaining a high grinding performance and a superior grinding quality.

8F. METAL REMOVAL RATE

The specific metal removal rate, also known as Qw', describes the removal capacity of a grinding wheel in cubic millimeters per millimeter of grinding rim width per second.

CUTTING SPEEDS

	REVOLUTIONS PER MINUTE AT A CUTTING SPEED OF								
Ø MM	10 M/SEC.	15 M/SEC.	20 M/SEC.	25 M/SEC.	30 M/SEC.	35 M/SEC.	40 M/SEC.	45 M/SEC.	50 M/SEC.
20	9550	14725	19100	23875	28650	33440	38215	42990	47770
25	7640	11460	15280	19100	22920	26750	30570	34390	38215
30	6365	9550	12730	15915	19100	22290	25475	28660	31845
50	3820	5730	7640	9550	11460	13375	15285	17195	19105
70	2545	3820	5095	6370	7640	8915	10190	11465	12735
100	1910	2865	3820	4775	5730	6685	7640	8600	9550
125	1530	2290	3055	3820	4580	5350	6115	6880	7640
150	1275	1910	2545	3180	3820	4460	5095	5730	6370
175	1090	1640	2185	2730	3280	3820	4367	4910	5460
200	955	1435	1910	2390	2865	3340	3820	4300	4780
250	765	1146	1530	1910	2290	2675	3055	3440	3820
300	635	905	1275	1590	1910	2230	2545	2865	3185
350	545	820	1090	1365	1640	1910	2180	2455	2730
400	480	715	955	1194	1435	1670	1910	2150	2390
450	425	635	850	1060	1275	1485	1700	1910	2120
450	382	573	764	955	1146	1337	1528	1719	1918
550	347	521	694	868	1042	1215	1389	1563	1737
600	318	477	636	796	955	1114	1273	1433	1592

NOTES

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