WINTER

Precision Grinding Solutions

Stationary diamond dressers

Stationary diamond dressers

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Stationary diamond dressers

Introduction

WINTER diamond dressing tools have a high reputation throughout the world for quality and economics in modern grinding and dressing technology.

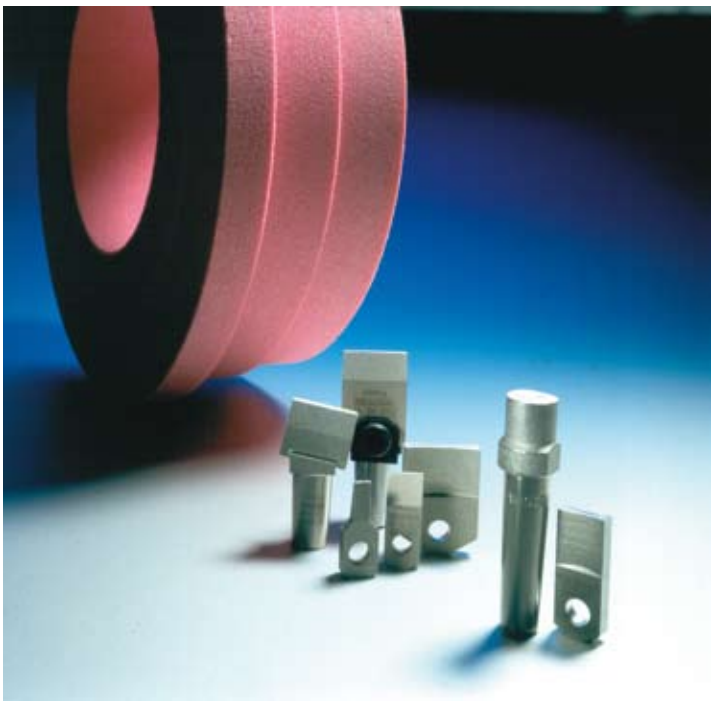
WINTER's many decades of experience in cooperation with industry has produced constant improvements in diamond dressers, keeping pace with the higher quality requirements for grinding and dressing today.

This catalogue gives an update of our range of stationary diamond dressing tools. It also gives guidance in selection of the most suitable diamond dressing tools for your specific operations, together with recommendations and guidelines for application.

If you have further technical questions on the use of diamond dressers, we are happy to provide advice and demonstrations of our tools at your premises.

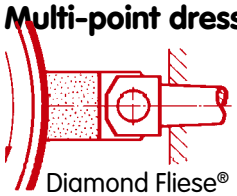
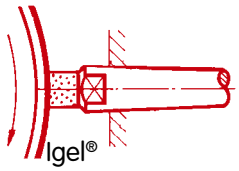
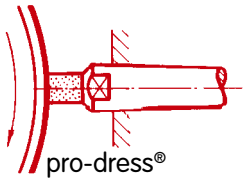
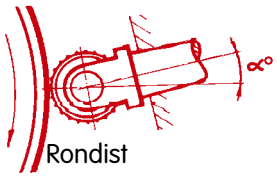
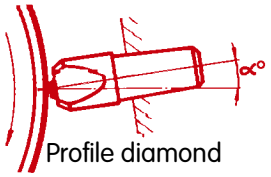
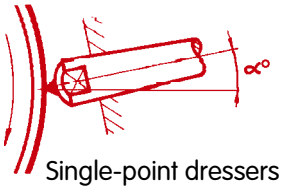
We can also help you in the optimization of existing applications.

Contact us for all matters concerning diamond dressing tools.

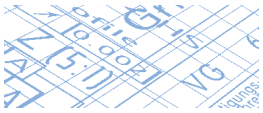


Stationary diamond dressers

Notes on tool selection

Tool group	Selection notes	Page
Multi-point dressers		
 Diamond Fliese®	A modern universal dressing tool for profiling and straight dressing. Diamond Fliese® tools feature constant operating behaviour throughout their service life. They may be used in place of single-point dressers or profile diamonds.	6
 Igel®	A robust tool for straight dressing of peripheral and flat surfaces. Igel® dressers are simple to use and highly economical in operation. They can replace the single-point dresser in many applications. One of their main advantages is their higher dressing feed rates.	22-23
 pro-dress®	The design of the pro-dress® is similar to that of the Igel®. It is used for straight dressing of peripheral and flat surfaces with fine and very fine wheel grits. The low cutting pressure of this dresser makes it highly suitable for ID grinding wheels and sharp-profile wheels.	24-25
 Rondist	A cost-effective multi-point dresser with the functional behaviour of a single-point dresser. It comprises a large number of individual diamonds, which can be used one after another. Simply rotate the used diamond point and use the next diamond. There are different versions available for profile dressing and straight dressing.	26-27
Single-point dressers		
 Profile diamond	Profile diamonds are tools for very high performance requirements. They are used to meet extremely high profile accuracy requirements.	28-29
 Single-point dressers Disposable dressers	Single-point dressers are suitable for straight grinding wheels and simple profiles. Depending on their quality, the diamonds have several usable points, which can be used in turn by resetting the diamond. Resetting is not possible with disposable diamonds which have only one working point.	30-32

The variety of dressing applications sometimes means that expert consultation is necessary. We are happy to provide such advice – to enable us to provide the best possible advice, please fill in the attached questionnaire (page 47) as completely as possible.



Stationary diamond dressers

Selection chart

	Single-point dresser with natural points	Single-point dresser with synthetic points	Multi-point dressers	Needle Fliese with natural points	Hand dresser	Blade tool D 21	Needle Fliese, synth. D 25	Needle Fliese, synth. D 30	Needle Fliese, synth. D 35	PKD Single-point dresser D 53	Dressing tools
See page	30-32	33-34	22-25	10-11	35-36	20	18-19	14-15	16-17	33	7-10
Machine type											
External angle-head (Profile)				X			XX	X	XXX		X
External-straight				XX			X	XXX	XXX		XX
Internal	X	XX						XXX			XX
Centerless grinding wheel Thrufeed grinding	X			XX		XXX		XXX			XX
Centerless control wheel	X							XX		XXX	XX
Surface				XXX		XX		X			X
Tool room grinders	X	XX	X		XXX			XXX		X	X
Special machines with very fine or very Coarse wheels			XXX								

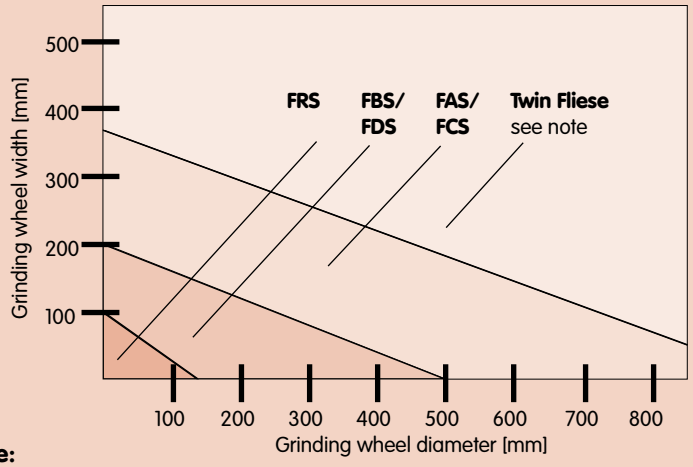
XXX = First Recommendation, XX = Second Recommendation, X = Third Recommendation

Stationary diamond dressers

Tool specification in four steps

Step 1 **Select appropriate Fliese size for wheel size**

FAS 115-



FAS/FCS = Fliese width W = 20mm and useful length 15 or 10mm, for large wheels.

FBS/FDS = Fliese width W = 10mm and useful length 15 or 10mm, for small wheels

FRS = Minifliese, width W = 5mm and useful length 12mm, for very small wheels.

Note:
For dressing work with high wear, or for large single and ganged grinding wheels, we recommend twin mounting of Fliese tool (see p. 13) or use of a twin Fliese, e.g. 5T FAS115-20-15-36 (see also p. 9).

Step 2 **Select diamond grit for grinding wheel grain size**

D1001-
(Winter designation 115)

Wheel grain	Diamond grit	Winter code	Active width b_D
120 - 180	D 501	75	ca.0,50
80 - 120	D 711	90	ca.0,70
54 - 80	D 1001	115	ca.1,00
36 - 54	D 1181	140	ca.1,12
46 - 80	Needles	180	ca.1,20

Further information on grain size available on request.

Step 3 **Select Fliese bond for abrasive**

T 645

Bond: T 645E **Preferred for fused alumina (Al_2O_3, including sintered Al_2O_3 = sol-gel).**

Bond: H 770J **Preferred for silicon carbide (SiC).**

Note: The bond type determines core E or J of the Fliese. Changes on request.

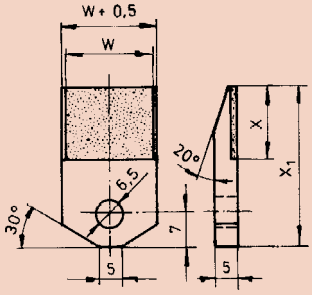
Step 4 **Select mount or holder, where necessary**

MK1 **If the Fliese is not directly clamped into the machine holder, please order the mount needed, e.g. cylindrical, tapered or square mounts.**
Recommendation: brazed mount (e.g. MK1) or alternatively swivel mount (see p.13)

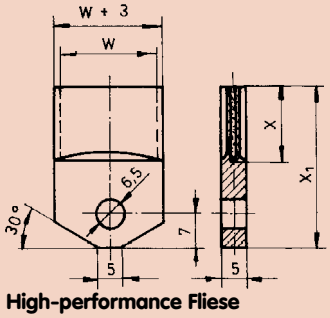
Example	**FAS 115 - 20 - 15 - 33 - D1001 - T645 E - MK1**				
	Step 1	Dimension	Step 2	Step 3	Step 4

Stationary diamond dressers

High-performance grit Fliese for mounting directly in machine holder



High-performance Fliese (FAS, FBS, FCS, FDS)
manufactured to a special setting scheme, with very uniform arrangement of full, uncrushed natural grit.
Bond T645, Core E



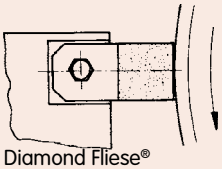
High-performance Fliese (FAS, FBS, FCS, FDS)
manufactured to a special setting scheme, with very uniform arrangement of full, uncrushed natural grit.
Bond H770, Core J

WINTER diamond Fliese

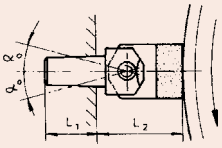
Shape	W	X	X_1	Grit size	Bond / Core	Material-No.
FAS 75	20	15	33	D 501	T645 E	**66260384327**
FAS 90	20	15	33	D 711	T645 E	**69014185720**
FAS 115	20	15	33	D 1001	T645 E	**69014185721**
FAS 140	20	15	33	D 1181	T645 E	**69014185722**
FBS 75	10	15	33	D 501	T645 E	**66260387135**
FBS 90	10	15	33	D 711	T645 E	**69014185726**
FBS 115	10	15	33	D 1001	T645 E	**69014185727**
FBS 140	10	15	33	D 1181	T645 E	**69014185728**
FCS 75	20	10	28	D 501	T645 E	**69014185746**
FCS 90	20	10	28	D 711	T645 E	**69014185732**
FCS 115	20	10	28	D 1001	T645 E	**69014185718**
FCS 140	20	10	28	D 1181	T645 E	**69014185716**
FDS 75	10	12	28	D 501	T645 E	**69014185747**
FDS 90	10	12	28	D 711	T645 E	**69014185735**
FDS 115	10	12	28	D 1001	T645 E	**69014185736**
FDS 140	10	12	28	D 1181	T645 E	**69014185737**
FAS 75	20	15	33	D 501	H770J	**69014185748**
FAS 90	20	15	33	D 711	H770J	**69014185723**
FAS 115	20	15	33	D 1001	H770J	**69014185724**
FAS 140	20	15	33	D 1181	H770J	**69014185725**
FBS 75	10	15	33	D 501	H770J	**69014185749**
FBS 90	10	15	33	D 711	H770J	**69014185729**
FBS 115	10	15	33	D 1001	H770J	**69014185730**
FBS 140	10	15	33	D 1181	H770J	**66260384396**
FCS 75	20	10	28	D 501	H770J	**66260385384**
FCS 90	20	10	28	D 711	H770J	**66260384227**
FCS 115	20	10	28	D 1001	H770J	**69014185734**
FCS 140	20	10	28	D 1181	H770J	**66260387133**
FDS 75	10	12	28	D 501	H770J	**66260387692**
FDS 90	10	12	28	D 711	H770J	**69014185738**
FDS 115	10	12	28	D 1001	H770J	**66260387592**
FDS 140	10	12	28	D 1181	H770J	**66260387481**

Other dimensions and specifications on request:
Order example:
FAS 90-20-15-33-D711-T645 E / **69014185720**

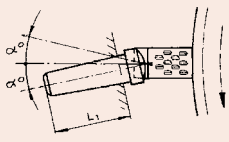
Holder or mount, Examples:



Diamond Fliese®
in machine holder



Diamond Fliese®
in swivel holder



Needle Fliese with
rigid soldered mount,
α = ± 0...15°

Stationary diamond dressers

Diamond Fliese tools -Special designs-

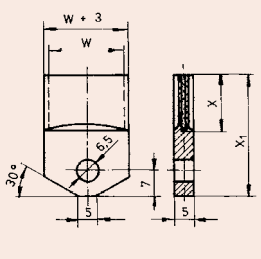
WINTER diamond Fliese						Remarks
Shape	W	X	X_1	Grit size	Bond and core	
3T FAS115	20	15	33	D1001	T645J	Dressing double-sided profiles, e.g. crankshaft bearings. Diamond plate centrally arranged, special core material. Constant active width (b_D) 3T FAS b_D = 1.15 mm **Mat. No. 69014185753**
9T FAS115	20	15	33	D1001	T645J	Dressing double-sided profiles, e.g. crankshaft bearings. Diamond plate centrally arranged, special core material and restricted core tolerance. Constant active width. 9T FAS b_D = 1.15 mm Tolerance of parallelism from diamond plate to core within 0.02mm. **Mat. No. 69014185774**
5T FAS115	20	15	36	D1001	T645J	Dressing double-sided profiles, e.g. crankshaft bearings. Diamond plate centrally arranged, special core material and restricted core tolerance. Constant active width. 5T FAS b_D = 1.15 ± 0.02mm x 2=2.3mm **Mat. No. 69014185762** The high diamond content permits accurate dressing even of large grinding wheel volumes.

Other dimensions and specifications on request.

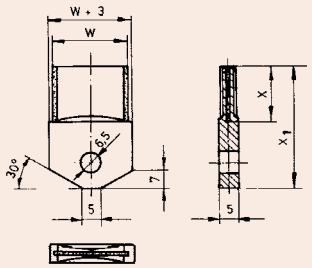
Order example:

3T FAS115-20-15-33 / D1001 / T645J (example **without** holder) **69014185753**
5T FAS115-20-15-36 / D1001 / T645J (example **without** holder) **69014185762**

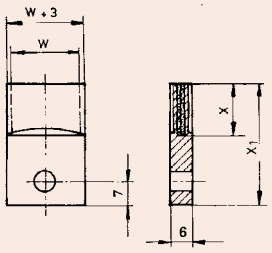
Beispiele:



3T FAS115



9T FAS115



5T FAS115

Stationary diamond dressers

Diamond Fliese tools -Special designs-

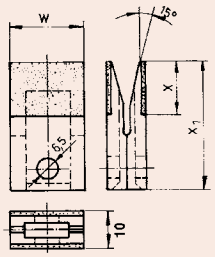
WINTER diamond Fliese						Remarks
Shape	W	X	X_1	Grit size	Bond and core	
1T FAS90	20	15	35	D711	T645J	Diamond twin Fliese with cooling duct, coolant supply necessary. For especially high demands, e.g. centerless grinding, high-speed grinding. D711: Grit range 80-120 D1001: Grit range 54-80 D1181: Grit range 36-54 D711 b_D = 0.7 mm x 2 = 1.4 mm D1001 b_D = 1.00 mm x 2 = 2.0 mm D1181 b_D = 1.12 mm x 2 = 2.24 mm
1T FAS115	20	15	35	D1001	T645J	
1T FAS140	20	15	35	D1181	T645J	
1T FDS9010	12	Z45	D711	T645 E		DIAFORM Fliese for cost-effective rough profiling with DIAFORM unit. Saves the profile diamond from premature wear. **1T FDS90** b_D = 0.7 - **66260384883**

Other dimensions and specifications on request.

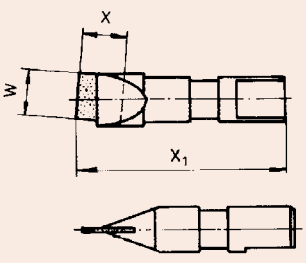
Order example:

1T FDS90-10-12-Z45 / D711 / T645E **66260384883**

Examples:



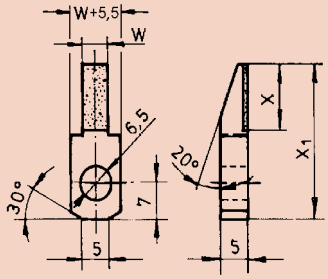
1T FAS115



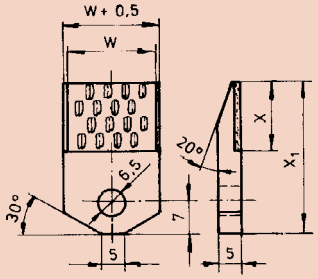
1T FDS90

Stationary diamond dressers

High-performance grit and needle Fliese for mounting directly in machine holder



Minifliese (FRS)
bOND T645, Core E.



Needle Fliese (FA, FB, FC, FD)
Bond T645,
Core E.

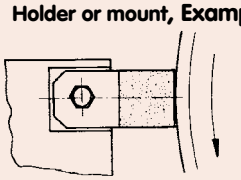
WINTER diamond Fliese

Shape	W	X	X_1	Grit size	Bond / Core	**Material-No.**
FRS 75	5	12	28	D 501	T645 E	**66260382020**
FRS 90	5	12	28	D 711	T645 E	**66260114636**
FRS 115	5	12	28	D 1001	T645 E	**66260388134**
FA 180	20	15	33	N1100	T645 E	**69014185755**
FB 180	10	15	33	N1100	T645 E	**69014185754**
FC 180	20	10	28	N1100	T645 E	**69014185756**
FD 180	10	12	28	N1000	T645 E	**69014185757**

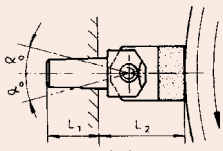
Other dimensions and specifications on request:

Order examples:FRS 75-5-12-28-D501-T645 E / **66260382020**
FD 180-10-12-28-N1000-T645 E / **69014185757**

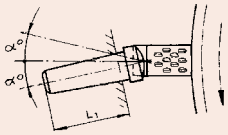
Holder or mount, Examples:



Diamond Fliese®
in machine holder



Diamond Fliese®
in swivel holder



Needle Fliese with
rigid soldered mount,
α = ± 0...15°

Stationary diamond dressers

Diamond needle Fliese tools -Special designs-

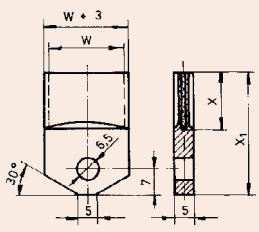
WINTER diamond Fliese						Remarks
Shape	W	X	X_1	Grit size	Bond and core	
9T FB180	10	15	33	N800	T625 J	Needle Fliese for specially high requirements for active width (b_D) and constant wear behaviour.
1T FB180	10	15	33	N1000	T645 J	**Mat.-Nr.**
8T FA18020	15	33	N900	T625 J		9T FB b_D = 0,8 **69014185798** 1T FB b_D = 1,0 **66260388626** 8T FA b_D = 0,9 **66260387342**
11T FB180	10	15	33	N1000	T645 E	Like 1T FB 180, but in steel core E
13T FB180	10	15	33	N800	T645 E	Like 9T FB, but in steel core E 11T FB b_D = 1.0 13T FB b_D = 0.8
6T FD18010	12	22	N800	T645J		Single-row needle Fliese for specially high requirements for profile accuracy and constant wear. **Mat. No.**
2T FD18010	12	22	N800	T645J		6T FD = 2 needles **66260114419** 2T FD = 3 needles **69014185795** 10T FD = 4 needles **66260112933** 1T FC = 5 needles **66260112932**
10T FD180	10	12	28	N800	T645J	
1T FC180	20	10	28	N800	T645J	

Other dimensions and specifications on request.

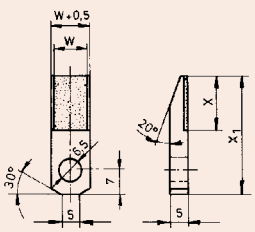
Order example:

2T FD180-10-12-22 / N800 / T645J (example **without** holder) **69014185795**

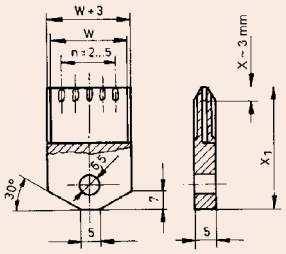
Beispiele:



8T FA180



11T FB180



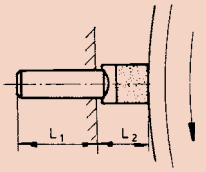
Depending on drawing e.g. 2T FD with 3 needles

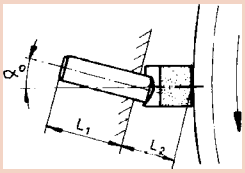
Stationary diamond dressers

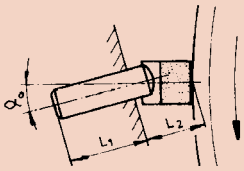
Holders for WINTER diamond Fliese tools

Holder for WINTER diamond Fliese

Shape and diameter mm	Clamping length L_1 mm	Inclination angle α° degrees	Inclination direction L - R
K (all tapered shapes, e.g. MK0, MK1)	For non-standard mounts please indicate L_1. The same applies for indications of modification, e.g. tightening thread M6	Standard mounts to table, or special designs acc. to dimension drawing.	G △ straight
Z (all cylindrical shapes)			R △ right inclined
V All shapes with square cross section	Please attach drawing indicating dimensions	Machine dependent, available with α = 6° 8° 10° 12° 15°	L △ left inclined







Order example: Fliese with holder

FAS75-20-15-MK1-40-G △ **MK1, L_1= 40 mm, straight α = 0°**
D501 - T645 E

FBS90-10-15-MK0-25,5-10 △ **MK0, L_1= 25,5 mm, 10°**
D711 - H770 J

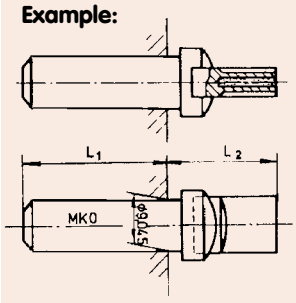
FCS115-20-10-Z10-30-15L △ **cylinder Ø 10 x 30 mm, 15° links**
D1001 - T645 E

FDS140-10-12-MK1-19/M6-6R △ **MK1 shortened with D1181 - T645 E tightening thread M6, 6° L_1 = 19mm**

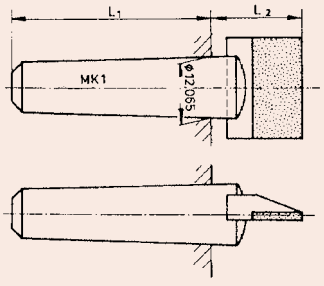
inclined to right

Diamond Fliese®	L_1 And L_2		
	L_1 clamping length [mm]	L_2 head length [mm]	
		α = 0...5°	α =5...15°
FAS	Standard holders, see sketches. Shorter Morse taper and cylindrical shank to specification.	23,5 ± 1	25 ± 2
FBS		23,5 ± 1	25 ± 2
FCS		18,5 ± 1	20 ± 2
FDS		18,5 ± 1	20 ± 2

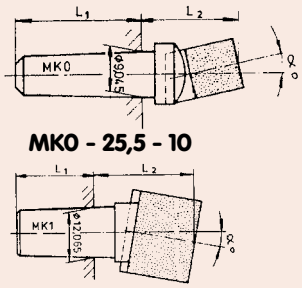
Example:



Z Ø - L_1 - G



MK1 - 40 G



MK0 - 25,5 - 10

MK1 - 19 - 15L

Stationary diamond dressers

Swivel holders for WINTER diamond Fliese tools

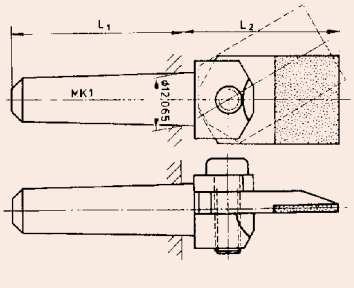
Swivel holder for WINTER diamond Fliese		
Shape and diameter mm	Clamping length L_1 mm	Inclination angle α°
K (all tapered shanks) e.g. MK1, MK0, K1:13.5	For non-standard mounts please indicate L_1.	Self-adjustable by clamping
Z (all cylindrical shapes)	-	
V (all shapes with square cross section)	Please attach drawing indicating dimensions	

Diamond Fliese®	L_1 And L_2		
	L_1 clamping length [mm]	L_2 head length [mm]	
		α = 0...5°	α =5...15°
FAS	Standard mounts, see sketches. Shortened Morse taper & cylindrical shank to specification.	37 ± 1	39,5 ± 2
FBS		37 ± 1	29,5 ± 2
FCS		32 ± 1	34,5 ± 2
FDS		32 ± 1	34,5 ± 2

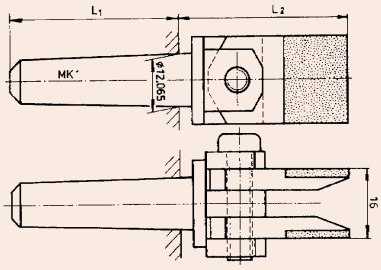
Please order swivel holder separately

Material No.	Swivel holder for Diamond Fliese	Explanations of abbreviations
66260196256 66260386838	MK1 MK0	△ Standard, Morse taper
66260387170	MK1-19 / M6	△ MK1 shortened plus tightening thread M 6
66260389757 66260386740	Z10-50 Z6-30	△ Cylindrical Ø 10 x 50mm △ Cylindrical Ø 6 x 30mm
	Swivel holder for two Fliese	
66260389454 66260390721	MK1 Z 12.7 - 50	△ Standard, Morse taper △ Cylindrical Ø 1/2" x 2"

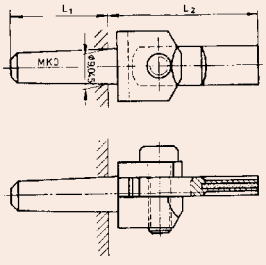
Examples:



Swivel holder MK1



Swivel holder MK1 for two Fliese tools

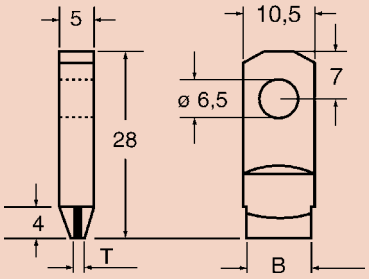


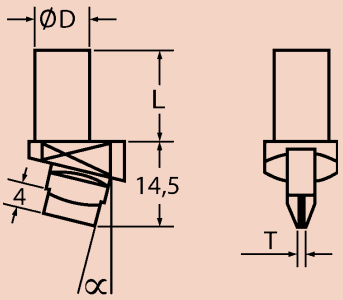
Swivel holder MK0

Stationary diamond dressers

Type D 30 Blade or Brazed Blade for Straight Precision Dressing

Tool No.	No. of Diamonds	D-Layer T	B
3044/2	2	0,4	4,0
3044/3	3	0,4	5,0
3044/4	4	0,4	6,0
3064/2	2	0,6	4,0
3064/3	3	0,6	6,0
3064/4	4	0,6	8,0
3084/2	2	0,8	5,0
3084/3	3	0,8	7,0
3084/4	4	0,8	9,0
30124/2	2	1,2	6,0
30124/3	3	1,2	8,0
30124/4	4	1,2	10,0



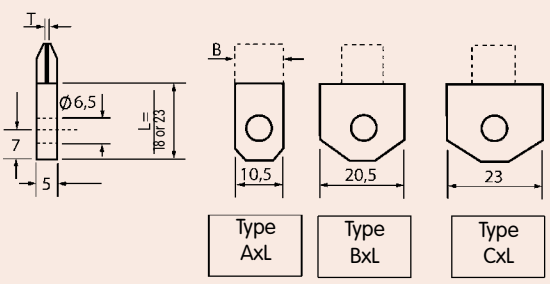


Advantages

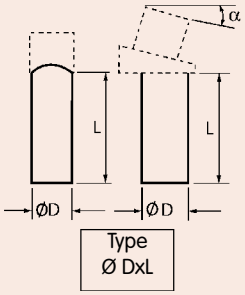
- **Consistent dressing result due to constant area of diamond contact**
- **Close tolerances**
- **Increased production due to reduced dressing frequency**
- **Better total economy**
- **Reduced tool cost**
- **Long tool life, long wheel life plus consistent surface integrity**

Sample of Brazed Blade Holders

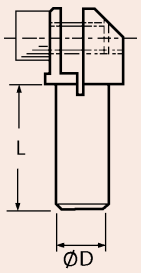
Blade Holder
Specify Type x L (18 Standard or 23mm)



Shank Holder
Specify ØD x L or Morse Cone and angle α



Standard Blade Holder
Ref. No. 1999/H



Stationary diamond dressers

D 30 Tool selection

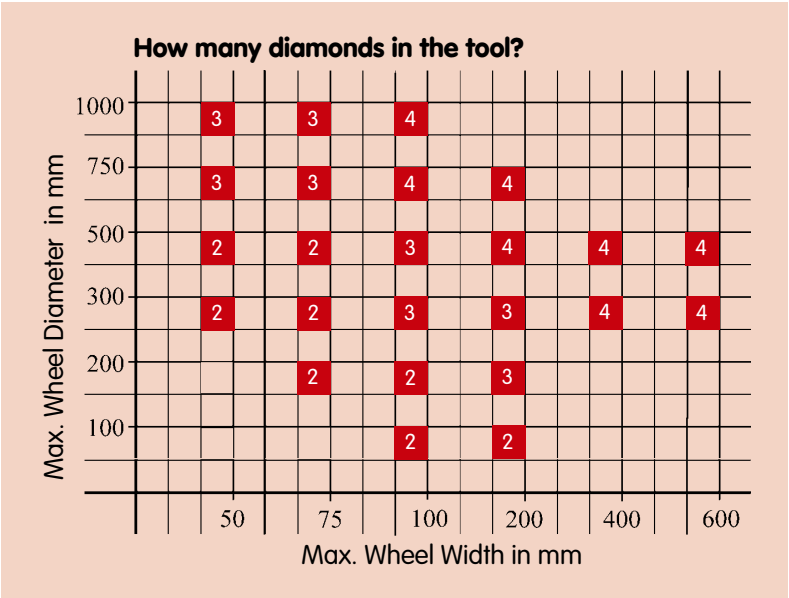
Example:

Wheel grit size	60
Wheel diameter	500 mm
Wheel width	75 mm

First tool recommendation will be:
3084 / 2

Grit size	Tool no.	How many diamonds
46	30124	See Tool selection Chart
60	3084	
80-120	3064	
150-240	3044	

Tool selection chart



Ordering Example:

5 pcs 3064 / 3 Blade A xL 18

5 pcs 3064 / 3 Blade B x L23

5 pcs 3064 / 3 Shank 11 x 40, 15°

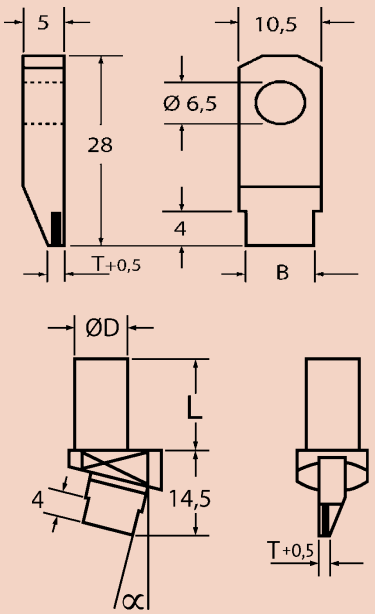
Type D 30 is also available as single point tool see page 34

Mounting instructions and Technical information see page 5 and 44-46

Stationary diamond dressers

Type D 35 Blade or Brazed Blade for Straight Precision Dressing

Tool No.	No. of Diamonds	D-Layer T	B
3544 - OC / 2	2	0,6	4,0
3544 - OC / 3	3	0,6	5,0
3544 - OC / 4	4	0,6	6,0
3564 - OC / 2	2	0,8	4,0
3564 - OC / 3	3	0,8	6,0
3564 - OC / 4	4	0,8	8,0
3584 - OC / 2	2	1,1	5,0
3584 - OC / 3	3	1,1	7,0
3584 - OC / 4	4	1,1	9,0
35124-OC / 2	2	1,5	6,0
35124-OC / 3	3	1,5	8,0
35124-OC / 4	4	1,5	10,0



Advantages

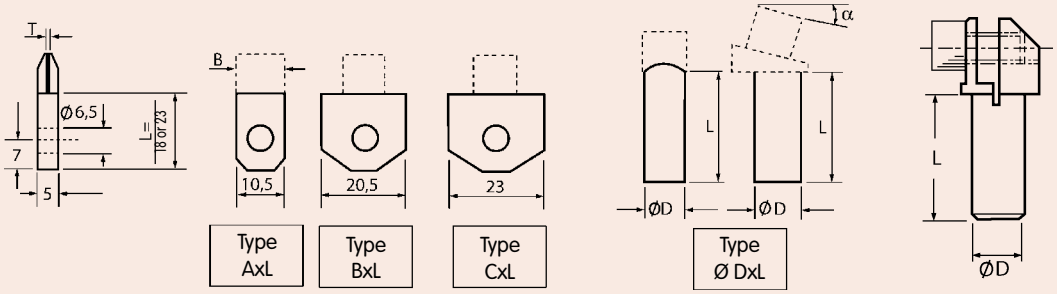
- **Consistent dressing result due to constant area of diamond contact**
- **Close tolerances**
- **Increased production due to reduced dressing frequency**
- **Better total economy**
- **Reduced tool cost**
- **Long tool life, long wheel life plus consistent surface integrity**

Sample of Brazed Blade Holders

Blade Holder
Specify Type x L (18 Standard or 23mm)

Shank Holder
Specify ØD x L or Morse Cone and angle α

Standard Blade Holder
Ref. No. 1999/H



Stationary diamond dressers

D 35 Tool selection

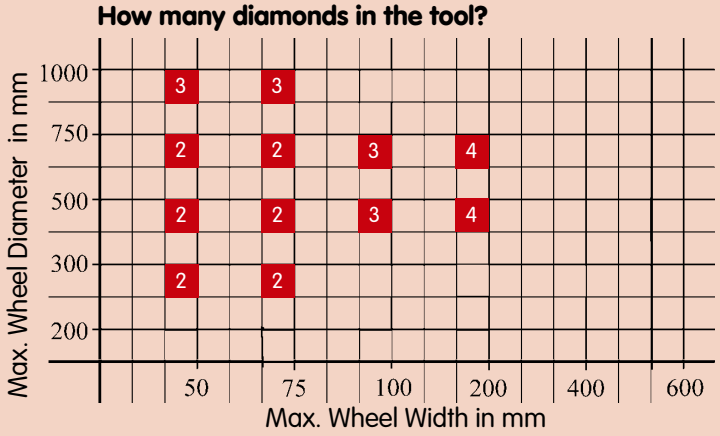
Example:

Wheel grit size	60
Wheel diameter	500 mm
Wheel width	75 mm

First tool recommendation will be:
3584-OC / 2

Grit size	Tool no.	How many diamonds
46	35124-OC	See Tool selection Chart
60	3584-OC	
80-120	3564-OC	
150-240	3544-OC	

Tool selection chart



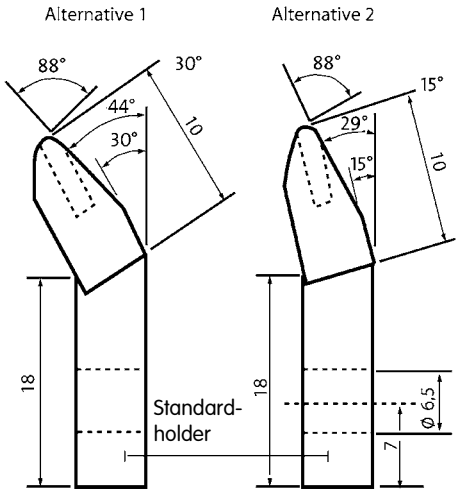
Ordering Example:
5 pcs 3584-OC/2
Shank A x 18 Blade

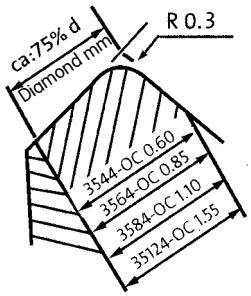
5 pcs 3584-OC/2
Shank B x 23

5 pcs 3584-OC/2
Shank 10 x 40 0°

5 pcs 3584-OC/2
Shank MC1 15°

Example of D 35 Advanced Design with Pre-Polished Diamonds





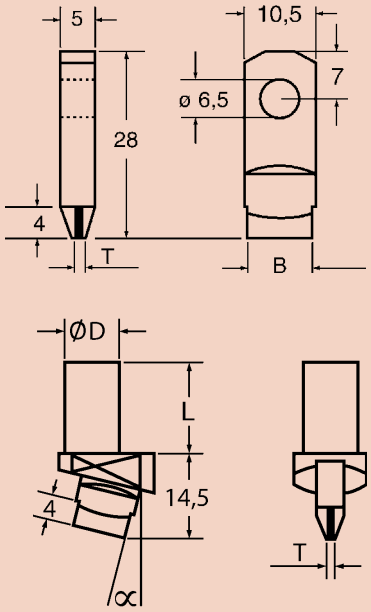
Drawing BV 136

Mounting instructions and Technical information see page 5 and 44-46

Stationary diamond dressers

Type D 25 Blade

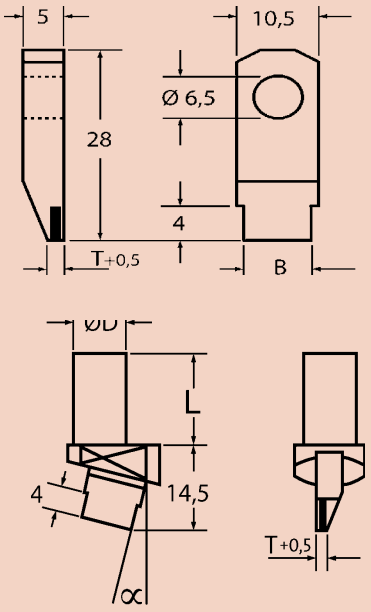
Tool No.	No. of Diamonds	D-Layer T	B
2565/2	2	0,8	6
2565/3	3	0,8	8
2565/4	4	0,8	10
2585/2	2	1,1	6
2585/3	3	1,1	8
2585/4	4	1,1	10
25115/2	2	1,5	6
25115/3	3	1,5	8
25115/4	4	1,5	10



Type D 25-OC Blade

Tool No.	No. of Diamonds	D-Layer T	B
2565- OC / 2	2	0,8	6
2565- OC / 3	3	0,8	8
2565- OC / 4	4	0,8	10
2585- OC / 2	2	1,1	6
2585- OC / 3	3	1,1	8
2585- OC / 4	4	1,1	10
25115- OC / 2	2	1,5	6
25115- OC / 3	3	1,5	8
25115- OC / 4	4	1,5	10

Ordering Example:
5 pcs 2585-OC/2 Shank A x 18 Blade
5 pcs 2585-OC/2 Shank B x 23
5 pcs 2585-OC/2 Shank 10 x 40 0°
5 pcs 2585-OC/2 Shank MC1 15 °



Stationary diamond dressers

D 25 Tool selection

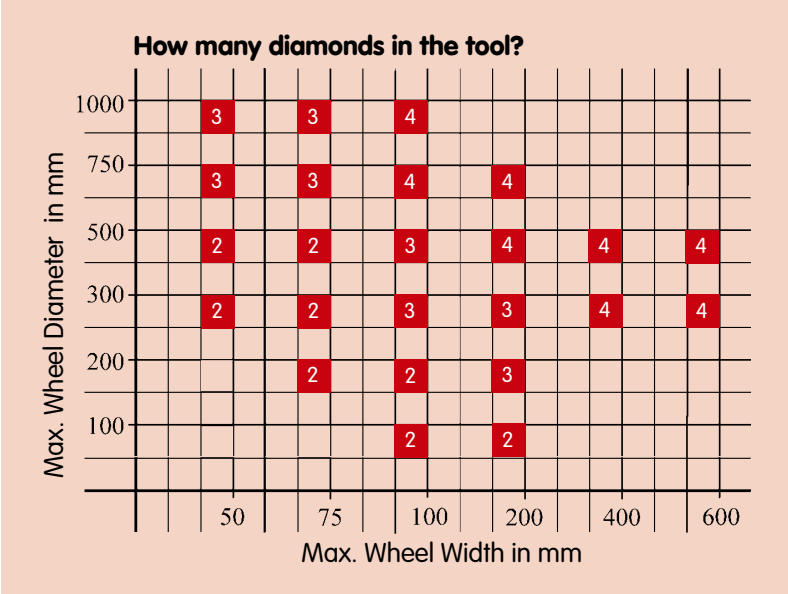
Example:

Wheel grit size	60
Wheel diameter	500 mm
Wheel width	75 mm

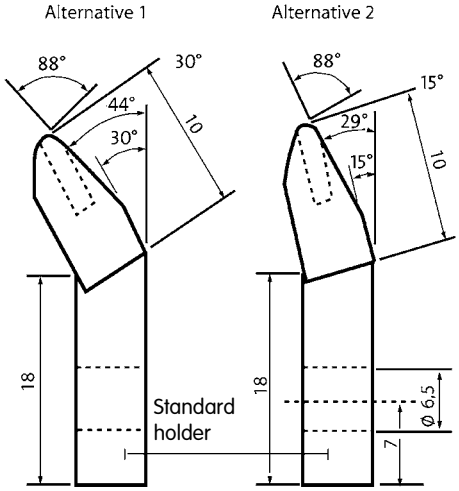
Grit size	Tool no.	How many diamonds
46	25115	See Tool selection Chart
60	2585	
80-120	2565	

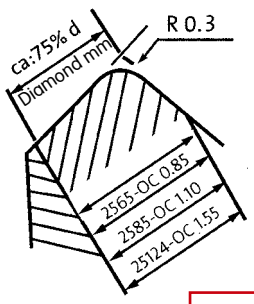
First tool recommendation will be:
2585 / 2

Tool selection chart



Example of D 25 Advanced Design with Pre-Polished Diamonds





Drawing BV 136

Mounting instructions and Technical information see page 5 and 44-46

Stationary diamond dressers

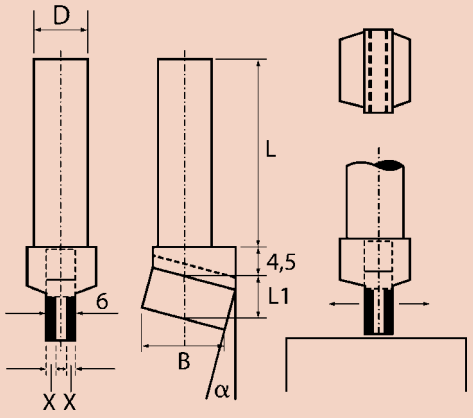
D 21 Dressing Tools

Two diamond sections

Tool No.	Diamond section		
	B	L_1	X
2102	12	10	0,7
2104	12	10	1,0
2106	18	10	0,7
2108	18	10	1,0

Three diamond sections

Tool No.	Diamond section		
	B	L_1	X
2101	12	10	0,7
2103	12	10	1,0
2105	18	10	0,7
2107	18	10	1,0
2109	18	10	1,5

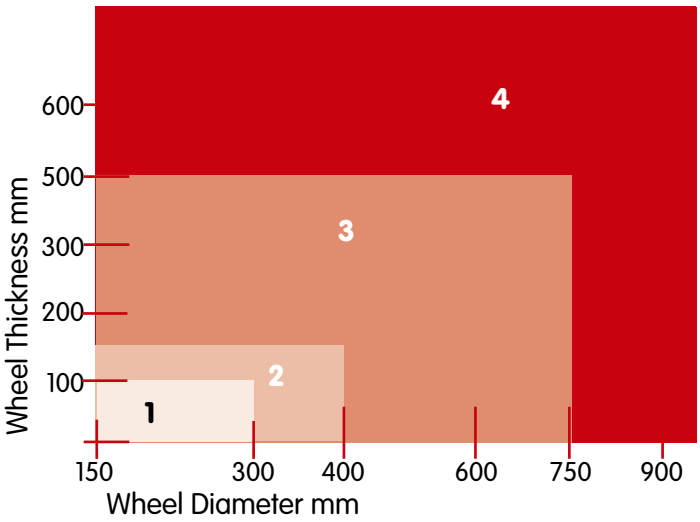


x = Diamond section (2 or 3)
Specify shank dimension
D x L and or conical angle α

Ordering Example:
5 pcs 2103 / Shank 11 x 40 0°
5 pcs 2103 / MC 1-15°

Tool selection Chart

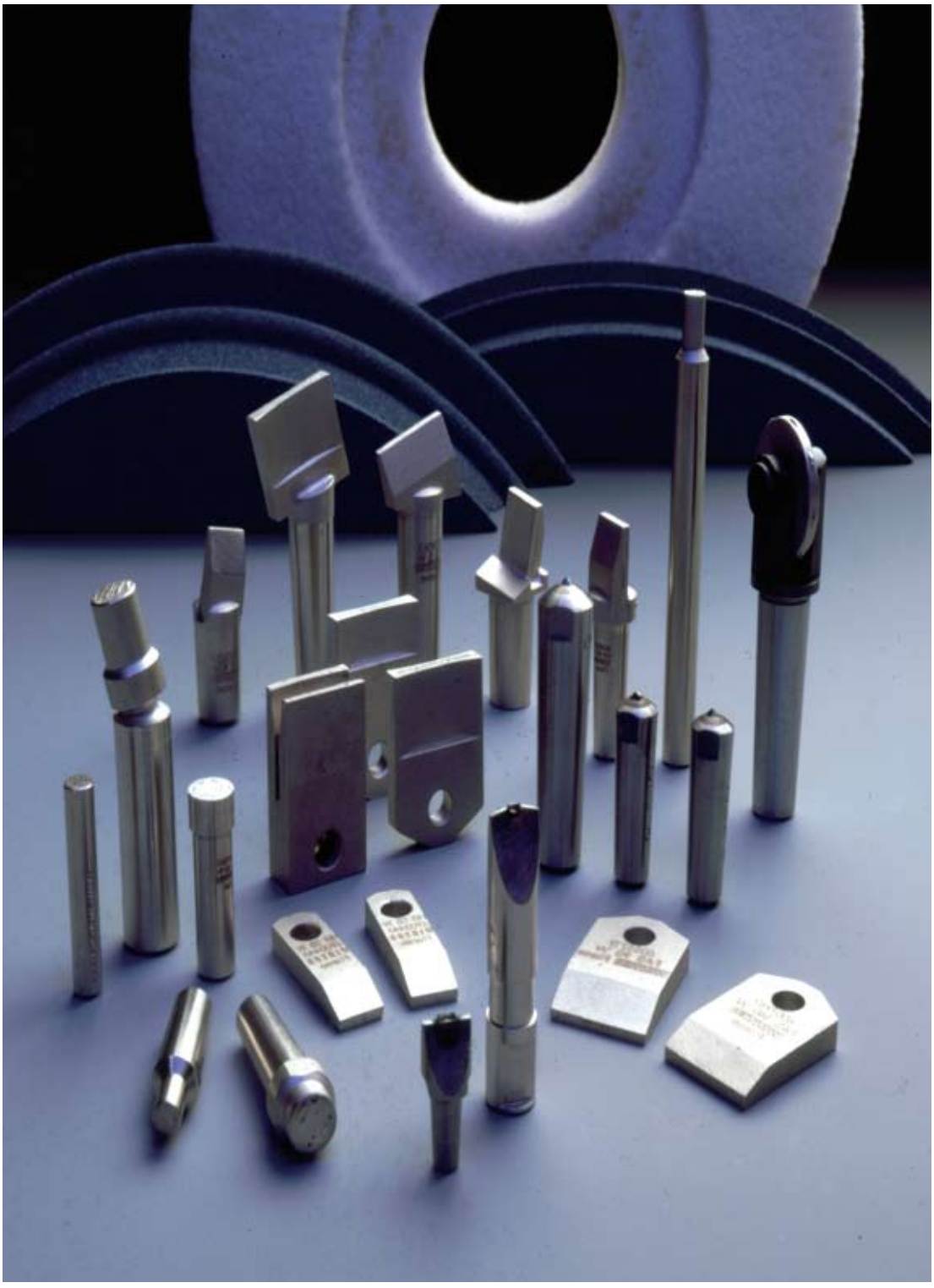
Tools should be chosen to suit the grit size and dimensions of the wheel.



	Grit Size	Tool No.
1	46 - 60	2104
	60 -120	2102
2	46 - 60	2108
	60 -120	2106
3	46 - 60	2103
	60 -120	2101
4	46 - 60	2107
	60 -120	2105

Mounting instructions and Technical information see page 5 and 44-46

Stationary diamond dressers

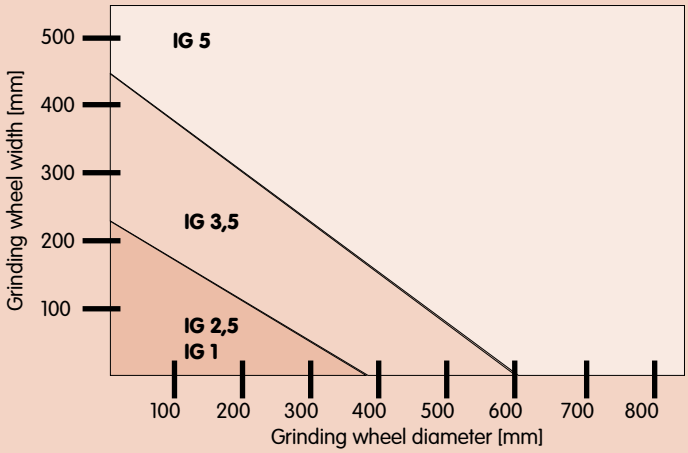


Stationary diamond dressers

Tool specification in four steps

Step 1 **Select appropriate Igel size for wheel size**

IG 2.5-



IG 1 = Igel® with diamond content 1ct and active diameter 8mm

IG 2.5 = Igel® with diamond content 2.5ct and active diameter 8 mm

IG 3.5 = Igel ® with diamond content 3.5ct and active diameter 8mm

IG 5 = Igel ® with diamond content 5ct and active diameter 11mm

IG 3 = Igel ® set with to specially large diamonds,
IG 15 e.g. for face dressing.

Step 2 **Selection of diamond grit for wheel abrasive**

D1001-

Wheel abrasive	Diamond grit	Old Winter designation
60-80	D 711	80
46-60	D 1001	60
36-46	D 2240	50
36-54	D 711	70

Step 3 **Selection of bond for grit type**

H 710-

Bond: H 710 **For fused alumina (Al_2O_3).** (old designation N)

Bond: H 770 **For silicon carbide (SiC).** (old designation N)

Step 4 **Selection of mount "always required".**

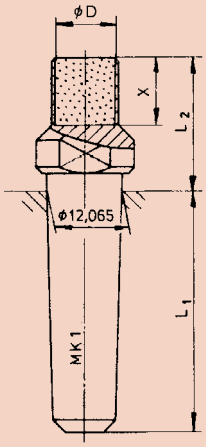
MK1 **Specify depending on machine type, e.g. MK1 or MK0.**
Straight version or inclined version.
For further mounts, see pages 12 and 32.

Example	**IG 2,5**	**-**	**8**	**-**	**11**	**-**	**D1001**	**-**	**H 710**	**-**	**MK1-15°**
	Step 1		Dimension				Step 2		Step 3		Step 4

Stationary diamond dressers

WINTER diamond Igel full diamond and set version

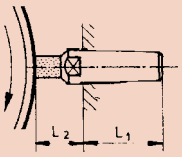
Examples:



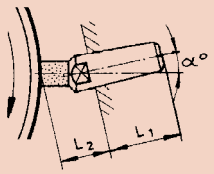
IG 2,5

WINTER diamond Igel, full-diamond version

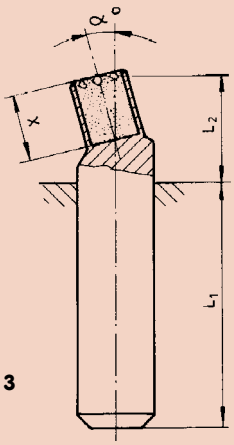
Shape	D	X	Grit size	Bond	Holder, selection see page 12
IG 1	8	4	D 2240 D 1001 D 711	H710 H770	
IG 2,5	8	11	D 2240 D 1001 D 711	H710 H770	
IG 3,5 highly concentrated	8	11	D 711	H710	
IG 5	11	11	D 2240 D 1001 D 711	H710 H770	



$L_2 = X + (6...11\ mm)$

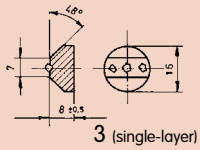
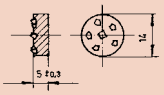
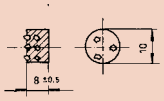


Please state iclination angle α when ordering



IG 3

WINTER diamond Igel set version

Shape	D	X	Grit size	Bond	Setting pattern
IG 3	16	8	D 3700	T625	 3 (single-layer)
IG 6	14	5	D 2600	T625	 6 (single-layer)
IG 6A	10	8	D 2600	T625	 6A (double-layer)

Other dimensions and specifications on request. Drawing needed for special versions.

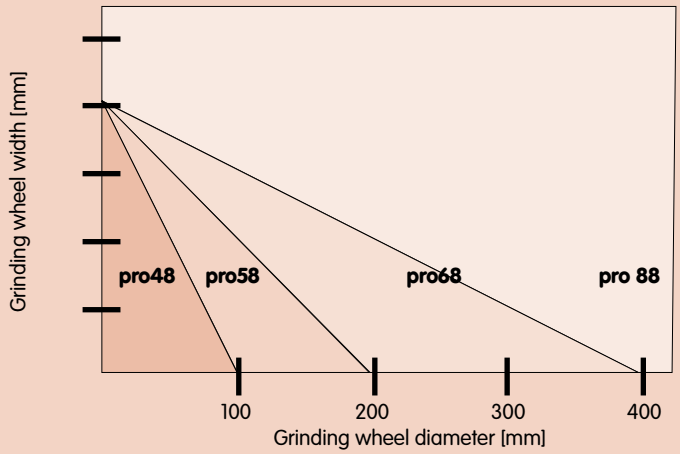
Order example: **IG 1**-8-4 / MK1-40-G / D1001 / H710
IG 3-16-8 / Z11-50-15° / D3700 / T625

Stationary diamond dressers

Tool specification in four steps

Step 1 **Select appropriate pro-dress® size for wheel size**

pro58-



pro48 = pro-dress® with diamond content 0.6ct and active diameter 4mm

pro58 = pro-dress® with diamond content 1ct and active diameter 5mm

pro68 = pro-dress® with diamond content 1.3ct and active diameter 6mm

pro88 = pro-dress® with diamond content 2.4ct and active diameter 8mm

Step 2 **Selection of diamond grit for wheel abrasive**

D151-

Wheel abrasive	Diamond grit
320 - 600	D 76
220 - 320	D 107
180 - 220	D 151
120 - 180	D 213

Wheel abrasive	Diamond grit
100 - 120	D 301
80 - 100	D 426
60 - 80	D 601
54 - 60	D 711

Step 3 **Selection of bond for grit type**

H 770-

H 760	**For fused alumina (Al_2O_3), D ≤ D301**	} old designation W
H 710	**For fused alumina (Al_2O_3), D > D301**	
H 770	**For silicon carbide (SiC).**	
ST 469	**For specially low cutting pressure, D optional e.g. for dressing VSS wheels**	} old designation BZ

Step 4 **Selection of mount "always required".**

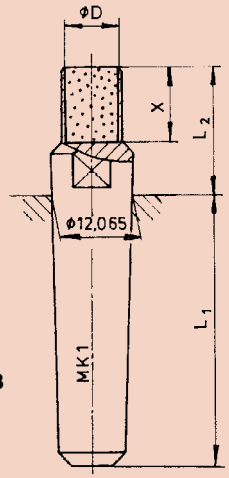
MK1 **Specify depending on machine type, e.g. MK1 or MK0. Straight version or inclined version. For further mounts, see page 12.**

Example	**pro58**	**-**	**5**	**-**	**8**	**-**	**D151**	**-**	**H 770**	**-**	**MK0**
	Step 1		Dimension				Step 2		Step 3		Step 4

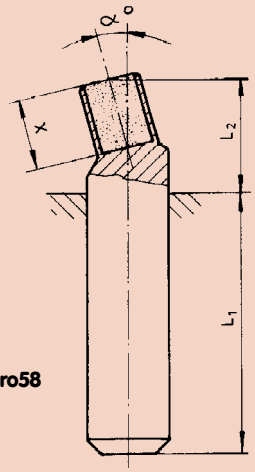
Stationary diamond dressers

WINTER pro-dress®

Examples:

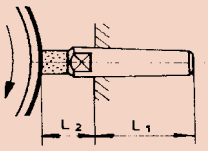
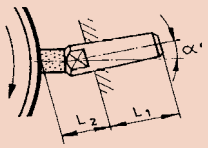


pro48



pro58

WINTER pro-dress®

Shape	D	X	Grit size	Bond	Holder, selection see page 12
pro48	4	8		H 710 H 760 H 770 ST 469	
pro58	5	8	D76 D107 D151 D213 D301	H 710 H 760 H 770 ST 469	
pro68	6	8	D426 D601 D711	H 710 H 760 H 770 ST 469	
pro88	8	8		H 710 H 760 H 770 ST 469	

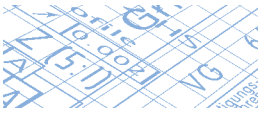
Diamond tips kept in stock = X

Grit size	Bond	pro48	pro58	pro68	pro88
D76	H 770				
D107	H 770				
D151	H 770				
D213	H 770				
D301	H 770				
D426	H 770		X		X
D601	H 770	X			X
D711	H 770				
D76	H 760		X		
D107	H 760		X	X	
D151	H 760				
D213	H 760		X	X	X
D301	H 760	X	X		X
D426	H 710	X	X	X	
D601	H 710	X	X	X	
D711	H 710		X	X	
D76	ST469				
D107	ST469				
D151	ST469				
D213	ST469		X		
D301	ST469	X			
D426	ST469				
D601	ST469				
D711	ST469				

For diamond tips not kept in stock, the minimum order size is 12 units per dimension.

Other dimensions and specifications on request.. Drawing required for special mounts.

Order examples:
pro48-4-8 / MK0-25.5-0° / D76 / H 710 with holder MK0, 0° = straight
pro58-5-8 / K1:20-18-G-17.5 / D151 / H 770 with holder taper 1:20, L_1 = 18, L_2 = 17.5, 0°



Stationary diamond dressers

Tool specification in two steps

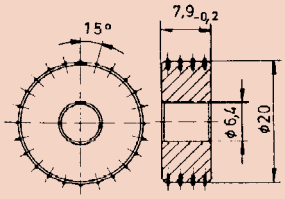
Step 1	**Select appropriate type**
Ro 2096	**For straight dressing cylindrical wheels, for diameter < 600mm and/or grit size 46-80.**
Ro 5096	**For straight dressing cylindrical wheels, for diameter > 600mm and/or grit size 36-60.**
Ro 1008	**For profile-truing of wheels, universal application for wheel grits from 46-100.** **- with natural diamonds high wear resistance** **- with synthetic diamond for reproducable dressing results**
Ro 15/5	**For straight dressing cylindrical wheels, for diameters from 5-40 mm, e.g. for ID grinding.**
Step 2	**Selection of clamping holder (multiple use)**
MK1	**Specify depending on machine type, e.g. MK1 or MK0. Shank designs: see pages 12 and 32.**

Example	**Ro 2096**	**-**	**MK1**		
	Step 1	Step 2 Clamping holder, see p. 13			

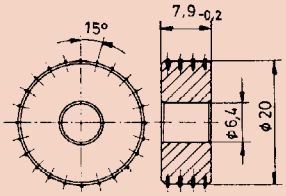
Stationary diamond dressers

WINTER Rondist Set version, electroplated layer

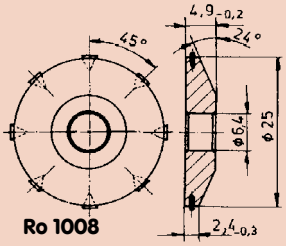
Examples:



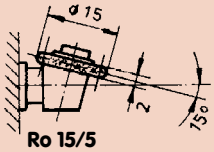
Ro 2096



Ro 5096



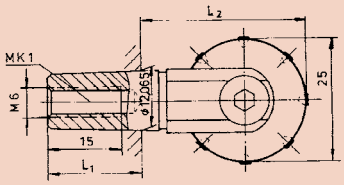
Ro 1008

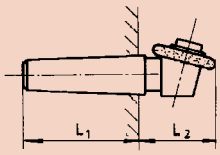


Ro 15/5

WINTER Rondist

Type	Carats	Diamond grade	Material No.
Ro 2096	2	Needle diamonds	69014185803
Ro 5096	5	Needle diamonds	66260390774
Ro 1008	1	Maccles	69014185801
		synthetic diamonds high reproduceability	66260354350
Ro 15/5	-	D501 electroplated bond	66260389341





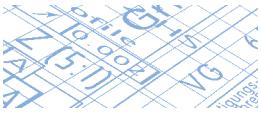
Please order clamping holders separately

Holder	L_1 mm	Rondist	L_2 mm
MK0 **MK1**	25,5 40,0	Ro2096 and Ro5096	24 + 1,5
MK1 shortened	e.g. 19	Ro1008	31 + 1,5
Cyl. mount	to be specified		
Sqare		Ro15/5	18
or to drawing			

Special holder on request (drawing required)

Order example: **Ro 2096, Clamping mount MK1-19 / M6**

Ro 15/5, Clamping mount MK0



Stationary diamond dressers

Tool specification in three steps

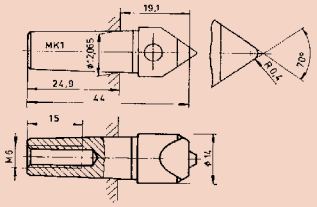
Step 1	**Select appropriate tool type for machine**
PD 410-	**The machine manufacturers have defined typical designs for the various machine types.** **The appropriate tool for each type of machine is given in the overview on page 29.** **Example: SCHAUDT machine = shape PD 410** **DIAFORM unit = shape PD 414.** **Other variants on request.**
Step 2	**Select carat weight**
Carat-	**The carat weight of the rough diamond to be used should be appropriate for the desired angle and radius.** **We normally use diamonds weighing approximately 1 carat.** **For DIAFORM diamonds: approx. 0.33 carats.** **On request, we can also manufacture types with other carat weights.** **Quality: WINTER uses only first-class maccles, to meet the highest standards.**
Step 3	**Select angle α and radius R**
55°- **R = 0.2**	**If not determined by machine type, angle and radius should be specified as large as possible, taking account of the required wheel profile.**

Example	**PD 410**	**-**	**1,0**	**-**	**55°**	**-**	**0,2**	**-**	**Fassung**
	Step 1		Step 2 Carat weight		Step 3 Angle		Radius		Is defined by designation 410

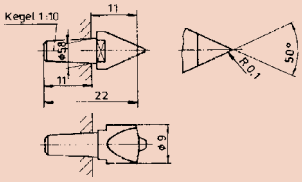
Stationary diamond dressers

WINTER profile dressing diamonds, ground with holder

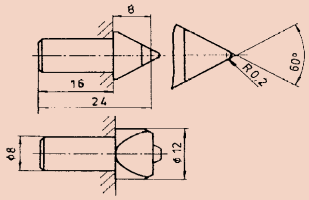
Example:



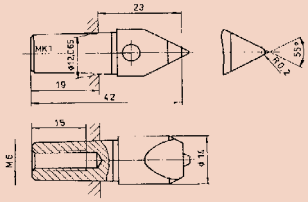
PD 410



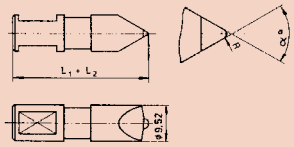
PD 428



PD 426



PD 425



PD 414

WINTER profile dressing diamonds

Shape	Carat weight	Nose angle α °	Nose radius R mm	Total length $L_1 + L_2$	Note on Machine
PD 410	Standard appr. 1 ct, but dependent on shape and processing	70°	0,4	44	SCHAUDT
PD 425		55°	0,2	42	FORTUNA
PD 426		60°	0,2	24	MSO
PD 428	0,5 Kt.	50°	0,1	22	JUNG RA38-53
PD 414 suitable for DIA-FORM units	0,33 0,25 or 0,5 Kt. on request	40° / 60° or as specified	0,125 0,250 0,500 or as specified	36△K 45,5△L 58△EL Dependent on unit K/L/EL code for total length	DIAFORM Unit models: see table below. Also available in unground type as "spur diamond". **Tolerance group 5.** Tolerance group 2 is possible on request. For cost-effective rouXgh profiling, we recommend the DIAFORM Fliese, see p. 9.

Holder: Part of shape, otherwise acc. to dimension drawing.

Other dimensions and specifications on request.

DIAFORM units

Shank	$L_1 + L_2$	Models
K	36	AT, ATR, BT, BTR
L	45,5	2A - 2AR - 2B - 2BR 3A - 3AR - 3B - 3BR 4A - 4AR - 4B - 4BR 5/1 - 5/2 - 10/2 6/1 - 6/2 - 12/1 - 12/2 8/1 - 8/2 - 14/1 - 14/2
EL	58	5/4 - 6/4 12/4 - 14/4

Rush repair service:
Saint-Gobain Diamantwerkzeuge GmbH & Co. KG
Unstrutweg 1
07743 Jena
Phone: +49 (0) 3641 4531-0
Fax: +49 (0) 3641 4531-25

Drawing required for special holders.

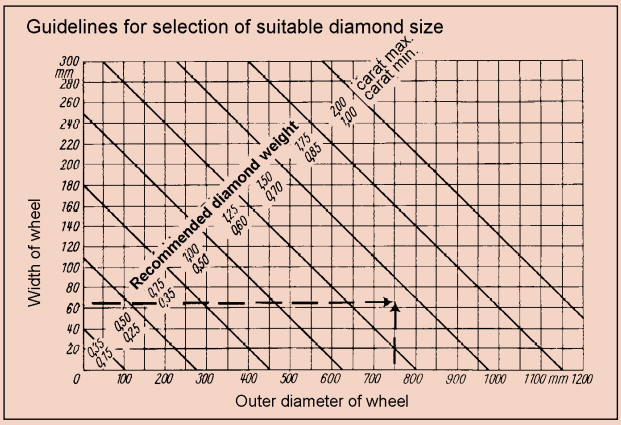
Order examples: **PD 410**-1.0-55-0.2
(shank / holder is part of order designation PD410.)

Stationary diamond dressers

Tool specification in three steps with natural points

Step 1 **Select appropriate diamond size for wheel size**

0,5 carats



Step 2 **Select diamond quality**

Vatom

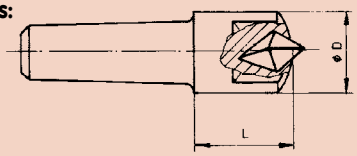
Industry	**Simple industrial quality. At least 2 working points.**
ZA	**Standard quality. At least 2 working points, few inclusions/ cracks permissible.**
Vatom	**Standard quality. At least 3 working points, irregularities of shape permitted within certain limits only. Few inclusions, no cracks.**
Diacar	**Good industrial quality. At least 3-4 working points, regular octahedron. No inclusions, no cracks.**
Basram	**Top quality. At least 4-6 working points, regular octahedron. No inclusions, no cracks.**

Step 3 **Select mount depending on machine type and diamond grit size**

MK1

Carat	D weight	L
0,18	> 4	6
0,25 / 0,33	> 5	6
0,4	> 6	8
0,5 / 0,6	> 7	10
0,7 / 0,8	> 8	10
1,0	> 9	10
1,25	> 10	10
1,5	> 11	12
< 2,5	> 12	12

A certain holder is required, depending on machine, e.g. MK1 or MK0.
Diamond weight must be specified in accordance with the table.
If necessary, a head is to be provided, examples:



Cylindrical shank Ø 6 mm,
Carat weight 0,5 ct.: without head
Carat weight 0,7 ct.: with head D x L = 8 x 10 mm

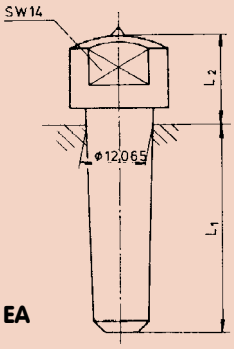
Example	**EA** -	**0,5** -	**Vatom** -	**MK1**
	Type	Step 1	Step 2	Step 3

0,5 Kt. D = % This means that no head is needed.

Stationary diamond dressers

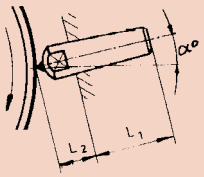
WINTER single-point diamond dressers with natural points

Example:

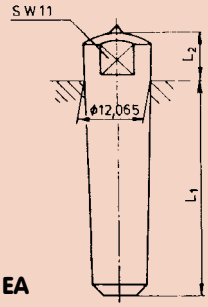


EA

WINTER single-point diamond dressers

Shape	Carat *)	Quality *)	Notes on selection of single-point diamonds
EA	**0,25**		
EA	0,33		
EA	0,40		
EA	**0,50**	**Industry** ZA	see page 30
EA	0,60	**Vatom Diacar**	
EA	**0,70**	**Basram**	*) For reasons of rapid availability the items shown in **bold** print should be preferred.
EA	**1,00**		
EA	1,25		
EA	**1,50**		

Notes on mount: see page 32



EA

WINTER disposable diamond dressers

Shape	Carat *)	Quality *)	Notes on selection of single-point diamonds
EW	≤ 0,1	Depending on applicaton sharp diamonds for low dressing forces or blockly tip.	Disposable diamond dressers with one working point firstclass small natural octahe-drons. Maintenance-free, no repairs. Highly suited to fine-grain grinding wheels and for small grinding wheel diameters.

Rush repair service:
Saint-Gobain Diamanterkzeuge GmbH & Co. KG
Unstrutweg 1, 07743 Jena
Phone: +49 (0) 3641 4531-0
Fax: +49 (0) 3641 4531-25

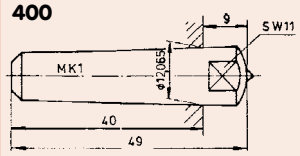
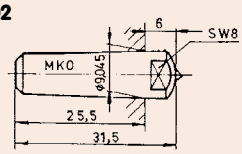
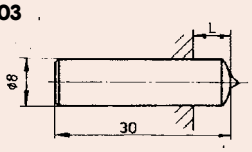
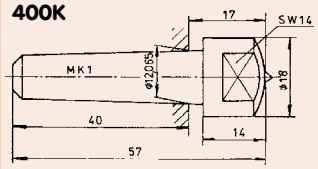
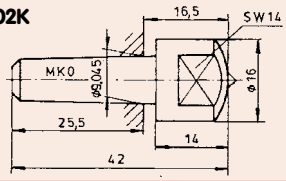
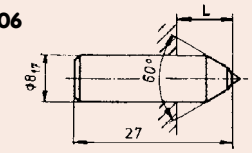
Single-point dressers available with other weights on request.
Special mounts with dimensioned sketch available on request.
Disposable dressers, minimum order: for standard inserts available ex stock = 5 pieces
for special mounts = 50 pieces

Order example:
EA 0,5 - Diacar - MK1
EW 01 -Mount to sketch.

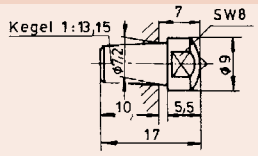
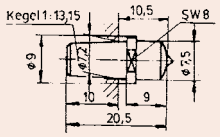
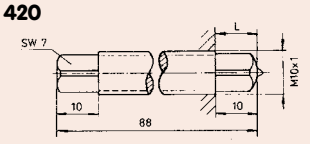
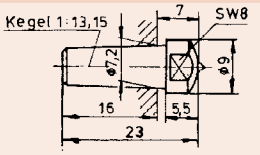
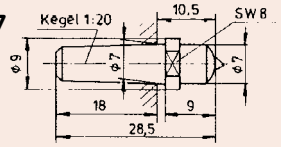
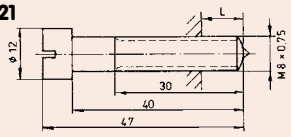
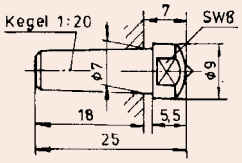
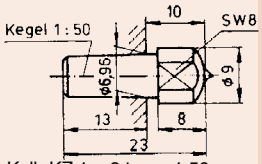
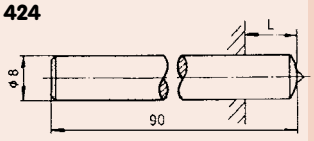
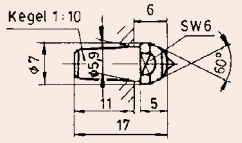
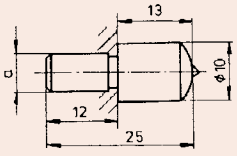
Stationary diamond dressers

Diamond holders to DIN 228 and to WINTER standard

Diamond holders to DIN 228

Cat. No.	Cat. No.	Cat. No.
400  	**402**  	**403** 
400K  	**402K**  	**406**  D (Diamond tip) central

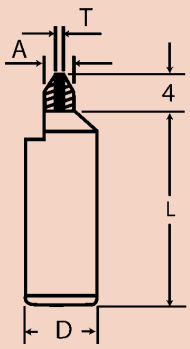
Other diamond holders

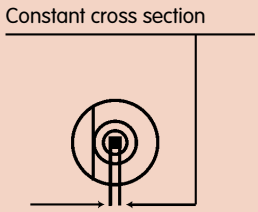
Cat. No.	Cat. No.	Cat. No.
407  Jung NT 65 taper 1:13,15	**413**  Jung C 8 taper 1:13,15	**420**  Niles
409  Jung JgN 1751 taper 1:13,15	**417**  Jung C 8 taper 1:20	**421**  Niles
 Jung JgN 1751 taper 1:20	 Kolb KZ 1 + 2 taper 1:50	**424**  Deckel
 Jung FA 42-12 taper 1:10	 Landis a = Ø 6; Ø 6,5;Ø 8	

Stationary diamond dressers

Type D 12 Single Point Dressing Tools

Tool Nr.	Diamond T	Diamond A
1265	0,8	Smallest possible, due to T size
1285	1,1	
12115	1,5	





Tool selection

Tool No.	Grit size
1265	80-120
1285	46-80
12115	*)

*) For extremely hard conditions

Ordering example:

2 pcs 1285Shank 10 x 40

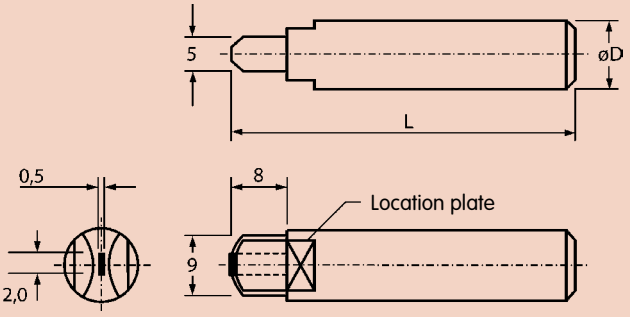
Type D 53 Centerless Control wheel dresser

Tool No.	Diamond Section Rectangular
5320	0,5 x 2 x 8

Shank: state D x L (or cone size)

High precision PKD (polycristalline diamond) dressing tool, with one diamond. For straight and profile dressing of control wheels, rubber or vitrified, in centreless machines. Maximum wheel dimension 500mm diameter x 600mm width

PKD-diamond with constant contact area



Mounting instructions and technical, information see page 5 and 44-46.

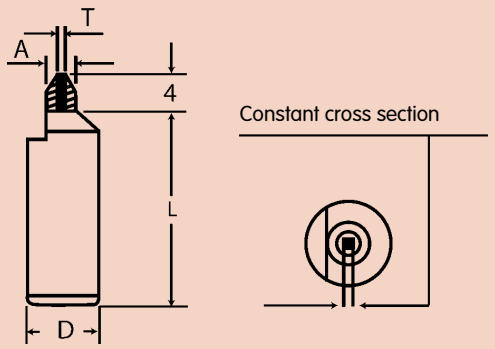
Ordering example:

1 pcs 5320 Shank, 11mm Ø x 50mm length
1 pcs 5320 Shank Morse Cone 1

Stationary diamond dressers

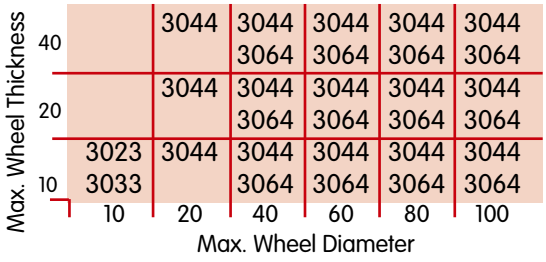
Type D 30 Single-Point Dressing Tools

Tool No.	Diamond T	Diamond A
3023	0,2	Smallest possible, due to T size
3033	0,3	
3044	0,4	
3064	0,6	
3084	0,8	
30124	1,2	



Tool Selection Chart for internal grinding machines with small wheels

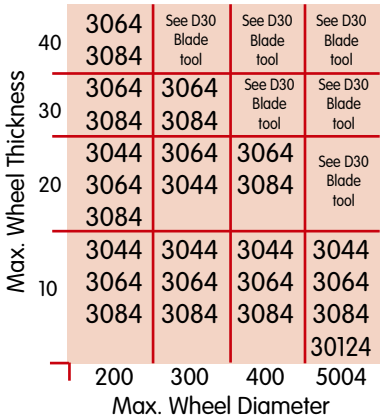
Tool No. Depends also on the wheel dimension	Grit size
3044 - 3064 - 3084	60
3044 - 3064 - 3084	80
3044 - 3064	100 - 120
3044	150 - 180
3023 - 3033 - 3044	220 - 320



Example: Wheel size D 60 T 40, Wheel grit size 80, Tool rec. 3064

Tool Selection Chart for all other machines with bigger wheels

Tool No.	Grit size
30124	46
3084	60
3064	80 - 100
3044	120 - 150



Ordering Example:
5 pcs 3064 Shank 10 x 40
5 pcs 3084 Shank MC 1

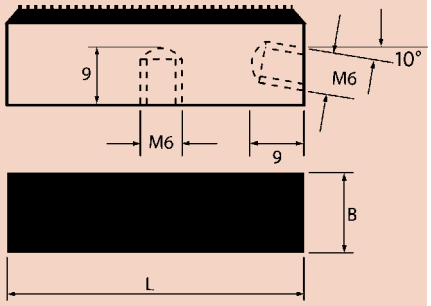
Mounting instructions and Technical information see page 5, 44 and 46

Stationary diamond dressers

Type D 20 Hand Dressing Tools

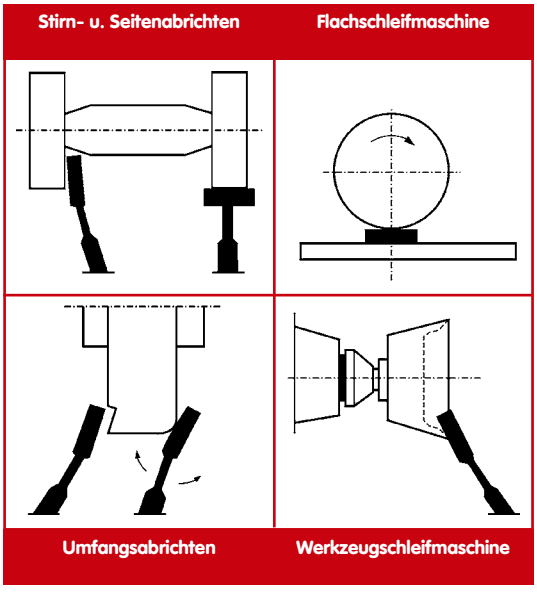
Tool No.	Diamond Face L x B mm	Diamond Carat Weight
2001	45 x 12	5,0
2001/A	45 x 12	5,0
2002	20 x 12	2,2
2002/A	20 x 12	2,2

A = Diamond head only (without the handle)



Application Examples

- Face and side dressing on bench grinders
- Face and undercut dressing on cylindrical grinders
- Hand dressing in tool rooms
- Rough profiling
- Dressing of surface grinding wheels, with the D 20 diamond head mounted on the magnetic table



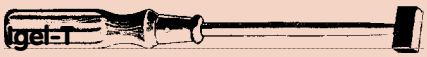
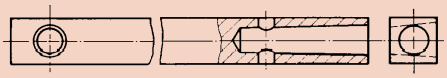
The multi-purpose hand dressing tool Advantages

- The D 20 diamond hand dressing tool has a high diamond concentration giving great wear resistance and long life.
- It is suitable for all hand dressing operations for rough profiling of both aluminium oxide and silicon carbide grinding wheels up to 1000mm in diameter and with grit sizes ranging from 36 to 100 mesh.
- D 20 tools are designed to meet present and future demands for the rapid dressing of all types of conventional grinding wheels.
- The robust and economical D 20 tool can quickly recondition a worn or dull grinding wheel with minimal loss of abrasive.
- The D 20 tool only dresses the high spots on the grinding wheel to re-establish running truth. Ensuring maximum wheel life and free cutting action.
- A high concentration of diamonds in the D 20 tool allows sharp corners to be dressed without damage to the tool.
- D 20 tools are available in two sizes, both having two methods of mounting – for side dressing and face dressing.
- D 20 tools are supplied with a 180mm long non-slip plastic covered handle.

Ordering Example: 3 pcs 2001
3 pcs 2001/A

Stationary diamond dressers

Other products -Hand dressers, hand holders, machine holders

	Article	Selection options
Igel-P 	**Hand dresser**	**Igel-P 1,25 Carats** **Mat. No. 66260134089**
		**Igel-T 1,25 Carats** **Mat. No. 6626013388**
No. 445 	**Hand holder for mounted dressers**	**Nr. 445** **for MK1 or MK0** **Hexagon with wooden handle** **MK1 = Mat. No. 66260386013** **MK0 = Mat. No. 66260388543**
No. 440 		**Nr. 440** **for MK0** **Cylindrcal holder** **Ø 12 x 200 mm** **MK0 = Mat. No. 66260385610**
No. 435 	**Machine holders for mounted dressers**	**Nr. 435** **for MK1 or MK0** **Square** **18 x 18 200 mm** **MK1 = Mat. No. 66260387168**

Technical notes

1. History and benefits of multi-point dressers

Up to the end of the fifties, single-point diamond dressers were practically the only type of dressing tool; after that the first multi-point diamond tools were made with small diamonds, and were used with great success for straight dressing of grinding wheels. Thus WINTER produced the Igel® dresser. Later the range was expanded to include pro-dress® with fine grit sizes for dressing fine-grained wheels.

Cylindrical multi-point dressers cannot be used for profile dressing, so the next development step was to sinter a flat plate instead of the cylindrical Igel shape. The was a precursor of the WINTER Fliese. The diamond Fliese® combines the benefits of the multi-point diamond dresser with those of the single-point diamond dresser. It is appropriate for universal dressing, of straight wheels and profiled wheels. The technical and commercial benefits of multi-point dressers:

- Igel®, pro-dress® and diamond Fliese® tools can be used universally for straight dressing.

- Diamond Fliese® tools are also universally capable of use for profile dressing.

Technical notes

- These tools can be used up completely without any requirement for maintenance, and are rugged in operation.

- There is less change in active width b_D compared with single-point diamond dressers, giving more constant dressing results and more constant behaviour of the grinding wheel, i.e. more precision in grinding.

- Multi-point dressers are available in different grit sizes, diamond qualities and concentrations, and as diamond needles; this permits versatile adaptation to the special requirements of a dressing and grinding operation.

- The diamond material used in multi-point tools is much lower-priced and thus more economical compared with the same carat weight in single-point dressers.

- Alongside the single-point dressers, there is also the Rondist programme, with a number of diamonds per tool that are used one after the other.

- Rotary diamond dressers, e.g. diamond profile and copy roller dressers. A separate catalogue is available for these tools. We will be glad to make recommendations for dressing diamond and CBN wheels on request.

2. Dressing with stationary diamond dressers

An optimal grinding process can only be achieved by proper preparation of the wheel by dressing (also known as conditioning). This means not only creating or restoring true running and the correct profile of the wheel, but above all generating the free cutting capability of the wheel which is needed for the grinding process. Thus the term "dressing" covers trueing and/or sharpening of the wheel.

The wheel topography can be controlled over a wide range by varying the dressing parameters. This has considerable effects on the characteristics of the wheel in the grinding process, and on the results of the grinding operation.

Diamond dressing tools may be classified as follows:

- "Stationary diamond dressers", e.g. single-point and multi-point dressers, and

- "Rotary diamond dressers", e.g. diamond profile and form dressers.

The dressing techniques used for stationary diamond dressers are considered in this catalogue.

There is a separate catalogue available for WINTER diamond roller dressers. We will be glad to send you this catalogue on request.
We will also be pleased to give you recommendations for dressing diamond and CBN wheels.

The result of dressing is determined by the parameters feed v_{fd}, infeed a_{ed} and the type of dresser used. One important parameter is the active width b_D, i.e. the shape of the diamond as apparent in the surface of the wheel to be dressed. These parameters are summarized in Fig. 1.

All dressing tools are subject to wear, dependent on the parameters set, on cooling, on the wheel volume dressed V_{sd} and on wear resistance. If a single-point diamond dresser is used, the active width b_D increases with increasing duration of operation, i.e. the original point is progressively used up, and the active width b_D changes at the same time, with a corresponding change in the dressing result. Multi-point dressers have much more consistent wear behaviour.

The overlap factor U_d provides a link between the parameters feed v_{fd}, active width b_D and wheel spindle speed n_{sd} during dressing. This overlap factor U_d influences the number of cutting points on the grinding wheel surface. In practice, the overlap factor U_d is between 2 and 8. The figures 2 to 8 characterize the surface topography, i.e. 2 = coarse, 8 = extremely fine. It is important to note that with coarse dressing (e.g. $U_d = 2$), the wheel topography is comparable, regardless of the wheel grain. With finer wheels, there are more cutting points involved in the cutting process, and this means higher cutting forces. However, the finer wheel topography causes greater wear resistance, i.e. higher removal ratios (v_{wd} / v_{sd}) can be achieved at higher overlap factors. U_d factors of more than 8 are uneconomical, as no change can be achieved in process behaviour, and there is no improvement in surface quality.

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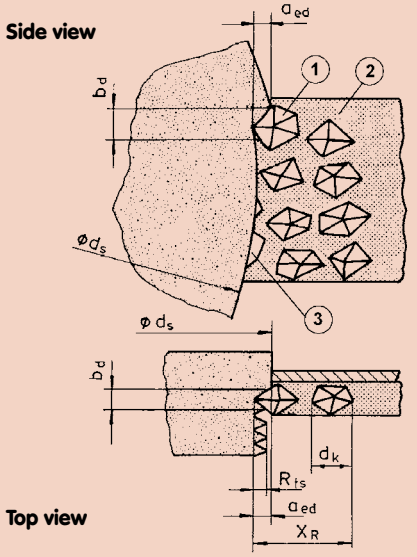

a_{ed}	(mm)	:	Infeed per stroke
b_D	(mm)	:	Active width of diamond
d_s	(mm)	:	Grinding wheel diameter
		:	Active diamond grit
,		:	Bond T or H
f		:	Pulled out, used grit
d_k	(mm)	:	Diamond grit diameter
R_{ts}	(µm)	:	Active roughness of grinding wheel
X_R	(mm)	:	Residual layer depth of diamond
Fliese®			
n_{sd}	(rpm)	:	Spindle speed for dressing
v_{fad}	(mm/min)	:	Axial feed rate for dressing
f_{ad}	(mm/rev)	:	Axial feed for dressing
$U_d = \frac{b_d}{f_{ad}} = \frac{b_d \cdot n_{sd}}{v_{fad}}$	(1)	:	Overlap factor for dressing
V'_w	(mm^3/mm)	:	Wheel (workpiece) removal volume per mm wheel width in grinding process

Fig. 1: Mode of operation of a diamond Fliese® and formation of active roughness depth R_{ts} as a function of b_D and f_{ad}.

The following overlap factors U_d are recommended as a function of grinding wheel grain size:

Wheel grain size	60:	$U_{dmax} = 4$
	80:	$U_{dmax} = 6$
	120:	$U_{dmax} = 8$
Or simplified:		U_{dmax} = (US mesh : 15)

3. Ways of improving results

The possible ways of improving a specific working result are shown in Figs. 2 and 3. The block diagram (Fig. 2) shows the settings that can be adjusted to improve the result. The left-hand block shows symbolically the grinding wheel to be dressed; the middle sections show the parameters that can be adjusted to achieve a specific result, i.e. machine, dressing tool and operating parameters.

These three possibilities can and must be used to achieve the desired topography on the grinding wheel, as shown symbolically in the right-hand block. Fig. 3 supplements Fig. 2 by a systematic overview of the possible ways of influencing the dressing parameters. In individual cases, the decision must be made on the basis of the capabilities of the specific machine with the dressing tool and the setting parameters.

Practical mounting and operating recommendations are given in Section 4. Section 5 shows how to cost an operation, which may permit savings. Section 6 gives a series of test results with true figures, for comparison of results and to help specify operating parameters.

Stationary diamond dressers

Technical notes

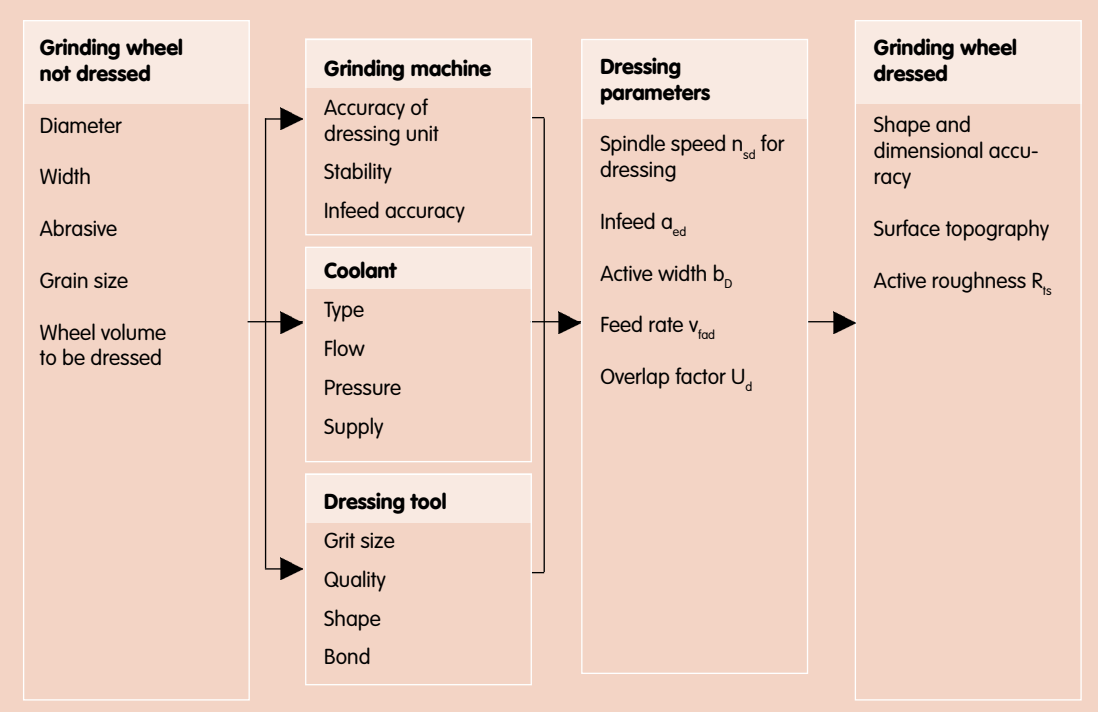

Fig. 2: Block diagram: dressing a grinding wheel with stationary diamond dressers and their variables such as grinding machine, coolant, dresser and operating parameters with the major influencing variables.

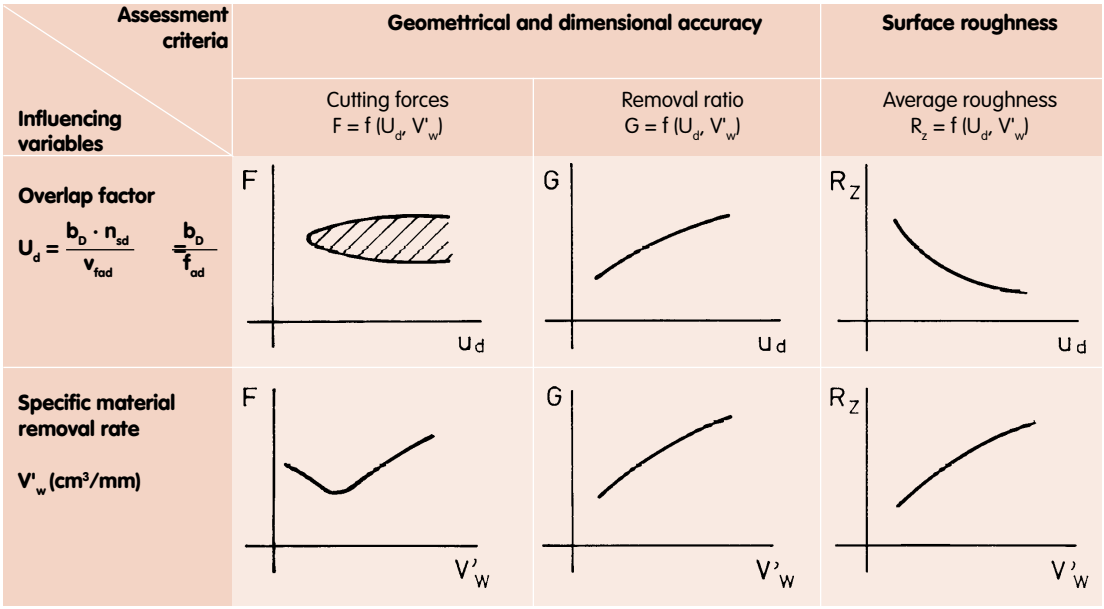

Fig. 3: Systematic diagram showing the influence of technical grinding result as a function of dressing parameters and specific material removal volume V'_w (cm^3/mm) of grinding wheel in the grinding process (acc. to Messer)

Technical notes

4. Mounting and operating recommendations (overview see pages 30-31)

5. Cost-effectiveness calculation

For comparison between different dressing tools, it is necessary to look not only at the technical dressing result, but also to make a cost comparison.

Total dressing cost K_{dtot} is calculated from two blocks of cost:

1. Costs related to the service life of the dressing tool, calculated from:

   - Cost of dressing tool K_w
   - Life (no. of dressings) of dressing tool i_d, i.e.

   $$K_{wd} = K_w : i_d \quad \text{(DM : no. of dressings)}$$

2. Costs related to the dressing operation K_{zd}, calculated from:

   - Machine rate K_M (incl. labour and ancillary labour cost)
   - Dressing duration t_d, i.e.

   $$K_{zd} = K_M : t_d \quad \text{(DM : no. of dressings)}$$

Thus the total dressing cost K_{dtot} can be calculated from the two blocks (1 and 2), as follows:

$$K_{dtot} = K_{wd} + K_{zd} \quad \text{(DM : no. of dressings)}$$

6. Test data and parameters

Practical data and research results are shown graphically on pages 30, 31 and 32 to help specify operating parameters and to enable comparison of results.

7. Recommended literature on dressing technology

I. Appun: Einfluß des Abrichtvorganges und der Kühlverfahren auf Verschleiß und Oberflächengüte beim Rundschleifen. Dissertation TH Braunschweig 1953.

D. M. Busch: Abrichten von Schleifscheiben mit Diamantwerkzeugen. MM Maschinenmarkt, Würzburg, Jahrgang 75 (1969) Nr. 82, Seiten 1807-1810.

H. Frank: Das Abrichten von Schleifscheiben mit Diamanten und der Einfluß auf das Schleifergebnis beim Außenrundeinstech-schleifen. Dissertation RWTH Aachen, 1963.

R. Gauger: Diamantwerkzeuge zum Abrichten von Schleifscheiben. IDR 1 (1967) 3, Seiten 141-151.

W. König u. J. Messer: Einstellbedingungen beim Abrichten von Schleifscheiben. Schweizer Maschinenmarkt Nr.49/1991, Seiten 26-29.

W. König u. J. Messer: Abrichten von Korundschleifscheiben mit Stehenden Abrichtwerkzeugen. Jahrbuch Schleifen, Honen, Läppen und Polieren, Vulkan-Verlag Essen, 1982, 51. Ausgabe, Seiten 307-317.

J. Messer: Abrichten konventioneller Schleifscheiben mit Stehenden Werkzeugen. Dissertation RWTH Achen, 1983.

E. Salje: Abrichtverfahren mit unbewegten und rotierenden Abrichtwerkzeugen. Jahrbuch Schleifen, Honen, Läppen und Polieren, Vulkan-Verlag Essen, 1981, 50. Ausgabe, Seiten 284-298.

W. Thöing: Untersuchungen über das Abrichten von Schleifscheiben mit Diamantwerkzeugen. Dissertation TH Braunschweig, 1956.

R. Völler: Feinschleifen - heute und morgen. Trennkompendium, Band 1, 1978, ETF Bergisch-Gladbach, Seite 309.

R. Völler: Abnutzung von Abrichtwerkzeugen. Jahrbuch Schleifen, Honen, Läppen und Polieren. Vulkan-Verlag Essen, 1981, 50. Ausgabe, Seiten 249-266.

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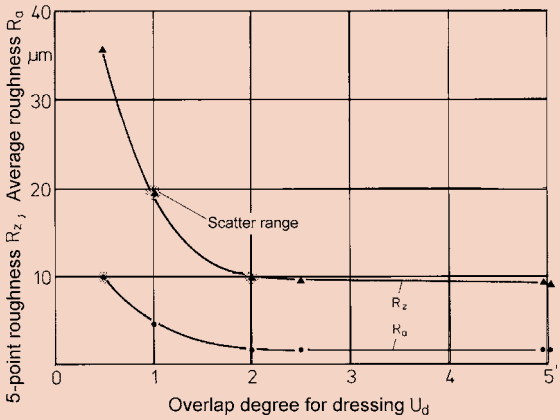
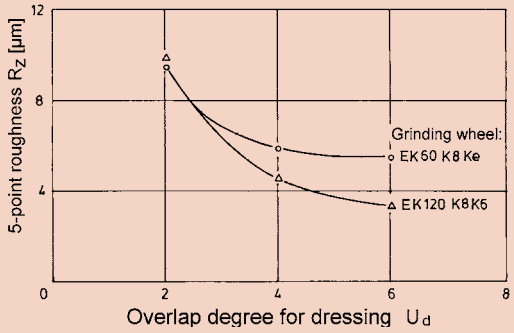


Material: Ck 45N (1.1191)
Grinding wheel: EK60 K8 Ke
Cutting fluid: Emulsion 3%

Grinding parameters:
v_c = 45 m/s
v_w = 0.75 m/s
Q'_w = 3.0 mm³/mm · s
V'_w = 800 mm³/mm

Dressing tool: WINTER needle Fliese FB180
Dressing infeed: a_{ed} = 0.02 mm

Fig. 4: Roughness on ground workpiece is influenced by overlap factor U_d (acc. to Messer).

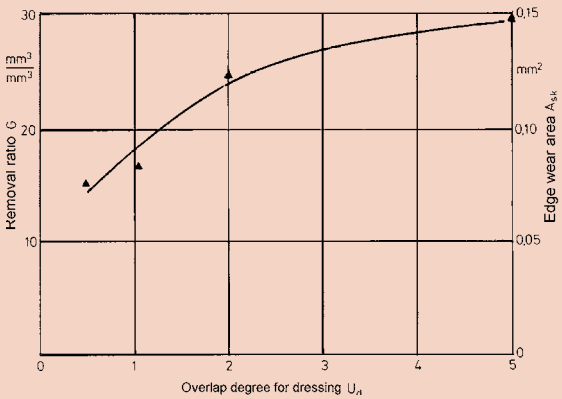


Material: Ck 45N (1.1191)
Grinding wheel: EK60 K8 Ke
EK120 K8 Ke
Cutting fluid: Emulsion 3%

Grinding parameters:
v_c = 45 m/s
v_w = 0.75 m/s
Q'_w = 3.0 mm³/mm · s
V'_w = 200 mm³/mm

Dressing tool: WINTER needle Fliese FB180
Dressing infeed: a_{ed} = 0.03 mm

Fig. 5: Workpiece roughness R_z is influenced by overlap factor U_d and wheel grit (acc. to König, Messer).



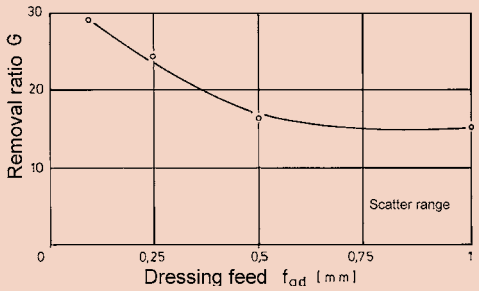
Material: Ck 45N (1.1191)
Grinding wheel: EK60 K8 Ke
Cutting fluid: Emulsion 3%

Grinding parameters:
v_c = 45 m/s
v_w = 0.75 m/s
Q'_w = 3.0 mm³/mm · s
V'_w = 800 mm³/mm

Dressing tool: WINTER needle Fliese FB180
Dressing infeed: a_{ed} = 0.03 mm

Fig. 6: Dressing ratio G of the grinding wheel is influenced by overlap factor U_d (acc. to Messer)

Technical notes

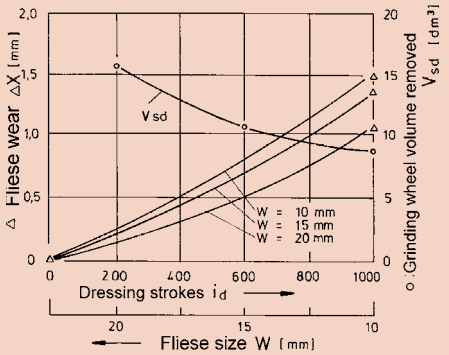


Material: Ck 45N (1.1191)
Grinding wheel: EK60 K8 Ke
Cutting fluid: Emulsion 3%

Grinding parameters:
v_c = 45 m/s
v_w = 0.75 m/s
Q'_w = 3.0 mm³/mm · s
V'_w = 800 mm³/mm

Dressing tool: WINTER needle Fliese FB180
Dressing infeed: a_{ed} = 0.02 mm

Fig. 7: Dressing ratio G (life of grinding wheel) is influenced by dressing feed f_{ad} (acc. to Messer).

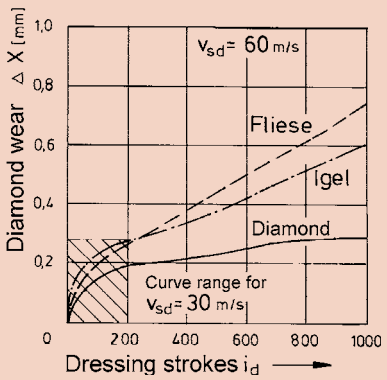


Material: Centerless grinding wheels
Ø 500 x 300 mm,
HK28-80a L6 VXM
Machine: Lidköpping Centerless 4 B
Cutting fluid: Emulsion 2%
Q_l = 4.4 l/min

Parameters:
v_{sd} = 60 m/s
n_{sd} = 2293 rpm
f_{ad} = 0.237 mm
v_{fad} = 540 mm/min
a_{ed} = 0.02 mm
U_d = appr. (0.8 · 2293) : 540=3.4

Dressing tool: WINTER needle Fliese
W = 20, 15, 10 mm

Fig. 8: Fliese wear is influenced by Fliese width W and number of dressing strokes i_d, grinding wheel volume removed V_{sd} (acc. to Völler).



Grinding wheel: Ø 750 x 60 mm
6A2 543 M 6 VAZ
Cutting fluid: Emulsion 2% and oil

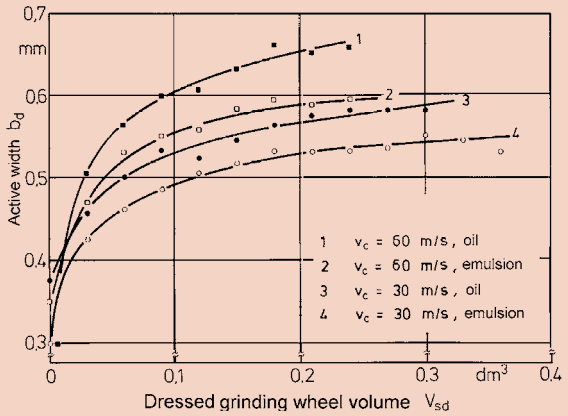
Parameters:

2% Emulsion			oil (BP CFL 5171)		
Q_l	=	4 l/min	Q_l	=	4 l/min
v_{sd}	=	30 m/s	v_{sd}	=	60 m/s
a_{ed}	=	0.02 mm	a_{ed}	=	0.02 mm

Dressing tool: WINTER needle Fliese W=10 mm
Igel IG 5
Single-point diamond dresser
EK 1.0 Basram

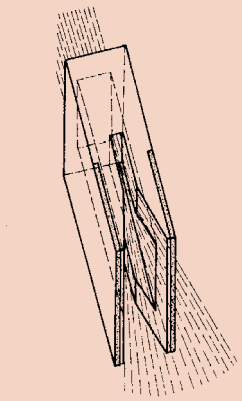
Fig. 9: Diamond wear Dx of Fliese, Igel and single-point dresser are influenced by operating parameters (acc. to Völler).

Technical notes



Grinding wheel:	EKw 70 Jot 7 Ke	
Cutting fluid:	Emulsion 3%	
	oil (18 mm²/s)	
	Free jet Q_{xss} = 5 l/min	
Dressing parameters:	v_c =	30 m/s
		60 m/s
	a_{ed} =	0.03 mm
	f_{ad} =	0.10 mm
		0.05 mm
Dressing tool:	Single-point diamond	
Basram, 1 carat		
Dressing infeed:	a_{ed} =	0.03 mm

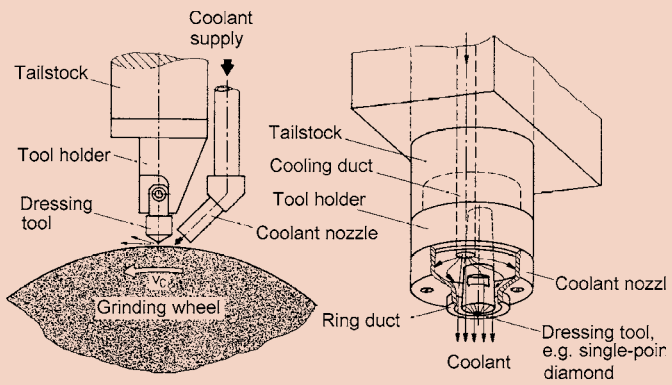
Fig. 10: Change in active width b_D for dressing with various cutting fluids and at various cutting speeds (acc. to König, Vits)



Cutting fluid for dressing

The results of temperature measurements on dressing tools have shown that the cutting fluid nozzles must be large enough and must be directed so as to ensure that even under unfavourable conditions, there is sufficient supply to the contact zone between the dressing tool and the grinding wheel. This is achieved, for example, by WINTER's "Twin Fliese with integrated coolant duct".

Fig. 11: Twin Fliese with coolant duct



Jet nozzle and ring nozzle

The fluid jet of the jet nozzle is supported by the direction of rotation of the grinding wheel and hits the contact zone at an angle of approx. 45°. If the exit velocity of the coolant is not similar to the peripheral speed of the grinding wheel, there is a danger that the coolant jet will be deflected by the air cushion of the grinding wheel.

The ring nozzle is a proven system for controlled supply of coolant to the contact zone.

Fig. 12: Dressing tool cooling by jet nozzle and ring nozzle (acc. to König, Vits)

Stationary diamond dressers

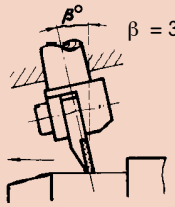
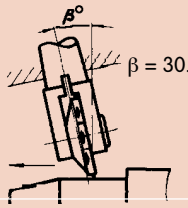
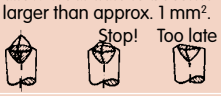
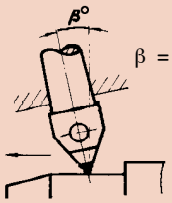
Technical notes

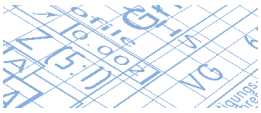
Working positions of diamond dressers

for **straight** mount	for **inclined** mount		for **straight** dressing	
Diamond Fliese®		Inclination is compensated by swivelling the Fliese in the swivel holder α = 0...30° or rigid brazed.		Vertical to β = 30°
Igel®		For inclined position of mount, please indicate inclination angle a°		Vertical
pro-dress®				Vertical
Diamond Rondist 2096/5096				Vertical
Diamond Rondist 1008				Vertical or α = 30°
Single-point diamond dresser		α = 5...45°		Vertical or α = 15° to main dressing direction
Profile diamond dresser		α = 5...10°		

Stationary diamond dressers

Technical notes

Dressing position for **profile** dressing	Active width b_D mm	Overlap factor U_d 1	Dressing infeed a_{ed} mm	Dressing cross feed f_{ad} mm/U	Remarks
 β = 30...45°	~ 0,8 · d_K d_K = theoretical Diamond grit diameter	2-8 see page 37-39	0,01 to 0,03	0,05-0,5	For straight dressing, slight diagonal position possible = drag-cut effekt = finer surface quality
			0,01 to 0,05	0,3-1,0	Due to large number of active diamonds during dressing, the dressing feed f_{ad} and feed rate v_{fad} must be correspondingly increased.
			0,005 to 0,03	0,05-0,5	For first operation of dressing tool, do several dressing strokes with increased infeed if possible, so that the dresser can adjust to the grinding wheel radius.
	~ 0,8 · d_K per active grit		0,01 to 0,05	0,3-1,0	Due to four active diamonds, the dressing feed f_{ad} and feed rate v_{fad} must be correspondingly increased.
 β = 30...45°	~ 0,8 · d_K	2-8 page 37-39	0,01 to 0,03	0,05-0,5	
	Corresponds to degree of wear	2-8 page 37-39	0,01 to 0,03	0,05-0,15	When sharpness decreases, turn diamond insert approx. 60° around its own axis, remount in good time. Do not allow wear flats to become larger than approx. 1 mm².  Stop! Too late
 β = 30...45°	Corresponds to profile of diamond (angle/ radius)	2-8 page 37-39	0,01 to 0,02	0,03-0,10	Please note instructions of equipment and machine manufacturer.



Stationary diamond dressers

Dressing Feedrate Chart for Single Point and Blade Tools

Wheel grit size in mesh	Feed-rate rev/mm	Spindle speed(1/min)									
		500	**1000**	**1500**	**2000**	**2500**	**3000**	**3500**	**4000**	**4500**	**5000**
150	0,05	25	50	75	100	125	150	175	200	225	250
100	0,15	75	150	225	300	375	420	525	600	675	750
60	0,25	125	250	375	500	625	750	875	1000	1125	1250
	0,35	175	350	525	700	875	1050	1225	1400	1575	1750
	0,45	225	450	675	900	1125	1350	1575	1800	2025	2250

Wheel grit size in mesh	Feed-rate rev/mm	Spindle speed(1/min)									
		5500	**6000**	**6500**	**7000**	**7500**	**8000**	**8500**	**9000**	**9500**	**10000**
150	0,05	275	300	325	350	375	400	425	450	475	500
100	0,15	825	900	975	1050	1125	1200	1275	1350	1425	1500
60	0,25	1375	1500	1625	1750	1875	2000	2125	2250	2375	2500
	0,35	1925	2100	2275	2450	2625	2800	2975	3150	3325	3500
	0,45	2475	2700	2925	3150	3375	3600	3825	4050	4275	4500
	0,50	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000

Example: 60 grit wheel, spindle speed 2000 rpm. Start test at feedrate 0,25 mm/rev -> feedrate 500 mm/min

Please kindly send the questionnaire to your responsible Sales from SGA or directly to our Product Product Manager:

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WINTER
Precision Grinding Solutions

Questionnaire on application of stationary diamond dressers

Company:

Technical advice ☐
Quotation ☐
Order ☐

1. Workpiece

1.1 Workpiece description

1.2 Workpiece material

1.3 Required surface quality R_a, R_t, R_z

2. Machine

2.1 Manufacturer

2.2 Design/type

2.3 Grinding process
Inclined infeed ☐ Straight infeed ☐

2.4 Cutting fluid
(Type, flow rate, supply method)

3. Grinding wheel

3.1 Dimensions mm
(Outer diameter x width)

3.2 Specification
(Abrasive, grit size, hardness, structure, bond)

3.3 Manufacturer

4. Diamond dresser in operation

4.1 Description

4.2 Dimensions mm
(Shank / Holder dimensions)

4.3 Specification

5. Dressing method

5.1 Straight dressing
on periphery ☐ on face ☐

5.2 Copy / Profile dressing ☐

6. Present dressing parameters

6.1 Grinding wheel peripheral speed for dressing v_{sd} = m/s

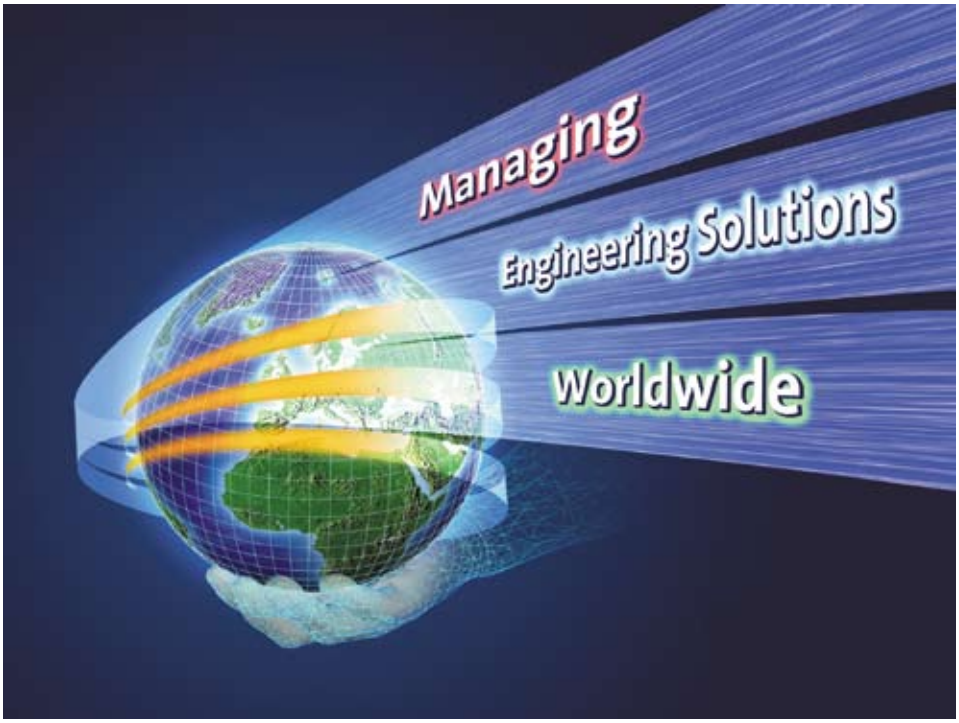
6.2 Dressing infeed / stroke a_{ed} = mm

6.3 Dressing transverse feed (see p. 25) f_{ad} = mm

v_{fad} = mm/min

7. Requirement/ Problem

If necessary please copy this questionnaire.



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