

pdtools
SUPERABRASIVES



**DIAMOND GRINDING WHEELS
FOR MACHINING OF GLASS,
CRYSTAL, DIAMONDS, CERAMICS**

MACHINING OF NONFERROUS MATERIALS WITH DIAMOND TOOLS

GLASS GRINDING

Diamond tools are used for glass grinding in a wide range of industries, including technical sheet glass processing, auto- mobile glass, optical glass, crystal and glassware.

Diamond wheels with semicircular and trapezoidal profiles, as well as with other profiles, are used for grinding glass surfaces. As a rule, diamond wheels that are electroplated and with metal bonds are used for glass surface grinding. The wheels are made with diamond powder types AC6-AC32 (synthetic diamonds) grit size D213 D64 with electroplating (nickel) or with metal bonds types M2-01, M3-04, M-300, M3-08.

For minimum wear of the diamond layer, diamond wheels should be balanced after being mounted on the spindle. It is not recommended to take the diamond wheels off the flange until they are fully used. Truing and dressing are necessary to restore the profile and the cutting properties of the wheels. Dressing is performed with a silicon carbide grinding wheel or electrolytes.

For automobile glass surfaces, the following parameters for diamond grinding are recommended:

Grinding speed, m/sec.....25-30;
 Glass feeding speed, m/min.....3,5-5,5;
 Wheel pressing strength, H.....0,35-0,50;
 Coolant usage (water based) is 10-15 l/min;
 Tolerances.....0,2-0,3mm;

During the use of the wheel, its cutting properties become weaker, so it is necessary to increase the wheel pressure on the glass. If chips appear on the edge of the glass, the wheel must be dressed.

CRYSTAL GLASS PROCESSING

Diamond tools are widely used in the manufacture of crystal and glassware: edge grinding, grinding of flat surfaces and bases (wine glasses, etc.), sharp edge blunting (facet grinding), engraving, grinding of conical surfaces. For such purposes diamond grinding wheels 14EE1, 1EE1 with metal bonds are used.

The wheel size and type are chosen depending on the operation and the shape and size of the item to be machined. As a rule, medium sized and large items are processed on machines individually, small parts are processed on automatic machines with programmed designs.

Characteristics of diamond layers for decorative glass processing

Processing type	Workpiece	Diamond powder characteristics	
		Grade	Diamond concentration, %
Edge grinding with width up to 5 mm	Small and medium	D54	50
Edge grinding with width more than 5 mm	Medium	D64	
Edge pregrinding with width more than 8 mm	Medium and Large	D213 D181 D107	100
Edge finishing with width more than 8 mm	Medium	D54	50
	Large	D64 M40	50; 100
Engraving, cone engraving, fine faceting, drawing	Small	D54	50
	Medium	M63	
	Large	M40	

CRYSTAL GLASS PROCESSING (continuation)

To prepare the grinding wheel for usage is of great importance. It is to be checked thoroughly after storage: cracks, diamond layer peeling, and nicks are not acceptable. The wheel must be balanced after mounting on the flange, and after its placement on the spindle the wheel must be adjusted to avoid wear of the diamond layer.

The wheel profile angle as a rule is 90°, 110°, 130° or 140°. The characteristics of diamond wheels recommended for decorative and household glass are found in the table.

The articles have been divided into the following sizes:

Large vases with height more than 250 mm, diameter 150 mm, decanters with capacity more than 500 ml, Medium vases with height up to 250 mm, diameter 150 mm, decanters with capacity up to 500 ml, Small wineglasses, glasses, salt shakers, etc.. During hand drawing operations, water based coolant is always used in order to visually monitor the process. Mineral oil coolant as well as water coolant are used in machine drawing operations.

DIAMOND DRILLS

Diamond drilling is the most productive method of making a hole in friable, hard, nonmetallic materials. The most commonly used in industry are tubular drills consisting of a diamond rim crown, fixed in a cylindrical core (drill end). These tools remove material only on the rim surface. Usage of drills of this type helps to reduce axial load and to ease coolant supply to the cutting area. It provides high productivity and quality of processing and decreases diamond use.

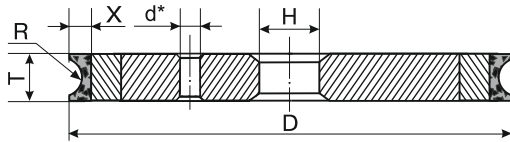
Recommended rotational speed of drills for glass drilling

Drill diameter, mm	Rotational speed, RPM	Mechanical feeding, mm/min
1 - 3	6 000 - 24 000	20 - 50
3 - 6	3 000 - 12 000	30 - 60
6 - 15	2 600 - 6 000	30 - 50
15 - 25	2 000 - 4 500	25 - 40
25 - 50	1 200 - 2 500	20 - 30
50 - 100	500 - 1 200	10 - 20

In other types of drilling, the coolant is supplied to the work area though a tube inside the tool. As a rule, for the hand drilling of furniture, mirror and automobile glass, industrial water is used.

The pressure of the coolant is normally determined by the drill diameter:

Drill diameter, mm	1 - 5	6 - 10	11 - 20	21 - 40	41 - 100
Coolant pressure, MPa	0,3 - 0,5	0,2 - 0,4	0,15 - 0,25	0,05 - 0,15	0,2 - 0,1

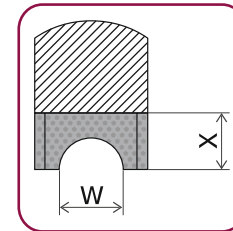


**DIAMOND WHEELS
FOR GLASS PROCESSING**

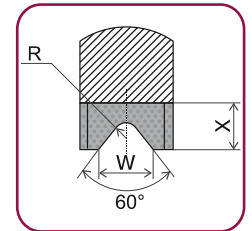
1F6V

1F6V D*T*X*W*R*H

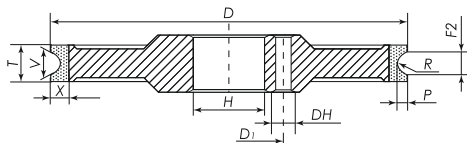
(A-LINE EDGE) (STANDARD LINE)



Picture 1



Picture 2

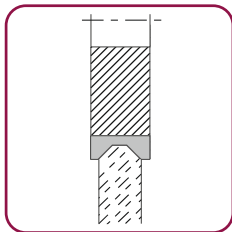


14F6V D*T*U*X*R*W*H

**DIAMOND
WHEELS**

14F6V

(STANDARD LINE)



Machining of technical glass edge



d*- at D=150,
2 apertures $\varnothing 7,0 \times 180^\circ$ by $\varnothing 70$

d*- at D=175,
3 apertures $\varnothing 8,5 \times 120^\circ$ by $\varnothing 76$

- Processing of technical glass and mirrors.
- Diamond layer is made of diamond grinding powders and micro grinding powders with metal bonds.
- Coolant is required.

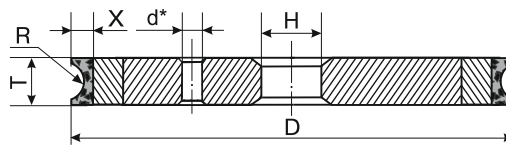
Glass thickness, mm	Wheel form	Picture	Code	D, mm	T, mm	U, mm	X, mm	R, mm	W, mm	H, mm
2	1F6V	1	150-02	150	10	-	5	1,4	2,7	22
3	1F6V	2	150-03	150	12	-	8	1,6	4,2	22
4	1F6V	2	150-04	150	12	-	8	2,0	4,6	22
5	1F6V	2	150-05	150	12	-	8	2,5	5,8	22
6	1F6V	2	150-06	150	12	-	8	4,0	8,1	22
8	1F6V	1	150-08	150	18	-	9	5,5	11,0	22
10	1F6V	1	150-10	150	18	-	8	8,6	12,1	22
2	14F6V	1	175-02	175	12	11	7	1,4	2,7	63,4
3	1F6V	2	175-03	175	12	-	7	1,6	4,2	63,4
4	1F6V	1	175-04	175	12	-	8	2,5	5,0	63,4
5	1F6V	2	175-05	175	12	-	8	2,5	5,8	63,4
6	14F6V	2	175-06	175	14	12	8	4,0	7,5	63,4
8	14F6V	1	175-08	175	17	12	8	5,5	10,0	63,4

Customer-specific and other grinding tools can be produced on request.

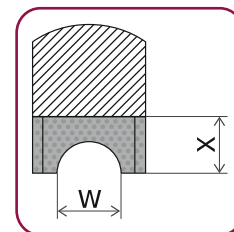
DIAMOND FLAT GRINDING WHEELS WITH SEMICIRCULAR-CONCAVE PROFILE FOR MACHINES BY: SULAK, INTERMAC, Z.BAVELLONI, SZILANK, ETC.

1F6V DIAMOND WHEELS FOR GLASS PROCESSING

(A-LINE EDGE) (PREMIUM LINE)



1F6V D*T*X*W*R*H

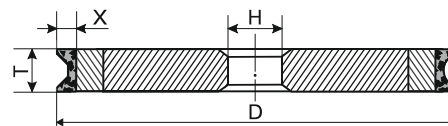


Glass thickness, mm	Code	D, mm	T, mm	X, mm	R, mm	W, mm	H, mm
2	FL-310	150	7	6	1,8	3,2	22
3	FL-311	150	8	6	2,25	4,2	22
4	FL-312	150	9	6	2,7	5,2	22
2	FS-310	150	7	6	1,8	3,2	22
3	FS-311	150	8	6	2,25	4,2	22
4	FS-312	150	9	6	5,2	5,2	22

Customer-specific and other grinding tools can be produced on request.

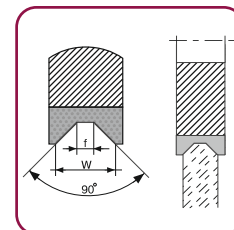
1DD6V DIAMOND WHEELS FOR GLASS PROCESSING

(A-LINE EDGE) (PREMIUM LINE)



1DD6V D*T*X*f*W*H

- Processing of technical glass edges and mirrors on machines by Sulak, Intermac, Z.Baveloni, Szilank, etc.
- Diamond layer is made of diamond grinding powders with metal bonds.
- Coolant is required.

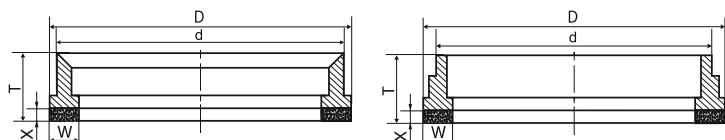


Machining of technical glass edges

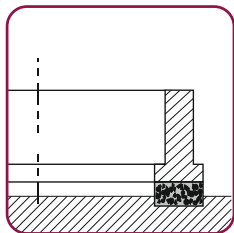
Glass thickness, mm	Code	D, mm	T, mm	X, mm	f, mm	W, mm	H, mm
4	DL-311	150	8	7	2,5	5	22
5	DL-312	150	9	7	3,3	6	22
6	DL-313	150	10	7	4	7	22
8	DL-314	150	12	7	5,3	9	22
10	DL-315	150	14	7	7,5	11	22
12	DL-316	150	16	7	9,5	13	22
4	DS-311	150	8	7	2,5	5	22
5	DS-312	150	9	7	3,3	6	22

Customer-specific and other grinding tools can be produced on request.

DIAMOND RING WHEELS 2A2



2A2 D*T*W*X*d



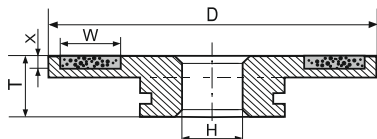
Hole drilling



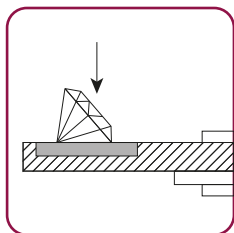
- Grinding of spherical and flat surfaces made of non-metal hard materials (glass, silicon).
- Production of tube drills with diameters more than 20 mm.
- The diamond layer is made of diamond grinding powder and micropowders with metal bonds.
- Usage of coolant is obligatory.

Catalog number	Picture	D, mm	T, mm	W, mm	X, mm	d, mm
6-0100	1	30	32	5	10	30
6-0101	1	35	32	5	10	25
6-0102	1	40	32	5	10	30
6-0103	1	60	32	5	10	50
6-0104	1	50	32	5	10	40
6-0105	1	70	32	5	10	60
6-0106	1	80	32	5	10	70
6-0107	2	50	31	2,5	8	47
6-0108	2	60	31	2,5	8	57
6-0109	2	70	31	2,5	8	67
6-0110	2	80	31	2,5	8	77

Customer-specific and other grinding tools can be produced on request.



1A2 D*T*W*X*H



Diamond faceting



FLAT DIAMOND GRINDING WHEELS 1A2

- Processing of diamonds, precious and semiprecious stones, decorative stones.
- Made with axis and without.
- The diamond layer is made of diamond grinding powder and micropowders with metal bonds.

Catalog number	D, mm	T, mm	W, mm	X, mm	H, mm
9-3050	270	22	30	2	50
9-3033	320	16	30	1,5	114
9-3034	315	22	30	1,5	114
9-3038	315	16	30	2	114
9-3035	315	22	40	1,5	114
9-3036	315	10,5	60	1,5	114
9-3037	315	22	40	1,5	50,8
9-3045	315	22	60	1,5	50,8
9-3042	315	44	60	2	30

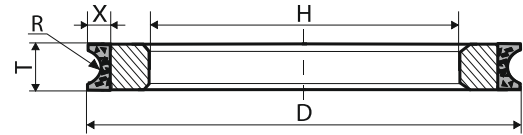
Customer-specific and other grinding tools can be produced on request.

2F6V FLAT DIAMOND GRINDING WHEELS

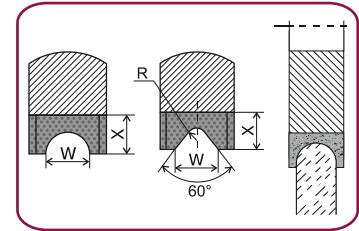
WITH SEMICIRCULAR-CONCAVE PROFILE

STANDARD LINE

- Machining of edges of industrial glass.
- The diamond layer is made of diamond grinding powder and micropowders with metal bonds.
- Usage of coolant is obligatory.



2F6V D*T*X*R*W*H



Machining of edges of industrial glass

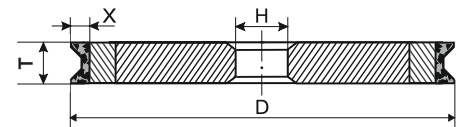
Glass thickness, mm	Code	Picture	D, mm	T, mm	X, mm	R, mm	W, mm	H, mm
3	9-0121	2	200	20	8,0	2,0	4,2	130
2	9-0112	1	250	9	7,0	1,6	3,2	200
3	9-0113	1	250	9	7,0	1,8	3,6	200
3	9-0114	1	250	9	7,0	2,0	4,0	200
3	9-0117	2	250	10	6,0	1,6	4,0	200
4	9-0115	1	250	12	7,0	2,5	5,0	200
5	9-0101	1	250	12	7,0	3,0	6,0	200
6	9-0116	1	250	17	7,0	4,0	8,0	200
8	9-0103	1	250	17	9,0	5,0	10,0	200

Customer-specific and other grinding tools can be produced on request.

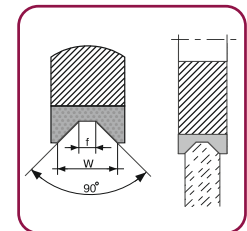
1DD6V DIAMOND WHEELS FOR GLASS PROCESSING

(STANDARD LINE)

- Processing of technical glass edges and mirrors on machines by Sulak, Intermac, Z.Baveloni, Szilank, etc.
- Diamond layer is made of diamond grinding powders with metal bonds.
- Coolant is required.



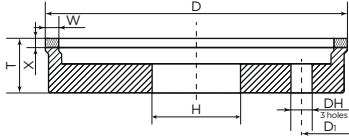
1DD6V D*T*X*f*W*H



Machining of technical glass edges

Glass thickness, mm	Code	D, mm	T, mm	X, mm	f, mm	W, mm	H, mm
4	150T04	150	14	4,5	2,5	6,5	22
5	150T05	150	14	4,5	3,0	7,0	22
6	150T06	150	14	4,5	3,5	7,5	22
8	150T08	150	16	4,5	5,0	9,0	22
10	150T10	150	16	4,5	7,0	11,0	22

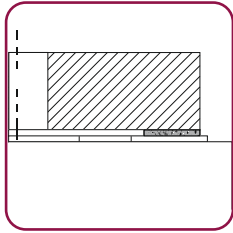
Customer-specific and other grinding tools can be produced on request.



FLAT RECESSED DIAMOND GRINDING WHEELS **6A2**

6A2 D*T*W*X*H

(PREMIUM LINE AND STANDARD)



Surface grinding



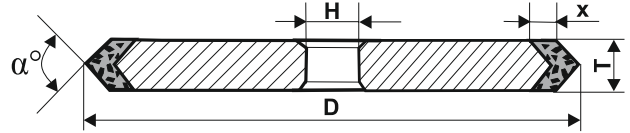
- Processing of technical glass edges and.
- Diamond layer is made of diamond grinding powders with metal bonds.
- Coolant is required.

Code	D, mm	T, mm	W, mm	X, mm	H, mm
3-2912	160	51	12	8	130
3-2870	150	40	8	8	30
3-2871	160	51	8	8	130
3-2868	150	42	5	8	40
3-2914	150	26	6	6	50
3-2932	100	23	15	6	40
3-3046	150	30	8	8	50

Customer-specific and other grinding tools can be produced on request.

1EE1 FLAT DIAMOND GRINDING WHEELS

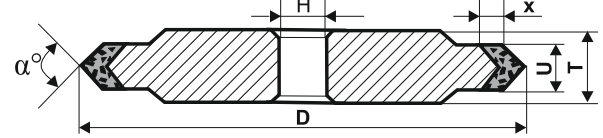
WITH DOUBLE-SIDED CONICAL PROFILE



1EE1 D*T*X* α *H

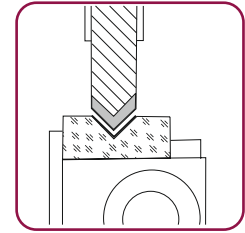
14EE1 FLAT DIAMOND GRINDING WHEELS

WITH DOUBLE-SIDED CONICAL PROFILE



14EE1 D*T*X* α *H

- Processing of industrial and decorative glass, crystal, external threading and grinding.
- Grinding of profiled workpieces made of carbide and other hard to process materials.
- The diamond layer is made of diamond grinding powder and micropowders with metal or resin bonds.
- For metal bonded tools coolant is required.



Glass cutting

Type 1EE1

Catalog number	D, mm	T, mm	X, mm	α°	H, mm
9-0616	30	4	2,5	30	6
7-1175	50	10	5	90	16
9-0035	50	10	5	120	16
7-0186	75	16	5	110	32
9-0618	80	10	10	120	32
7-1240	100	10	10	90	42
7-1246	100	10	10	120	42
7-0190	150	8	5	90	32
7-0191	150	8	5	110	32
7-0274	150	10	5	120	42
9-0539	150	10	10	90	32
9-0531	150	10	10	120	42
7-0193	150	12	5	90	32
7-0197	150	12	10	110	32
7-0303	150	12	10	110	42
7-0196	150	12	10	90	32
7-0200	150	16	5	110	32
7-0203	150	16	10	110	32
9-0034	200	10	10	90	42
9-0540	200	10	10	120	42
7-0210	250	10	10	110	32
7-0215	250	12	10	110	32
7-0216	250	16	5	90	32
7-0217	250	16	5	110	32

Customer-specific and other grinding tools can be produced on request.

Type 14EE1

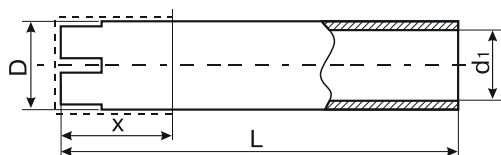
Catalog number	D, mm	T, mm	U, mm	X, mm	α°	H, mm
9-3229	125	6	3	3	90	32
9-3133	125	6	3	4	60	32
9-3204	125	6	3	5	45	32
9-3203	125	6	3	6	35	32
7-0154	250	10	6	5	110	32
7-0158	250	10	8	5	110	32

Customer-specific and other grinding tools can be produced on request.

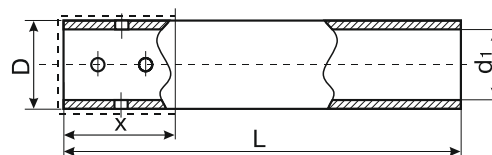
DIAMOND DRILLS

Application:

- Drilling of holes in optical and industrial glass and other non-metal materials
- Diamond layer is made of diamond powders and micropowders with electroplated bonds
- Usage of coolant is obligatory.

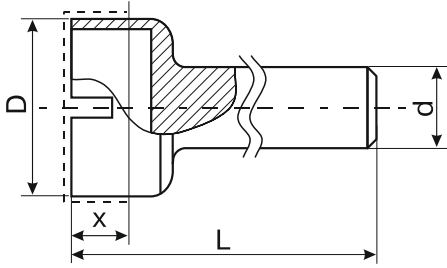


Picture 1

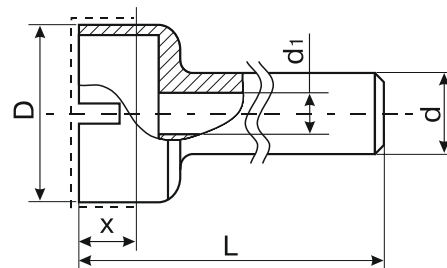


Picture 2

Designation of drill size and type	Core	Picture	D, mm	d ₁ , mm	L, mm	X, mm
04.01.159.00	Brass	1	3	2,5	57	6
04.01.159.00-01		1	4	3,5	57	6
04.01.159.00-02		1	5	4,5	57	6
04.01.159.00-03		1	6	5	57	6
04.01.159.00-04		1	7	6	57	6
04.01.159.00-05		1	8	7	57	6
04.01.159.00-06		1	9	8	57	6
04.01.159.00-07		1	10	9	57	6
04.01.159.00-08		1	12	10	57	6
04.01.159.00-09		1	14	12,8	57	6
04.01.159.00-10	1	16	14,8	57	6	
04.01.242.00	Steel	1	3	1,4	50	6
04.01.242.00-01		1	4	2,4	50	6
04.01.242.00-02		1	5	3,4	50	6
04.01.242.00-03		1	6	4,4	50	6
04.01.242.00-04		1	7	5	50	6
04.01.242.00-05		1	8	6	50	6
04.01.242.00-06		1	9	7	50	6
04.01.242.00-07		1	10	8	50	6
04.01.242.00-08		1	12	10	50	6
04.01.242.00-09		1	14	12	50	6
04.01.242.00-10		1	16	14	50	6
04.01.242.00-11		1	14,6	13	60	6
04.01.242.00-12		1	19,6	17,6	60	8
04.01.242.00-13	1	18	15,6	60	8	
06.02.002.00	Steel	2	3	2,5	57	8
06.02.002.00-01		2	4	3,5	57	8
06.02.002.00-02		2	5	4,5	57	8



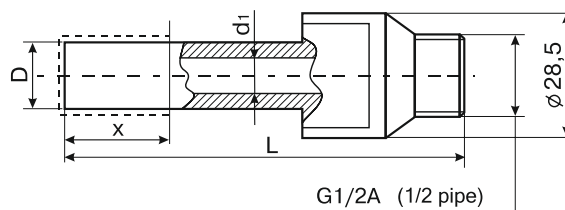
Picture 3



Picture 4

Designation of drill size and type	Picture	D, mm	d, mm	d ₁ , mm	L, mm	X, mm
06.02.001.00	3	65	9,5	-	60	10
06.03.001.00	4	19	9,5	4	70	7
06.03.001.00-30	4	10	9,5	4	70	8
06.03.001.00-31	4	12	9,5	4	70	8
06.03.001.00-32	4	14	9,5	4	70	8
06.03.001.00-33	4	16	9,5	4	70	8
06.03.001.00-34	4	20	9,5	4	70	8
06.03.001.00-36	4	17	9,5	4	70	14
06.03.001.00-04	4	26	9,5	4	70	8
06.03.001.00-08	4	22	9,5	4	70	8
06.03.001.00-09	4	24	9,5	4	70	8
06.03.001.00-13	4	25	9,5	4	70	8
06.03.001.00-14	4	27	9,5	4	70	8
06.03.001.00-05	4	30	6	4	50	8
06.03.001.00-46	4	32	9,5	4	70	8
06.03.001.00-24	4	35	9,5	4	70	8
06.03.001.00-35	4	36	9,5	4	70	8
06.03.001.00-40	4	40	9,5	4	70	14
06.03.001.00-16	4	50	9,5	4	60	10
06.03.001.00-49	4	60	9,5	4	50	10
06.03.001.00-17	4	70	9,5	4	50	10
06.03.001.00-12	4	80	9,5	4	60	10
06.03.001.00-01	4	81	9,5	4	60	10
06.03.001.00-02	4	86	9,5	4	50	10
06.03.001.00-48	4	120	9,5	4	60	10
06.03.005.00	4	12	9,5	4	70	8
06.03.005.00-01	4	14	9,5	4	70	8
06.03.005.00-02	4	16	9,5	4	70	8
06.03.005.00-03	4	26	9,5	4	70	8
06.03.005.00-04	4	30	9,5	4	70	8
06.03.005.00-05	4	35	9,5	4	70	8
06.03.005.00-06	4	55	9,5	4	70	8
06.03.005.00-07	4	75	9,5	4	70	10
06.03.005.00-08	4	90	9,5	4	70	10
06.03.005.00-09	4	40	9,5	4	65	10
06.03.006.00	4	78	28	M14	81	10

Customer-specific and other grinding tools can be produced on request.



Picture 5

Designation of drill size and type	Picture	D, mm	d ₁ , mm	L, mm	X, mm
06.04.001.00	5	12	8	75	10
06.04.001.00-01	5	12,5	8	75	10
06.04.001.00-02	5	13	8	75	10
06.04.001.00-03	5	13,5	8	75	10
06.04.001.00-04	5	14	8	75	10
06.04.001.00-05	5	14,5	8	75	10
06.04.001.00-06	5	15	8	75	10
06.04.001.00-07	5	15,5	8	75	10
06.04.001.00-09	5	16	8	75	10
06.04.001.00-11	5	16,5	8	75	10
06.04.001.00-12	5	17	8	75	10
06.04.001.00-13	5	17,5	8	75	10
06.04.001.00-14	5	18	8	75	10
06.04.001.00-15	5	18,5	8	75	10
06.04.001.00-16	5	19	8	75	10
06.04.001.00-17	5	19,5	8	75	10
06.04.001.00-18	5	20	8	75	10
06.04.001.00-19	5	21	8	75	10
06.04.001.00-22	5	22	8	75	10
06.04.001.00-24	5	23	8	75	10
06.04.001.00-26	5	24	8	75	10
06.04.001.00-27	5	40	8	75	10
06.04.001.00-28	5	50	8	75	10
06.04.001.00-30	5	51	8	75	10
06.04.001.00-31	5	52	8	75	10
06.04.001.00-32	5	54	8	75	10
06.04.001.00-33	5	55	8	75	10
06.04.001.00-34	5	3	8	75	10
06.04.001.00-35	5	6	8	75	10
06.04.001.00-36	5	10	8	75	10
06.04.001.00-37	5	30	8	75	10
06.04.001.00-38	5	70	8	75	10
06.04.001.00-39	5	100	8	75	10
06.04.001.00-40	5	5	3,5	75	5

Customer-specific and other grinding tools can be produced on request.