ZAPORIZHZHIA
ABRASIVE PLANT
PJSC

ABRASIVE TOOLS MANUFACTURING

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ABRASIVE.ZP.UA

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ABRASIVE TOOLS MANUFACTURING

Zaporizhzhia Abrasive Plant PJSC produces more than 80,000 types of abrasive tools. These tools can be categorized into two groups: fixed geometric form tools (such as wheels, rings, segments and hones on the ceramic and bakelite bonds) and flexible grinding tools (including coated abrasives, grinding belts, flap wheels, and fiber wheels).

TO ENSURE EFFICIENT GRINDING AND THE DESIRED QUALITY OF THE PROCESSED MATERIAL, SEVERAL PARAMETERS NEED TO BE CONSIDERED WHEN CHOOSING AN ABRASIVE TOOL.

These parameters include the characteristics of the processed material (chemical composition, physical and mechanical properties), geometric parameters and form of the grinding surface (solid or dashed), machining allowance, initial state of the grinding surface (including roughness), required processing quality, type and parameters of the working machine, processing conditions (speed, feed, cooling), and processing efficiency (productivity, tool durability, adjustments, energy consumption).

The selection of the abrasive tool depends on various characteristics, such as type, size, brand, and grit of the grinding material, as well as the hardness and structure of the tool's bonding material and the operating speed. It is crucial to choose the appropriate wheel hardness and structure based on the material being processed and the type of grinding operation.

The choice of abrasive tool form and size is determined by factors such as machine design and purpose, machine dimensions, fixture design, and the shape and dimensions of the parts being processed. The efficiency of the wheel's operation relies on the proper selection of characteristics, including its cutting ability, resistance, and the quality of the grinding surface it produces.

ABRASIVE MATERIAL CHOOSING

CHARACTERISTIC OF THE PROCESSED MATERIAL AND PERFORMING OPERATION	ABRASIVE MATERIAL MARK						
	13A	14A	25A	53C	54C	63C	64C
Materials processing with high breaking strength: stripping of steel castings, forgings, rolled products, steel-like high-strength and chilled cast irons, malleable cast iron; semifinish operation of various machine parts, made of carbon and alloy steels in non-hardened and hardened form, manganese bronze, nickel and aluminum alloys.	X	X					
Parts of carbon steel, high speed steel and stainless steel, chrome and nitrated surfaces hard-part machining.			X				
Processing of thin parts and tools in non scar mode (stamps, teeth, gearwheels, threading tool, thin knives, blades, steel cutters, drills, knives, woodworking knives, etc.). in-process part			X				
Parts processing: surface inner and profile grinding with a contact between the wheel and the in-process part large area, accompanied by abundant heat generation; fine grinding (honing operation and superfinishing, etc.).			X				
Hard materials processing with low breaking strength: cast iron, bronze and brass castings, hard alloys, precious stones, glass, marble, granite, porcelain, hard rubber, etc.very viscous materials: heat-resistant steel, copper and aluminum alloys, rubber.				X	X	X	X

GRINDING MATERIALS GRIT OF ABRASIVE TOOL CHOOSING DEPENDING ON THE PROCESSING TYPE

GRINDING MATERIALS GRIT OF TOOL	TYPE OF PROCESSING
F22-F10	Stripping operations: deseaming, fettling, flogging, die fogging stripping
F36-F22	Surface grinding by the wheel end, sharpening middle and large cutters, adjustment of abrasive tool, cutting off
F46-F36	Preliminary and combined grinding (preliminary and final grinding is performed without removing the product from the machine), cutter sharpening
F90-F46	Clean grinding. Profile surface processing, small tool sharpening, grinding of brittle materials
F180-F100	Fine grinding, hard alloys lapping, cutting tool lapping, pre-honing, thin blades sharpening
F220-F180	Fine grinding of metals, glass, marble, etc., thread grinding, clean grinding
F230	Superfinishing, final honing, lapping of thin blade and calibre measuring surfaces, products with fine pitch thread grinding

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Hardness and structure of wheel is selected depending on the material, the type and purpose of the grinding operation.

RECOMMENDATIONS FOR HARDNESS OF WHEEL CHOOSING

GRINDING OPERATION	HARDNESS OF WHEEL
- Round outer by plunge cutting with longitudinal motion	L-N L-K
- Centreless by plunge cutting with longitudinal motion	N-O M-N
Inner	M-N
- Even with wheel periphery by wheel end	J-L I-K
- Gear grinding module < 3 module > 3	K-L J-K
> Thread grinding, spacing, mm 0,5... 1 1... 1,5 1,5...2 2...3 3	O-Q, N-O, M-N, L K-L
Spline grinding	K-N
- Carbide material tool sharpening: rough finishing high-speed steel: rough finishing	H-K, K-M J-L, L-M
Striping grinding	P-S

The selected abrasive tools form and size is determined depending on the design and purpose of the machine, its dimensions, the fixture design, in-process parts form and dimensions, the tool contact area with the processed parts surfaces.

FIELD OF APPLICATION OF ABRASIVE TOOLS ON DIFFERENT BONDS

BOND TYPE	DESIGNATION	TYPE OF PROCESSING
Ceramic	V	All grinding operations of precision products, made of steel, alloys, based on nickel, titanium; Grinding of hardwearing coating coatings (plasma, detonation, etc.).
Bakelite	B	Stock material striping grinding (mill products, casting, forging); Sharpening of cutting tools; Grinding of brittle materials; Grinding by hand-held small machines; Cutting of metals and non-metallic materials, grooving.

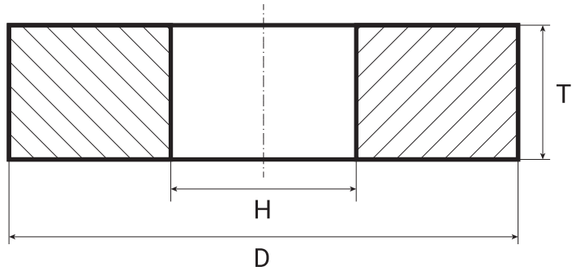
ABRASIVE TOOLS ON CERAMIC BOND

The ceramic bond provides high strength, heat resistance, and wear resistance.

This type of tool is used for sharpening, smoothing, grinding, polishing various surfaces, providing high speed of material knowledge, excellent surface finish, efficient and accurate grinding results.

Abrasive tools on ceramic bond is manufactured from grinding materials of marks 14A, 25A, 54C and 64C, with grit F46-F180, hardness F-Z, of different types: 1, 3, 4, 5, 6, 7, 11, 12, 23, AS (angle section), OP (profiled outline), with operating speed up to 63 m/s under the current regulatory documentation, acting at the plant, with outer diameter of 63-900 mm tool bore diameter 20, 32, 51, 76, 127, 203, 305 and a standard range of heights 6, 8, 10, 13, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 150, 200, 250 mm.

Type 1



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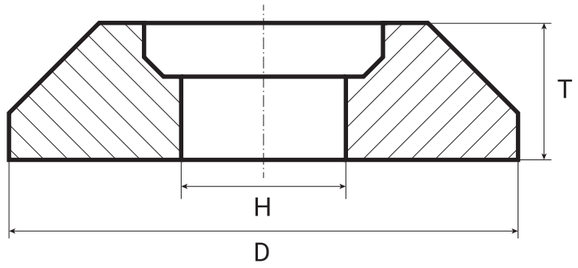
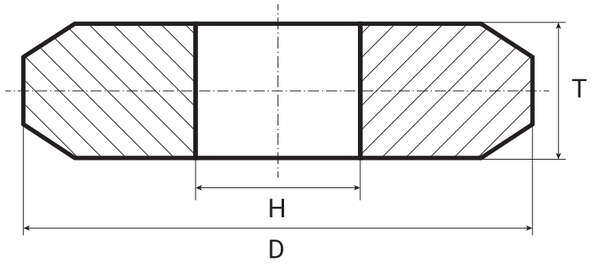
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
I	63	8, 10, 13, 16, 20, 25, 32	20	14A, 25A, 54C, 64C/F46-F80, K-Q 14A, 54C, 64C/F100-F180, K-Q
I	80-100	8, 10, 13, 16, 20, 25, 32	20, 32	
I	125	8, 10, 13, 16, 20, 25 32,40 16,20, 25, 32	20, 32 32	
I	150	8, 10, 13, 16, 20, 25, 32,40, 50 16,20, 25, 32	20, 32,51 32	14A, 25A, 54C, 64C/F46-F80, K-Q 14A, 54C, 64C/F100-F180, K-Q
I	175	16, 20, 25. 32	32	14A, 54C, 64C/F100-F180, K-Q
1	175	8, 10, 13, 16, 20,25, 32, 20, 25	32 20	14A, 25A, 54C, 64C/F46-F80, K-Q 14A, 54C, 64C/F100-F180, K-Q
I	200	8, 10, 13, 16, 20,25, 32,40 10, 13, 16, 20,25 20, 25, 32, 40, 63 16, 20, 25, 32	32 51 76 32, 76	
I	250	6, 8, 10, 13, 16, 20, 25, 32,40 6, 8,10, 13, 16,20, 25, 32, 40, 50, 63 16, 20, 25, 32	32 76 32, 76	14A, 25A, 54C, 64C/F46-F80, K-Q 14A, 54C, 64C/F100-FI80, K-Q
I	300	8, 10, 11, 13, 14, 16, 18, 20, 22,25, 28, 32, 40, 50, 63,80, 100 10, 13, 16, 20, 25, 32, 40, 50, 100	32 76, 127 76, 127	14A, 25A, 54C, 64C/F46-F80, K-Q 14A, 54C, 64C/F100-FI80, K-Q
1	350	8, 10, 13, 16, 20,25, 32,40, 50, 63, 80, 100, 150 40,63, 80,100,150	127 203	14A, 25A, 54C, 64C/F46-F80, K-Q
I	400	10,13,16, 20,25,32, 40, 50, 63,80, 100 8, 10, 13, 16, 20,25, 32,40, 50, 63, 80, 100, 150	127 203	
I	450	25, 32,40, 50, 63, 80, 100 25, 32, 40, 50, 63, 80	127 203	
I	500	13, 16,20,25,32, 40, 50, 63, 80, 100, 125, 150 13, 16,20,25,32, 40, 50, 63, 75, 80, 100 125, 150, 200,250	203 305	
I	500	16,20,25,32, 40,50, 63, 80,100, 125, 150	203, 305	14A, 54C, 64C/F100-F180, K-Q
1	600	13, 16, 20,25, 28, 32, 34, 35, 40, 45, 50, 55, 63,75, 80, 100, 110, 125, 135, 140, 150, 160, 200, 250 20, 25, 68, 86, 100	305 305	14A, 25A, 54C, 64C/F46-F80, K-Q 14A, 54C, 64C/F100-F 180, K-Q
I	750	20, 25, 28, 32, 40, 45, 50, 63, 78, 80,100	305	14A, 54C, 64C/F100-F180, K-Q
I	900	25,28, 29,31,32, 33, 35, 39, 40, 43, 50, 52, 63, 80, 100	305	

Type 3



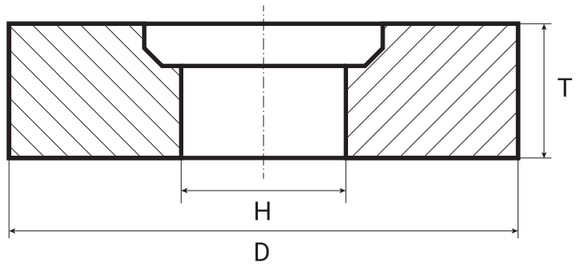
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
3	125, 150, 175	8, 10, 13, 16, 20	32	14A, 25A, 54C, 64C/F46-F80, K-Q
	200	10, 13, 16, 20, 25	32,51	
	250	8, 10, 13,20, 25	76	
		16	32, 76	
	300	8,10, 25, 32	76	
		8,10,13, 20	127	

Type 4



TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
3	250,300,350,400	10,13, 16,20, 25 20, 25, 32	76 127	I4A, 25A, 54C, 64C/F46-F80, K-Q

Type 5



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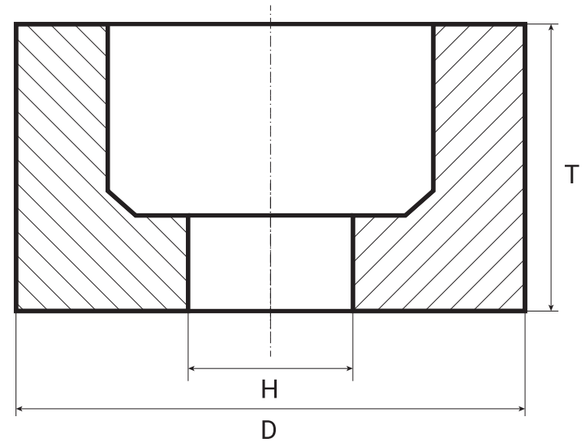
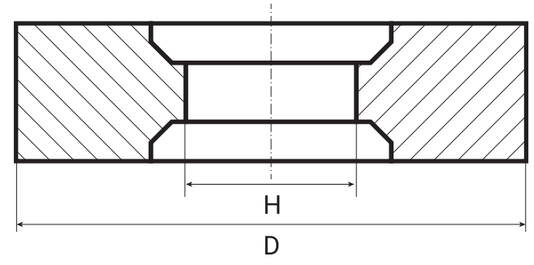
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
5	200	32,40	76	14A, 25A, 54C, 64C/F46-F80, K-Q
	250	40	76	
	300	50, 63	127	
	350	40, 50	127	
	400	40, 50	203	
	600	50, 63, 80	305	

Type 6



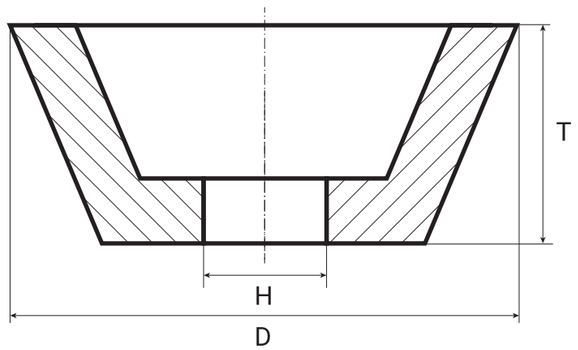
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
6	100	50	20	14A, 25A, 54C, 64C/F46-F80, K-Q
	125	63	32	
	150	80	32,51	
	200	63	32,51	
	250	100	150	

Type 7



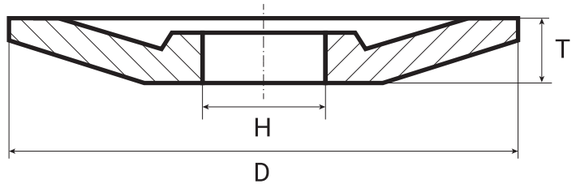
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
7	600	63, 80, 100	305	14A, 25A, 54C, 64C/F46-F80, K-Q

Type 11



TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/ GRIT, HARDNESS
11	125. 150	40. 50	32	14A, 25A, 54C, 64C/F46-F80, K-Q
	175	63	32	
	250	100	150	

Type 12



TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
12	125	13	32	14A, 25A. 54C. 64C/F46-F80, K-Q
	150	16	32	
	175	16, 20	32	
	200	63	32	
	250	20. 25	32	

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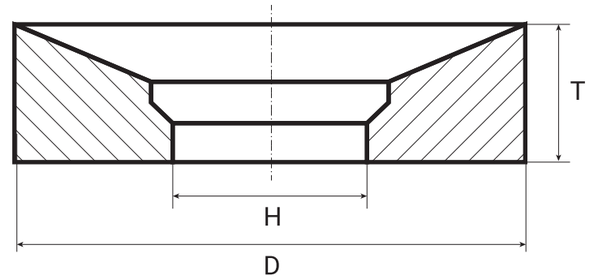
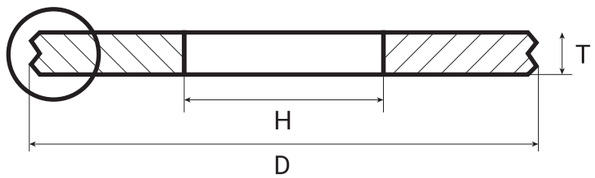
Type 23



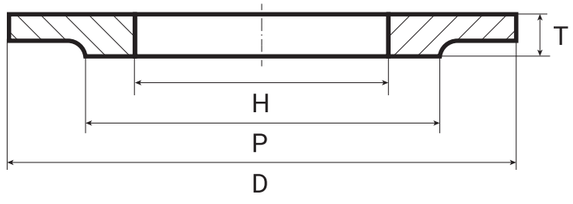
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/ GRIT, HARDNESS
23	600	80	305	I4A, 25A, 54C, 64C/F46-F80, K-Q

Angle Section



TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/ GRIT, HARDNESS
AS	750	30, 40	305	I4A, 25A, 54C, 64C/F46-F80, K-Q

Profiled Outline



TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/ GRIT, HARDNESS
PO	600	20	305	14A, 25A / F46-F80, K-Q

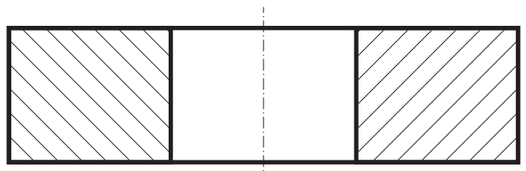
GRINDING WHEELS FOR BEARING BALL GRINDING

TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/ GRIT, HARDNESS
1	800	100	290	14A/54C fr. -160/F320 (2,7-2,96)-103 kg/m3

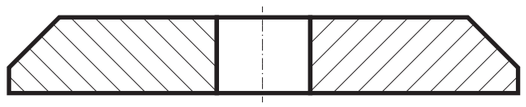
WHEEL FOR DECORTICATIONS, DEFUZZING WHITE STRAW CROPS

TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/ GRIT, HARDNESS
1	250	40, 63	76, 127	54C / F16-F22, F46, P-T, U
	300	40, 80	76, 127	
	350	63	127, 203	
	400	40	127, 203	
	450	50	203	
2	250	125	35	54C / F16-F22, F46, P-T, U
7	250	63	127	
7-C	450	50	203	54C / F16-F22, F46, Q-T, U

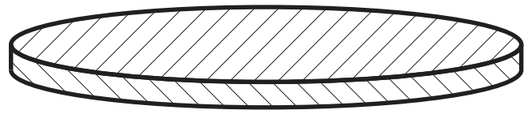
ABRASIVE PRODUCTS OF ECONOMIC PURPOSE ON CERAMIC BOND



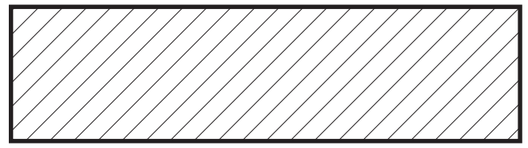
Grinding wheels for electric sharpening 150 x 20-40 x 32 14A J-Q 30 m/s



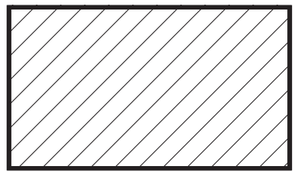
Grinding wheels for saw filing 250 x 10 x 32 14A P46-P80 J-Q 30 m/s



Whetstone «Boat» for scythes sharpening 250 x 10 x 32 14A P46-P80 J-Q 30 m/s



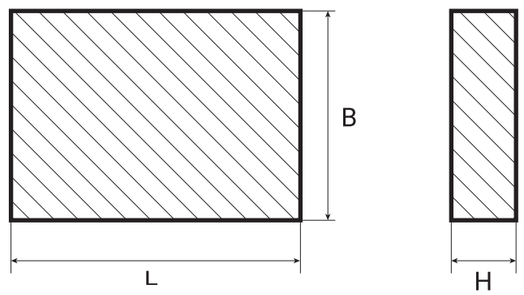
Commercial bar 200x20x40 14A K-O



Carpenter’s 150x25x52 14A, K-O

SET OF HEAT-RESISTANT CARBORUNDUM PLATES FOR LINING FIREPOTS OF HOUSEHOLD OVENS

LENGTH OF PLATE L, MM	WIDTH OF PLATE B, MM	HEIGHT THE PLATE H, MM	NUMBER OF PLATES IN THE SET, PC
280	180	25	1
330			2



ABRASIVE TOOLS ON BAKELITE BOND

Bakelite bond is strong and heat-resistant, allowing the tool to withstand high loads and temperatures during operation. This type of tool is widely used for deburring, rough grinding, grinding and processing various materials, ensuring efficiency in machining.

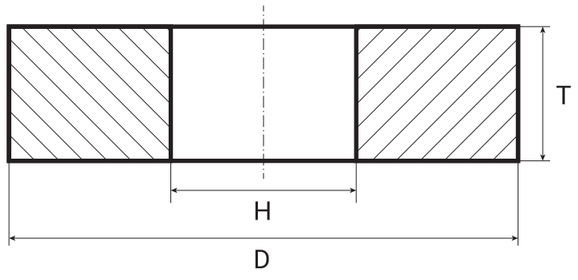
Abrasive tools on bakelite bond are manufactured from materials of marks 14A, 25A, 54C and 64C, with grit F12-F150 and hardness H-U:

- different types of wheels (1, 2, 11, 36, 40)
- different types of segments (5C, 6C, 9C)

Tool working speed from 25 to 50 m/s according to the current regulatory documentation at the plant.

STRIPING WHEELS

Type 1



TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
1	125, 150,200	20,25,32	32	14A/F16-F22, O-T, U
	250	20, 25, 32, 40	32, 76	
	300	32, 40, 50	50, 76	
	400	32, 40, 50	127, 203	14A, 54C / F16-F22, O-T, U
	500	40, 50, 63, 80	203	14A, 54C / F16-F22, O-T, U
	600	63, 75, 80	305	
	750	63. 80	305	

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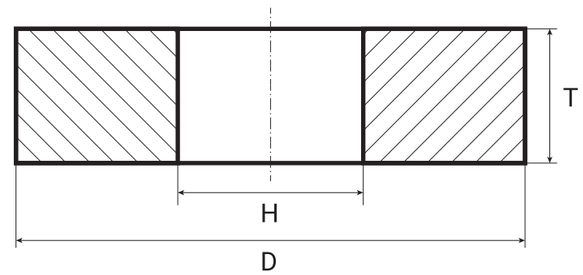
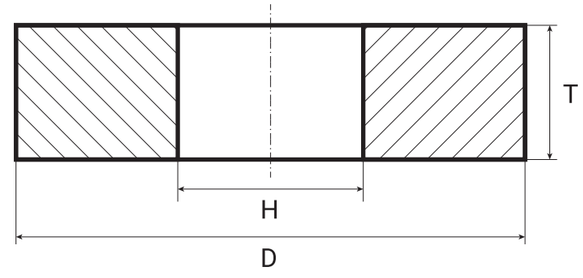
GRINDING WHEELS

Type 1



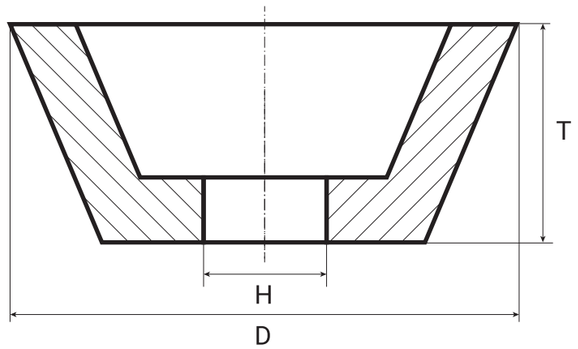
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/ GRIT, HARDNESS
1	125, 150,175,200	20,25,32	32	14A, 54C / F46-F80, H-Q
	250	20,25,32,40,63	32,76	
	300	32,40	76,127	
	350	40,50,100	127,203	
	400,450	32,40, 50,63, 80	127,203	
	500	50,63,80,100,125, 150,200	203,305	
	600	50,63,75,80,100,125, 150,200	305	
	750, 900	30,32,40, 50,63,80, 100	305	

Type 2



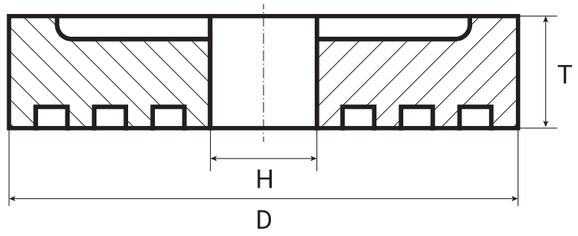
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
2	450	150	250	14A, 54C / F46-F80, H-O
	500	150	380	
	685	150	580	

Type 11

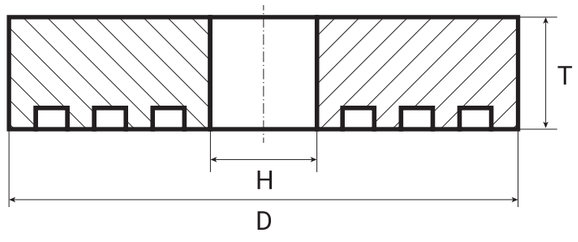


TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
11	125, 150	50	32	14A/F40-F80, K-Q

GRINDING WHEELS FOR FACE GRINDING



40(PNR) with pressed on fasteners, corrugated

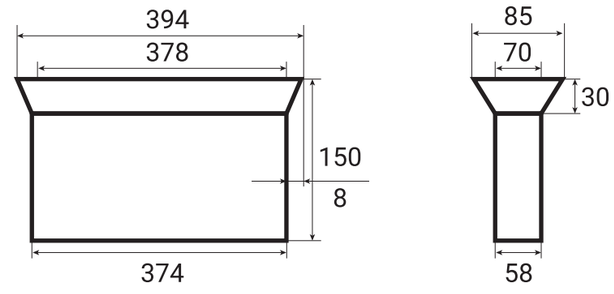


36(PN) with pressed on fasteners

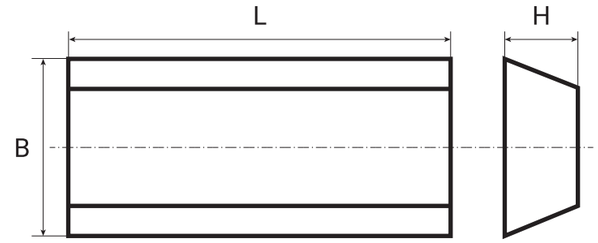
TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
36	600	75	305	14A, 54C / F46-F150, J-Q
	750	70	25	
		75	305	
40	750	70	25	
		45	350	

GRINDING SEGMENTS

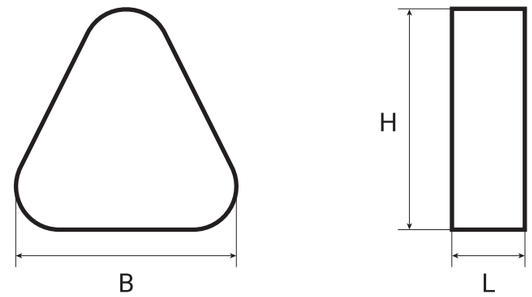
Type 9C



Type 5C



Type 6C



TYPE	OUTER DIAMETER D, MM	HEIGHT T, MM	DIAMETER OF TOOL BORE H, MM	MARK OF GRINDING MATERIAL/GRIT, HARDNESS
5C	100	40	150	14A / F46-F80, K-Q
6C	85	78	50	
9C	394	150	86	14A/F16-F22, O-Q

CUTTING-OFF AND GRINDING WHEELS ON BAKELITE BOND WITH REINFORCED COMPONENTS

Cutting-off wheels

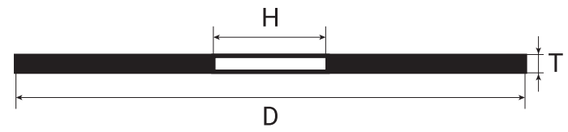
Cutting-off wheels made of straight section - type 41 and with the depressed center - type 42. Wheels are designed to perform cutting and slotting operations of metal and non-metal materials with the hand tools and pneumatic tools, stationary and portable machines using.

THE CHOICE OF GRINDING MATERIAL, USED FOR THE CUTTING-OFF WHEELS MANUFACTURING UNDER THE DIFFERENT OPERATIONS

MARK OF ABRASIVE MATERIAL	GRIT	OPERATION
14A	F24	For multi-purpose cutting of steel workpieces, including casting and heavy in section, cast iron, etc.
	F30	For cutting of steel workpieces of high-tensile-strength, instrument, heat-resistant steels, cast iron. As well as heavy in section non-ferrous metal stock materials, etc.
	F36	For cutting of steel workpieces of high-tensile-strength, instrument, heat-resistant steels (including pipes, steel plate), cast iron and non-ferrous metal workpieces of small cross section.
	F46, F60	For cutting a thin metal sheet, thin-walled tubes and profiles, including stainless steel, instrument steel and aluminum.
54C	F24	For cutting workpieces from titanium and its alloys, asphalt, concrete, granite, marble, basalt.
	F30	For cutting parts and fragments of concrete and pumice compression, granite, ceramics, porcelain, tile, slate, ceramic pipes, fireclay and building bricks.
	F36	For cutting operations of small cross section workpieces of granite, technical ceramics, electrotechnical porcelain, tile, slate, ceramic pipes, special glass, polymeric materials.
	F46	For precision cutting of ceramic and the other tiles, glass products, plastic materials, etc.

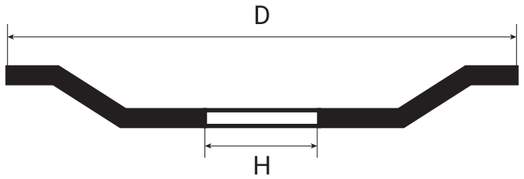
ZAPORIZHZHIA ABRASIVE PLANT PJSC

Type 41



USED EQUIPMENT	D, MM	T, MM	H, MM	TYPE ABRASIVE	GRAIN SIZE	HARDNESS	MAXIMUM OPERATING SPEED, M/S
Group of processed materials			STEEL				
Portable electric or pneumatic tool	115	1,0; 1,2; 1,6; 2,0; 2,5; 3,0	22,23	14A		SI 37...43	80
	125	1,0; 1,2; 1,6; 2,0; 2,5; 3,0	22,23				80
	150	2,0; 2,5; 3,0	22,23; 3		F24, F30		80
	180	1,6; 2,0; 2,5; 3,0	22,23		F36, F46,		80
	230	1,6; 2,0; 2,5; 3,0	22,23		F60		80
	300	3,0; 3,5; 4,0	32				80
Stationary or portable machines	350	2,5; 2,8; 3,0; 3,2; 3,5; 4,0	25,4				80
	350	3; 3,5; 4,0	32				
	400	3,0; 3,5; 4,0	32				80
	500	5.0	32				80
	350	4	25,4		F24, F30		100
Portable electric or pneumatic tool	115	1,0; 1,2; 1,6; 2,0; 2,5; 3,0	22,23	14A		SI 37...43	80
	125	1,0; 1,2; 1,6; 2,0; 2,5; 3,0	22,23				80
	150	2,5; 3,0	22,23; 32				80
	180	1,6; 2,0; 2,5; 3,0	22,23		F24, F30,		80
	230	1,6; 2,0; 2,5; 3,0	22,23		F80, F60		80
Stationary or portable machines	300	3.0: 3,5: 1.0	32				80
	350	3,0; 4,0	25,4				80
	400	3,0; 4,0; 5,0	32				80
Used equipment	D, mm	T, mm	H, mm	Type abrasive	Grain size	Hardness	Maximum operating speed, m/s
Group of processed materials			STONE				
Portable electric or pneumatic tool	115	2,5; 3,0	22,23	54C		SI 37...43	80
	125	2,5; 3,0	22,23				80
	150	2,5; 3,0	22,23; 3				80
	180	2,5; 3,0	22,23		F80, F30,		80
	230	2,5; 3,0	22,23		F36		80
Stationary or portable machines	300	3,0;	32				80
	400	3,0; 4,0	32				80
	500	5,0	32				80

Type 42



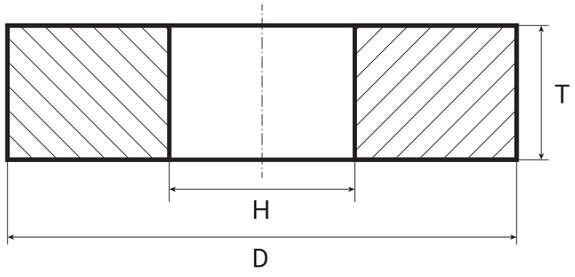
USED EQUIPMENT	D, MM	T, MM	H, MM	TYPE ABRASIVE	GRAIN SIZE	HARDNESS	MAXIMUM OPERATING SPEED, M/S
Group of processed materials - STEEL							
Portable electric or pneumatic tool	115	2,5; 3,0	22,23	14A	F24, F30	SI 37...43	80
	125	2,5; 3,0	22,23				
	180	3,0	22,23				80
	230	3,0	22,23				
Group of processed materials - STAINLESS STEEL							
Portable electric or pneumatic tool	115	2,5; 3,0	22,23	14A	F24, F30, F36	SI 37...43	80
	125	2,5; 3,0	22,23				80
	180	3,0	22,23				80
	230	3,0	22,23				80

GRINDING WHEELS

Grinding wheels are manufactured of straight profile - type 1 and with depressed center - type 27.

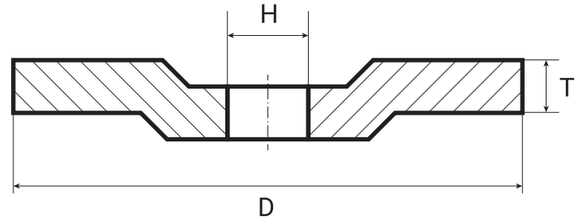
Wheels are used to perform the metallic materials stripping, using portable electric and pneumatic tools, stationary and portable machines.

Type 1



USED EQUIPMENT	D, MM	T, MM	H, MM	TYPE ABRASIVE	GRAIN SIZE	HARDNESS	MAXIMUM OPERATING SPEED, M/S
Group of processed materials - STEEL							
Portable electric or pneumatic tool	115	6,0; 6,4	22,23	14A	F24, F30	SI 37...43	80
	125	6,0; 8,0	22,23				80
	180	4,0; 6,0 ; 8,0	22,23				80
	230	4,0; 6,0; 10,0	22,23				80
Group of processed materials - STAINLESS STEEL							
Portable electric or pneumatic tool	115	4,0; 6,0; 8,0	22,23	14A	F24, F30	SI 37...43	80
	125	4,0; 6,0; 8,0	22,23				80
	180	4,0; 6,0; 8,0; 10	22,23				80
	230	4,0; 6,0; 10	22,23				80

Type 27



USED EQUIPMENT	D, MM	T, MM	H, MM	TYPE ABRASIVE	GRAIN SIZE	HARDNESS	MAXIMUM OPERATING SPEED, M/S
Group of processed materials - STEEL							
Portable electric or pneumatic tool	115	6,0; 6,4	22,23	14A	F24, F30	SI 37...43	80
	125	6,0; 6,4; 8,0	22,23				80
	150	6,0	22,23				80
	180	4,0; 6,0;	22,23				
		6,4; 8,0					80
	230	6,0; 6,4	22,23				
Group of processed materials - STAINLESS STEEL							
Portable electric or pneumatic tool	115	4,0; 6,0	22,23	14A	F24, F30, F36	SI 37...43	80
	125	4,0; 6,0; 8,0	22,23				80
	150	4,0; 6,0; 8,0	22,23				80
	180	4,0; 6,0;	22.23				
		8,0; 10					80
	230	4,0; 6,0; 8,0	22,23				

ZAPORIZHZHIA
ABRASIVE PLANT
PJSC

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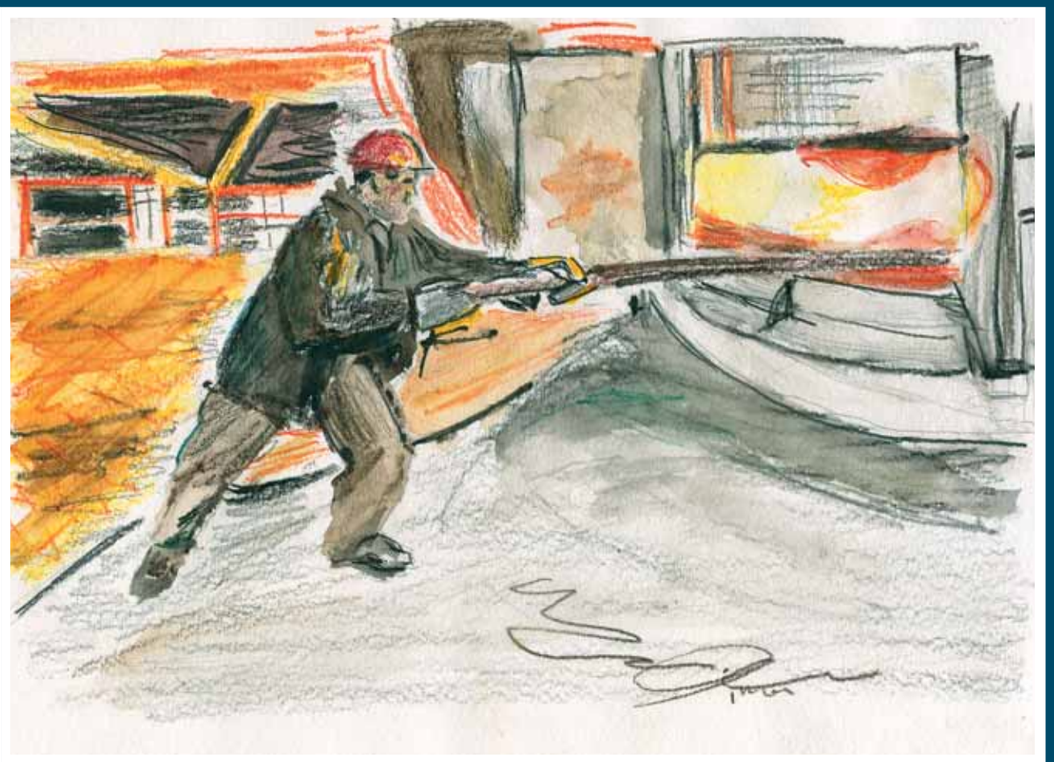
PJSC

FOR YOUR IDEAS



Dear friends, we decided to add colors,
to make our catalog colorful.

If you give a quick glance on a page, you may see a small yellow sun that smiles to you from the sketch of our factory. A famous melody from sunny Naples comes to mind – “O sole Mio”. There is also a lot of sun above Zaporizhzhia, where we stay. It gives us a lot of power to work intensively and to be productive in this turbulent time.

Meanwhile, a powder of Boron Nitride, if you see closely have a slightly yellow shadow that’s why we put yellow on the page. We used blue color in the catalog – artists know it as turquoise. We used it because we have long-term and reliable Turkish partners. Long-term interaction with them allows us to move forward.

One of our main products – Brown Fused Aluminium has a slight brown color. Artists know it as a burned umbra. There is a region of Umbria in Italy. We established a new partnership in Italy recently.

Our abrasive disks are grey. But the grey color has an endless quantity of shadows as well our facilities allow us to produce a very wide range of abrasive materials.

In fact, for many years, we help our partners and many companies, engineers, artists, and masters of their businesses to create new products.

Ideas drive a new world, and we do our best to help your ideas to come true.

With the help of our tools, masters are cutting and polishing still and glass. They are grinding stone and wood. Specialists, with the help of our tools form and shape details necessary for airplanes and helicopters, cars, and boats. Our small grinding stones are needed in the kitchen and are helpful for every housekeeper.

We often do not know precisely where and how exactly our materials and tools are used, but we know for sure, that lots of valuable things are made with them.

For many dozens of years, our factory permanently works on the quality of our production. We develop and implement new technologies into production. We are responsible for the quality of our materials and proved it many times. We are open to the world, to new ideas and orders.

Yours Sincerely,
Zaporizhzhia Abrasive Plant

Zaporizhzhia Abrasive Plant PJSC is a leading Ukrainian manufacturer of abrasive materials and grinding wheels in Eastern Europe.

The company was founded in 1939 and has since then been a trusted supplier of high-quality abrasive products to customers all over the world.

Our production facilities are located in Zaporizhzhia. The company's product line includes a wide range of abrasive materials, such as silicon carbide, brown fused aluminium oxide, boron nitride, and boron carbide, as well as grinding wheels of various types and sizes.

Zaporizhzhia Abrasive Plant PJSC has a solid commitment to quality and customer satisfaction. The company's products are manufactured using the latest technology and undergo rigorous quality control procedures to ensure they meet the highest standards. Our plant confirms the achieved standards by ISO 9001 certificate of conformity.

The company's customer base includes various industries, such as automotive, aerospace, construction, metalworking, defense and security.

Zaporizhzhia Abrasive Plant PJSC is known for its flexibility and ability to customize its products to meet each & every customer's needs.

SILICON CARBIDE GRINDING MATERIALS ARE USED IN:

SILICON CARBIDE

Crystals in nature grow 150 years.
We crystalize it in 8 hours only.

Crystal
of Silicon Carbide

SILICON CARBIDE

Zaporizhzhia Abrasive Plant is the leading manufacturer of silicon carbide (SiC). Based on long time experience and industrial expertise, we are delighted to provide a wide range of high-quality products and excellent services.

SiC is a versatile and high-performance material that has been used in a wide range of industries for many years. With its exceptional properties such as high strength, hardness, and thermal conductivity, SiC is a popular choice for applications that require superior performance.

One of the most common uses of SiC is in the manufacturing of abrasives and cutting tools. Its exceptional hardness and wear resistance make it an ideal material for grinding, cutting, and polishing. Additionally, SiC is widely used in the production of semiconductors and electronic devices due to its excellent thermal conductivity and high-temperature stability.

Zaporizhzhia Abrasive Plant offers black silicon carbide and metallurgical grade silicon carbide.

THE BLACK SIC GRINDING MATERIALS ARE USED:

IN THE PROCESS OF IRON AND NONFERROUS METALS, CARBON, GLASS AND CERAMICS, STONE, CONCRETE, WOOD SUBSTANCE, PLASTICS, LEATHER, AND OTHER MATERIALS OF NATURAL AND ARTIFICIAL ORIGIN TREATMENT.

IN THE REFRACTORY AND CERAMIC INDUSTRIES AS A COMPONENT FOR MOLDINGS AND ANTI-PENETRATION WASHES, IN CRUCIBLES FOR THE CASTING OF NONFERROUS AND PRECIOUS METALS PRODUCTION, AND FOR WASH TROUGHS.

The black silicon carbide with SiC 88% min, 94% min mass proportions in the form of 0-10mm grain size fraction for use as a modifier (deoxidizer) in the process of synthetic iron melting in cupola furnaces, electric arc, or induction furnaces.

Zaporizhzhia Abrasive Plant produces and sells black silicon carbide grinding materials of marks 54C, 53C with indexes F and P. We offer silicon carbide refractory as black SiC macro and micro fractions with a grain size from 0 to 2 mm and metallurgical grade silicon carbide in a fraction of size 0-10 mm.

SILICON CARBIDE GRINDING MATERIALS PHYSICO-CHEMICAL POINTS

GRINDING MATERIALS CHEMICAL CONSTITUTION

Mark	Grit	Mass share, %			Test grit
		SiC, not less	Fe, not more	C free, not more	
54C	F14-F24	97.5	0.2	0.4	F24
	P16-P24				P24
	F30-F54	98.0		0.3	F54
	P30-P50				P50
	F60-F80	97.5		0.4	F80
	P60-P80				P80
	F90-F150	97.0	0.3	0.5	F120
	P100-P150				P100
	F180	96.0	0.6	0.4	F180
	P180				P180
	F230-F280	98.0	0.3		F280
	F320-F600	97.0			F600
	F800-F1000	96.0	0.4	0.5	F1000
	F1200	95.0			F1200
	P240-P360	97.5			P320
	P400-P1500	96.5			P1200
	P2000, P2500	95.0	0.5	0.6	P2500
53C	F14-F24	97,0	0,3	0,5	F24
	P16-P24				P24
	F30-F54			0,4	F54
	P30-P50				P50
	F60-F80			0,5	F80
	P60, P80				P80
	F90-F150	96,0	0,4		F120
	P100-P150				P100
	F180	96,0	0,7		F180
	P180				P180
	F220	93,0	1,5	0,6	F220

MASS SHARE OF MAGNETIC MATERIAL

Material kind	Mark	Grit	Mass share, % not more
Black Silicon Carbide	54C	F14-F80	0,13
	54C	P16-P80	0,13
	54C	F90-F180	0,2
	54C	P100-P180	0,2
	53C	F14-F180	0,3
	53C	P16-P180	0,3
	53C	F220	0,3

GRINDING MATERIALS BULK DENSITY

Grit	Bulk density, g/sm³, not less for marks 54C, 53C grinding materials	Test grit
F14	1,31	F14
P16	1,31	P16
F16, F20	1,35	F20
P20	1,35	P20
F22, F24	1,37	F24
P24	1,37	P24
F30-F60	1,40	F60
P30-P60	1,40	P60
F70, F80	1,35	F80
P80	1,35	P80
F90, F100	1,33	F100
P100, P120	1,33	P120
F120-F220	1,27	F150
P150-P180	1,27	P180

DESTROYING AND ABRASIVE ABILITY OF GRINDING MATERIALS

Indicator	Grit	Value of indicator for marks 54C, 53C	Test grit
Destroying, % not more	F14-F30	75	F14
	P16-P30	75	P16
	F36-F80	47	F60
	P36-P80	47	P60
Abrasive ability, g not less	F90-F150	0,08	F150
	P100-P180	0,08	P180
	F180-F220	0,07	F180

BLACK SILICON CARBIDE REFRACTORY FRACTION

Fraction	Granular composition. %	Chemical Composition, %		
		SiC, not less	C, not more	Fe, not more
1-3 mm 97% SiC	+2,8 mm 10% max. -1 mm 10% max.	97	-	-
0,5-2 mm 97% SiC	+2 mm 10% max. -500 mkm 10% max.	97	0,5	0,5
0,2-2 mm 97% SiC	+2 mm 5% max. +1 mm 15-40% -212 mkm 10% max.	97	0,5	0,5
0-1 mm 97% SiC	+1 mm 5% max. +212 mkm 70% min. -106 mkm 5% max.	97	0,5	0,5
0,5-1 mm 97% SiC	+ 1 mm 10% max. -500 mkm 10% max.	97	0,5	0,5
0,2-1 mm 97% SiC	+1 mm 10% max. +500 mkm 30-70% -212 mkm 10% max.	97	0,7	0,5
0,2-0,5 mm 97% SiC	+500 mkm 10% max. -212 mkm 10% max.	97	-	-
30/80 97% SiC	+1 mm 5% max. +125 mkm 80-95% -125 mkm 5% max.	97	0,5	0,3
60/90 97% SiC	+500 mkm 0% +355 mkm 10% max. +212 mkm 30% min. -106 mkm 10% max.	97	0,5	0,3
70/90 97% SiC	+425 mkm 0% +212 mkm 20% min. +150 mkm 30% min. -106 mkm 10% max.	97	0,5	0,3
0-0,35 mm 95% SiC	+300 mkm 5% max. +106 mkm 15-40% -45 mkm 30-50%	95	0,7	0,6
200 F 95% SiC	+90 mkm 0-5% +63 mkm 10-30% -45 mkm 60-80%	95	1,0	0,7
0-0,2 mm 95% SiC	+212 mkm 5% max. +106 mkm 15-40% -63 mkm 30-45%	95	0,7	0,5

BLACK SILICON CARBIDE REFRACTORY FRACTION

Fraction	Granular composition. %	Chemical Composition, %		
		SiC, not less	C, not more	Fe, not more
100 F 95% SiC	+212 mkm 0-2%	95	0,7	0,7
	+106 mkm 15-40%			
	+63 mkm 25-40%			
	-63 mkm 30-50%			
0-0,1 mm 95% SiC	+ 106 mkm 0-10%	95	1	0,5
	+63 mkm 20-40%			
	-63 mkm 50-80%			
0-0,066 mm 95% SiC	+63 mkm 10% max.	95	1	0,5
325 F 95% SiC	-45 mkm 80-90%	95	1	1

CUTTING ABILITY

Grit designation	Cutting ability, g/min, not less	Grit designation	Cutting ability, g/min, not less
F230	0,074	P240	0,076
F240	0,068	P280	0,074
F280	0,062	P320	0,072
F320	0,055	P360	0,070
F360	0,047	P400	0,068
F400	0,040	P500	0,058
F500	0,037	P600	0,047
F600	0,020	P800	0,040
F800	0,015	P1000	0,037
F1000	0,014	P1200	0,022
F1200	0,007	P1500-P2500	0,015

METALLURGICAL GRADE SILICON CARBIDE

Fraction name	Side of grid cell clear dimension, mm		Silicon carbide mass fraction, has passed through the mesh, %, not less
	grit №1	grit №2	
0-10 mm	20,0	-	100
	-	10,0	95

SIC IN SILICON CARBIDE MASS FRACTION IN PERCENTAGE TERMS WILL BE NOT LESS THAN:

- IN 0 – 10 MM FRACTION 88% SIC – 88;
- IN 0 – 10 MM FRACTION 94% SIC – 94.

Moisture content in silicon carbide in percentage terms will not exceed 1%.

THE PLANT HAS THE CAPACITY FOR THE OTHER FRACTIONS GRANULOMETRIC COMPOSITION PRODUCTION:

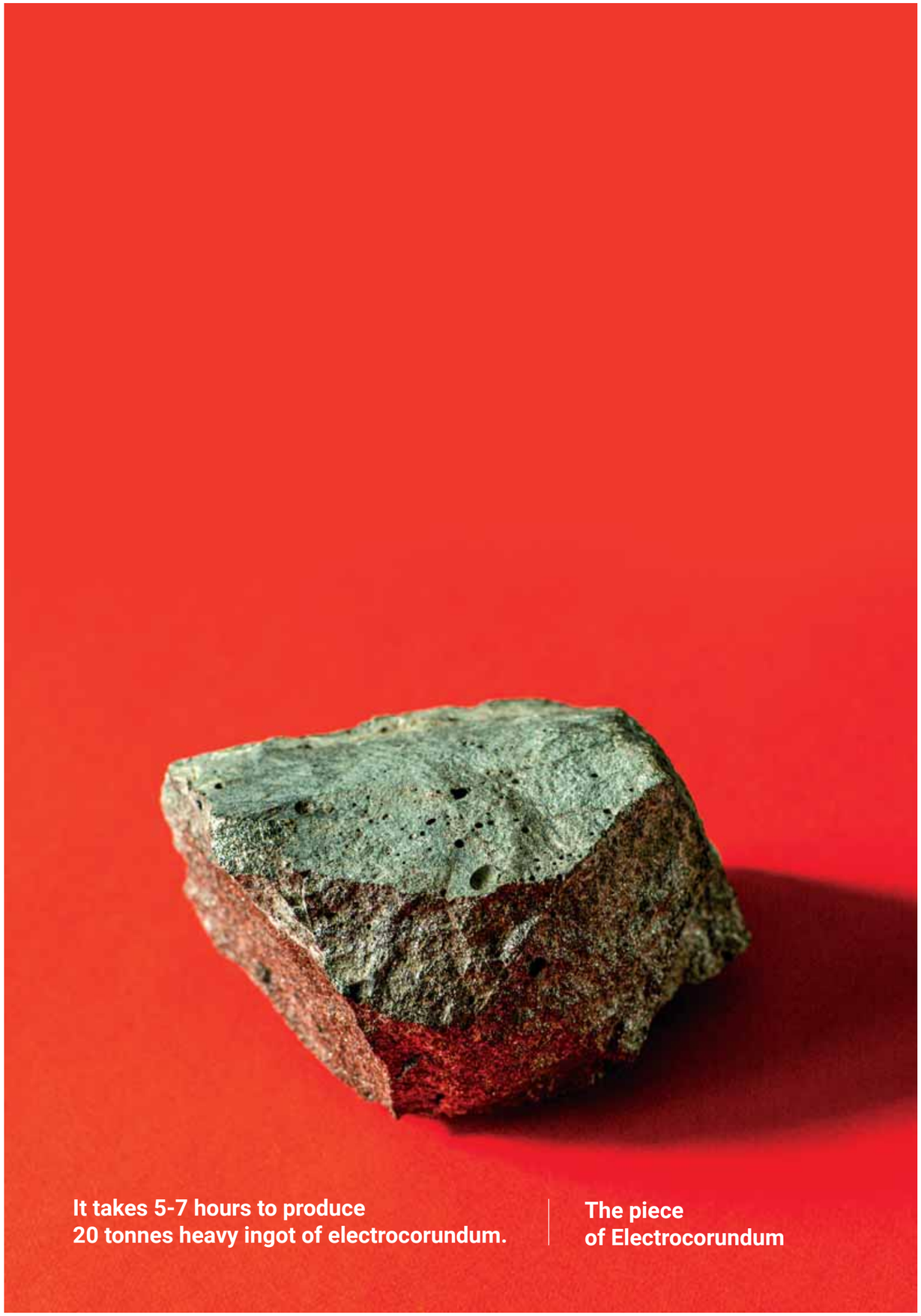
- 0 – 20 MM 88% SIC
- 0 – 400 MM 88% SIC


SILICON CARBIDE
Metallurgical Black
Silicon Carbide
Our Type: MET 94 0-10mm
Chemical Analysis (typical):
SiC
Grits 0-10 mm
94% min
SILICON CARBIDE
Crystalline Black Silicon
Carbide for Abrasives
Our Type: 54C F120
Fe
C
0.3 % max
0.5% max
SILICON CARBIDE
Crystalline Black
Silicon Carbide
Our Type: SiC 97 0-10mm
Chemical Analysis (typical):
SiC
Grits 0-10 mm
94% min
SILICON CARBIDE
Crystalline Black Silicon
Carbide for Abrasives
Our Type: 54C F36
Fe
C
0.2 % max
0.3% max
SILICON CARBIDE
Crystalline Black
Silicon Carbide Microgrits
Our Type: MIC 54C F280
Chemical Analysis (typical):
Fe
C
0.3 % max
0.4% max

BROWN FUSED ALUMINIUM

BROWN FUSED ALUMINIUM IS USED IN:

- ABRASIVES
- INDUSTRY
- METALLURGY
- TECHNICAL CERAMICS
- AUTOMOTIVE



It takes 5-7 hours to produce
20 tonnes heavy ingot of electrocorundum.

The piece
of Electrocorundum

BROWN FUSED ALUMINIUM (BFA) OXIDE

Brown fused aluminium is a tough, hard, and chemically inert material with high thermal conductivity, making it ideal for use in a variety of industrial applications.

One of the primary uses of brown fused aluminium is in abrasive applications. It is commonly used as a blasting media for surface preparation, cleaning, and finishing of metals and other surfaces. Its high hardness and toughness make it ideal for use in grinding wheels, cutting tools, and abrasive papers and cloths.

In addition to its abrasive properties, brown fused aluminium is also used as a refractory material due to its high melting point and resistance to thermal shock. It is used in the production of refractory bricks and other materials used in high-temperature applications such as kilns, furnaces, and boilers.

Brown fused aluminium is also used as a filler material in the manufacture of plastics and composites, as well as in the production of advanced ceramics. It is an important material in the aerospace, defense, and automotive industries, where its strength, durability, and thermal properties are highly valued.

ZAPORIZHZHIA ABRASIVE PLANT PRODUCES THE BFA GRINDING MATERIALS OF MARKS 14A, 13A OF THE SPECIAL GRAIN COMPOSITION:

WITH **F** INDEXES – FOR FREE GRINDING WITH UNBONDED GRAINS AND ABRASIVE TOOLS OF FIXED GEOMETRIC SHAPE MANUFACTURING;

WITH **P** INDEXES – FOR THE ABRASIVE TOOLS ON THE FLEXIBLE BASE (COATED ABRASIVES) MANUFACTURING; AS WELL AS THE FRACTIONS OF MACRO AND MICROGRITS WITH A GRAIN SIZE OF 6 MM TO 0.003 MM.

THE GRINDING MATERIALS OF THE BROWN FUSED ALUMINIUM OXIDE PHYSICO-CHEMICAL POINTS

THE GRINDING MATERIALS OF THE BROWN FUSED ALUMINIUM OXIDE CHEMICAL CONSTITUTION

Mark	Grit	Mass share, %				Test grit
		Al_2O_3 not less	Fe_2O_3 not more	TiO_2 not less	CaO not more	
14A	F12-F30	94,0	0,6	1,8	0,8	F20
	P12-P30					P20
	F36-F80	94,5	0,5			F60
	P36-P80					P60
	F90-F180	93,0	0,7		0 9	F120
	P100-P220					P150
	F220		0,8		1,1	F220
	F230-F280	96,0	0,4		0,5	F280
	F320-F600	95,0				F600
	F800-F1000	94,0	0,5			F1000
	F1200				0,7	F1200
	P240-P360	95,0	0,5		0,6	P320
	P400-P2500	94,0	0,5		0,7	P1200
13A	F12-F90	*	1,3		1,0	F40
	F100-F220				1,3	F150
	F240					F240

** is determined by the customer's request*

MASS SHARE OF MAGNETIC MATERIAL

Material kind	Mark	Grit	Mass share, % not more
Regular fused aluminium oxide	14A	P12-P220	0,2
	14A	F12-F220	0,2
	13A	F12-F240	0,8

DESTROYING AND ABRASIVE ABILITY OF GRINDING MATERIALS

Indicator	Grit	Value of indicator for marks 14A, 13A	Test grit
Destroying, % not more	F12-F30	52	F14
	P12-P30		P16
	F36-F80		F60
	P36-F80		P60
Abrasive ability, g not less	F90-F150	0,05	F150
	P100-P180		P180
	F180-F220		F180
	P220		P220
	F240	0,04	F240

THE BFAO BULK DENSITY OF GRINDING MATERIALS

Grit	Bulk density, g / sm³, not less
F12, P12	1,88-2,07
F14	1,86-2,05
FI6, P16	1,84-2,03
F20, P20	1,83-2,02
F22	1,82-2,01; 1,82-1,92*
F24, P24	1,80-2,00; 1,80-1,90*
F30, P30	1,78-1,98; 1,78-1,88*
F36, P36	1,76-1,96; 1,76-1,86*
F40, P40	1,74-1,94; 1,72-1,82*
F46	1,73-1,93; 1,70-1,80*
F54, P50	1,73-1,91; 1,67-1,77*
F60, P60	1,73-1,91; 1,63-1,73*
F70	1,72-1,88; 1,58-1,68*
F80, P80	1,70-1,86; 1,56-1,76*
F90, P100	1,68-1,84; 1,53-1,63*
F100, P120	1,66-1,82; 1,53-1,63*
F120, P150	1,64-1,80; 1,51-1,61*
F150, P180	1,64-1,80; 1,49-1,59*
F180, P220	1,58-1,74; 1,47-1,57*
F220	1,58-1,74; 1,45-1,55*
F240	1,54-1,82; 1,42-1,59*

** Grinding material is made at the request of the consumer by grinding in roller mills*

FUSED ALUMINIUM OXIDE GRINDING MICROPOWDERS

In loose-form and pastes these materials are advantageously used for grinding and polishing of metallic and glass parts, as far as for the clock-parts finishing in the clock industry.

Grit designation	Cutting ability, g/min, not less	Grit designation	Cutting ability, g/min, not less
F230	0,048	P240	0,051
F240	0,045	P280	0,047
F280	0,045	P320	0,045
F320	0,034	P360	0,045
F360	0,026	P400	0,045
F400	0,026	P500	0,035
F500	0,020	P600	0,030
F600	0,014	P800	0,026
F800	0,010	P1000	0,020
F1000	0,007	P1200	0,014
F1200	0,004	P1500-P2500	0,012


BROWN FUSED
ALUMINUM OXIDE
for Abrasives
Our Type: 14A F120
Chemical Analysis (typical)
Al_2O_3 | TiO_2 | Fe_2O_3 | CaO
93.0% min | 1.8% min | 0.9% max | 0.8% max
BROWN FUSED
ALUMINUM OXIDE
for Abrasives, Shot-Blasting
Our Type: 14A F14
Chemical Analysis (typical)
Al_2O_3 | TiO_2 | Fe_2O_3 | CaO
94% min | 1.8% min | 0.6% max | 0.8% max
BROWN FUSED
ALUMINUM OXIDE
for Refractories
Our Type: REF 14A 3-6mm
Chemical Analysis (typical)
Al_2O_3 | TiO_2 | Fe_2O_3 | CaO
93.5% min | 1.8% min | 0.9% max | 0.8% max
BROWN FUSED
ALUMINUM OXIDE
for Polishing
Our Type: MIC 14A F800
Chemical Analysis (typical)
Al_2O_3 | TiO_2 | Fe_2O_3 | CaO
Grits F800 | 94% min | 1.8% min | 0.4% max | 0.8% max

BORON CARBIDE & BORON NITRIDE ARE USED IN:

BORON CARBIDE & BORON NITRIDE

BORON NITRIDE

The boron nitride (BN) is boron with the nitrogen high– melting compound, which has a high thermal insulation, insulating and semiconducting properties, the low temperature coefficient of linear expansion.

The BN is an oxidation-resistant out of doors, is not wetted by molten glass, silicon, bronzes, it does not interact with the molten cryolite and aluminium.

Thanks to its properties, the boron nitride can be used as a high–temperature solid lubricant during operation at elevated temperatures conditions, under the acid solutions strong aggressive action. The BN is used for the castable refractory in the precision metallurgical engineering, in the process of refractories manufac¬turing, for heat insulation and as a part of dielectrics.

The boron nitride of the Zaporizhzhia Abrasive Plant PJSC manufacturing is a material with unique properties that make it indispensable in solving difficult problems in a variety of industries:

BOTH EXCELLENT ELECTRICAL AND THERMAL INSULATOR, SO IT IS THE ONLY MATERIAL FOR THE USAGE IN SPECIAL PURPOSES ELECTRONIC DEVICE.

NON-TOXIC, INERT SUBSTANCE, WHICH IS NOT WETTED BY MOST MOLTEN METALS, AND DO NOT INTERACT WITH MANY CHEMICALS.

It is widely used as a high-temperature lubricant and as a parting medium in a variety of processes with ceramics, metals and glass.

However, the main application of the boron nitride, manufactured by the Zaporizhabrasive – super-hard material synthesis: cubic and wurtzite similar boron nitrides.

BORON NITRIDE CHEMICAL COMPOSITION AND PHYSICAL AND MECHANICAL PROPERTIES

Indicators name	Standards for the kinds and grades of boron nitride			
	hexagonal		graphitesimilar	
	A	B	GM	GK
Boron nitride (BN) mass fraction, %, not less	97,4	97,7	97,8	98,0
Boron oxide (B_2O_3) mass fraction, %, not more	0,2	0,2	0,3	0,2
Boron carbide (B_4C), mass fraction, %, not more	1,5	1,0	undefined	0,3
Graphitation index	undefined	undefined	1,8-2,5	not more than 1,5
The boron nitride gaphitesimilar (BN-G) mass fraction, %, not more	undefined	undefined	undefined	undefined
Boron Nitride wurtzitesimilar (BN-W) mass fraction, %, not less	undefined	undefined	undefined	undefined
Iron (Fe), mass fraction, %, not more	undefined	undefined	undefined	undefined
Bulk density, g/sm^3	not less than 0,33	0,27-0,37	0,27-0,37	not less than 0,25
Moisture content, %, not more	undefined	undefined	undefined	undefined
Boron nitride mass fraction, passed through a sieve with a side of cells in clear of 100 mkm according to DSTU ISO 3310-1, %, not less	90	90	95	95

CHEMICALLY PURIFIED BORON NITRIDE CHEMICAL COMPOSITION AND PHYSICAL AND MECHANICAL PROPERTIES

Indicators name	Standards for chemically purified boron nitride of marks:		
	hexagonal		graphitesimilar
	A demineralized	B demineralized	HG demineralized
Boron nitride (BN) mass fraction, %, not less	98,0	98,0	98,5
Boron oxide (B_2O_3) mass fraction, %, not more	0,2	0,2	0,2
Boron carbide (B_4C), mass fraction, %, not more	1,0	1,0	0,3
Iron (Fe), mass fraction, %, not more	0,05	0,05	0,05
Graphitation index	not more 1,5	not more 1,5	not more 1,5
Bulk density, g/sm^3	not less 0,33	not less 0,27	not less 0,25
Boron nitride mass fraction, passed through a sieve with a side of cells in clear of 100 mkm according to DSTU ISO 3310-1, %, not less	90	90	95

BORON CARBIDE

The boron carbide (BC) is characterized by extra-hardness: it is the third substance after diamond and cubic boron nitride material, with high wear-resisting property, chemical resistance in aggressive environments, heat resistance, neutron absorption large cross-section, high electric resistance and semiconductor properties.

The grinding material are used for grinding and polishing by loose abrasive grains and in the form of pastes for the operations of technical stones, minerals, alloys, glass, ceramics, quartz processing, in the process of cutting plates of hard alloys grinding and finishing, for abrading and metallographic work.

The boron carbide is used for diffusive borating stamping equipment dies and parts, molds for metals and ceramics, pump parts, textile machinery and other steel parts, which are working in drudgery conditions at ambient and elevated temperatures, improves their performance in 2–5 times.

Jet nozzles, manufactured of alloys with BC, designed to spray solutions and melts, having aggressive properties, is 300 times more durable than those, made of cast iron, gauges and templates are from 100 to 200 times more durable than steel ones.

Due to the high wear-resisting property, the BC use is efficient under templates, right crushers, yarn carriers, filters for textile and chemical industry, blow holes, indenters for red hardness measuring, tools for manual lapping, welding electrodes, mortars manufacturing, as well as under the manufacturing of hard replaceable parts – rings, gauges, inserts, precision plates. The BC is used in the manufacture of resistance and thermocouples when working under high temperatures conditions and in corrosive environments. The boron carbide is used in the process of armor plates and bullet-proof body armour manufacturing.

The BC is widely used in the nuclear industry for the control rods manufacturing.

Zaporizhzhia Abrasive Plant PJSC produces materials boron carbide of grades 1B, 2B, 3B of grit F80-F220 with index F and grit F240 and 3, as well as the fraction with a grain size from 0.045 mm to 5 mm and minus 45 mkm.

BORON CARBIDE CHEMICAL COMPOSITION WITH GRIT F80-F220, F240, 3

Grit	Mark	Mass share, %					
		B_4C, not less	B total, not less	C total, not less	B_2O_3, not more	Fe, not more	Si, not more
F80	1B	93,0	74,5	-	-	-	-
	2B	95,0	76,0	-	0,2	0,2	-
F90-F180	1B	94,0	75,0	-	-	-	-
	2B	95,0	77,0	20,5-22,5	0,2	0,15	-
	3B	96,0	76,0	19,5	0,2	0,15	0,15
F220	1B	93,0	74,5	-	-	-	-
	2B	95,0	76,0	20,5-22,5	0,2	0,15	-
F240	-	95,0	75,0		0,3	0,3	-
3	-	93,0	74,0	-	0,5	-	-

BORON CARBIDE GRAIN SIZE WITH GRIT 3

Grading limit		Grading limit plus coarse grain		Base grain		Integrated grain		Fine grain	
Grain size, mkm	Mass share,% not more	Grain size, mkm	Mass share,% not more	Grain size, mkm	Mass share,% not less	Grain size, mkm	Mass share,% not less	Grain size, mkm	Mass share,% not more
53	1	53-54	22	45-28	40	45-20	68	under 20	15

BORON CARBIDE FRACTION CHEMICAL COMPOSITION

Fraction	Mark	Mass share, %							
		B_4C, not less	B+C, not less	B total, not less	C total	B_2O_3, not more	C free, not more	Fe, not more	Si, not more
Minus 5,0 mm plus 1,0 mm	-	95,0	-	76,0	-	0,6	-	0,8	0,5
Minus 5,0 mm plus 0,3 mm	1B	94,0	-	74,0	-	0,5	-	0,8	-
	2B	95,0	-	76,5	20-22	0,5	-	0,8	-
Minus 1,0 mm plus 0,3 mm	-	90,0	-	73,0	-	1,0	-	-	-
Minus 0,3 mm	-	90,0	-	72,0	-	-	-	-	-
Minus 250 mkm plus 45 mkm	-	95,0	98,0	77,0	21,3-22,5	-	1,7	0,1	-
Minus 250 mkm plus 35 mkm	-	95,0	98,0	76,5	21,0-22,5	-	2,0	0,1	-
Minus 75 mkm	-	95,0	-	76,5	20-22	0,5	-	0,8	-
Minus 63 mkm	1B	85,0	-	70,0	-	-	-	-	-
	2B	88,0	-	73,5	-	-	-	0,5	-
Minus 45 mkm	-	94,5	-	75,5	-	0,5	-	0,8	-
Minus 45 mkm (325F)	1B	94,5	-	75,0	-	0,5	-	-	-
	2B	94,5	-	75,0	-	0,5	-	-	-
	3B	95,0	-	76,0	-	-	-	-	-

BORON CARBIDE FRACTION GRAIN SIZE

Fraction	Hole nominal size, mm	Mass share, %			
		material residu on the sieve, not more	material residu on the sieve, not less	material residue on the in a tray	
				not more	not less
Minus 5,0 mm plus 1,0 mm	5	10	-	10	-
	1	-	80		
Minus 5,0 mm plus 0,3 mm	5	10	-	10	-
	0,300	-	80		
Minus 1,0 mm plus 0,3 mm	1	10	-	10	-
	0,300	-	80		
Minus 0,3 mm	0,300	15	-	-	-
Minus 250 mkm plus 45 mkm	0,250	5	-	5	-
	0,045	-	90		
Minus 250 mkm plus 35 mkm	0,250	5	-	15	-
	0,045	-	80		
Minus 75 mkm	0,106	0	-	-	-
	0,075	25	-	-	-
Minus 63 mkm	0,063	15	-		
Minus 45 mkm	0,075	0	-	-	-
	0,045	25	-		
Minus 45 mkm (325F)	0,045	5	-	-	95

ENGINEERING DESIGN FOR YOUR APPLICATION

If our standard of mark and size is not exactly what you need, we will work out new marks specifically for your application according to your order.

ABRASIVE TOOLS

APPLICATION AREAS OF ABRASIVE TOOLS:

Cutting wheels are used for cutting metal, stone, marble, granite, ceramic pipes, concrete, pipes, rails, corners, profiles

Within last 20 years we produced over 180 millions of cutting disks

Our factory produces 1500 tonnes of grinding disks annually

Grinding circles are used for processing of metal surfaces with a hand-held power tool; to remove rust (peeling), level the surface (grinding)

ABRASIVE TOOLS

Zaporizhzhia Abrasive Plant PJSC produces more than 80,000 types of abrasive tools. These tools can be categorized into two groups: fixed geometric form tools (such as wheels, rings, segments and hones on the ceramic and bakelite bonds) and flexible grinding tools (including coated abrasives, grinding belts, flap wheels, and fiber wheels).

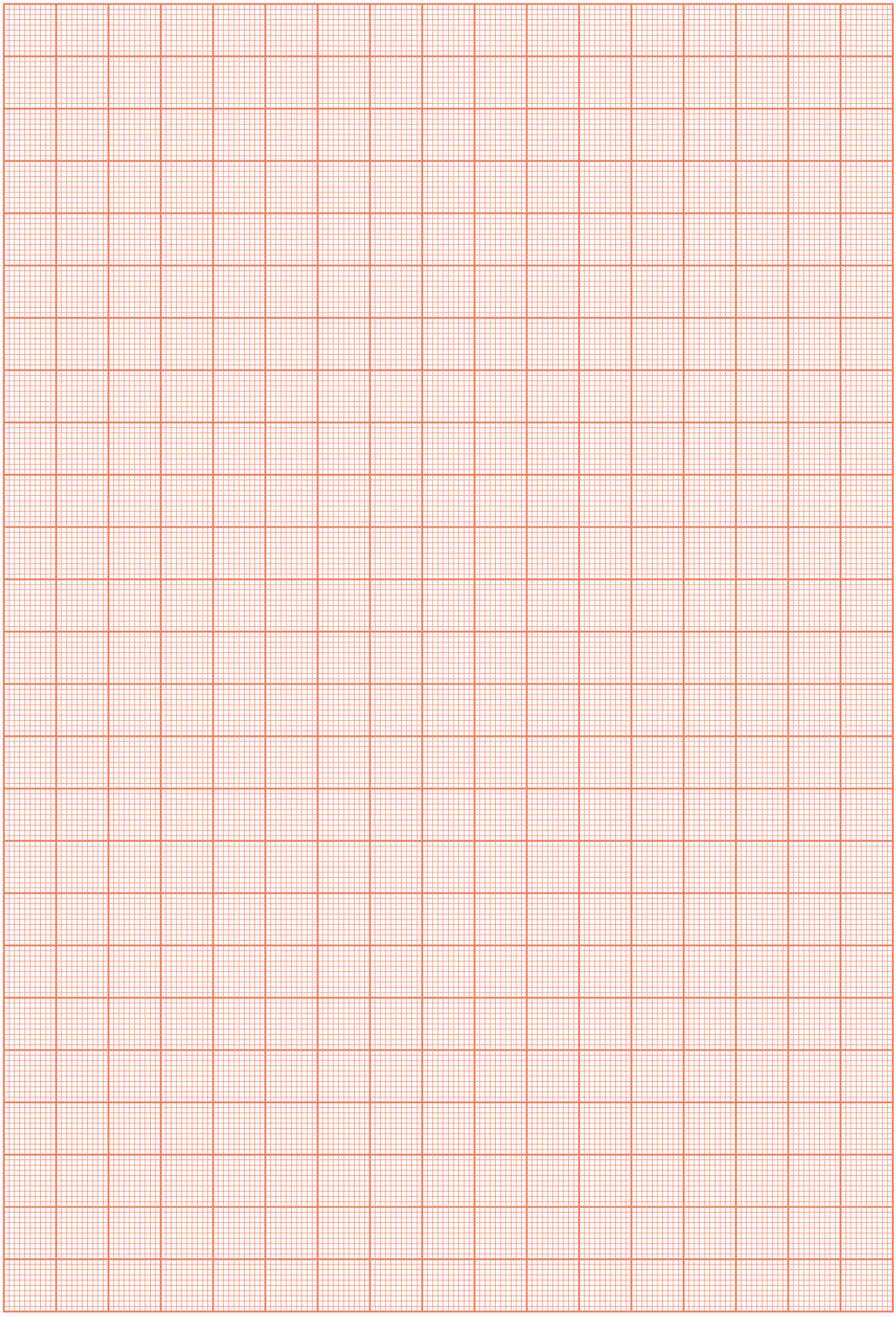
To ensure efficient grinding and the desired quality of the processed material, several parameters need to be considered when choosing an abrasive tool.

These parameters include the characteristics of the processed material (chemical composition, physical and mechanical properties), geometric parameters and form of the grinding surface (solid or dashed), machining allowance, initial state of the grinding surface (including roughness), required processing quality, type and parameters of the working machine, processing conditions (speed, feed, cooling), and processing efficiency (productivity, tool durability, adjustments, energy consumption).

The selection of the abrasive tool depends on various characteristics, such as type, size, brand, and grit of the grinding material, as well as the hardness and structure of the tool's bonding material and the operating speed. It is crucial to choose the appropriate wheel hardness and structure based on the material being processed and the type of grinding operation.

The choice of abrasive tool form and size is determined by factors such as machine design and purpose, machine dimensions, fixture design, and the shape and dimensions of the parts being processed. The efficiency of the wheel's operation relies on the proper selection of characteristics, including its cutting ability, resistance, and the quality of the grinding surface it produces.

The vitrified bond tool has no expiration date. It is everlasting.



Boron carbide & Boron nitride are used in:

- Abrasives
- Technical Ceramics
- Industry
- Automotive
- Metalurgy
- Defence & Sequrity
- Energy
- Chemistry
- Aerospace

Zaporizhzhia Abrasive Plant PJSC
Ukraine, 2023
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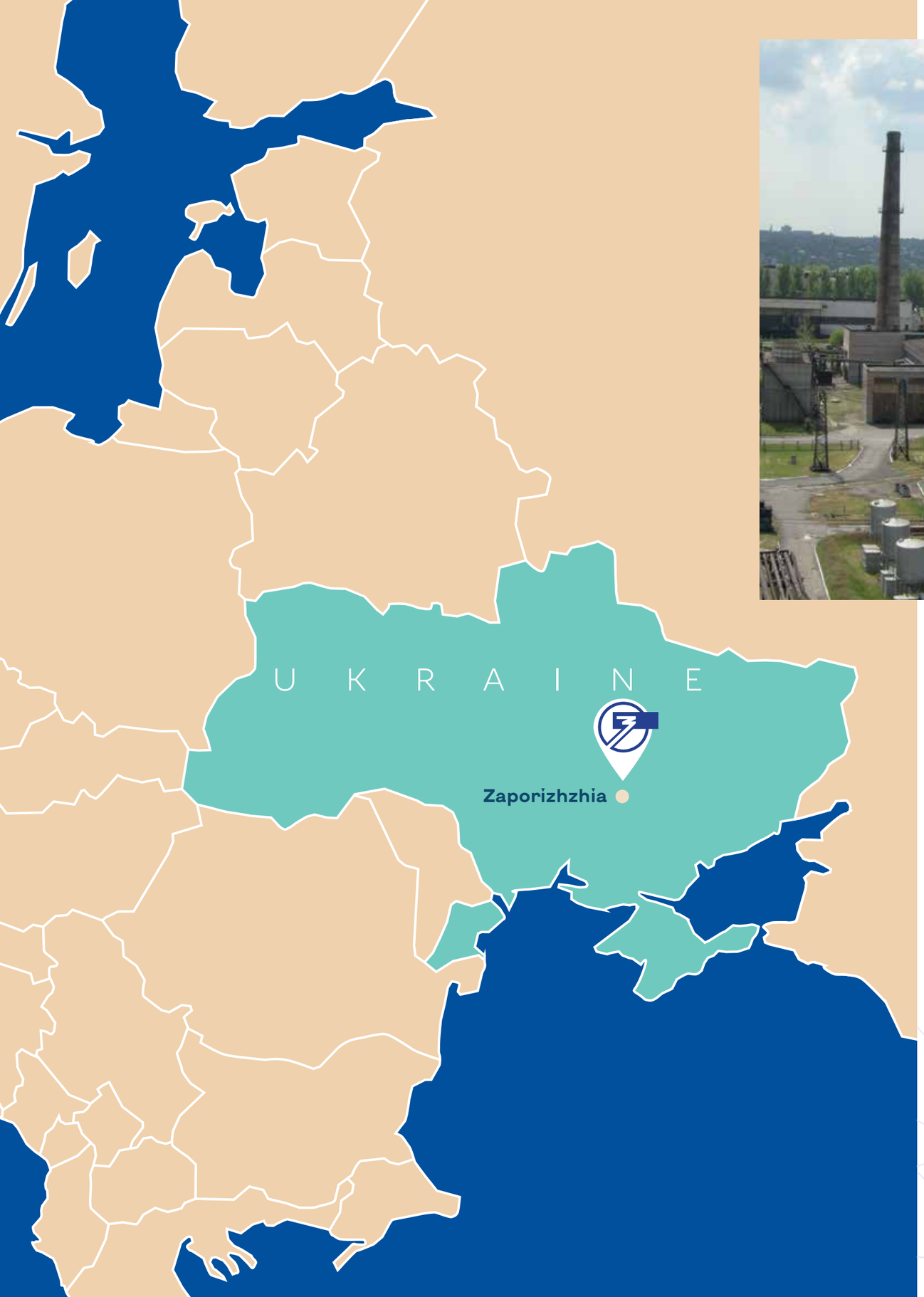

Zaporizhzhia Abrasive Plant PJSC is a leading Ukrainian manufacturer of abrasive materials and grinding wheels in Eastern Europe.

The company was founded in 1939 and has since then been a trusted supplier of high-quality abrasive products to customers all over the world.

Our production facilities are located in Zaporizhzhia. The company's product line includes a wide range of abrasive materials, such as silicon carbide, brown fused aluminium oxide, boron nitride, and boron carbide, as well as grinding wheels of various types and sizes.

Zaporizhzhia Abrasive Plant PJSC has a solid commitment to quality and customer satisfaction. The company's products are manufactured using the latest technology and undergo rigorous quality control procedures to ensure they meet the highest standards. Our plant confirms the achieved standards by ISO 9001 certificate of conformity.

The company's customer base includes various industries, such as automotive, aerospace, construction, metalworking, defense and security.

Zaporizhzhia Abrasive Plant PJSC is known for its flexibility and ability to customize its products to meet each & every customer's needs.

Boron nitride

The boron nitride (BN) is boron with the nitrogen high- melting compound, which has a high thermal insulation, insulating and semi-conducting properties, the low temperature coefficient of linear expansion.

The BN is an oxidation-resistant out of doors, is not wetted by molten glass, silicon, bronzes, it does not interact with the molten cryolite and aluminium.

Thanks to its properties, the boron nitride can be used as a high- temperature solid lubricant during operation at elevated temperatures conditions, under the acid solutions strong aggressive action. The BN is used for the castable refractory in the precision metallurgical engineering, in the process of refractories manufacturing, for heat insulation and as a part of dielectrics.

The boron nitride of the Zaporizhzhia Abrasive Plant PJSC manufacturing is a material with unique properties that make it indispensable in solving difficult problems in a variety of industries:

- both excellent electrical and thermal insulator, so it is the only material for the usage in special purposes electronic device.
- non-toxic, inert substance, which is not wetted by most molten metals, and do not interact with many chemicals.

It is widely used as a high-temperature lubricant and as a parting medium in a variety of processes with ceramics, metals and glass.

However, the main application of the boron nitride, manufactured by the Zaporizh-abrasive – super-hard material synthesis: cubic and wurtzite similar boron nitrides.

Boron nitride chemical composition and physical and mechanical properties

Indicators name	Standards for the kinds and grades of boron nitride			
	hexagonal		graphitesimilar	
	A	B	GM	GK
Boron nitride (BN) mass fraction, %, not less	97,4	97,7	97,8	98,0
Boron oxide (B_2O_3) mass fraction, %, not more	0,2	0,2	0,3	0,2
Boron carbide (B_4C) mass fraction, %, not more	1,5	1,0	undefined	0,3
Graphitation index	undefined	undefined	1,8-2,5	not more than 1,5
The boron nitride gaphitesimilar (BN-G) mass fraction, %, not more	undefined	undefined	undefined	undefined
Boron Nitride wurtzitesimilar (BN-W) mass fraction, %, not less	undefined	undefined	undefined	undefined
Iron (Fe) mass fraction, %, not more	undefined	undefined	undefined	undefined
Bulk density, g/sm^3	not less than 0,33	0,27-0,37	0,27-0,37	not less than 0,25
Moisture content %, not more	undefined	undefined	undefined	undefined
Boron nitride mass fraction, passed through a sieve with a side of cells in clear of 100 mkm according to DSTU ISO 3310-1, %, not less	90	90	95	95

Chemically purified boron nitride chemical composition and physical and mechanical properties

Indicators name	Standards for chemically purified boron nitride of marks:		
	hexagonal		graphitesimilar
	A demineralized	B demineralized	HG demineralized
Boron nitride (BN) mass fraction, %, not less	98,0	98,0	98,5
Boron oxide (B_2O_3) mass fraction, %, not more	0,2	0,2	0,2
Boron carbide (B_4C) mass fraction, %, not more	1,0	1,0	0,3
Iron (Fe) mass fraction, %, not more	0,05	0,05	0,05
Graphitation index	not more 1,5	not more 1,5	not more 1,5
Bulk density, g/sm^3	not less 0,33	not less 0,27	not less 0,25
Boron nitride mass fraction, passed through a sieve with a side of cells in clear of 10 mkm according to DSTU ISO 3310-1, %, not less	90	90	95


BORON NITRIDE
graphite structure
Our Type: NB GA
Chemical Analysis (typical):
BN
98% min
B2O3
0.2% max
BORON CARBIDE
Our Type: BC 45-250 micron
Chemical Analysis (typical):
B4C
95% min
B+C
98% min
B
77% min
Cutal
21.3-22.5%
Fe
0.1% max

Boron carbide

The boron carbide (BC) is characterized by extra-hardness: it is the third substance after diamond and cubic boron nitride material, with high wear-resisting property, chemical resistance in aggressive environments, heat resistance, neutron absorption large cross-section, high electric resistance and semi-conductor properties.

The grinding material are used for grinding and polishing by loose abrasive grains and in the form of pastes for the operations of technical stones, minerals, alloys, glass, ceramics, quartz processing, in the process of cutting plates of hard alloys grinding and finishing, for abrading and metallographic work.

The boron carbide is used for diffusive borating stamping equipment dies and parts, molds for metals and ceramics, pump parts, textile machinery and other steel parts, which are working in drudgery conditions at ambient and elevated temperatures, improves their performance in 2-5 times.

Jet nozzles, manufactured of alloys with BC, designed to spray solutions and melts, having aggressive properties, is 300 times more durable than those, made of cast iron, gauges and templates are from 100 to 200 times more durable than steel ones.

Due to the high wear-resisting property, the BC use is efficient under templates, right crushers, yarn carriers, filters for textile and chemical industry, blow holes, indenters for red hardness measuring, tools for manual lapping, welding electrodes, mortars manufacturing, as well as under the manufacturing of hard replaceable parts – rings, gauges, inserts, precision plates. The BC is used in the manufacture of resistance and thermocouples when working under high temperatures conditions and in corrosive environments. The boron carbide is used in the process of armor plates and bullet-proof body armour manufacturing.

The BC is widely used in the nuclear industry for the control rods manufacturing.

Zaporizhzhia Abrasive Plant PJSC produces materials boron carbide of grades 1B, 2B, 3B of grit F80-F220 with index F and grit F240 and 3, as well as the fraction with a grain size from 0,045 mm to 5 mm and minus 45 mkm.

Boron carbide chemical composition with grit f80-f220, f240, 3

Grit	Mark	Mass share, %					
		B_4C not less	B_{total} not less	C_{total} not less	B_2O_3 not more	Fe not more	Si not more
F80	1B	93,0	74,5	-	-	-	-
	2B	95,0	76,0	-	0,2	0.2	-
F90-F180	1B	94,0	75,0	-	-	-	-
	2B	95,0	77,0	20,5-22,5	0,2	0,15	-
	3B	96,0	76,0	19,5	0,2	0,15	0,15
F220	1B	93,0	74,5	-	-	-	-
	2B	95,0	76,0	20,5-22,5	0,2	0,15	-
F240	-	95,0	75,0		0,3	0,3	-
3	-	93,0	74,0	-	0,5	-	-

Boron carbide grain size with grit 3

Grading limit		Grading limit plus coarse grain		Base grain		Integrated grain		Fine grain	
Grain size, mkm	Mass share, % not more	Grain size, mkm	Mass share, % not more	Grain size, mkm	Mass share, % not less	Grain size, mkm	Mass share, % not less	Grain size, mkm	Mass share, % not more
53	1	53-54	22	45-28	40	45-20	68	under 20	15

Engineering design for your application

If our standard of mark and size is not exactly what you need, we will work out new marks specifically for your application according to your order.

Boron carbide fraction chemical composition

Fraction	Mark	Mass share, %							
		B_4C, not less	B+C, not less	B_{total} not less	C_{total}	B_2O_3 not more	C_{free} not more	Fe, not more	Si, not more
Minus 5,0 mm plus 1,0 mm	-	95,0	-	76,0	-	0,6	-	0,8	0,5
Minus 5,0 mm plus 0,3 mm	1B	94,0	-	74,0	-	0,5	-	0,8	-
	2B	95,0	-	76,5	20-22	0,5	-	0,8	-
Minus 1,0 mm plus 0,3 mm	-	90,0	-	73,0	-	1,0	-	-	-
Minus 0,3 mm	-	90,0	-	72,0	-	-	-	-	-
Minus 250 mkm plus 45 mkm	-	95,0	98,0	77,0	21,3-22,5	-	1,7	0,1	-
Minus 250 mkm plus 35 mkm	-	95,0	98,0	76,5	21,0-22,5	-	2,0	0,1	-
Minus 75 mkm	-	95,0	-	76,5	20-22	0,5	-	0,8	-
Minus 63 mkm	1B	85,0	-	70,0	-	-	-	-	-
	2B	88,0	-	73,5	-	-	-	0,5	-
Minus 45 mkm	-	94,5	-	75,5	-	0,5	-	0,8	-
Minus 45 mkm (325F)	1B	94,5	-	75,0	-	0,5	-	-	-
	2B	94,5	-	75,0	-	0,5	-	-	-
	3B	95,0	-	76,0	-	-	-	-	-

Boron carbide fraction grain size

Fraction	Hole nominal size, mm	Mass share, %			
		material residu on the sieve, not more	material residu on the sieve, not less	material residue on the in a tray	
				not more	not less
Minus 5,0 mm pi us 1,0 mm	5	10	-	10	-
	1	-	80		
Minus 5,0 mm plus 0,3 mm	5	10	-	10	-
	0,300	-	80		
Minus 1,0 mm plus 0,3 mm	1	10	-	10	-
	0,300	-	80		
Minus 0,3 mm	0,300	15	-	-	-
Minus 250 mkm plus 45 mkm	0,250	5	-	5	-
	0,045	-	90		
Minus 250 mkm plus 35 mkm	0,250	5	-	15	-
	0,045	-	80		
Minus 75 mkm	0,106	0	-	-	-
	0,075	25	-	-	-
Minus 63 mkm	0,063	15	-		
Minus 45 mkm	0,075	0	-	-	-
	0,045	25	-		
Minus 45 mkm (325F)	0,045	5	-	-	95