

Boron

nitride & carbide

catalog

Boron carbide & Boron nitride
are used in:



Abrasives



Technical
Ceramics



Industry



Automotive



Metalurgy



Defence &
Security



Energy



Chemistry

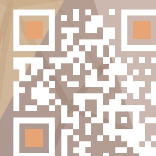


Aerospace

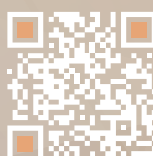
Zaporizhzhia Abrasive Plant PJSC

Ukraine, 2023

Oleksiya Porady str, 44,
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abrasive.zp.ua



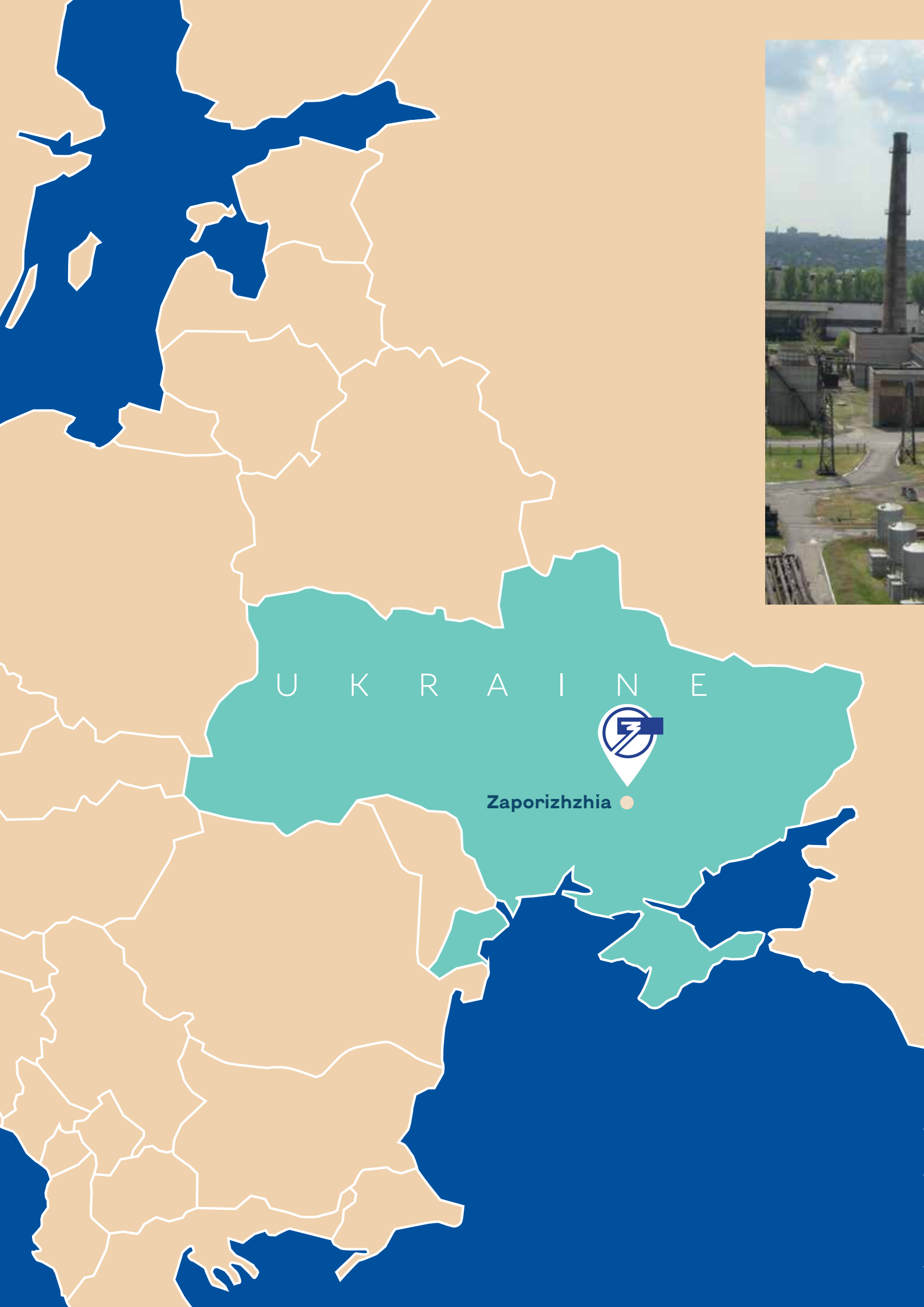
YouTube Channel
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ZAPORIZHZHIA
ABRASIVE PLANT
PJSC



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.

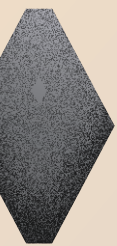
Boron nitride chemical composition and physical and mechanical properties

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 ₂ O ₃) mass fraction, %, not more	0,2	0,2	0,3	0,2
Boron carbide (B ₄ C) mass fraction, %, not more	1,5	1,0	undefined	0,3
Graphitization 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 ₂ O ₃) mass fraction, %, not more	0,2	0,2	0,2
Boron carbide (B ₄ C) mass fraction, %, not more	1,0	1,0	0,3
Iron (Fe) mass fraction, %, not more	0,05	0,05	0,05
Graphitization 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 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 boring 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 ₄ C not less	B _{total} not less	C _{total} not less	B ₂ O 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 ₄ C, not less	B+C, not less	B _{total} not less	C _{total}	B ₂ O 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

