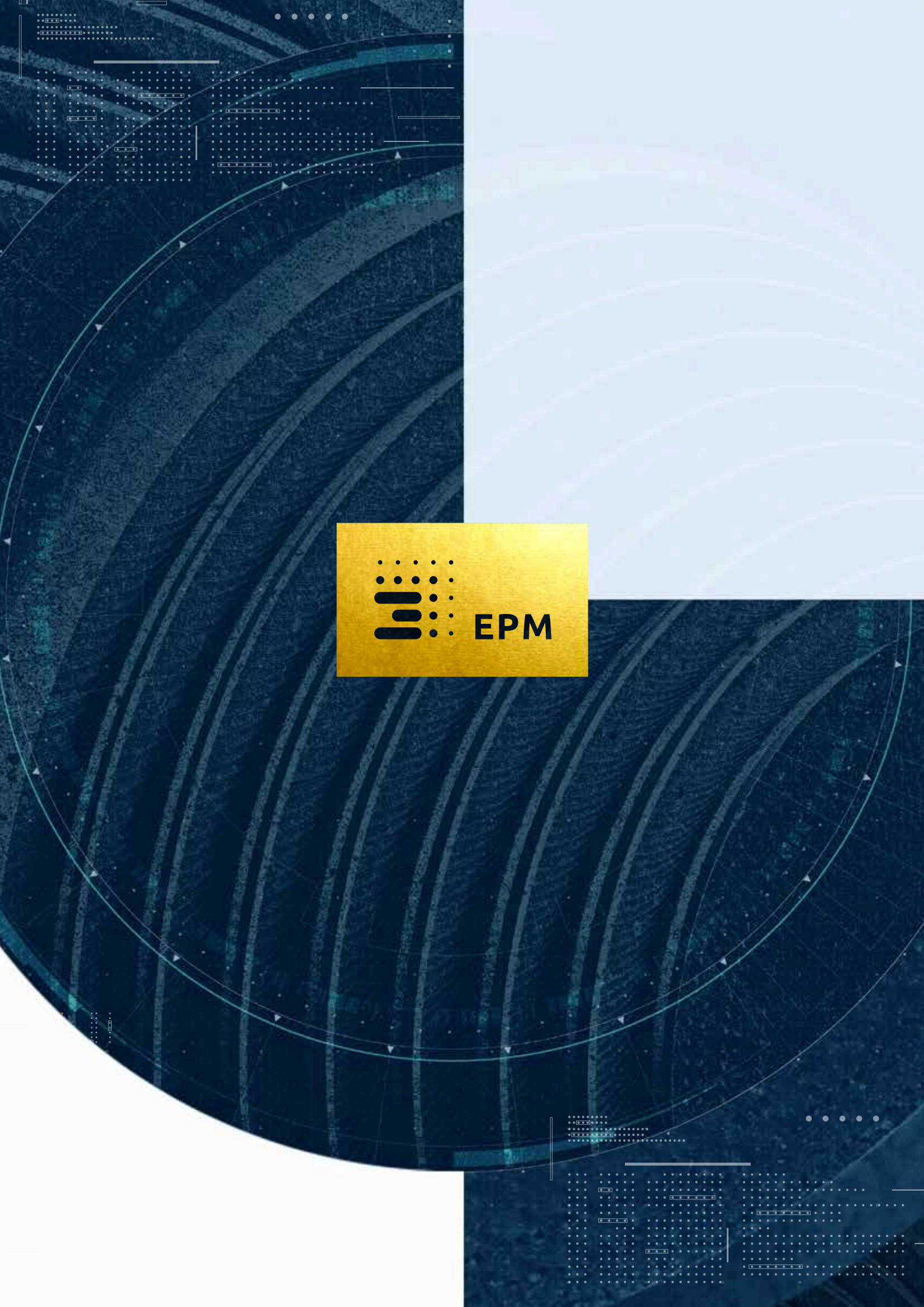

EPM

EPM

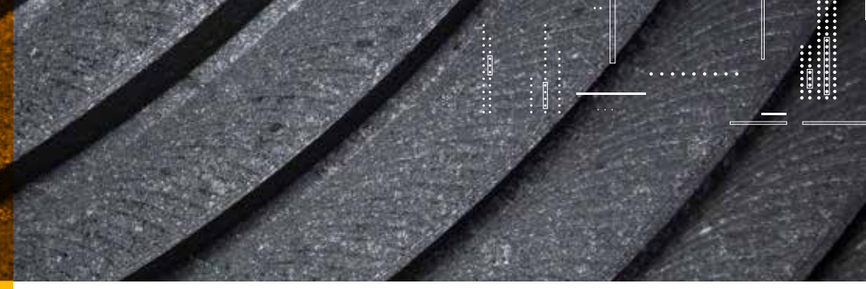
#1 THE LEADING RUSSIAN MANUFACTURER OF GRAPHITE & CARBON-BASED PRODUCTS

TOP10 GLOBAL TOP 10 MANUFACTURER OF GRAPHITE AND CARBON PRODUCTS

>60 WE EXPORT OUR PRODUCTION TO MORE THAN 60 COUNTRIES ALL OVER THE WORLD

4600 STAFF ACROSS PRODUCTION FACILITIES

LEADERS TRUST US!



EPM

EPM is Russia's largest manufacturer of graphite and carbon based products, and an active player in the global market. We are worldwide supplier selling up to 50% of our products to more than 60 different countries.

We manufacture high-tech electrodes, cathodes and other carbon and graphite products for steel, aluminum, ferroalloy, silicon, chemical and machinery industries.

We are a Top 10 carbon and graphite product manufacturer worldwide.

The Company employs approximately 4600 staff across our production facilities.

EPM MARKET SHARES

RUSSIA — EPM SALES

MANAGEMENT — EPM HEADQUARTERS AND REPRESENTATIVE OFFICES

PLANT — MANUFACTURING FACILITIES

MANAGEMENT COMPANY
MOSCOW

DONCARB GRAPHITE

NOVOSIBIRSK ELECTRODE PLANT

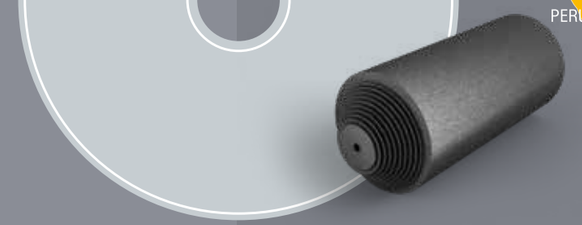
ENERGOPROM GMBH
GERMANY

NOVOCHERKASSK ELECTRODE PLANT
DONCARB GRAPHITE

ICELAND
SWEDEN
NORWAY
FINLAND
ESTONIA
LATVIA
BELARUS
POLAND
GERMANY
CZECH REP.
AUSTRIA
HUNGARY
MOLDOVA
ROMANIA
CRIMEA
FRANCE
SWITZERLAND
SLOVENIA
BOSNIA AND HERZEGOVINA
BULGARIA
ITALY
MONTENEGRO
GREECE
TURKEY
GEORGIA
ARMENIA
AZERBAIJAN
PORTUGAL
SPAIN
MOROCCO
ISRAEL
EGYPT
KUWAIT
UAE
SAUDI ARABIA
OMAN
KAZAKHSTAN
UZBEKISTAN
KYRGYZSTAN
TAJIKISTAN
MONGOLIA
CHINA
INDIA
SOUTH KOREA
THAILAND
MALAYSIA
INDONESIA
AUSTRALIA
SOUTH AFRICA
CANADA
USA
MEXICO
COLOMBIA
VENEZUELA
PERU
BRAZIL
ARGENTINA
URUGUAY

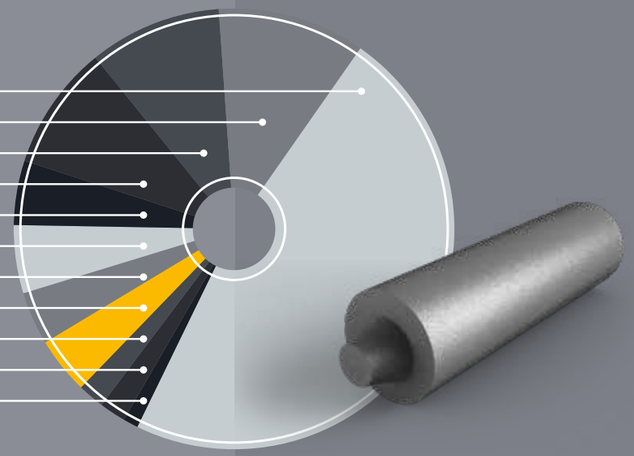
CARBON ELECTRODES MARKET SHARES IN THE WORLD

78%	China (5 companies)
15%	**EPM (Russia)**
5%	SGL (Europe)
3%	Elkem (Brazil)



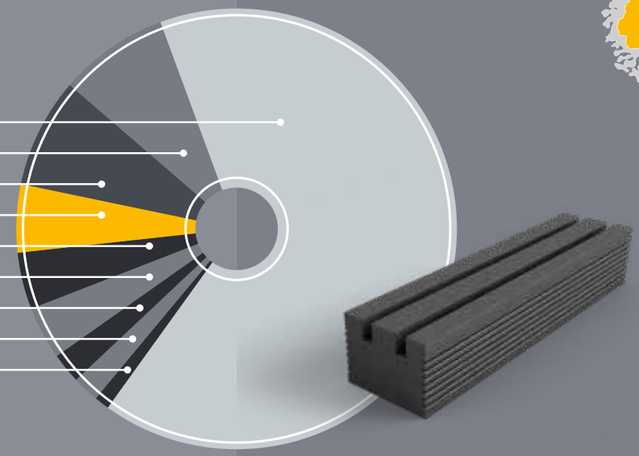
GRAPHITE ELECTRODES MAKET SHARES IN THE WORLD

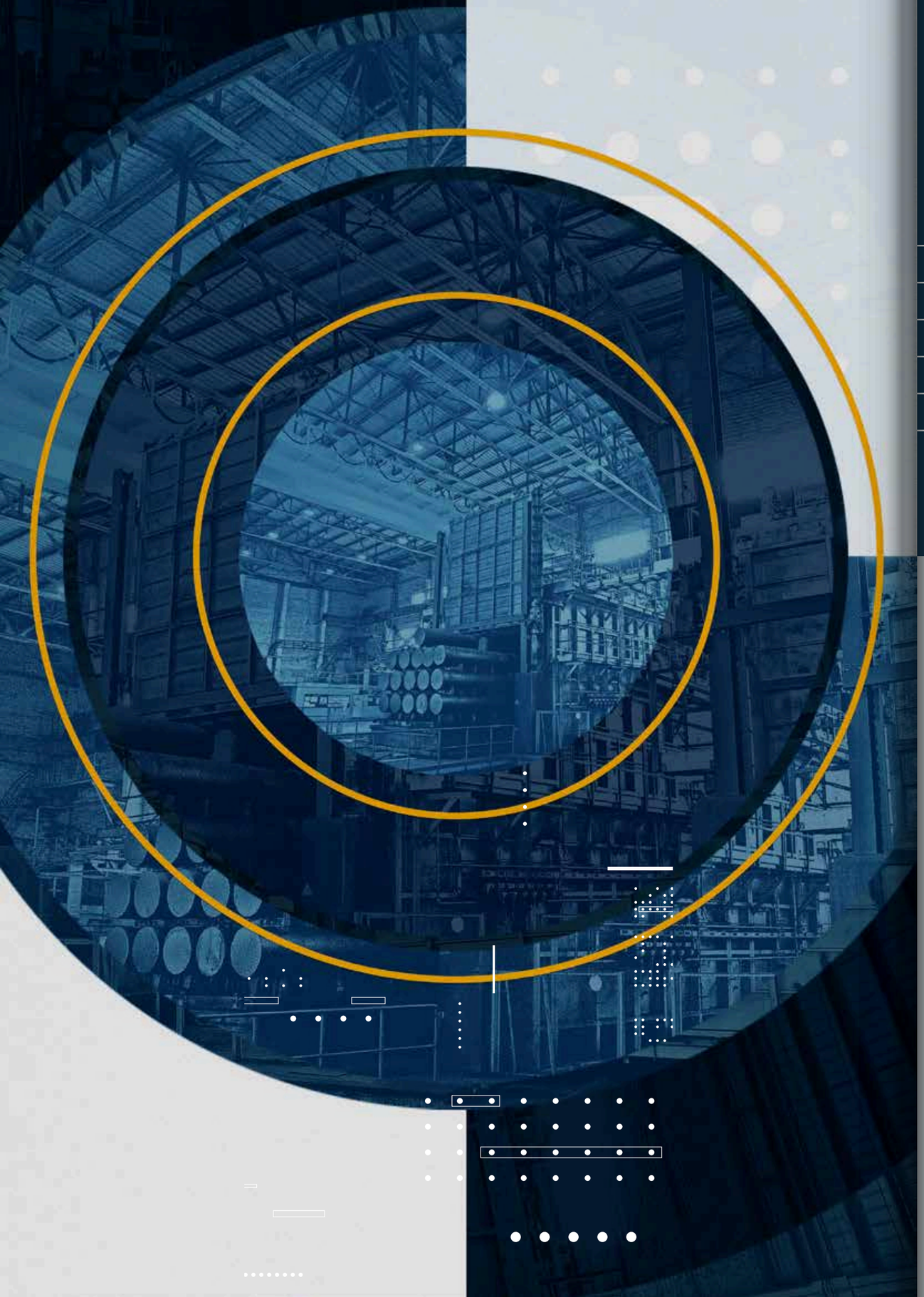
48%	China (>50 companies)
11%	Graftech (USA)
10%	SGL (Europe)
9%	Showa Denko (Japan)
5%	GIL (India)
5%	Tokai Carbon (Japan)
4%	HEG (India)
4%	**EPM (Russia)**
2%	Nippon Carbon (Japan)
2%	SEC (Japan)
1%	Ukrgraphite (Ukraine)



CATHODE BLOCKS MARKET SHARES IN THE WORLD

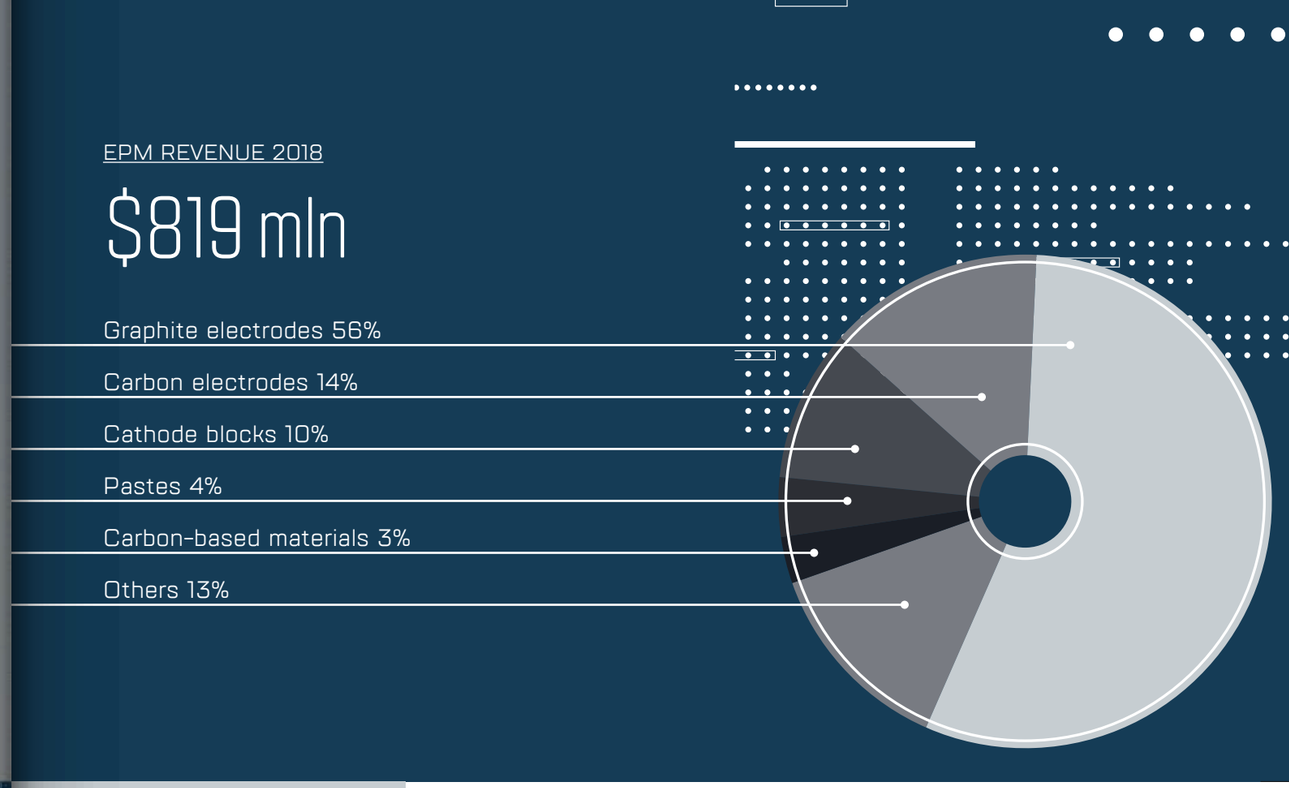
65%	China (14 companies)
8%	SGL (Europe)
8%	SEC (Japan)
5%	**EPM (Russia)**
4%	Carbon Savoie (Europe)
4%	Ukrgraphite (Ukraine)
2%	Bawtry Carbon (Europe)
2%	Nippon Electrode (Japan)
1%	ElectroCarbon (Europe)





EPM REVENUE 2018

$819 mln



OUR PRODUCT RANGE

GRAPHITE AND CARBON ELECTRODES

CATHODE BLOCKS

CARBON AND ELECTRODE PASTES

SPECIALTY GRAPHITE PRODUCTS

EPM BUSINESS RANGE PORTFOLIO

We export over 50% of our production to more than 60 countries all over the world.

EPM is continuously investing into new grades development and production efficiency.

EPM revenue: $819 mln (2018).

Graphite electrodes, carbon electrodes and cathode blocks constitute more than 80% of total sales.

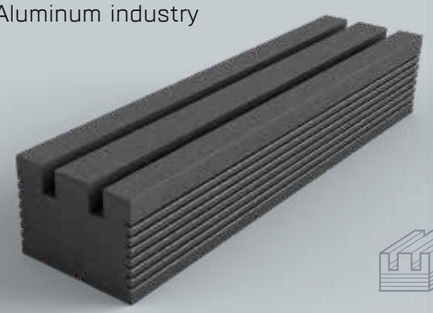
Key established markets: Russia, CIS, Europe, North America and South America.

Key development markets: Russia, USA, Europe Middle East, South East Asia, Australia.

EPM KEY PRODUCTS

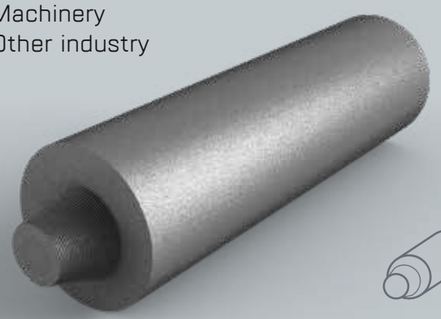
CATHODE BLOCKS

- Aluminum industry



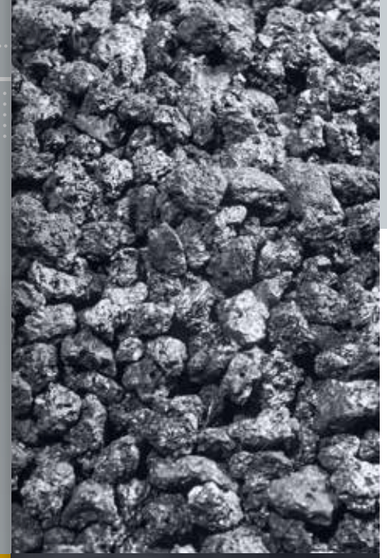
GRAPHITE ELECTRODES

- Steelmaking industry
- Ferroalloy industry
- Tube/pipe industry
- Machinery
- Other industry



CARBON ELECTRODES

- Silicon production
- Phosphorus production
- Carbide and calcium production
- Ferroalloy industry



ELECTRODE PASTE

- Ferroalloy industry
- Carbide and calcium production
- Phosphorus production
- Abrasives production

GRAPHITE PARTS AND DETAILS

- Metallurgy industry
- Machinery industry
- Manufacturer industry
- Electronic industry

NOVOCHERKASSK ELECTRODE PLANT

- Graphite electrodes

NOVOSIBIRSK ELECTRODE PLANT

- Carbon electrodes
- Cathode blocks
- Graphite electrodes
- Electrode paste

DONCARB GRAPHITE

- Graphite products
- Anti-corrosive heat conductive graphite plastic products
- Graphite chemical equipment
- Reactor-grade graphite
- Specialty product
- Siliconized graphite

R+D

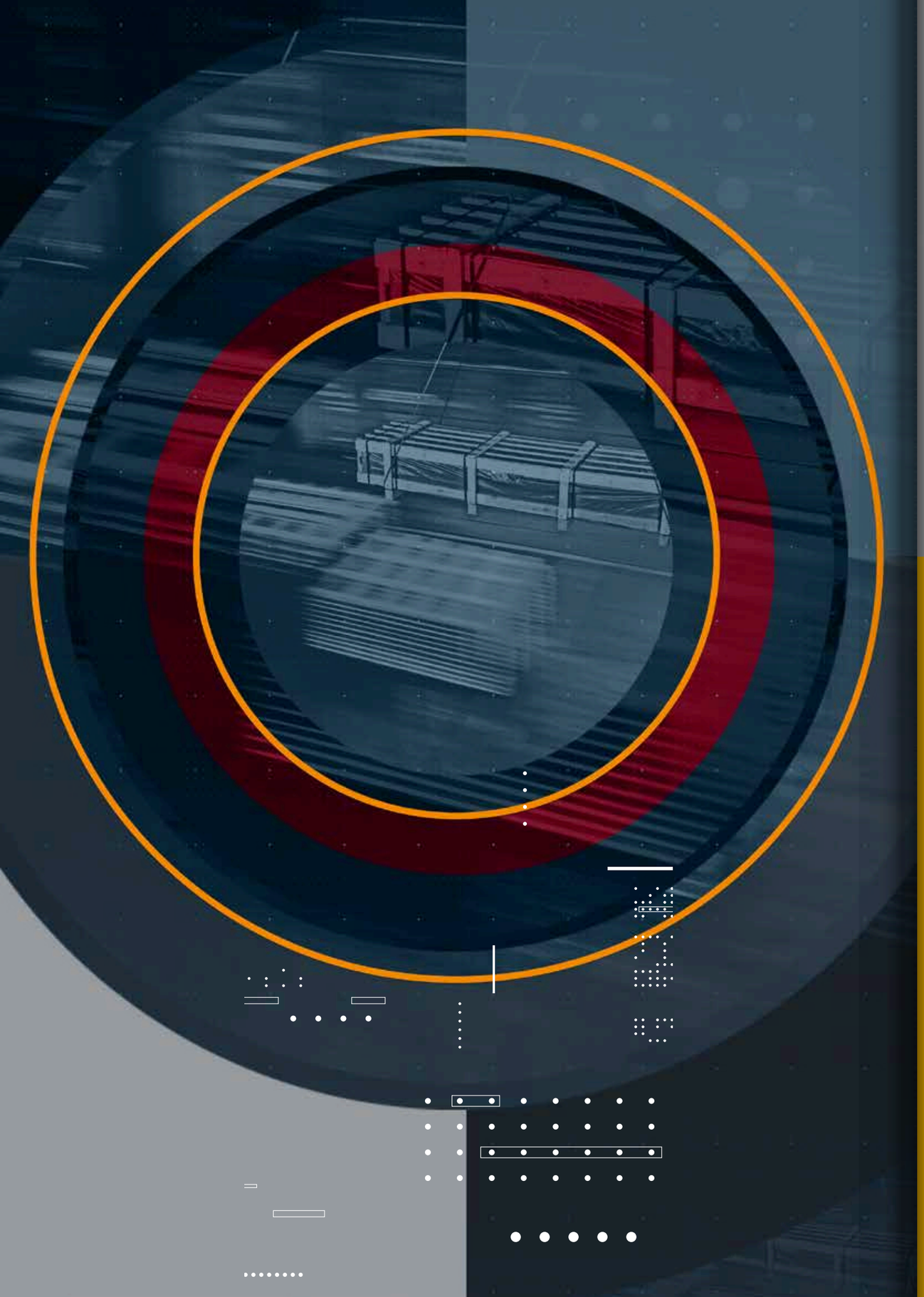
EPM R&D CENTER

In 2013 EPM established our own Research and Development Center. The Center develops innovative products and production technologies, researches technology solutions to improve the performance of carbon graphite products, and commercializes innovations in our production facilities. The Center also collaboration with other research organizations and businesses to identify and develop new technologies and products.

EPM R&D Center is a resident of Skolkovo Innovation Center. Our research team includes Russian and international scientists as well as talented graduate and undergraduate students. The R&D Center focuses on open innovations to promote international cooperation and share best practices in application of high technology.

KEY PROJECTS

- Development of quality control methods
- Development of carbon based components for energy sources
- Implementation of international best practices to meet requirements technology projects
- Non-destructive methods for graphite and carbon based products
- Development of acoustic emission test methods for graphite and carbon based products
- Anti-oxidation treatment for graphite products
- Electrode paste for silicon and ferroalloy production
- Isostatic graphites

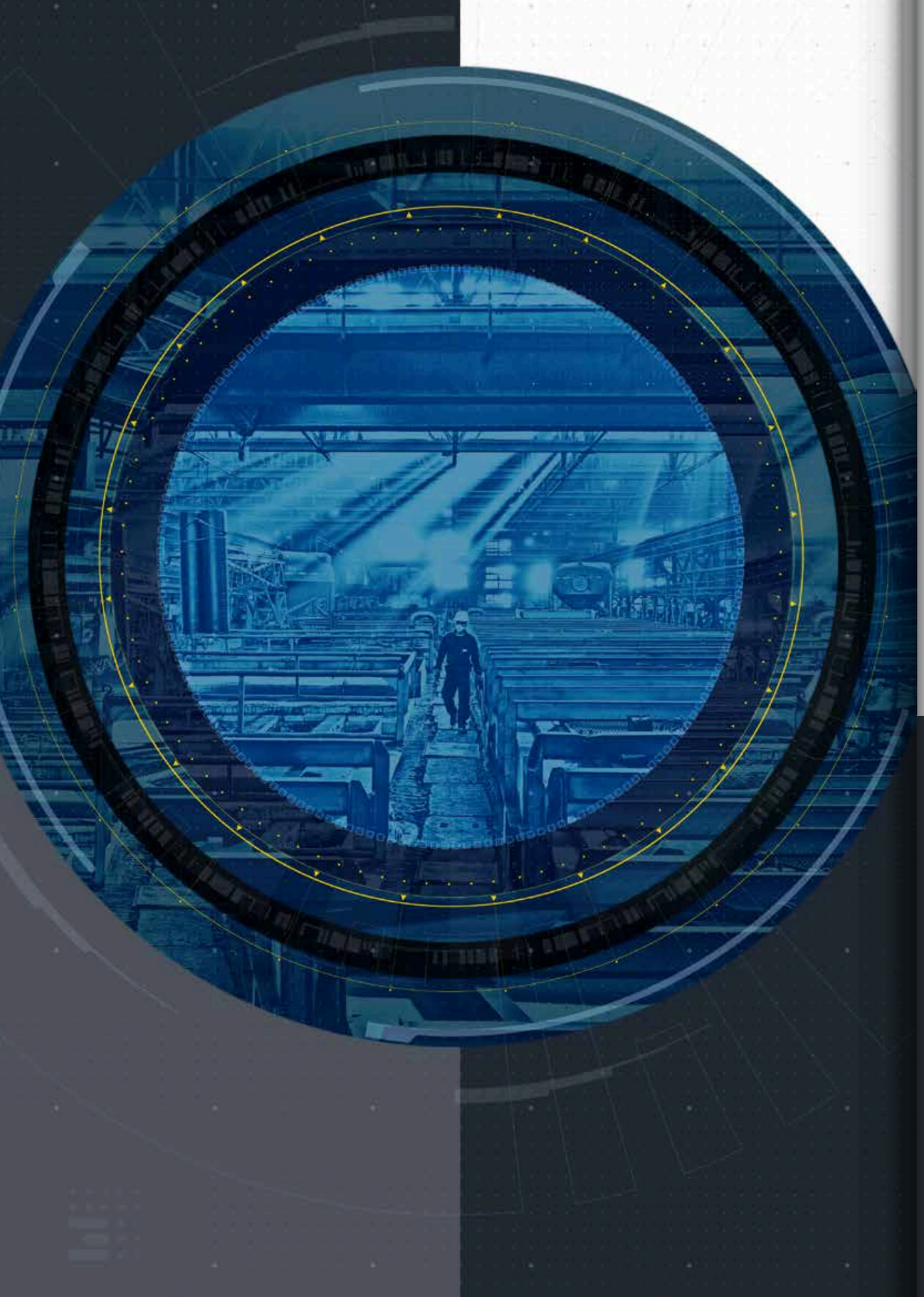


EXPERT IN WORLDWIDE LOGISTICS

- Secured packaging for every type of transportation
- Safe and reliable transportation options (maritime, railway, trucks)
- Just-in-time delivery

QUALITY IS THE KEY FACTOR

- Quality control of the incoming raw materials: regularly performed laboratory tests of raw materials.
- On going cooperation with raw materials suppliers for properties and consistency improvement.
- Statistical process controls for all and each production process step.
- Our know-how non-destructive ultrasonic test for possible hidden cracks detection. This method allows to get a complete 3d reconstruction of the internal structure of electrode.
- Taylor-made products that fit your needs the best



NOVOCHERKASSK ELECTRODE PLANT

ESTABLISHED: 1954

Novocherkassk Electrode Plant is one of the largest manufacturers of graphite electrodes in Russia and Eastern Europe. Its core product range includes high-quality graphite electrodes, mostly UHP. The plant is certified for compliance with ISO 14001 environmental management standard, OHSAS 18001 occupational health & safety standard, and ISO 9001 quality management standard.

→ 346413, Rostov oblast, Novocherkassk Aluminum site

→ +7 (86352) 9-42-23

→ nez@energoprom.ru

CAPACITY
(TONNES PER ANNUM)

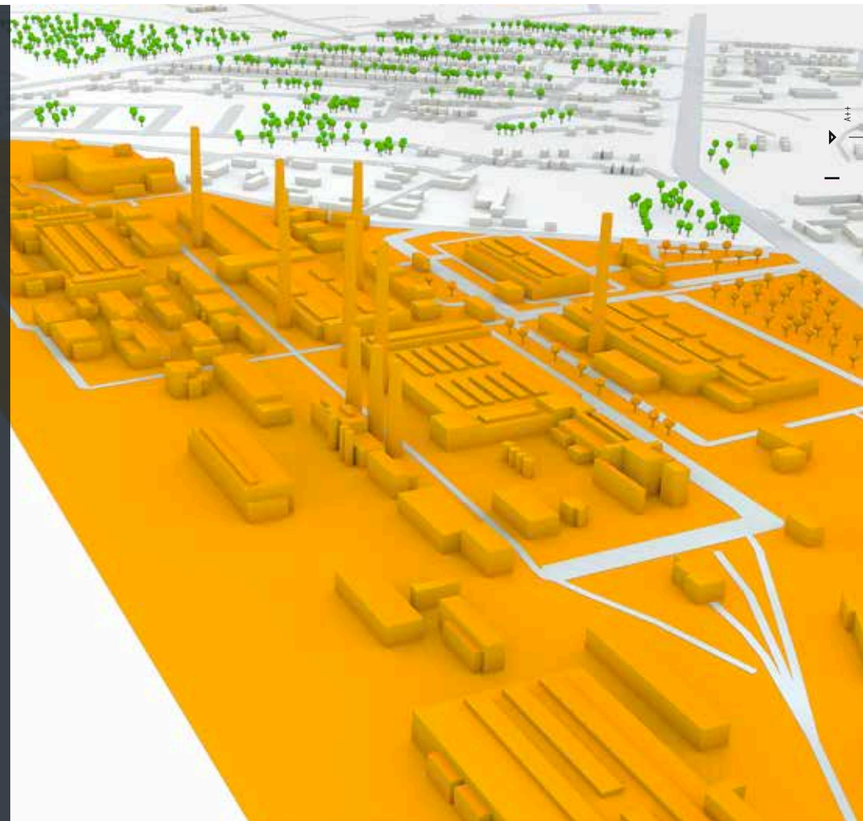
50,000

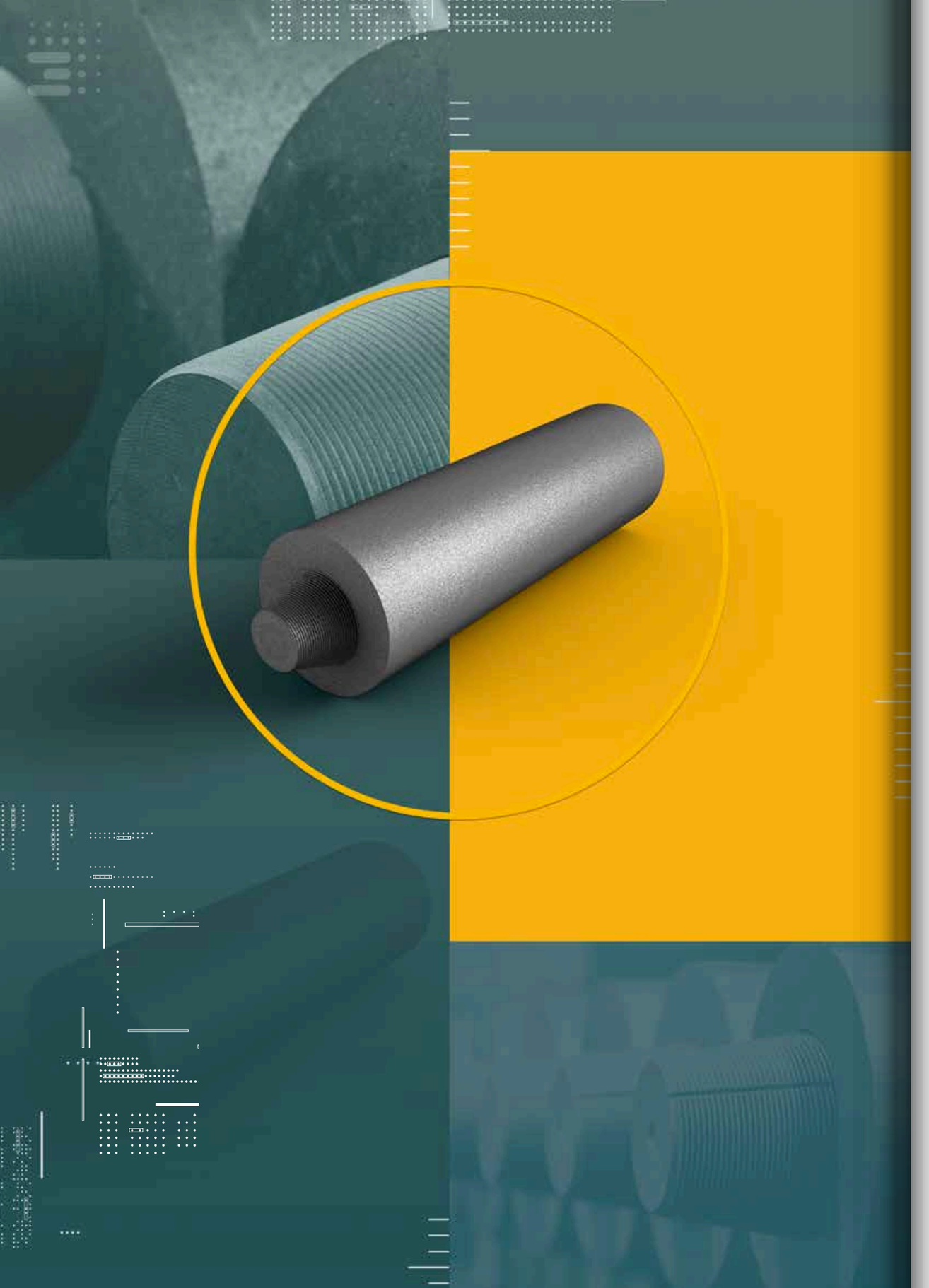
PRODUCT RANGE

GRAPHITE ELECTRODES

KEY CUSTOMERS

STEEL AND SILICON PRODUCERS IN RUSSIA, CIS, EU, MIDDLE EAST, NORTH AND LATIN AMERICA, ASIA AND AUSTRALIA





GRAPHITE ELECTRODES (PRODUCT SPECIFICATIONS)

GRAPHITE ELECTRODES

Diameter			Nominal length, mm				
mm	max, mm	min, mm	1500	1800	2100	2400	2700
250	253	247	·	·			
300	307	302	·	·	·		
	303	297	·	·	·		
350	358	352	·	·	·	·	
	353	347	·	·	·	·	
400	409	403	·	·	·	·	
	403	397	·	·	·	·	
450	460	454	·	·	·	·	
500	511	505	·	·	·	·	
550	562	556		·	·	·	·
600	613	607		·	·	·	·
650	663	659		·	·	·	·
700	714	710		·	·	·	·

TYPICAL PROPERTIES OF GRAPHITE ELECTRODES

Properties	Diameter, mm	Grade			
		RP	HP	SHP	UHP
Specific electrical resistance (μΩm)	250-700	7.0-11.0	5.0-7.5	4.5-6.5	4.0-6.0
Flexural strength (MPa)	250-450	6.5-14.0	9.0-17.0	9.0-14.0	9.0-14.0
	500-700	6.5-9.5	8.0-15.0	8.0-13.0	8.0-13.0
Apparent density (g/cm)	250-450	1.55-1.65	1.65-1.75	1.65-1.78	
	500-700	1.54-1.64	1.65-1.75	1.65-1.75	
Thermal Expansion within the range of 20-520° C, 10^{-6} x K^{-1}, not more than	250-700			1.7	1.5
	250-700			0.2-0.9	0.2-0.7

PIN DIMENSIONS / TPI 4 PITCH OF THREAD 6.35 MM

Electrode diameter, mm	IEC designation code	Diameter, mm	Length, mm
250	152T4N	152.40	190.50
300	177T4N	177.80	215.90
350	203T4N	203.20	254.00
	203T4L	203.20	304.80
400	222T4N	222.25	304.80
	222T4L	222.25	355.60
450	241T4N	241.30	304.80
	241T4L	241.30	355.60
500	269T4N	269.88	355.60
	269T4L	269.88	457.20
550	298T4N	298.45	355.60
	298T4L	298.45	457.20
600	317T4N	317.50	355.60
	317T4L	317.50	457.20
650	355T4N	355.60	457.20
	355T4L	355.60	558.80
700	374T4N	374.65	457.20
	374T4L	374.65	558.80

* Non-typical pin sizes can be produced upon request

PIN DIMENSIONS / TPI 3 PITCH OF THREAD 8.47 MM

300	177T3N	177.16	270.90
350, 400	215T3N	215.90	304.80
350, 400	215T3L	215.90	355.60
400, 450	241T3N	241.30	338.70
	241T3L	241.30	355.60
500	273T3N	273.05	355.60
	273T3L	273.05	457.20
550	298T3L	298.45	457.20

* Non-typical pin sizes can be produced upon request

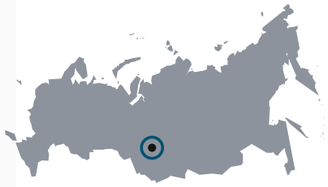
PIN PROPERTIES

Properties	Units	
Specific Electrical Resistance	μΩm	3.50–5.50
Flexural Strength	MPa	min 15
Apparent Density	g/cm³	min 1.70
Thermal Expansion	μm/(K x m)	0.5–1.5 max

NOVOSIBIRSK ELECTRODE PLANT

ESTABLISHED: 1974

EPM manufactures two core product groups at Novosibirsk Electrode Plant—carbon electrodes and cathode blocks. Novosibirsk Electrode Plant benefits from geographical proximity to key customers (Russian aluminum businesses and Siberian anthracite mine). The plant specializes in carbon electrodes, graphite electrodes, cathode blocks and cold ramming paste. It is certified for compliance with ISO 14001 management standard, occupational health and safety standard, and ISO 9001 quality management standard.



→ 633216, Novosibirsk Region, Iskitimsky District, Industrial site of Novosibirsk Electrode Plant

→ +7(383)43-50-316

→ novez@energoprom.ru

CAPACITY (TONNES PER ANNUM)

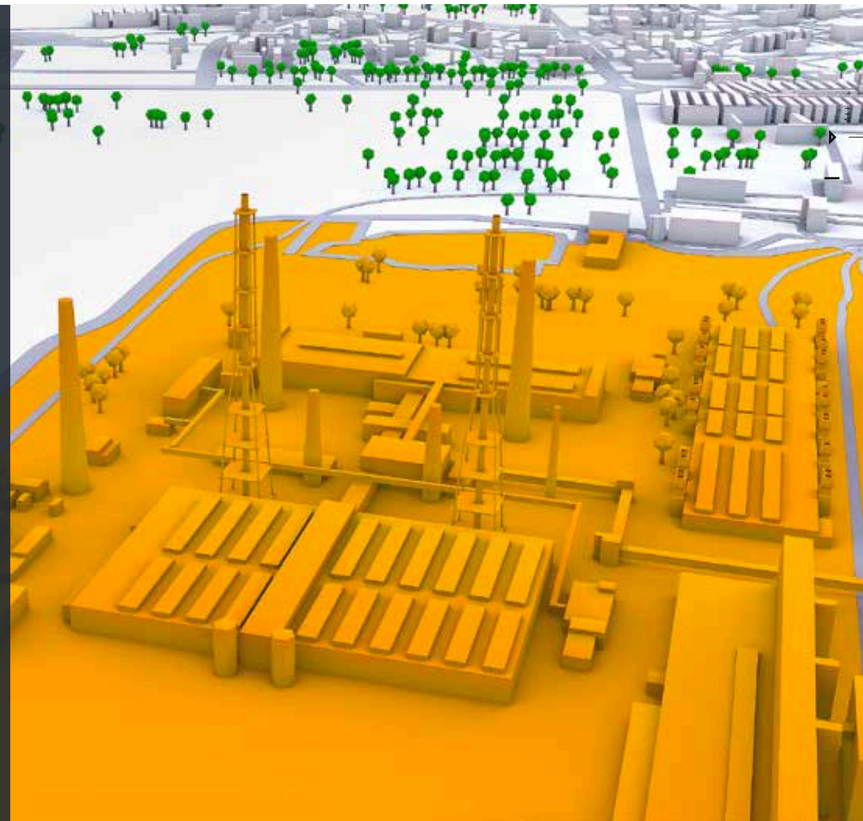
130,000

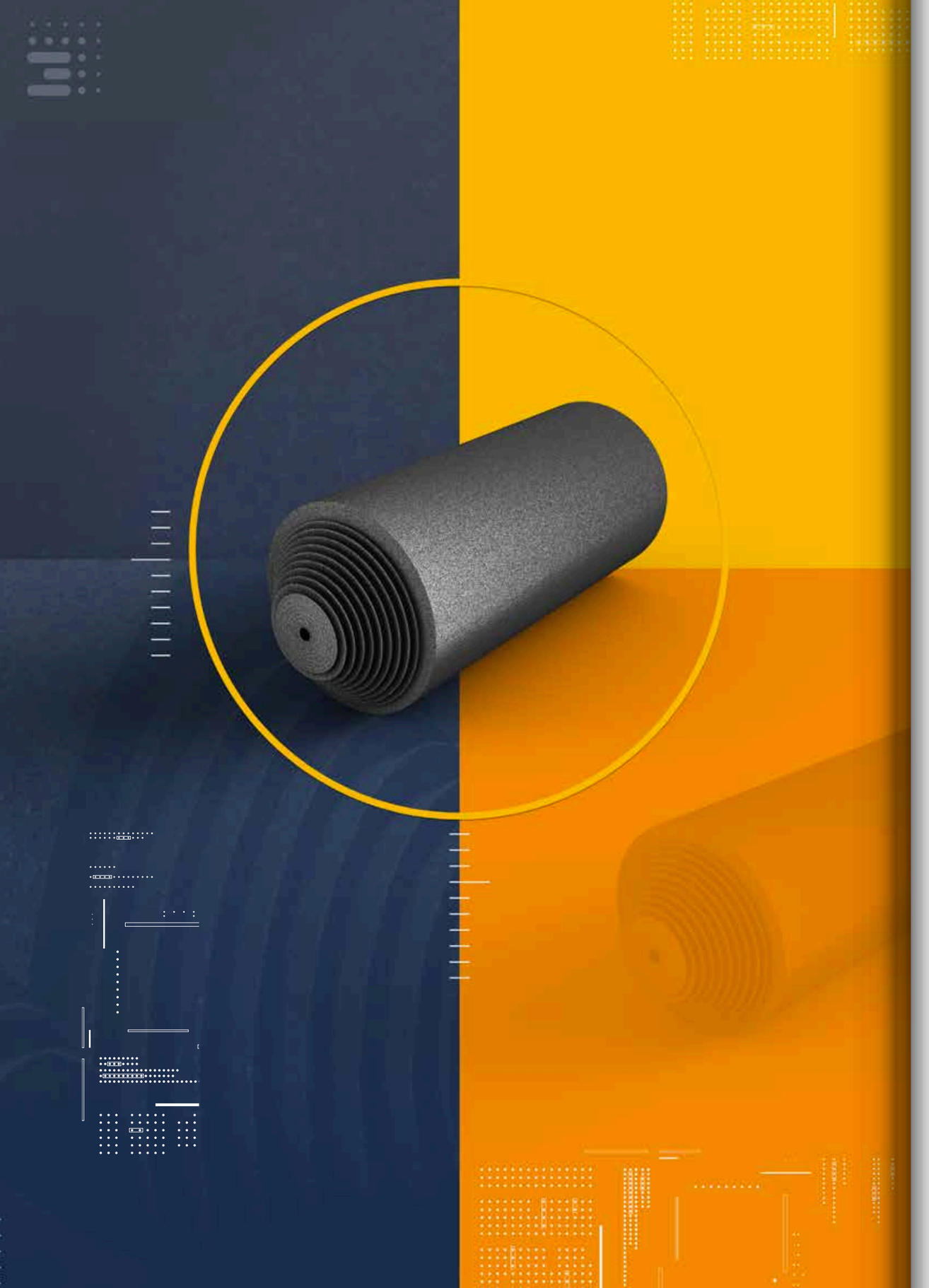
PRODUCT RANGE

CARBON ELECTRODES, GRAPHITE ELECTRODES, CATHODE BLOCKS, RAMMING PASTE, ELECTRODE PASTE AND FURNACE LININGS

KEY CUSTOMERS

PRODUCERS OF ALUMINUM, SILICON METAL, FERROALLOYS AND STEEL IN RUSSIA, CIS, EUROPE, MIDDLE EAST, NORTH AND LATIN AMERICA, AUSTRALIA AND SOUTHEAST ASIA





CARBON ELECTRODES (PRODUCT SPECIFICATIONS)

GRADES

Carbon electrode, Grade A(MCM-A)	50% / 50%
Carbon electrode, Grade C (MCM-C)	55% / 45%
Carbo-graphitic electrode (MCGM)	80% / 20%
Graphitized electrode (MGM)	Graphitized (petroleum coke + pitch)

CARBON ELECTRODES

Nominal diameter		Nominal length		Approximate weight per piece
mm	inches	mm	inches	kg
610	24	2350	93	1050
890	35	2700	106	2450
900	35,5	2700	106	2500
904	35,5	2700	106	2550
960	38	2700	106	2850
1016	40	2500	98	2900
		2700	106	3150
1018	40	2700	106	3200
1060	42	2700	106	3400
		2900	114	3600
1146	45	2900	114	4350
1205	47	3000	118	4900
1272	50	2700	106	4900
		2900	114	5300
1320	52	2900	114	5600
1397	55	2900	114	6000

TYPICAL PROPERTIES OF CARBON ELECTRODES

Carbon electrodes	Unit	Grade			
		MCM-A	MCM-C	MCGM	MGM
Specific electrical resistivity, max	μΩm	35	30	25	15
Breaking strength, min	MPa	3.0	3.0	4.0	3.5
Breaking strength, min	MPa	6.0	6.0	8.5	7.0
Total porosity, max	%	20	20	24	28
Thermal conductivity, min	W/m)	10	11	20	80
Coefficient of thermal expansion (interval of 20-520 °C), max	10^{-6} x K^{-1} at 20°C	3.6	3.5	3.5	3.4
Apparent density, min	g/cm³	1.58	1.56	1.58	1.59
Ash content, max	%	2.5	2.5	1.6	1.5

RECOMMENDED JOINING TORQUE

Electrode diameter, mm	Torque, kNm	
	Carbon	Graphitized
610	11.5-14.6	10.5-11.6
890	22.3-29.1	22.3-26.2
900	22.3-29.1	22.3-26.2
904	23.3-29.1	22.3-26.2
960	30.1-32.0	29.1-31.1
1016	33.0-36.9	31.1-35.0
1018	33.0-36.9	31.1-35.0
1060	35.0-40.8	33.0-38.8
1146	43.7-46.6	41.7-45.6
1205	50.5-55.3	49.5-54.4
1272	56,3-61,2	54,4-59,2
1320	56,3-63,1	54,4-61,2

CATHODE BLOCKS (PRODUCT SPECIFICATIONS)

- Cathode blocks are used in lining of aluminum electrolysis pots.
- EPM offers a complete product range from amorphous to graphitized cathodes.
- Customized cathode block shapes.
- Flexibility in dimensions to different slots.

AMORPHOUS CATHODE BLOCKS

N-1: GAS CALCINED ANTRACITE (GCA) + GRAPHITE

N-2: ELECTRICALLY CALCINED ANTRACITE (ECA) + GRAPHITE

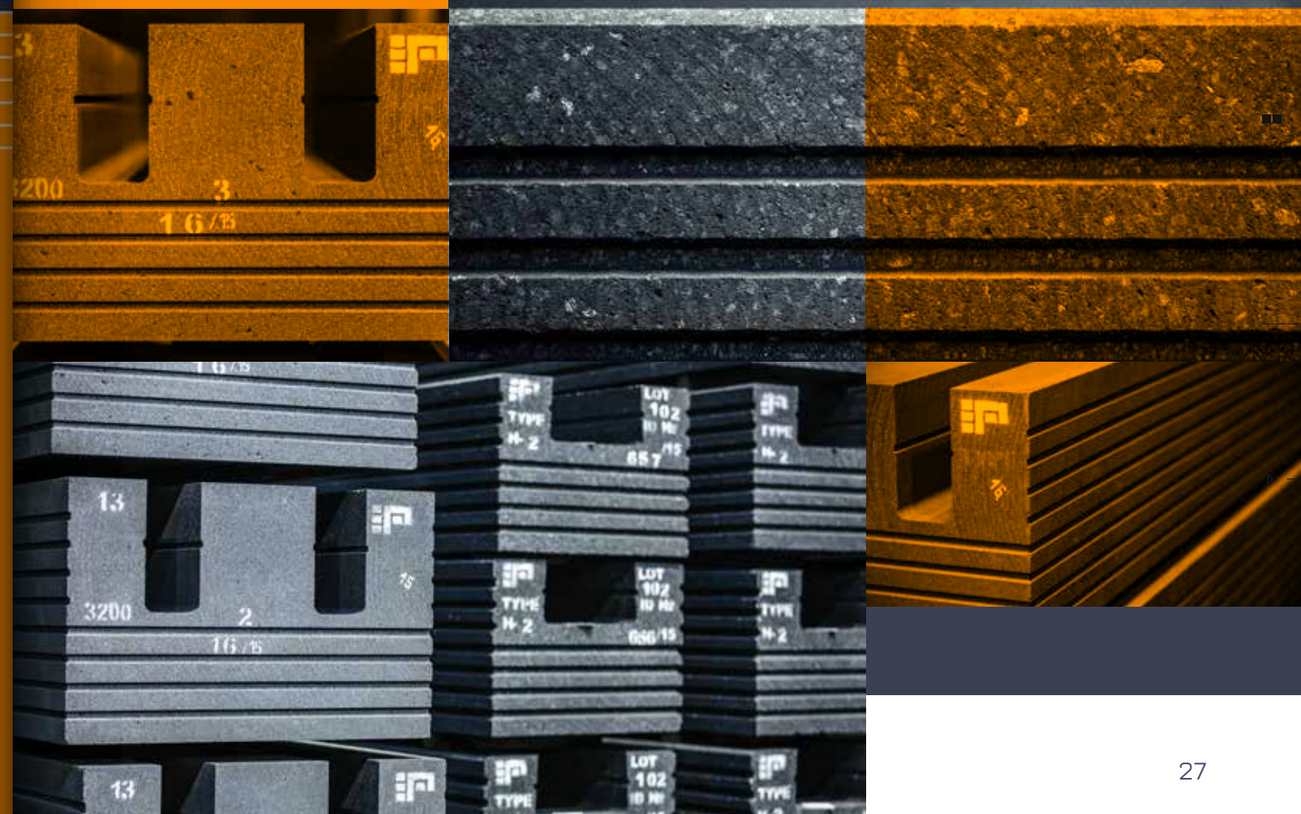
GRAPHITIC CATHODE BLOCKS

N-3: GRAPHITE

GRAPHITIZED CATHODE BLOCKS

N-4: PETROLEUM COKE

CATHODE BLOCKS SHAPES

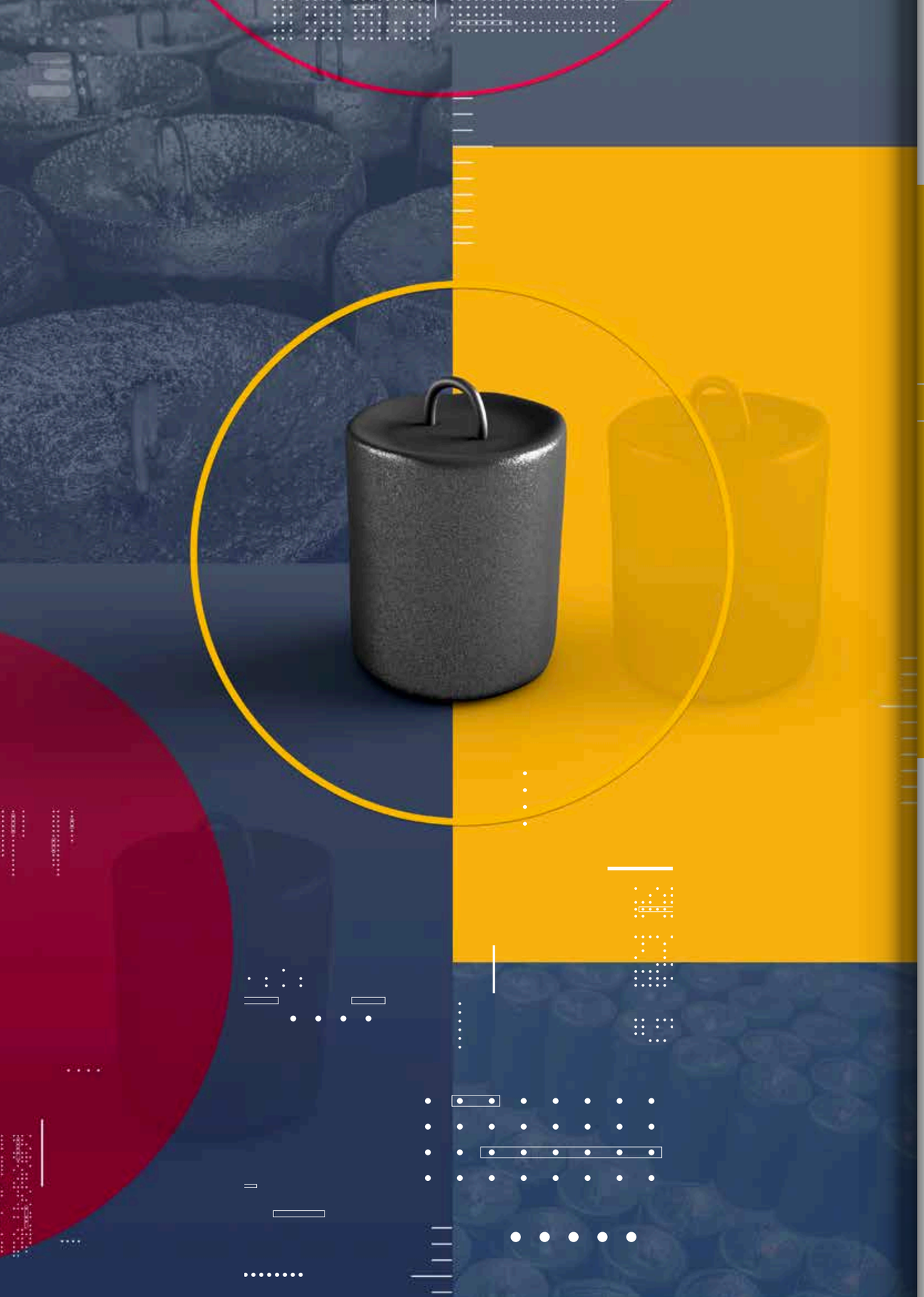


TYPICAL PROPERTIES OF CATHODE BLOCKS

Properties	Unit	Sampling	Amorphous GCA(N1)	Amorphous EGA(N2)	Graphitic EGA(N3)	Graphitized EGA(N4)
Real density, min	g/cm³	parallel	1.91	1.93	2.03	2.20
Apparent density, min	g/cm³	parallel	1.56	1.59	1.6	1.62
Electrical Resistance, max	μΩm	parallel	35	27	20	12
Total porosity, max	%	parallel	19.5	19	21	30
Open porosity, max	%	parallel	15	14	17	24
Compressive strength, min	MPa	parallel	34	32	28	20
Bending strength, min	MPa	parallel	12	11	10	8
Elasticity modulus / max	GPa	perpendicular	11	10	8	7
Thermal conductivity (20 °C), min	W/mK	parallel	10	14	22	97
Coefficient of thermal expansion (interval of 20-520 °C), max	10^{-6} x K^{-1}	parallel	3.3	3.3	3.3	3.1
Rapport test, max	%	perpendicular	0.7	0.5	0.4	0.2
Ash content, max	%	parallel	2.5	2	1.3	0.6

VARIATIONS OF CATHODE BLOCK GRADES CORRESPONDING TO POT AMPERAGES

The choice of CB depends on cells amperage	Amperage
Amorphous GCA (N-1)	70-160 kA
Amorphous ECA (N-2)	70-240 kA
Graphitic (N-3)	240-350 kA
Graphitized (N-4)	240-500 kA



ELECTRODE PASTE (PRODUCT SPECIFICATIONS)

ELECTRODE PASTE

38,000 tons

Briquette

Cylinder

Form	Standard size, mm
Briquette	100x100x70
	70x60x35
Cylinder	450x700
	500x1100

Electrode paste of other dimensions is available by agreement with a consumer

PHYSICAL MECHANICAL PROPERTIES

Characteristics, units	Grade A	Grade C
Coefficient of fluidity, %	1.6-2.8	1.8-2.3
Ash content, %	7	6
Resistivity, μΩm	90	80
Volatile content, %	12.0-18.0	13.0—16.0
Rupture resistance, MPa, not more than	1.47	1.76

Grade A — paste based on gas calcined anthracite.

Grade C — paste based on electrically calcined anthracite.

TYPES OF CARBON MATERIALS

GRAPHITE PRODUCTS
MU-99

Petroleum needle-based coke materials made during graphite production at t2300°C

COAL PRODUCTS
MU-90, MU-95

Materials made from petroleum coke, anthracite, graphite, and pitch during coal products manufacture.

BLEND MATERIALS
MU-80, MU-60

Materials made from furnace mixing and graphitization.

SPECIFICATION

PRODUCTION VOLUMES (TONS/MONTH)

MU-99	MU-90(95)	MU-80	MU-60
350-700	250-500	2000-4000	2000-4000

PHYSICAL AND MECHANICAL PROPERTIES OF CARBONACEOUS MATERIALS

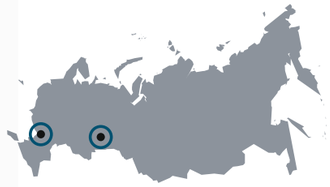
Parameter	MU-99	MU-99*	MU-95	MU-90	MU-80 (МУЛ-80)	MU-60 (МУЛ-60)
Carbon content, % min	99.8-99.0	99.8-99.0	98.0-95.0	96.0-90.0	89.0-80.0	68.0-60.0
Ash content, % max	0.2-1.0	0.2-1.0	2.0-5.0	5.0-10.0	10.0-18.0	25.0-38.0
Sulphur content, % max		0.1	0.5	0.5	0.5	1.5
Moisture content, % max	0.5	0.5	0.5	0.5	0.5	8.0-12.0
Volatile matter content, % max	0.1-1.0	0.1-1.0	0.1-1.1	0.1-1.2	0.1-1.5	0.1-1.5
Sizing	0-2 mm	0-2 mm	0-0.5 mm	0-1 mm	0-25 mm	

* Needle coke-based material

DONCARB GRAPHITE

ESTABLISHED: 2008

Doncarb Graphite is the leading producer of specialty carbon graphite products, specialty shapes and heat exchanger equipment in Russia and CIS. It uses its own production facilities in Novocherkassk and Chelyabinsk.



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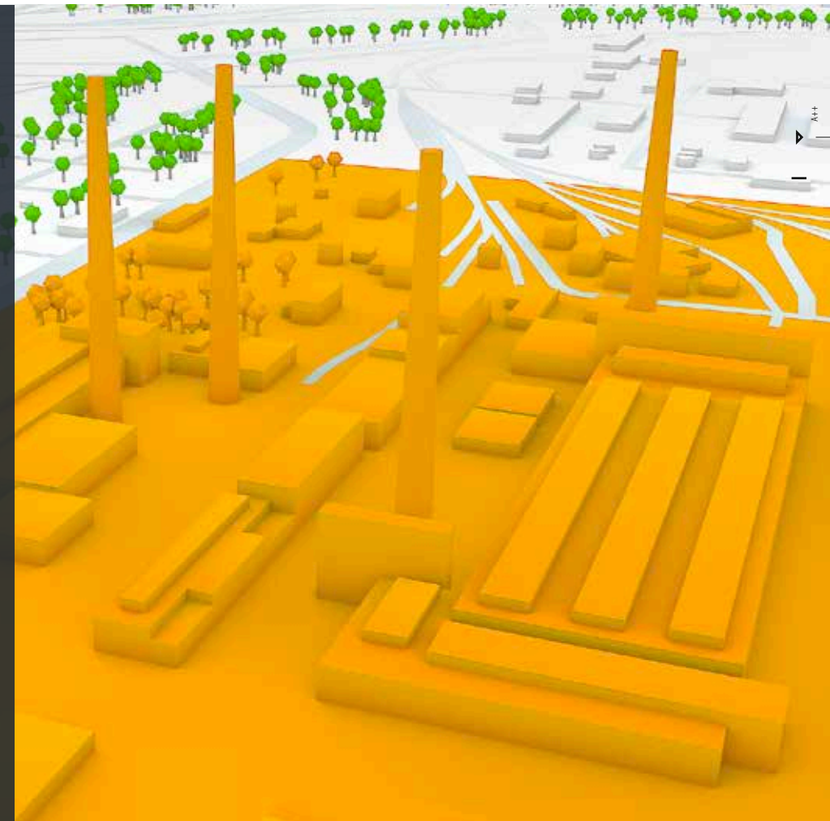
PRODUCT RANGE

COARSE-GRAINED, MEDIUM-GRAINED, FINE-GRAINED GRAPHITES, FINE-GRAINED DENSE-GRAPHITES, MONOSILICONIZED GRAPHITES

KEY CUSTOMERS

LEADING FERROUS AND NON-FERROUS METAL PRODUCERS, MACHINERY AND CHEMICAL ENTERPRISES IN RUSSIA, CIS AND EASTERN EUROPE



COARSE-GRAINED GRAPHITES

SPECIAL GRAPHITIZED ELECTRODES

These brands are general purpose graphites. A large number of semi-finished and ready products are manufactured from these graphites, and after appropriate machining they are used as parts of apparatus, as well as independent tools for the various processes.

COARSE-GRAINED GRAPHITES

Characteristic	Graphite brand				
	GE	EG	EGP	EGSP	EGS
Density, g/cm³ (min)	1.45	1.55	1.6	1.55	1.55
Cross-breaking strength, MPa (min)	4.9	5.9	8.8	6.5	6.5
Compressing resistance, MPa (min)	–			–	–
Electrical resistivity, μΩm (max)	16	12.5	7.5	11	11
Ash-contents, % (max)	–	0.5	0.5	–	–
Grain size, mm (max)	8				
Porosity, % (max)	30				

COARSE-GRAINED GRAPHITES

Characteristic	Graphite brand				
	MNG-O-FF	MNG-FF	MNGP-FF	EG-FF	EGP-FF
Density, g/cm³ (min)	1.75	1.75	1.8	1.75	1.89
Cross-breaking strength, MPa (min)	15.7	15.2	20	14.7	22
Compressing resistance, MPa (min)	58.8	49	49	49	49
Grain size, mm (max)	4	4	4	–	–
Air permeability under pressure, (min) 0.2 MPa	impermeable				

MEDIUM-GRAINED GRAPHITES

They are used for the manufacture of pipes, screens, supports for screens, crucibles, heaters. Heaters are used instead of tungsten and molybdenum ones for smelting of rare and semiconductor metals in vacuum and other closed electric furnaces at temperatures up to 2000 °C.

These graphite brands are for protective blocks and covers for thermometers and thermocouples, working in neutral environments up to 2300 °C and in oxidizing environment up to 400-450 °C; as well as for lining tiles and blocks for of chemical equipment and iron and slag troughs.

The materials have a high resistance in aggressive environments with different temperature and physical loads.

MEDIUM-GRAINED GRAPHITES

Characteristic	Graphite brand					
	GMZ	GMZ-O	GMZA	GMZA-O	30PG	20PG
Density, g/cm³ (min)	1.6	1.6	1.6	1.6	1.76	1.7
Cross-breaking strength, MPa (min)	9.8	9.8	7.8	7.8	16.7	14.7
Compressing resistance, MPa (min)	29.4	29.4	24.5	24.5	36.2	29.4
Electrical resistivity, μΩm (max)	11	11	11	11	11	12
Ash-contents, % (max)	–	0.03	–	0.03	–	–
Grain size, mm (max)	2.5	2.5	2.5	2.5	2.5	2.5
Porosity, % (max)	25	25	25	25	20	22

FINE-GRAINED GRAPHITES

These graphite brands are fine-grained material produced from calcined pitch coke.

They have high mechanical strength and low ash content. These brands are allowed to use in the production of ultrapure materials. Fine-grained graphite structure is suitable for production of complicated shapes, and for cutting fine thread of 0.5–1.0 mm.

These shaped graphite products are used in the manufacture of quartz glass and kinescope for electronic devices, during baking and smelting of metals and alloys, for the chemical equipment lining, and for vacuum furnaces furnishing.

FINE-GRAINED GRAPHITES

Characteristic	Graphite brand						
	ARV-U	ARV-1	ARV-2	MG	MG-0	MG1	MG1-0
Density, g/cm³ (min)	1.76	1.76	1.76	1.50	1.50	1.65	1.65
Cross-breaking strength, MPa (min)	—	4.5	—	8.8	8.8	11.7	11.7
Compressing resistance, MPa (min)	34.3	29.4	24.5	19.6	19.6	34.3	34.3
Electrical resistivity, μΩm (max)	16	16	16	18	18	13	13
Ash-contents, % (max)	—	—	n/a	0.5	0.03	0.3	0.03
Grain size, mm (max)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Porosity, % (max)				30	30	23	23

FINE-GRAINED DENSE-GRAPHITES

Billets and goods made of fine-grained dense-graphite are used for the production of tooling and parts under increased mechanical load and/or high temperatures. Different from other ordinary graphites by low content of impurities.

Fields of application: semiconductor equipment, EDM of metals, crystallizers at casting of non-ferrous metals and their alloys. Also MPG graphites are used as the electrode-tool in electro-pulse machining of press-tools and molds of various steels.

FINE-GRAINED DENSE-GRAPHITES

Characteristic	Graphite brand		
	MPG-6	MPG-7	MPG-8*
Density, g/cm³ (min)	1.6	1.72	1.8
Cross-breaking strength, MPa (min)	30	35	38
Compressing resistance, MPa (min)	60	65	75
Electrical resistivity, μΩm (max)	12	12	12
Ash-contents, % (max)	0.25	0.25	0.25
Grain size, mm (max)	0.04	0.04	0.04

* MPG-8 is advanced project.

MONOSILICONIZED GRAPHITES

Doncarb Graphite constantly interacts with the client and is able to offer a number of unique materials created out of the raw materials of the highest quality.

Depending on the requirements to the final material, applied raw material may also have differences in the porosity, density and other characteristics.

Graphite SG-T (siliconized hard graphite) is made with a high content of silicon carbide and has the highest density and durability.

Graphite SG-M (siliconized soft graphite) has a high softness. It is used in areas where the requirements for abrasion resistance are not critical, but heat resistance of parts is required.

Graphite SG-P (silicified low-porosity graphite) has low porosity. It is used in production, requiring higher surface matching as the friction pair of mechanical seals.

MONOSILICONIZED GRAPHITES

Characteristic	Graphite brand		
	SG-M	SG-T	SG-P 0.5
Density, g/cm³ (min)	2.25-2.4	2.5-2.7	2.4-2.5
Cross-breaking strength, MPa (min)	70–90	90–110	100–120
Compressing resistance, MPa (min)	130–160	300–320	420–450
Electrical resistivity, μΩm (max)	4.6	4.6	4.2
Ash-contents, % (max)	140–200	100–120	120–140
Grain size, mm (max)	0.05	0.05	0.04
Porosity, % (max)	29.56	29.56	40.8

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