Coal and coal concentrate

Iron ore concentrate

Coke, coke breeze and coking products

CATALOGUE 2015-2016

MECHEL

Mechel Carbon

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1 Mechel and its coal mining assets

Mechel Group, founded in 2003, is one of the world's leading metals and mining companies. The company has production facilities in 11 Russian regions, as well as in Ukraine and Lithuania. Mechel comprises more than 20 production enterprises, producing coal, iron ore, steel, rolled products, ferroalloys, heat and electric power.

All of the Group's enterprises work within a single production chain – from raw materials to high value-added products. The holding also owns three trade ports, a transport operator and international sales and service networks. Mechel's products are sold in Russia and abroad. The company has some 68,000 personnel.

The company was the first and only metals and mining producer in Russia and Eastern Europe to place 3rd level ADRs on the New York Stock Exchange in 2004. Mechel's depositary receipts on preferred shares have been traded on the New York Stock Exchange since May 2010.

Mechel Mining is a subsidiary of Mechel consolidating the group's coal and iron ore mining and coke production assets. The headquarters of Mechel Mining is located in Moscow.

Mechel Mining is one of the world's leading producers and exporters of metallurgical coals. The company produces coking coal concentrate, anthracites, PCI, steam coal, iron ore concentrate, coke and chemical products. As of December 31, 2014, Mechel Mining's coal reserves under JORC standards amounted to 3,074.5 million tonnes. Iron ore reserves under JORC standards were at 170.5 million tonnes.

Mechel Mining's products are sold through the own international sales network, with Mechel Carbon and Mechel Carbon Singapore managing sales for foreign customers. The key competitive advantages of Mechel Mining are its flexible sales policy based on close partnership with clients, commitment to long-term, mutually beneficial relations and its ability to cooperate directly with end customers, bypassing intermediaries. Mechel Mining's priority project is developing one of the world's largest coking coal deposits – the Elga coking coal field.

In 2014, Mechel Mining produced 22.6 million tonnes of raw coal, sold 9.9 million tonnes of coking coal concentrate, 2.6 million tonnes of PCI, 1.5 million tonnes of anthracites, 7.6 million tonnes of thermal coal, 3.2 million tonnes of iron ore concentrate and approximately 3.385 million tonnes of coke.

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Mechel and it's coal mining assets

Southern Kuzbass Coal Company

Mezhdurechensk, Kemerovo Region, Russia

Southern Kuzbass was founded in 1993 after a merger of several coal mining and processing companies and is now one of the largest coal companies in the Kuzbass mining area (Russia, Kemerovo Region). The company's key assets are located near the towns of Mezhdurechensk and Myski, Kemerovo Region. Southern Kuzbass's production assets include four open pits – Krasnogorsky, Sibirginsky, Olzherassky and Tomusinsky – as well as three underground mines – Olzherasskaya-Novaya, V.I. Lenina and Sibirginskaya. Southern Kuzbass's processing assets include four washing plants – Sibir, Kuzbasskaya, Krasnogorskaya and Tomusinskaya, and Sibirginskaya processing unit. Their combined annual capacity comes to approx. 17 million tonnes of coal. Total JORC coal reserves of Southern Kuzbass amounted to some 611 million tonnes as of December 31, 2014. Southern Kuzbass's coal assets produce semi-hard and semi-soft low-volatile coking coal, steam coal and anthracites. In 2014, total ROM production amounted to 12 million tonnes.

Since its inception, the company produced over 212 million tonnes of coal. Southern Kuzbass has a well-developed road infrastructure and a railway link to the Trans-Siberian Railway, which enables the company to deliver its products to domestic markets as well as sea ports for further export to Europe and Asia.

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Mechel and it's coal mining assets

Yakutugol Holding Company OAO

Neryungry, The Republic of Sakha (Yakutia), Russia

Yakutugol Holding Company OAO is one of Russia's largest coal companies. Its assets include Neryungrinsky Open Pit, Elga Open Pit, Kangalassky Open Pit, Dzhebariki-Khaya Underground Mine and Neryungrinskaya Washing Plant.

Yakutugol is one of the few producers of hard coking coal in Russia. It also produces steam coal and middlings. Total JORC coal reserves of Yakutugol, including Elga coal deposit, amounted to some 2.46 billion tonnes, as of December 31, 2014.

Mechel and it's coal mining assets

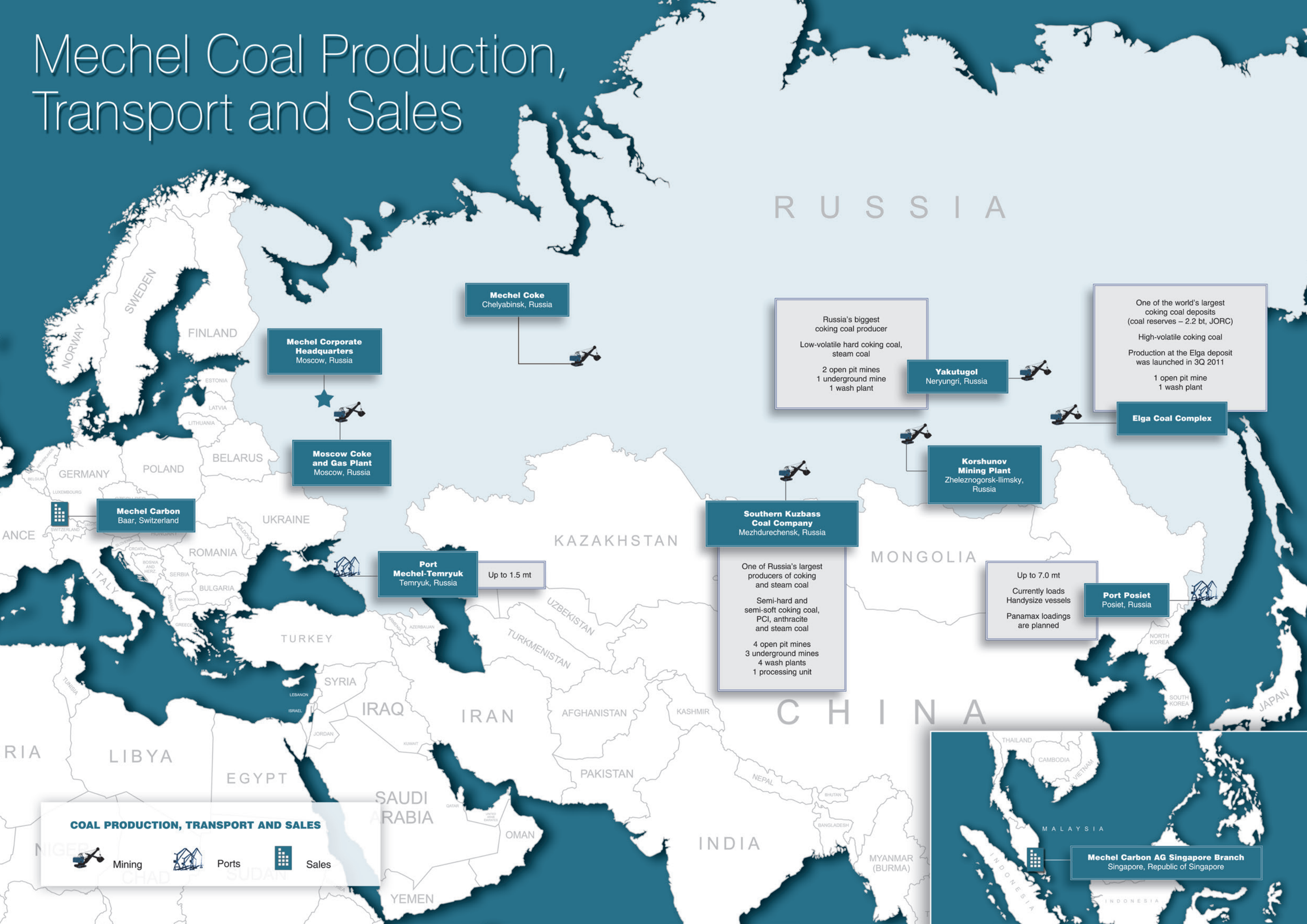
Elga Coal Complex

The Republic of Sakha (Yakutia), Russia

The Elga Coal Complex is Yakutugol's subsidiary set up in 2010 for the purpose of development of the Elga coal deposit. The Elga deposit is one of the largest coking coal fields in the world with 2.247 billion tonnes of mineral reserves as of December 31, 2014, under JORC standards. Elga is located in the south-east of Yakutia, 415 km east of the town of Neryungri and 320 km north of Verkhnezeysk village in the central part of Toko Coal-Bearing region.

Coal mining at the Elga pit commenced in August 2011. Elga mines and washes high-volatile, highly fluid coking coal with low sulfur, nitrogen and phosphorus content and high calorific value as well as oxidized coals with high calorific value, which will be marketed as steam coals. Elga also produces middlings as a byproduct of coking coal washing process which is sold as steam coal. The coal from the deposit is transported by a private railway. In December 2011, Mechel Mining laid the last section of track of the railway which links the deposit with the Baikal-Amur Mainline. Construction involved laying 321 kilometers of tracks. Elga's development helps increase coal exports to the rapidly-growing economies in Pacific Asia.

Mechel Coal Production, Transport and Sales



Sales routes
Coal and Coking coal

France[DAP] • Germany[DAP] • Italy[DAP]
and most of European countries

Mechel Carbon Belgium
Antwerp, Belgium

Port Mechel-Temryuk
Bulgaria • Egypt • Italy
Spain • Turkey

Port Posiet
China • India • Japan
South Korea

Ports Arkhangelsk and Ventspils
Belgium • Brazil • France
Holland • Spain • UK

Port Vanino
China • India • Indonesia
Japan • South Korea
Vietnam

Slovakia[DAP] • Ukraine[DAP]

Southern Kuzbass Coal Company
Mezhdurechensk, Russia

Ports Vanino and Posiet
China • Japan • India
Indonesia • South Korea
Taiwan

China[DAP]

Yakutugol
Neryungri, Russia

Port Vanino
China

China[DAP]

Elga Coal Complex

Port Vanino
Vanino, Russia

Port Mechel-Temryuk
Temryuk, Russia

Port Posiet
Posiet, Russia

Arkhangelsk

Ventspils

- Elga Coal Complex
- Yakutugol
- Southern Kuzbass Coal Company
- Mechel Carbon Belgium
- DAP
- FOB, CIF, CFR, DES
- Third parties' ports

Sales routes
Coke products and Iron ore concentrate

Coke products

Port Mechel-Temryuk
Serbia • Turkey • Bulgaria
India

Port Ventspils
Belgium • Brazil

Slovakia[DAP]

Coke breeze

Port Ventspils
Finland • Norway • Germany
France • Belgium • Spain

Moscow Coke and Gas Plant
Moscow, Russia

Mechel Coke
Chelyabinsk, Russia

Coking products

Port Mechel-Temryuk
Serbia • Turkey • Bulgaria

Slovakia[DAP]

Coke breeze

Port Mechel-Temryuk
Turkey

Port Ventspils
Finland • Norway • Germany
France • Belgium • Spain

Iron ore concentrate

China[DAP]

Korshunov Mining Plant
Zheleznogorsk-Ilimsky, Russia

Port Mechel-Temryuk
Temryuk, Russia

Ventspils

Coke products
Coke breeze
Iron ore concentrate
DAP
FOB, CIF, CFR, DES
Third parties' ports

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Coking coal

Coking coal is produced by two of Mechel Mining's mining companies Southern Kuzbass Coal Company, Yakutugol Holding Company and Elga Coal Complex. Please see below details on coking coal produced by Mechel Mining.

TSOF Sibir Low Vol Semi-Soft Coking Coal

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
OS+KS 0–100 mm	9.8	8.0	0.45	17.0	19.0	6,870	8,500

Solid (fixed) carbon, %	C_f^{daf}	77.0	• aluminum oxide	Al_2O_3	29.04
Roga index, unites	$RI_{1:5}$	43	• iron oxide	Fe_2O_3	1.9
Free swelling index, unites	FSI	3.0	• calcium oxide	CaO	9.2
Hardgrove Index	HGI	78	• magnesium oxide	MgO	2.1
Grey-King coke	GK	E	• titanium oxide	TiO_2	0.2
Carbon, %	C_t^{daf}	88.8	• manganese oxide	MnO_2	0.02
Hydrogen, %	H_t^{daf}	4.9	• phosphorus oxide	P_2O_5	0.4
Nitrogen, %	N_t^{daf}	2.3	• sulfur oxide	SO_3	3.5
Oxygen, %	O_d^{daf}	3.79	• sodium oxide	Na_2O	0.6
Phosphorus, %	P^d	0.022	• potassium oxide	K_2O	1.04
Chlorine, %	Cl^d	0.07	**Ash fusion temperature (oxidizing atmosphere), °C :**		
Arsenic, %	As^d	0.0006	• initial deformation temperature	T_1	1,380
Plastometry, mm:			• hemispherical temperature	T_2	1,480
• shrinkage	x	27	• fluid temperature	T_3	>1,500
• plastic layer	y	10	**Maceral composition of carbon, %:**		
Odiber-Arne dilatometry:			• vitrinite	Vt	71
• maximum compression, %	a	24	• exinite (liptinite)	L	-
• maximum expansion	b	-23	• semivitrinite	Sv	3
• softening temperature, °C	T_1	411	• inertinite	I	26
• compression temperature, °C	T_2	469			
• expansion temperature, °C	T_3	475	Fusion components, %	∑OK	36
Ash mineral analysis, %:			Reflection, %	R_0	1.32
• silicon oxide	SiO_2	52.0			

Coking coal

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TSOF Kuzbasskaya Mid Vol Semi-Soft Coking Coal

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
KS 0–100 mm	10.5	8.0	0.38	23.5	26.8	6,850	8,500

Solid (fixed) carbon, %	C_f^{daf}	73.0	• iron oxide	Fe_2O_3	6.63
Roga index, unites	$RI_{1:5}$	34	• calcium oxide	CaO	2.91
Free swelling index, unites	FSI	3.5	• magnesium oxide	MgO	0.95
Hardgrove Index	HGI	71	• titanium oxide	TiO_2	1.08
Grey-King coke	GK	E	• manganese oxide	MnO_2	0.012
Carbon, %	C_t^{daf}	86.05	• phosphorus oxide	P_2O_5	0.50
Hydrogen, %	H_t^{daf}	5.14	• sulfur oxide	SO_3	1.55
Nitrogen, %	N_t^{daf}	2.19	• sodium oxide	Na_2O	0.91
Oxygen, %	O_d^{daf}	6.25	• potassium oxide	K_2O	1.50
Phosphorus, %	P^d	0.021			
Chlorine, %	Cl^d	0.0112	**Ash fusion temperature (oxidizing atmosphere), °C :**		
Plastometry, mm:			• initial deformation temperature	T_1	1,390
• shrinkage	x	28	• hemispherical temperature	T_2	1,480
• plastic layer	y	9	• fluid temperature	T_3	>1,500
Odiber-Arne dilatometry:					
• maximum compression, %	a	13	**Chemistry of carbon, %:**		
• maximum expansion	b	-	• vitrinite	Vt	75
• softening temperature, °C	T_1	415	• exinite (liptinite)	L	-
• compression temperature, °C	T_2	490	• semivitrinite	Sv	2
• expansion temperature, °C	T_3	-	• inertinite	I	23
Ash mineral analysis, %:					
• silicon oxide	SiO_2	54.56	Fusion components, %	∑OK	50
• aluminum oxide	Al_2O_3	29.38	Reflection, %	R_0	1.15

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Coking coal

OF Neryungrinskaya Low Vol Hard Coking Coal K9
OF Neryungrinskaya Low Vol Coking Coal K10

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
K-9 0–30 mm **K-10 0–30 mm**	10.0 11.0	8.0	0.21	17.5	19.3	7,130	8,700

Solid (fixed) carbon, %	C_f^{daf}	80.8	• phosphorus oxide	P_2O_5	0.467
Roga index, unites	$RI_{1:5}$	53	• sulfur oxide	SO_3	2.62
Free swelling index, unites	FSI	7–9	• sodium oxide	Na_2O	0.46
Hardgrove Index	HGI	95	• potassium oxide	K_2O	0.46
Grey-King coke	GK	G			
Carbon, %	C_t^d	83.0	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Hydrogen, %	H_t^d	4.4	• initial deformation temperature	T_1	1,217
Nitrogen, %	N_t^d	0.70	• hemispherical temperature	T_2	1,503
Oxygen, %	O_d^d	2.9	• fluid temperature	T_3	1,537
Plastometry, mm:					
• shrinkage	x	0	**Temperature of plastic property by Gieseler, °C:**		
• plastic layer K-9 / K-10	y	9 / 10	• melting point		458
Odiber-Arne dilatometry:			• maximum flow temperature		489
• maximum compression, %	a	-18	• chilling point		510
• maximum expansion	b	21			
Ash mineral analysis, %:			**Chemistry of carbon, %:**		
• silicon oxide	SiO_2	44.9	• vitrinite	Vt	81
• aluminum oxide	Al_2O_3	30.6	• exinite (liptinite)	L	0
• iron oxide	Fe_2O_3	6.59	• semivitrinite	Sv	2
• calcium oxide	CaO	7.0	• inertinite	I	8
• magnesium oxide	MgO	2.62			
• titanium oxide	TiO_2	1.483	Reflection, %	R_0	1.51
• manganese oxide	MnO_2	0.311	CSR, %		44

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Coking coal

OF Neryungrinskaya Middlings

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
Middlings 0–30 mm	25	8.0	0.25	16.5	21.1	5,900	8,500

Solid (fixed) carbon, %	C_f^{daf}	78.9	• sulfur oxide	SO_3	2.78
Roga index, unites	$RI_{1:5}$	-	• sodium oxide	Na_2O	0.61
Free swelling index, unites	FSI	5	• potassium oxide	K_2O	0.53
Carbon, %	C_t^d	83.1			
Hydrogen, %	H_t^d	4.0	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Nitrogen, %	N_t^d	0.8	• initial deformation temperature	T_1	1,338
Oxygen, %	O_d^d	4.7	• hemispherical temperature	T_2	1,408
			• fluid temperature	T_3	1,442
Ash mineral analysis, %:					
• silicon oxide	SiO_2	56.29			
• aluminum oxide	Al_2O_3	24.02	**Chemistry of carbon, %:**		
• iron oxide	Fe_2O_3	8.55	• vitrinite	Vt	77
• calcium oxide	CaO	3.41	• exinite (liptinite)	L	0
• magnesium oxide	MgO	1.21	• semivitrinite	Sv	2
• titanium oxide	TiO_2	0.57	• inertinite	I	10
• manganese oxide	MnO_2	0.03			
• phosphorus oxide	P_2O_5	0.53	Reflection, %	R_0	1.53

2 Coking coal

Elga Coking Coal

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
Zh 0–20 mm	10.0	8.0	0.34	33.8	38.0	–	8,400

Solid (fixed) carbon, %	C_f^{daf}	62.0	• manganese oxide	MnO_2	0.073
Roga index, unites	$RI_{1:5}$	84	• phosphorus oxide	P_2O_5	0.150
Free swelling index, unites	FSI	8	• sulfur oxide	SO_3	3.284
Hardgrove Index	HGI	78	• sodium oxide	Na_2O	0.558
Grey-King coke	GK	G11	• potassium oxide	K_2O	1.143
Fluidity	ddpm	16000	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Carbon, %	C_t^{daf}	87.13	• initial deformation temperature	T_1	1,432
Hydrogen, %	H_t^{daf}	6.01	• hemispherical temperature	T_2	1,470
Nitrogen, %	N_t^{daf}	0.99	• fluid temperature	T_3	1,494
Oxygen, %	O_d^{daf}	5.31			
Plastometry, mm:			**Temperature of plastic property by Gieseler, °C:**		
• shrinkage	x	18	• melting point		391
• plastic layer	y	32	• maximum flow temperature		445
Odiber-Arne dilatometry:			• chilling point		484
• maximum compression, %	a	-22			
• maximum expansion	b	155	**Chemistry of carbon, %:**		
Ash mineral analysis, %:			• vitrinite	Vt	97
• silicon oxide	SiO_2	50.72	• exinite (liptinite)	L	2
• aluminum oxide	Al_2O_3	29.84	• semivitrinite	Sv	0
• iron oxide	Fe_2O_3	5.11	• inertinite	I	1
• calcium oxide	CaO	6.19			
• magnesium oxide	MgO	1.82	Reflection, %	R_0	0.93
• titanium oxide	TiO_2	1.11	CSR, %		50

2 Coking coal

Elga Middlings

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
Middlings 0–20 mm	24.6	8.0	0.26	25.6	34.0	5,400	8,200

Solid (fixed) carbon, %	C_f^{daf}	66.0	• phosphorus oxide	P_2O_5	0.155
Roga index, unites	$RI_{1:5}$	86	• sulfur oxide	SO_3	2.799
Free swelling index, unites	FSI	6	• sodium oxide	Na_2O	1.33
Hardgrove Index	HGI	76	• potassium oxide	K_2O	1.00
Carbon, %	C_t^d	62.4			
Hydrogen, %	H_t^d	4.5	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Nitrogen, %	N_t^d	0.8	• initial deformation temperature	T_1	1,310
Oxygen, %	O_d^d	6.3	• hemispherical temperature	T_2	1,359
			• fluid temperature	T_3	1,387
Ash mineral analysis, %:					
• silicon oxide	SiO_2	49.60	**Chemistry of carbon, %:**		
• aluminum oxide	Al_2O_3	22.74	• vitrinite	Vt	75
• iron oxide	Fe_2O_3	7.45	• exinite (liptinite)	L	3
• calcium oxide	CaO	11.89	• semivitrinite	Sv	0
• magnesium oxide	MgO	1.93	• inertinite	I	6
• titanium oxide	TiO_2	0.63			
• manganese oxide	MnO_2	0.137	Reflection, %	R_0	0.93

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PCI coal

PCI coal is produced by Mechel Mining's mining subsidiary Southern Kuzbass Coal Company. Please see below details on PCI coal produced by Mechel Mining.

Krasnogorsky Low Vol PCI

ITEM	Ash content	Moisture	Sulfur	Volatile matter	Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	NAR, kcal/kg	GD, kcal/kg
Krasnogorsky PCI	10.0	9.0	0.30	8.80	6,665	8,163

Ultimate analysis:			**Ash mineral analysis, %:**		
Hardgrove Index	HGI	50	• silicon oxide	SiO_2	56.0
Carbon, %	C_t^d	85.5	• aluminium oxide	Al_2O_3	26.0
Hydrogen, %	H_t^d	3.15	• iron oxide	Fe_2O_3	5.75
Nitrogen, %	N_t^d	1.90	• calcium oxide	CaO	4.40
Oxygen, %	O_d^d	0.50	• magnesium oxide	MgO	1.10
Phosphorus, %	P^d	0.040	• sodium oxide	Na_2O	1.20
Chlorine, %	Cl^d	0.002	• potassium oxide	K_2O	1.05
			• manganese oxide	MnO_2	0.10
Ash fusion temperature (reducing atmosphere), °C:			• titanium oxide	TiO_2	0.88
• deformation	T_1	1,340	• phosphorus oxide	P_2O_5	0.50
• sphere	T_2	1,380	• sulfur oxide	SO_3	2.00
• hemispherical	T_3	1,430			
• flow	T_4	1,480	**Sizing, mm:**		
			• +50	%	0.5
Ash fusion temperature (oxidizing atmosphere), °C:			• 50–25	%	6.8
• deformation	T_1	1,430	• 25.0–12.5	%	21.5
• sphere	T_2	1,460	• 12.5–6.3	%	16.6
• hemispherical	T_3	1,490	• 6.3–1.0	%	32.6
• flow	T_4	>1,500	• 1.0–0.5	%	8.6
			• 0–0.5	%	13.4

PCI coal

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Sibirginsky Low Vol PCI

ITEM	Ash content	Moisture	Sulfur	Volatile matter	Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	NAR, kcal/kg	GD, kcal/kg
Sibirginsky PCI	10.0	9.0	0.38	13.0	6,752	7,768

Ultimate analysis:			**Ash mineral analysis, %:**		
Hardgrove Index	HGI	65	• silicon oxide	SiO_2	58.5
Carbon, %	C_t^d	83.2	• aluminium oxide	Al_2O_3	28.0
Hydrogen, %	H_t^d	3.61	• iron oxide	Fe_2O_3	3.70
Nitrogen, %	N_t^d	2.10	• calcium oxide	CaO	2.42
Oxygen, %	O_d^d	1.40	• magnesium oxide	MgO	0.95
Phosphorus, %	P^d	0.020	• sodium oxide	Na_2O	1.52
Chlorine, %	Cl^d	0.005	• potassium oxide	K_2O	1.34
			• manganese oxide	MnO_2	1.04
Ash fusion temperature (reducing atmosphere), °C:			• titanium oxide	TiO_2	0.49
• deformation	T_1	>1,500	• phosphorus oxide	P_2O_5	1.54
• sphere	T_2	>1,500	• sulfur oxide	SO_3	0.40
• hemispherical	T_3	>1,500			
• flow	T_4	>1,500	**Sizing, mm:**		
			• +50	%	1.0
Ash fusion temperature (oxidizing atmosphere), °C:			• 50–25	%	2.0
• deformation	T_1	>1,500	• 25.0–12.5	%	15.8
• sphere	T_2	>1,500	• 12.5–6.3	%	16.8
• hemispherical	T_3	>1,500	• 6.3–1.0	%	39.8
• flow	T_4	>1,500	• 1.0–0.5	%	9.1
			• 0–0.5	%	15.5

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PCI coal

Kuzbassky Mid Vol PCI

ITEM	Ash content	Moisture	Sulfur	Volatile matter	Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	NAR, kcal/kg	GD, kcal/kg
Kuzbassky PCI	9.50	9.00	0.30	19-21	6,750	7,900

Ultimate analysis:		
Hardgrove Index	HGI	55
Carbon, %	C_t^d	82.5
Hydrogen, %	H_t^d	3.75
Nitrogen, %	N_t^d	2.06
Oxygen, %	O_d^d	1.70
Phosphorus, %	P^d	0.03
Chlorine, %	Cl^d	0.03
Ash fusion temperature (reducing atmosphere), °C:		
• deformation	T_1	-
• sphere	T_2	-
• hemispherical	T_3	-
• flow	T_4	-
Ash fusion temperature (oxidizing atmosphere), °C:		
• deformation	T_1	-
• sphere	T_2	-
• hemispherical	T_3	-
• flow	T_4	-

Ash mineral analysis, %:		
• silicon oxide	SiO_2	64.0
• aluminium oxide	Al_2O_3	22.5
• iron oxide	Fe_2O_3	4.70
• calcium oxide	CaO	2.60
• magnesium oxide	MgO	0.90
• sodium oxide	Na_2O	0.60
• potassium oxide	K_2O	1.60
• manganese oxide	MnO_2	0.08
• titanium oxide	TiO_2	0.90
• phosphorus oxide	P_2O_5	0.11
• sulfur oxide	SO_3	1.55
Sizing, mm:		
• +50	%	1.0
• 50–25	%	6.5
• 25.0–12.5	%	13.3
• 12.5–6.3	%	11.7
• 6.3–1.0	%	43.3
• 1.0–0.5	%	10.7
• 0–0.5	%	13.5

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PCI coal

Olzherassky High Vol PCI

ITEM	Ash content	Moisture	Sulfur	Volatile matter	Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	NAR, kcal/kg	GD, kcal/kg
Olzherassky PCI 0-25 mm	10.0	9.5	0.30	31.0	6,400	7,100

Ultimate analysis:		
Hardgrove Index	HGI	60
Carbon, %	C_t^d	80
Hydrogen, %	H_t^d	5.00
Nitrogen, %	N_t^d	1.90
Oxygen, %	O_d^d	6.80
Phosphorus, %	P^d	0.017
Chlorine, %	Cl^d	0.008
Ash fusion temperature (reducing atmosphere), °C:		
• deformation	T_1	1,225
• sphere	T_2	1,250
• hemispherical	T_3	1,270
• flow	T_4	1,300
Ash fusion temperature (oxidizing atmosphere), °C:		
• deformation	T_1	1,290
• sphere	T_2	1,310
• hemispherical	T_3	1,330
• flow	T_4	1,350

Ash mineral analysis, %:		
• silicon oxide	SiO_2	52
• aluminium oxide	Al_2O_3	22.0
• iron oxide	Fe_2O_3	6.60
• calcium oxide	CaO	9.00
• magnesium oxide	MgO	1.60
• sodium oxide	Na_2O	0.70
• potassium oxide	K_2O	1.00
• manganese oxide	MnO_2	0.08
• titanium oxide	TiO_2	0.85
• phosphorus oxide	P_2O_5	0.40
• sulfur oxide	SO_3	4.0
Sizing, mm:		
• +25	%	3.4
• 25.0–12.5	%	7.9
• 12.5–6.0	%	11.2
• 6.0–2.0	%	29.0
• 2.0–1.0	%	17.5
• 1.0–0.5	%	13.8
• 0–0.5	%	17.2

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Anthracite

Anthracite is produced by Mechel Mining's Russian mining subsidiary Southern Kuzbass Coal Company. Please see below details on anthracite produced by Mechel Mining.

Krasnogorsky Low Vol Sized Anthracite

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
APK 50–200 mm	12.0	9.0	0.3	3.5	4.0	6,300	8,100

Solid (fixed) carbon, %	C_f^{daf}	98.9	• sulfur oxide	SO_3	0.75
Carbon, %	C_t^{daf}	94.6	• sodium oxide	Na_2O	1.0
Hydrogen, %	H_t^{daf}	1.8	• potassium oxide	K_2O	2.0
Nitrogen, %	N_t^{daf}	1	• others	-	0.10
Oxygen, %	O_d^{daf}	2.6	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Phosphorus, %	P^d	0.019	• initial deformation temperature	T_1	1,280
Chlorine, %	Cl^d	0.02	• hemispherical temperature	T_2	1,350
Arsenic, %	As^d	0.0004	• fluid temperature	T_3	1,410
Ash mineral analysis, %:			**Chemistry of pure coal, %:**		
• silicon oxide	SiO_2	59.0	• vitrinite	Vt	35
• aluminum oxide	Al_2O_3	24.8	• exinite (liptinite)	L	-
• iron oxide	Fe_2O_3	6.5	• semivitrinite	Sv	3
• calcium oxide	CaO	3.2	• inertinite	I	62
• magnesium oxide	MgO	1.3			
• titanium oxide	TiO_2	0.8	Fusion components, %	∑OK	62
• manganese oxide	MnO_2	0.15	Reflection, %	R_0	3.5
• phosphorus oxide	P_2O_5	0.40			

Anthracite

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Krasnogorsky Low Vol Sized Anthracite

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
AK 40–75 mm	12.0	9.0	0.3	3.5	4.0	6,300	8,100

Solid (fixed) carbon, %	C_f^{daf}	98.9	• sulfur oxide	SO_3	0.75
Carbon, %	C_t^{daf}	94.6	• sodium oxide	Na_2O	1.0
Hydrogen, %	H_t^{daf}	1.8	• potassium oxide	K_2O	2.0
Nitrogen, %	N_t^{daf}	1	• others	-	0.10
Oxygen, %	O_d^{daf}	2.6	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Phosphorus, %	P^d	0.019	• initial deformation temperature	T_1	1,280
Chlorine, %	Cl^d	0.02	• hemispherical temperature	T_2	1,350
Arsenic, %	As^d	0.0004	• fluid temperature	T_3	1,410
Ash mineral analysis, %:			**Chemistry of pure coal, %:**		
• silicon oxide	SiO_2	59.0	• vitrinite	Vt	35
• aluminum oxide	Al_2O_3	24.8	• exinite (liptinite)	L	-
• iron oxide	Fe_2O_3	6.5	• semivitrinite	Sv	3
• calcium oxide	CaO	3.2	• inertinite	I	62
• magnesium oxide	MgO	1.3			
• titanium oxide	TiO_2	0.8	Fusion components, %	∑OK	62
• manganese oxide	MnO_2	0.15	Reflection, %	R_0	3.5
• phosphorus oxide	P_2O_5	0.40			

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Anthracite

Krasnogorsky Low Vol Sized Anthracite

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
AO 25–40 mm	12.0	10.0	0.3	3.5	4.0	6,230	8,100

Solid (fixed) carbon, %	C_f^{daf}	98.9	• sulfur oxide	SO_3	0.75
Carbon, %	C_t^{daf}	94.6	• sodium oxide	Na_2O_3	1.0
Hydrogen, %	H_t^{daf}	1.8	• potassium oxide	K_2O	2.0
Nitrogen, %	N_t^{daf}	1	• others	-	0.10
Oxygen, %	O_d^{daf}	2.6	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Phosphorus, %	P^d	0.019	• initial deformation temperature	T_1	1,280
Chlorine, %	Cl^d	0.02	• hemispherical temperature	T_2	1,350
Arsenic, %	As^d	0.0004	• fluid temperature	T_3	1,410
Ash mineral analysis, %:			**Chemistry of pure coal, %:**		
• silicon oxide	SiO_2	59.0	• vitrinite	Vt	37
• aluminum oxide	Al_2O_3	24.8	• exinite (liptinite)	L	-
• iron oxide	Fe_2O_3	6.5	• semivitrinite	Sv	4
• calcium oxide	CaO	3.2	• inertinite	I	59
• magnesium oxide	MgO	1.3			
• titanium oxide	TiO_2	0.8	Fusion components, %	∑OK	59
• manganese oxide	MnO_2	0.15	Reflection, %	R_0	3.5
• phosphorus oxide	P_2O_5	0.40			

4 Anthracite

Krasnogorsky Low Vol Sized Anthracite

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
AM 13–25 mm	14.0	11.0	0.3	3.0	4.0	6,160	8,100

Solid (fixed) carbon, %	C_f^{daf}	98.9	• sulfur oxide	SO_3	0.75
Carbon, %	C_t^{daf}	94.6	• sodium oxide	Na_2O	1.0
Hydrogen, %	H_t^{daf}	1.8	• potassium oxide	K_2O	2.0
Nitrogen, %	N_t^{daf}	1.2	• others	-	0.10
Oxygen, %	O_d^{daf}	2.6	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Phosphorus, %	P^d	0.019	• initial deformation temperature	T_1	1,280
Chlorine, %	Cl^d	0.02	• hemispherical temperature	T_2	1,350
Arsenic, %	As^d	0.0004	• fluid temperature	T_3	1,410
Ash mineral analysis, %:			**Chemistry of pure coal, %:**		
• silicon oxide	SiO_2	59.0	• vitrinite	Vt	37
• aluminum oxide	Al_2O_3	24.8	• exinite (liptinite)	L	-
• iron oxide	Fe_2O_3	6.5	• semivitrinite	Sv	4
• calcium oxide	CaO	3.2	• inertinite	I	59
• magnesium oxide	MgO	1.3			
• titanium oxide	TiO_2	0.8	Fusion components, %	∑OK	59
• manganese oxide	MnO_2	0.15	Reflection, %	R_0	3.5
• phosphorus oxide	P_2O_5	0.40			

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Anthracite

Krasnogorsky Low Vol Anthracite Fines

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
ASSh 0–13 mm	14.0	12.0	0.3	3.0	4.0	6,180	8,080

Solid (fixed) carbon, %	C_f^{daf}	98.9	• sulfur oxide	SO_3	0.75
Carbon, %	C_t^{daf}	94.6	• sodium oxide	Na_2O	1.0
Hydrogen, %	H_t^{daf}	1.8	• potassium oxide	K_2O	2.0
Nitrogen, %	N_t^{daf}	1.3	• others	-	0.10
Oxygen, %	O_d^{daf}	2.6	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Phosphorus, %	P^d	0.019	• initial deformation temperature	T_1	1,280
Chlorine, %	Cl^d	0.02	• hemispherical temperature	T_2	1,350
Arsenic, %	As^d	0.0004	• fluid temperature	T_3	1,410
Ash mineral analysis, %:			**Chemistry of pure coal, %:**		
• silicon oxide	SiO_2	59.0	• vitrinite	Vt	64
• aluminum oxide	Al_2O_3	24.8	• exinite (liptinite)	L	-
• iron oxide	Fe_2O_3	6.5	• semivitrinite	Sv	1
• calcium oxide	CaO	3.2	• inertinite	I	35
• magnesium oxide	MgO	1.3			
• titanium oxide	TiO_2	0.8	Fusion components, %	∑OK	35
• manganese oxide	MnO_2	0.15	Reflection, %	R_0	3.5
• phosphorus oxide	P_2O_5	0.40			

4 Anthracite

Krasnogorsky Sized Anthracite

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
TPKO +25–200 mm	12.0 – typical 14.0 – max	5.5	0.3	9.0	10.5	6,780	8,380

Solid (fixed) carbon, %	C_f^{daf}	89.7	• sodium oxide	Na_2O	0.6
Roga index, unites	$RI_{1:5}$	0	• potassium oxide	K_2O	1.3
Free swelling index, unites	FSI	0	• others	-	0.6
Hardgrove Index	HGI	48	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Carbon, %	C_t^{daf}	91.8	• initial deformation temperature	T_1	1,290
Hydrogen, %	H_t^{daf}	3.6	• hemispherical temperature	T_2	1,392
Nitrogen, %	N_t^{daf}	1.8	• fluid temperature	T_3	1,420
Oxygen, %	O_d^{daf}	2.5	**Maceral composition of coal, %:**		
Phosphorus, %	P^d	0.037	• pure coal		91
Chlorine, %	Cl^d	0.04	• clay matter	Mgl	5
Arsenic, %	As^d	0.0003	• sulfides	Ms	-
Ash mineral analysis, %:			• carbonates	Mk	4
• silicon oxide	SiO_2	56	• quartz	Mkz	-
• aluminum oxide	Al_2O_3	25.5	**Chemistry of pure coal, %:**		
• iron oxide	Fe_2O_3	7.5	• vitrinite	Vt	35
• calcium oxide	CaO	3.8	• exinite (liptinite)	L	-
• magnesium oxide	MgO	1.2	• semivitrinite	Sv	yes
• titanium oxide	TiO_2	0.8	• inertinite	I	65
• manganese oxide	MnO_2	0.2			
• phosphorus oxide	P_2O_5	0.8	Fusion components, %	∑OK	65
• sulfur oxide	SO_3	1.7	Reflection, %	R_0	2.23

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Anthracite

Krasnogorsky Anthracite Fines

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
TMSSh, 1st category 0–50 mm	12.0 – max	10	0.22	9.0	10.5	6,640	8,300

Solid (fixed) carbon, %	C_f^{daf}	89.7	• sodium oxide	Na_2O	0.6
Roga index, unites	$RI_{1:5}$	0	• potassium oxide	K_2O	1.3
Free swelling index, unites	FSI	0	• others	-	0.6
Hardgrove Index	HGI	48	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Carbon, %	C_t^{daf}	91.8	• initial deformation temperature	T_1	1,290
Hydrogen, %	H_t^{daf}	3.6	• hemispherical temperature	T_2	1,392
Nitrogen, %	N_t^{daf}	1.8	• fluid temperature	T_3	1,420
Oxygen, %	O_d^{daf}	2.5	**Maceral composition of coal, %:**		
Phosphorus, %	P^d	0.037	• pure coal		91
Chlorine, %	Cl^d	0.04	• clay matter	Mgl	5
Arsenic, %	As^d	0.0003	• sulfides	Ms	-
Ash mineral analysis, %:			• carbonates	Mk	4
• silicon oxide	SiO_2	56	• quartz	Mkz	-
• aluminum oxide	Al_2O_3	25.5	**Chemistry of pure coal, %:**		
• iron oxide	Fe_2O_3	7.5	• vitrinite	Vt	26–35
• calcium oxide	CaO	3.8	• exinite (liptinite)	L	-
• magnesium oxide	MgO	1.2	• semivitrinite	Sv	yes
• titanium oxide	TiO_2	0.8	• inertinite	I	74–65
• manganese oxide	MnO_2	0.2			
• phosphorus oxide	P_2O_5	0.8	Fusion components, %	∑OK	69
• sulfur oxide	SO_3	1.7	Reflection, %	R_0	2.23

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Steam coal

Steam coal is produced by Mechel Mining's Russian mining subsidiary Southern Kuzbass Coal Company and Elga Coal Complex.
Please see below details on steam coal produced by Mechel Mining.

Sibirginsky Sized Coal

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
TKO +25 mm	14.0	6.0	0.22	14.5	17.0	6,810	8,500

Solid (fixed) carbon, %	C_f^{daf}	89.7	• sodium oxide	Na_2O	1.03
Roga index, unites	$RI_{1:5}$	0	• potassium oxide	K_2O	1.4
Free swelling index, unites	FSI	0	• others	-	1.74
Hardgrove Index	HGI	85	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Carbon, %	C_t^{daf}	91.8	• initial deformation temperature	T_1	1,290
Hydrogen, %	H_t^{daf}	3.6	• hemispherical temperature	T_2	>1,425
Nitrogen, %	N_t^{daf}	1.8	• fluid temperature	T_3	>1,460
Oxygen, %	O_d^{daf}	2.5	**Maceral composition of coal, %:**		
Phosphorus, %	P^d	0.037	• pure coal		91
Chlorine, %	Cl^d	0.035	• clay matter	Mgl	5
Arsenic, %	As^d	0.0003	• sulfides	Ms	-
Ash mineral analysis, %:			• carbonates	Mk	4
• silicon oxide	SiO_2	55.6	• quartz	Mkz	-
• aluminum oxide	Al_2O_3	24.5	**Chemistry of pure coal, %:**		
• iron oxide	Fe_2O_3	7.15	• vitrinite	Vt	60
• calcium oxide	CaO	3.15	• exinite (liptinite)	L	-
• magnesium oxide	MgO	0.88	• semivitrinite	Sv	yes
• titanium oxide	TiO_2	0.8	• inertinite	I	40
• manganese oxide	MnO_2	0.18			
• phosphorus oxide	P_2O_5	0.57	Fusion components, %	∑OK	40
• sulfur oxide	SO_3	3	Reflection, %	R_0	1.61

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Steam coal

Krasnogorsky Low Vol Steam Coal

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
TOMSSh, 3rd category 0–50 mm	18.0 – min 20.0 – typical	7.4	0.22	8.7	11.5	5,950 – typical 6,250 – max	8,280

Solid (fixed) carbon, %	C_f^{daf}	89.7	• sodium oxide	Na_2O	0.6
Roga index, unites	$RI_{1:5}$	0	• potassium oxide	K_2O	1.3
Free swelling index, unites	FSI	0	• others	-	0.6
Hardgrove Index	HGI	48	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Carbon, %	C_t^{daf}	91.8	• initial deformation temperature	T_1	1,290
Hydrogen, %	H_t^{daf}	3.6	• hemispherical temperature	T_2	1,392
Nitrogen, %	N_t^{daf}	1.8	• fluid temperature	T_3	1,420
Oxygen, %	O_d^{daf}	2.5	**Maceral composition of coal, %:**		
Phosphorus, %	P^d	0.037	• pure coal		91
Chlorine, %	Cl^d	0.04	• clay matter	Mgl	5
Arsenic, %	As^d	0.0003	• sulfides	Ms	-
Ash mineral analysis, %:			• carbonates	Mk	4
• silicon oxide	SiO_2	56	• quartz	Mkz	-
• aluminum oxide	Al_2O_3	25.5	**Chemistry of pure coal, %:**		
• iron oxide	Fe_2O_3	7.5	• vitrinite	Vt	20–35
• calcium oxide	CaO	3.8	• exinite (liptinite)	L	-
• magnesium oxide	MgO	1.2	• semivitrinite	Sv	yes
• titanium oxide	TiO_2	0.8	• inertinite	I	80–65
• manganese oxide	MnO_2	0.2			
• phosphorus oxide	P_2O_5	0.8	Fusion components, %	∑OK	68
• sulfur oxide	SO_3	1.7	Reflection, %	R_0	2.26

Steam coal

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Elga Steam Coal

ITEM	Maximum ash content	Moisture	Sulfur	Volatile matter		Calorific value	
	A^d, %	W^r, %	S^d, %	V^d, %	V^{daf}, %	Q_i^r, kcal/kg	Q_s^{daf}, kcal/kg
Zh 0–50/100 mm	24.5	9.0	0.26	23.5	34.0	5,350	7,800

Solid (fixed) carbon, %	C_f^{daf}	66.0	• phosphorus oxide	P_2O_5	0.216
Roga index, unites	$RI_{1:5}$	22	• sulfur oxide	SO_3	3.014
Free swelling index, unites	FSI	1 1/2	• sodium oxide	Na_2O	0.202
Hardgrove Index	HGI	80	• potassium oxide	K_2O	0.837
Carbon, %	C_t^{daf}	64.9			
Hydrogen, %	H_t^{daf}	4.2	**Ash fusion temperature (oxidizing atmosphere), °C:**		
Nitrogen, %	N_t^{daf}	0.7	• initial deformation temperature	T_1	1,341
Oxygen, %	O_d^{daf}	9.3	• hemispherical temperature	T_2	1,384
			• fluid temperature	T_3	1,417
Ash mineral analysis, %:					
• silicon oxide	SiO_2	53.1	**Chemistry of pure coal, %:**		
• aluminum oxide	Al_2O_3	21.99	• vitrinite	Vt	85
• iron oxide	Fe_2O_3	8.65	• exinite (liptinite)	L	2
• calcium oxide	CaO	8.92	• semivitrinite	Sv	0
• magnesium oxide	MgO	1.85	• inertinite	I	11
• titanium oxide	TiO_2	0.86			
• manganese oxide	MnO_2	0.137	Reflection, %	R_0	0.93

6 Mechel Mining's iron ore and coke assets

Korshunov Mining Plant

Zheleznogorsk-Ilimsky, Irkutsk Region, Russia

Korshunov Mining Plant, Mechel Mining's subsidiary, is an industrial complex for iron ore mining and beneficiation, one of the largest such plants in Russia and the only one in the East Siberian region. Korshunov Mining Plant is located near Zheleznogorsk-Ilimsky, a town in the Irkutsk region, and operates two iron ore mines: Korshunovsk Open Pit and Rudnogorsk Open Pit. The run-of-mine iron ore is processed at the Korshunov concentrating plant that produces iron ore concentrate with a standard iron fraction of 62%. The company seeks to continue upgrading production assets through implementation of modern technologies and safety improvements. This makes Korshunov Mining Plant one of the region's fastest growing enterprises, which enables it to create new jobs and improve local infrastructure.

Moscow Coke and Gas Plant

Vidnoye, Moscow Region, Russia

Moscow Coke and Gas Plant is located in central Russia and has a favorable geographical position with direct access to stable markets. The plant operates four coke oven butteries with a total annual capacity of 1.3 million tonnes of coke. The plant's products are successfully marketed both domestically and internationally, including the CIS member states, Europe and Middle East. The plant has its own electricity supply from a power station with a total capacity of 30 MW which operates on cleansed coke gas released during the coking process.

Mechel Coke

Chelyabinsk, Russia

Mechel Coke comprises more than 10 shops and departments, including coke-making facilities formerly belonging to Chelyabinsk Metallurgical Plant. The plant's coke chemical production base is eight coke-oven batteries with a total annual capacity of 3.7 million tonnes of coke. Its primary product is metallurgical coke. Mechel Coke produces 24 types of chemical products as by-products of coke gas, including benzene, toluene, solvent (paint thinner), naphthalene, ammonium sulphate, tar and others. These products are used for further industrial steps to produce plastic, synthetic fibers, medicines, perfumes, cosmetics and organic synthesis products both in Russia and abroad. Mechel Coke fully supplies coke for Mechel's sinter-making, pig iron and steelmaking companies and also delivers it to mining, metallurgical, electrode and machine building enterprises. Coal-tar pitch and pitch coke are in high demand in the electrode and aluminum industries. The plant regularly carries out various upgrades and implements measures for environment protection. For example, in October 2011, the plant launched a unique biochemical facility to cleanse waste water, enabling significant reduction in waste emissions.

Iron ore concentrate

Iron ore concentrate is produced by Mechel Mining's Russian mining subsidiary Korshunov Mining Plant. Please see below details on iron ore concentrate produced by Mechel Mining.

Fe, %, not less than	62.0+0.5
P, %, not more than	0.16
S, %, not more than	0.05
MgO, %, not more than	4.00
SiO_2, %, not more than	5.00
CaO, %, not more than	2.10
Al_2O_3, %, not more than	2.90
MnO, %, not more than	0.18
TiO_2, %, not more than	0.282
H_2O (winter), %, not more than	2.50
H_2O (summer), %, not more than	10.50

Grain size, mm	Content, %
+0.40	0.4
+0.20	4.4
+0.20	10.9
0.074	24.3
-0.074	60.0

Bulk density: 2,200–2,300 kg/m^3

8 Coke, coke breeze and coking products

Coke, coke breeze and coking products are produced by Mechel Mining's Russian subsidiaries Moscow Coke and Gas Plant and Mechel Coke. Please see below details on coke, coke breeze and coking products produced by Mechel Mining.

Coke +60 mm

ITEM	Value	Maximum Value
Moisture, %	2.2	4.2
Ash (dry basis), %	11.8	12
Volatiles (dry basis), %	0.3	0.6
Total sulfur (dry basis), %	0.5	0.6
Phosphorus (dry basis), %	0.026	0.034
Micum:		
M_{40}, %, not less than	80.6	82.2
M_{10}, %, not more than	9.4	10
Mass fraction of pieces with size:		
less 60 mm, %, not more than	-	19.8

Coke +40 mm

ITEM	Value	Maximum Value
Moisture, %	4.9	5
Ash (dry basis), %	11	12
Volatiles (dry basis), %	0.3	0.6
Total sulfur (dry basis), %	0.47	0.6
Phosphorus (dry basis), %	0.027	0.035
Micum:		
M_{40}, %, not less than	76	78
M_{10}, %, not more than	9.38	10
Mass fraction of pieces with size:		
more than 80 mm, %	-	-
40–80 mm, %	80	-
less 40 mm, %, not more than	-	10
CRI, %	29	30.5
CSR, %	58	59.6

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Coke, coke breeze and coking products

Coke +40 mm low phosphorus

ITEM	Value	Maximum Value
Moisture, %	5	6
Ash (dry basis), %	11.7	12
Volatiles (dry basis), %	0.3	0.6
Total sulfur (dry basis), %	0.5	0.6
Phosphorus (dry basis), %	0.026	0.028
Micum:		
M_{40}, %, not less than	75.4	81.2
M_{10}, %, not more than	8.1	10
Mass fraction of pieces with size:		
more than 80 mm, %	29–35	-
40–80 mm, %	55–61	-
less 40 mm, %, not more than	-	10
CRI, %	30	32
CSR, %	52	55

Coke 25–40 mm

ITEM	Value	Maximum Value
Moisture, %	13.4	17.8
Ash (dry basis), %	11.8	12.5
Volatiles (dry basis), %	0.4	0.5
Total sulfur (dry basis), %	0.5	0.6
Phosphorus (dry basis), %	0.028	0.034
Mass fraction of pieces with size:		
more than 40 mm, %	10-15	-
25–40 mm, %	75-80	-
less 25 mm, %, not more than	-	10

8 Coke, coke breeze and coking products

Coke 10–25 mm

ITEM	Value	Maximum Value
Moisture, %	16.3	19.7
Ash (dry basis), %	12.8	14
Volatiles (dry basis), %	0.4	0.6
Total sulfur (dry basis), %	0.43	0.55
Phosphorus (dry basis), %	0.028	0.034
Mass fraction of pieces with size:		
more than 25 mm, %	10-15	-
10–25 mm, %	70-75	-
less 10 mm, %, not more than	15	-

Coke breeze 0–10 mm

ITEM	Value	Maximum Value
Moisture, %	17.9	21.3
Ash (dry basis), %	14.2	16.3
Volatiles (dry basis), %	0.6	0.8
Total sulfur (dry basis), %	0.49	0.66
Phosphorus (dry basis), %	0.028	0.034
Mass fraction of pieces with size:		
more than 10 mm, %	5.1	12.2
less 1 mm, %	35.4	59.6

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Coke, coke breeze and coking products

Crude coal benzene

ITEM	Value
Density at 20 ^{0}C, kg/m^{3}, not more than	878
Initial Boiling Point, ^{0}C, not more than	80
98% of benzene is distillated at a temperature of ^{0}C, not more than	200
Mass fraction of aromatic hydrocarbons, %	90.4
Toluene, %, not more than	15.9

Coal tar

ITEM	Value
Thickness, kg/m^{3}, not more than	1197
Fraction of total water mass, %, not more than	4.0
Fraction of total substance mass insoluble in toluol, %	7.0
Fraction of total substance mass insoluble in quinoline, %	2.0
Ash value, %, not more than	0.12

8 Coke, coke breeze and coking products

Coke +25 mm, 25–40 mm

ITEM	Rate		
	BF Coke I	BF Coke II	BF Coke III
Ash content, %, not more than	11.5	12.5	13.6
Total sulfur, %, not more than	0.5	0.6	0.8
Moisture, %, not more than:			
25 mm and more	6.0	6.0	6.0
25-40 mm	14	14	14
Volatiles, %, not more than:			
25 mm and more	1.2	1.2	1.2
25-40 mm	1.5	1.5	1.5
Micum (coke +25 mm), %:			
M_{25}, not less than	82.0	82.0	82.0
M_{10}, not more than	11.0	11.0	11.0
Mass fractions of pieces with size less 25 mm, %:			
25 mm and more, %	4.0	4.0	4.5
25-40 mm	8	8	8

Coke nuts 10–25 mm

ITEM	Rate		
	CN I	CN II	CN III
Ash content, %, not more than	11.0	13.0	13.0
Moisture in the working conditions of the fuel, %, not more than	20.0	20.0	20.0
Mass fraction of pieces with size more than 25 mm, %, not more than	10.0	10.0	10.0
Mass fraction of coke breeze:			
Pieces with size less than 10 mm, %, not more than	10.0	15.0	-
Pieces with size less than 8 mm, %, not more than	-	-	13.0

Coke, coke breeze and coking products

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Coke breeze 0–10 mm

ITEM	Rate	
	CB I	CB II
Total moisture, %	22	24
Ash (dry basis), %	17	20
Mass fractions of pieces with size more than 10 mm, %:	8	8

Naphthalene

QUALITY: A and B per TU 14–7–97–89

ITEM	Value
Crystallization temperature, ^{0}C, not less than	78.5
Ash content, %, not more than	0.15
Mass part of water, %, not more than	0.2
Mass part of sulfur, %, not more than	0.5

Ammonium sulphate

ITEM	Value
Free sulfur acid content, %, max	0.05
Water mass content, %, max	0.5
Nitrogen mass content, %, min	21
Friability, %	100

9 Logistics

Mecheltrans

Moscow, Russia

Mechel Group has its own logistics division – Mecheltrans, which ensures maximum efficiency in delivering goods to end customers. Mecheltrans focuses on transportation of various cargos by rail and as well provides a range of freight forwarding services.

The company's core business is domestic, export and import shipping operations. Mecheltrans actively develops its logistics network and currently owns about 12,000 rail cars, which are used to deliver Mechel's own products and provide transportation services to third parties.

Trade port Posiet

Posiet, Russia

Mechel Group owns Trade Port Posiet, which is located at the Pacific coast, Sea of Japan (south of Vladivostok, close to the Russian border with China and North Korea). Posiet's advantageous geographical location, its connection to the Trans-Siberian Railway line, and proximity to car and rail routes within Russia and China make it a cost-effective link in the supply chain for bringing coal produced at Yakutugol and Southern Kuzbass to seaborne markets. The port will also be used for export deliveries of coal from Elga Open Pit. Posiet's current annual transshipment capacity is 7 million tonnes with an expected increase of up to 9 million tonnes.

Port Mechel-Temryuk

Temryuk, Russia

Mechel Group owns Port Mechel Temryuk, Russia's southernmost port at the Sea of Azov, which supplies coal to the countries at the Black Sea and Mediterranean basin using both "river-to-sea" class cargo vessels and large bulk cargo vessels in the Strait of Kerch. The port's major advantages are its favorable geographical location and climatic conditions, namely proximity to the Strait of Kerch and the Black Sea, as well as the year-round navigation. Mechel Temryuk's current annual transshipment capacity is 1.5 million tonnes. The port handles deliveries of Mechel Mining's products to Turkey, Romania, Bul-garia, and further along the European routes.

MECHEL

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