



Job File No.: 181202/65467-1269/M-NK-2015

ANALYTICAL REPORT

In pursuance of an order for inspection given to us

BY : " CARBO ONE LIMITED "
TO ANALYZE : Coal Sample 0-100 mm, grade "HV PCI coal", (as declared)
AT : SGS Laboratory

WE HEREBY REPORT that we have performed analysis of the sample delivered to us by our Principal on 05.01.2015. The sample, weighting 16,000 kg, was packed in polypropylene bag, with label of producer's inspection department and not sealed.

I. ANALYSES WERE PERFORMED IN SGS LABORATORY:

1. **Proximate analysis** was performed in SGS laboratory (Accreditation Certificate No. POCRU.0001.21TY38, valid till 22.09.2016) according to ISO Methods with results as follows:

Basis reported	Total moisture, % ISO 589-2003, ISO 5068-1- 2007	Ash, % ISO 1171-97	Yield of volatile matter, % ISO 562-98	Total sulphur, % ISO 19579-92	Gross calorific value, kcal/kg ISO 1928-76
As Received	8.9	7.8	36.7	0.35	6774
Dry Basis		8.6	40.3	0.38	7433
Dry Ash Free			44.1	0.42	8129

Net Calorific Value (as received) was calculated in accordance with ISO 1928:2009 (Pt. 12.2.2.1 и Pt E.3.3): 6488 kcal/kg

SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service (www.sgs.com/en/Terms-and-Conditions.aspx). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



2. **Screen test** were performed in accordance with ISO 1953 with results as follows:

Nominal Top Size (mm)	+100	75-100	50-75	25-50	0-25
Yield (%)	1.0	4.5	2.9	7.9	83.7

3. **Determination of characteristics of hygroscopic moisture** was performed in accordance with GOST 8719-90 with results as follows:

Hygroscopic moisture: 3.59%

4. **Determination of characteristics of plastic layer** was performed in accordance with GOST 1186-87 with results as follows:

Attribute	Unit	Value
X	mm	48
Y	mm	11

5. **Ultimate analysis** was performed in accordance with GOST. The reported results are as follows:

Element	Percentage, %
	Dry Ash Free basis
Carbon	81.82
Hydrogen	5.00
Nitrogen	2.58
Oxygen	10.18

SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service (www.sgs.com/en/Terms-and-Conditions.aspx). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



6. Determination of chemical composition of ash was performed in accordance with ISO with the following results:

Compounds	Percentage, %
Silicon dioxide	47.26
Alumina	22.65
Iron trioxide	8.96
Titanium dioxide	0.90
Calcium oxide	6.86
Magnesium oxide	3.87
Potassium oxide	2.240
Sodium oxide	1.614
Sulphur trioxide	4.799
Phosphorus oxide	0.749
Manganese oxide	0.090

7. Determination of elements' content was performed in accordance with ISO methods with results as follows:

Compounds	Percentage, %
Fluorine	0.0081
Chlorine	0.0099
Arsenic	<0.0005
Phosphorous	0.028
Sodium	0.103
Potassium	0.159

8. Determination of free swelling Index was performed in accordance with ISO 501-81:
FSI 2.0

9. Determination of Grey-King coke type was performed in accordance with ISO 502-82:
GREY-KING COKE TYPE D

SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service (www.sgs.com/en/Terms-and-Conditions.aspx). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



10. Determination of Roga Index was performed in accordance with GOST 9318-91:

RI 37 (1:5)

11. Determination of Caking Index was performed in accordance with GB/T 5447-1997 with results as follows:

G 34 (1:5)

12. Determination of Hardgrove Index was performed in accordance with ASTM D 409-93:

HGI 51

13. Determination of actual density was performed in accordance with GOST 2160-92:

AD 1.33 g/cm³

14. Determination of ash fusibility was performed in accordance with ASTM D1857-87. The reported results are as follows:

Attribute	Unit	Value	
		Oxidizing	Reducing
Initial deformation temperature	°C	1235	1168
Softening temperature	°C	1243	1178
Hemispherical temperature	°C	1257	1194
Fluid temperature	°C	1322	1259



SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service (www.sgs.com/en/Terms-and-Conditions.aspx). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



II. ANALYSES WERE PERFORMED IN SUBCONTRACTED LABORATORY:

The sample was sent to subcontracted laboratory OAO "Zapadno-Sibirski Ispytatelny Centr" (Accreditation Certificate No. POCC RU.0001.21 AY 07) for analysis and the findings reported by OAO "Zapadno-Sibirski Ispytatelny Centr" were as follows:

1. Determination of elements' content was performed in accordance with ISO methods with results as follows:

Compounds	Percentage, %
Germanium	<0.0001
Selenium	0.19*10-4
Gallium	0.0003
Mercury	0.05*10-4

2. Moisture-holding capacity was performed in accordance with GOST 8858-93 with results as follows:
Wmax 4.4

3. Determination of elements' content was performed in accordance with ISO methods with results as follows:

Element	Content, %	Element	Content, %	Element	Content, %
Ba	0.3	Cd	<0.001	Pb	0.0003
Be	0.0004	Co	0.0007	Ag	<0.00001
B	0.01	Li	<0.001	Sc	0.0002
Bi	<0.0002	La	0.005	Sr	0.05
V	0.002	Mn	0.03	Sb	<0.002
W	<0.002	Cu	0.001	Ti	0.5
Yb	0.0001	Mo	0.0004	P	0.2
Y	0.002	As	<0.01	Cr	0.001
Nb	<0.001	Ni	0.003	Ce	0.03
Sn	0.0002	Zr	0.03	Zn	0.005



4. Determination of **ash fusibility** was performed in accordance with ASTM D1857-87 with results as follows:

Attribute	Unit	Value / atmosphere
		Semireducing
Initial deformation temperature	°C	1190
Softening temperature	°C	1210
Hemispherical temperature	°C	1240
Fluid temperature	°C	1270

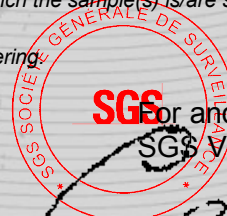
5. Values of **sulphur forms** were determined with the following results:

Attribute	Test Method, Standard	Result
Pyrite sulphur, Sd . %	GOST 30404-00	0.08
Sulphate sulphur, Sd . %	GOST 30404-00	0.01
Organic sulphur, Sd . %	GOST 30404-00	0.26

WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was (were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

This document is a witness of services in collection and processing of information rendering.

Signed and dated in
Novokuznetsk / ES
20 January 2015



For and on behalf of
SGS Vostok Limited