



MONGOLIA  
CENTRAL GEOLOGICAL LABORATORY



# CERTIFICATE OF ANALYSIS

## REFERENCE MATERIAL

### HARD COAL "SOEN"

№	Parameters	Unit	PV <sup>1</sup>	$\pm\Delta_A^2$ (P=0.95)	N <sup>3</sup>
1	Ash content (db*)	%	6.29	0.11	10
2	Volatile matter (daf**)	%	44.8	0.45	9
3	Calorific value (daf)	MJ/kg	32.16	0.27	7
4	Total Sulphur (db)	%	0.78	0.04	7
5	Carbon (daf)	%	76.62	3.35	6
6	Hydrogen (daf)	%	5.41	0.25	6

db\* - dry basis analysis

daf\*\* - dry ash free basis analysis

<sup>1</sup> Property value (PV) - based on a minimum of 6 results

<sup>2</sup> Confidence interval ( $\pm\Delta_A$ ), at 95% level

<sup>3</sup> Number of datasets (N)

#### Additional information (non-certified values)

№	Parameters	Unit	IV <sup>4</sup>	N <sup>3</sup>
1	Coal density	g/cm <sup>3</sup>	1.39	5
2	Hg	mg/kg	0.4	6
3	FSI		1.67	5

#### Composition of coal ash obtained from hard coal "SOEN"

4	SiO <sub>2</sub>	%	12.49	4
5	TiO <sub>2</sub>	%	0.56	4
6	Al <sub>2</sub> O <sub>3</sub>	%	11.58	4
7	T Fe <sub>2</sub> O <sub>3</sub>	%	26.50	4
8	MnO	%	8.20	4
9	MgO	%	5.76	4
10	CaO	%	14.98	4
11	Na <sub>2</sub> O	%	0.15	4
12	K <sub>2</sub> O	%	0.35	4
13	P <sub>2</sub> O <sub>5</sub>	%	0.66	4
14	LOI	%	5.82	4
15	SO <sub>3</sub>	%	16.05	4

<sup>4</sup> Non - certified information value (IV) - based on a less than 6 results

### **Intended uses of Reference Material (RM)**

This RM is intended to be used for quality control applications.

### **Material description**

As starting material, a hard coal bulk sample of 340 kg was collected by the Central Geological Laboratory (CGL) from the Saikhan Ovoo – Ereen coal deposit in 2009.

The petrographic composition was examined at the CGL. The coal consists of ultraclarain, clarain, duroclarite and clarodurite and comprises 73.8 – 88.3% of vitrinite, 6.2 – 6.9% of liptinite, 1.9 – 5.2% of inertinite and 4.5 – 12.9% of mineral mix.

### **Sample preparation**

The sample preparation was performed in 2009-2010 at CGL laboratories. The bulk sample was first crushed down to a grain size of approximately 2 mm, and then pulverized by continuous ring mill to the grain size of approximately 0.2 mm. An asymmetric rotating mixer was applied for homogenization of the batch.

After passing the homogeneity tests, portions of 80 g and 200g candidate material from the batch were bottled by rotary splitter to polyethylene bottles and labeled.

### **Assignment of property values**

An interlaboratory approach with 11 participating laboratories was selected to obtain a reliable base of data for assignment of the property values.

The Technical Committee of CGL assessed production and evaluation procedures for compliance with the valid standard GOST 27872-88 and approved the certificate of the reference material.

### **Instructions for storage and use**

The RM should be stored at room temperature and tightly sealed to protect it from absorption of atmospheric moisture, direct sun reflection and laboratory chemicals.

To overcome possible segregation effects caused by storage or transport condition, the bottle should be shaken three dimensionally prior to taking out material.

No material that had once been removed from the original sample bottle should be returned to it, as that might cause contamination of the remaining sample.

### **Validity of the Certificate**

This certificate of analysis is valid until the end of 2019.

### **Availability of material**

This RM is registered by code **CGL 402** and available from:

Central Geological Laboratory  
CGL - building  
Trade Union Street  
Songinokhairkhan District  
P.O.Box - 437  
18080 Ulaanbaatar  
MONGOLIA

Tel.: + (976 11) 632904, 632914  
Fax: + (976 11) 632944, 632564  
e-mail: [info@cengeolab.com](mailto:info@cengeolab.com)  
[cengeolab@mbox.mn](mailto:cengeolab@mbox.mn)  
web: [www.cengeolab.com](http://www.cengeolab.com)

### **Customer feedback**

Customers, using this RM are kindly requested to register at the CGL. This opens the opportunity to notify the user community on any new development with regard to this RM. Customer feedback with respect to property and information values is highly appreciated.

### **Methods used for analysis**

- Gravimetric method for determination of moisture in solid fuels
- Gravimetric method for determination of ash in solid fuels
- Gravimetric method for determination of volatile matter in solid fuels
- Calorimetric method for determination of gross calorific value in solid fuels
- Gravimetric method for determination of total sulfur (Eschka method)
- Elemental analysis for determination of carbon, hydrogen, oxygen, nitrogen and sulfur
- Method for determination of relative density
- Method for determination of the crucible swelling number
- Wavelength dispersive X-ray fluorescence spectrometry for determination of elemental concentrations of coal ash
- Direct combustion-atomic absorption spectroscopy for determination of mercury

### **Participating laboratories**

- West Siberian Testing Center, Novokuznetsk, Russia
- Methane Kuzbas, Leninsk-Kuznetsk, Russia
- West - Siberian Metallurgical Combine, Novokuznetsk, Russia
- Oriental Research Institute of Coal Chemistry, Ekaterinburg, Russia
- SGS - Mongolia Co., Ltd, Ulaanbaatar, Mongolia
- Fluxana GmbH & CoLtd, Sommerdeich, Germany
- ALS - Geochemical laboratory, Ulaanbaatar, Mongolia
- Stewart - Mongolia Co., Ltd, Ulaanbaatar, Mongolia
- HuK Umweltlabor GmbH, Wenden-Hünsborn, Germany
- Central Geological Laboratory, Ulaanbaatar, Mongolia
- BGR - Federal Institute for Geosciences and Natural Resources, Hannover, Germany

### **Legal notice**

Based on decision of Technical Committee of Central Geological Laboratory of 27<sup>th</sup> December 2012, by the resolution No.241 of director of CGL, this material had been approved as a Reference Material with the code number CGL 402.

**B.BATJARGAL**

**DIRECTOR**  
**Central Geological Laboratory**