



# VANGUARD SOLUTIONS, INC.

## CERTIFICATE OF ANALYSIS

### Certified Calibration Sample – Coal

CATALOG # VS6-046

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**Description:** VS6-046 is a coal reference material. The type of coal is *bituminous*.

**Methodology:** VS6-046 was analyzed by round robin sample exchange.

**Drying:** The values reported are based on a properly dried sample. Vanguard Solutions recommends drying for 1 hour at 105 degrees C. Typical moisture loss in this product is **0.94 %**.

#### Statistics:

<u>Parameter</u>	<u>Certified Value</u>	<u>Uncertainty Value</u>	<u>Determinations</u>
% Sulfur	0.52	± 0.03	52
% Ash	9.15	± 0.10	60
% Volatile	21.62	± 0.47	40
BTU/lb.	14,142	N.A.	58
% Fixed Carbon	69.25	*	38
<b><u>Ultimate Analysis</u></b>			
% Carbon	81.26	± 0.99	14
% Hydrogen	4.48	± 0.20	16
% Nitrogen	1.67	± 0.11	12
% Oxygen	2.45	*	14
<b><u>Sulfur Forms</u></b>			
% Pyritic	0.03	± 0.08	10
% Sulfate	0.03	± 0.06	8
% Organic	9.12	*	8

\*Note: % Fixed Carbon, % Oxygen and % Organic Sulfur are determined by difference, therefore there is no standard deviation.

% Chlorine	0.01	± 0.005	12
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Date of Certification: 06/01/10



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### Statistics (continued):

<u>Parameter</u>	<u>Certified Value</u>	<u>Uncertainty Value</u>	<u>Determinations</u>
<b>Mineral Analysis of Ash</b>			
% P <sub>2</sub> O <sub>5</sub>	0.93	± 0.32	16
% SiO <sub>2</sub>	50.95	± 1.97	14
% Fe <sub>2</sub> O <sub>3</sub>	6.39	± 0.74	16
% Al <sub>2</sub> O <sub>3</sub>	32.83	± 0.09	12
% CaO	1.86	± 0.05	10
% MgO	0.84	± 0.24	16
% SO <sub>3</sub>	1.13	± 0.26	16
% K <sub>2</sub> O	1.98	± 0.56	16
% Na <sub>2</sub> O	0.43	± 0.01	4
% TiO <sub>2</sub>	1.84	± 0.07	10
% MnO <sub>2</sub>	0.07	± 0.04	10
<b>Ash Fusion Temperature (Degrees Fahrenheit) Reducing</b>			
Initial	-	± -	-
Softening	-	± -	-
Hemispherical	-	± -	-
Fluid	-	± -	-

### Notes:

- Results are on a dry basis.
- Certification is valid for three (3) years from date of certification.

Date of Certification: **06/01/10**  
Prepared By: **SR**  
Lot Number: **1642**

Any inquiries concerning this certified calibration sample should be directed to 1-800-304-1970.

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