



VANGUARD SOLUTIONS, INC.

CERTIFICATE OF ANALYSIS

Certified Calibration Sample – Coal

CATALOG # VS6-016

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Description: VS6-016 is a coal reference material. The type of coal is *bituminous*.

Methodology: VS6-016 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 **1.45 %**.

Statistics:

<u>Parameter</u>	<u>Certified Value</u>	<u>Uncertainty Value</u>	<u>Determinations</u>
% Sulfur	1.11	± 0.07	58
% Ash	15.66	± 0.13	58
% Volatile	33.11	± 0.54	38
BTU/lb.	12,077	N.A.	56
% Fixed Carbon	51.09	*	26
<u>Ultimate Analysis</u>			
% Carbon	68.77	± 0.61	8
% Hydrogen	4.50	± 0.29	12
% Nitrogen	1.33	± 0.06	10
% Oxygen	8.89	*	12
<u>Sulfur Forms</u>			
% Pyritic	0.35	± 0.08	12
% Sulfate	0.02	± 0.00	12
% Organic	0.74	*	12

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

% Chlorine	0.023	± 0.012	16
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Date of Certification: 03/01/10



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Statistics (continued):

<u>Parameter</u>	<u>Certified Value</u>	<u>Uncertainty Value</u>	<u>Determinations</u>
Mineral Analysis of Ash			
% P ₂ O ₅	0.16	± 0.14	16
% SiO ₂	57.11	± 1.64	10
% Fe ₂ O ₃	5.10	± 0.51	12
% Al ₂ O ₃	28.96	± 0.33	8
% CaO	0.75	± 0.18	12
% MgO	0.77	± 0.22	12
% SO ₃	0.46	± 0.26	12
% K ₂ O	2.70	± 0.36	12
% Na ₂ O	0.26	± 0.05	8
% TiO ₂	1.43	± 0.28	12
% MnO ₂	0.01	± 0.00	4
Ash Fusion Temperature (Degrees Fahrenheit) Reducing			
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: **03/01/10**
 Prepared By: **SR**
 Lot Number: **1589**

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

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