



VANGUARD SOLUTIONS, INC.

CERTIFICATE OF ANALYSIS

Certified Calibration Sample – Coal

CATALOG # VS6-066

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Description: VS6-066 is a coal reference material. The type of coal is *bituminous*.

Methodology: VS6-066 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 **1.80 %**.

Statistics:

<u>Parameter</u>	<u>Certified Value</u>	<u>Uncertainty Value</u>	<u>Determinations</u>
% Sulfur	0.96	± 0.04	54
% Ash	9.79	± 0.06	38
% Volatile	36.86	± 0.77	36
BTU/lb.	13,145	N.A.	52
% Fixed Carbon	53.34	*	36
<u>Ultimate Analysis</u>			
% Carbon	74.95	± 2.25	14
% Hydrogen	5.13	± 0.18	14
% Nitrogen	1.48	± 0.16	16
% Oxygen	7.73	*	14
<u>Sulfur Forms</u>			
% Pyritic	0.15	± 0.04	8
% Sulfate	0.07	± 0.06	8
% Organic	0.77	*	8

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

% Chlorine	0.16	± 0.02	6
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Date of Certification: **04/01/11**



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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	0.17	± 0.06	10
% SiO ₂	54.73	± 1.20	8
% Fe ₂ O ₃	4.68	± 0.86	10
% Al ₂ O ₃	32.95	± 2.25	8
% CaO	0.86	± 0.02	4
% MgO	0.67	± 0.06	8
% SO ₃	0.51	± 0.14	8
% K ₂ O	1.89	± 0.10	8
% Na ₂ O	0.39	± 0.22	10
% TiO ₂	1.27	± 0.22	10
% MnO ₂	0.01	± 0.01	6
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: **04/01/11**
 Prepared By: **SR**
 Lot Number: **1619**

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

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