



Certificate of Analysis

AR-2776

ULTIMATE COAL STANDARD

LOT # 776419

LID # 776419

DRIED BASIS VALUES

Proximate Analysis		ASTM	Ultimate Analysis		ASTM
% Ash.....	10.02 ± 0.26	D3174/D7582	% Carbon.....	71.57 ± 1.16	D5373
% Volatile Matter.....	35.80 ± 2.52	D3175/D7582	% Hydrogen.....	4.80 ± 0.43	D5373
% Fixed Carbon(calculated)	(54.18)	D3172	% Nitrogen.....	1.26 ± 0.02	D5373
% Sulfur.....	1.12 ± 0.04	D4239	% Oxygen (calculated)...	(11.23)	D3176
Btu/lb.....	12533 ± 151	D5865	MAF/DAF BTU	13954 ± 116	D3180
Mineral Analysis		ASTM	Sulfur Forms		ASTM
Silica.....	44.20 ± 5.12	D4326/D6349	% Pyritic.....	0.36 ± 0.07	D2492
Alumina.....	22.57 ± 1.68	D4326/D6349	% Organic (calculated)...	(0.58)	D2492
Titania.....	1.23 ± 0.10	D4326/D6349	% Sulfate.....	0.18 ± 0.05	D2492
Ferric Oxide.....	10.22 ± 0.72	D4326/D6349	Ash Fusion Temperature		
Calcium Oxide.....	6.99 ± 1.13	D4326/D6349	ASTM D1857	Degrees F	Degrees F
Magnesium Oxide.....	2.05 ± 0.27	D4326/D6349	Initial deformation...	Reducing	Oxidizing
Potassium Oxide.....	1.90 ± 0.46	D4326/D6349	Softening.....	2181	2303
Sodium Oxide.....	0.60 ± 0.07	D4326/D6349	Hemispherical.....	2254	2354
Sulfur Trioxide.....	(9.30)	D4326/D6349	Fluid/Final.....	2292	2407
Phosphorus Pentoxide.....	0.36 ± 0.03	D4326/D6349		2360	2464
Strontium Oxide.....	0.14 ± 0.02	D4326/D6349	% Chlorine D4208/D6721		
Barium Oxide.....	0.27 ± 0.03	D4326/D6349		(0.0979)	
Manganese Oxide...	(0.02)	D4326/D6349			
Undetermined (calculated)	(0.15)				

REFERENCES USED: Sulfur - NIST SRM 2692, SRM 2693, SRM2692c, NCS FC28004f; BTU - NIST 39j(Benzoic Acid); C/H/N - Phenylalanine, EDTA, CRM-6, CRM-9; Form of Sulfur - QAR-RM-6, RM-1 SRM1635a; Mineral Analysis - NIST634a, 2689, USGS AGV-2; Chlorine - SRM2693, 2685c, 1635a. () indicates reference only value

Notes:

The intended use of this standard is for the verification of various tests by the above-mentioned methods. Typical sample size for analytical testing and minimum size is subject to the test method and instrumentation used. The uncertainty values represent the expanded uncertainty (k=2, @95% confidence) obtained through analytical testing by the mentioned ASTM methods utilizing ANOVA, ISO Guide 35, and the Guide to Uncertainty Measurement. Normal test procedures should be employed when using this standard; this includes using the *reproducibility* and *repeatability* factors of the method for establishing analytical uncertainty if needed. When necessary, professional judgment is applied toward consideration of data and statistical information. The statistical analysis and the overall direction and coordination of the analytical measurements leading to certification were performed by K.E. Dyer, Chief Chemist at Alpha Resources.

The material used in production of this standard was prepared and sampled in accordance with ARI 041. The samples for round-robin testing were selected in accordance with ARI 031. The above values relate only to the material used to produce this standard. The analytical samples should be dried or corrected for moisture as per the test method you are using. This bottle contains 50g fine coal powder (-60 mesh). While unable to determine a definite shelf life this reference standard should be reviewed 20 years from the date of certification. Once opened this certificate is valid for two years. Keep sealed tight and store under normal laboratory conditions. This certificate cannot be reproduced except in full.

Remedies for any claimed defect in this product will be limited to product replacement or refund of the purchase price. In no event shall Alpha Resources be liable for incidental or consequential damages. This is a Certified Reference Material and is traceable to the above-mentioned references. For good laboratory practice it is recommended that all standards be verified as fit for purpose prior to use. This standard was produced in accordance to ISO Guide 31 and ISO 17034 (RMP) accreditation issued by ANSI-ASQ/ANAB. Refer to certificate and scope of accreditation AR1920.

EXPIRATION DATE

THIS CRM IS VALID FOR TWO YEARS FROM THE DATE OF OPENING
CERTIFIED July 19, 2019

Kent Dyer