



Certificate of Analysis

AR-745

GREEN PETROLEUM COKE STANDARD

LOT # 745418

LID # 131217

ALL ANALYSIS REPORTED ON A DRIED BASIS VALUE	MEAN	Exp. Unc.	METHODS USED
MEAN WEIGHT PERCENT SULFUR	= 0.49	± 0.03	ASTM D4239, D1552
MEAN WEIGHT PERCENT ASH	= (0.09)	-----	ASTM D3174, D4422
MEAN WEIGHT PERCENT VOLATILE MATTER	= 5.79	± 1.59	ASTM D3175, D7582
MEAN BTU/POUND	14,861	± 170	ASTM D5865
FIXED CARBON (CALCULATED)	= (94.12)	-----	ASTM D3172
MEAN WEIGHT PERCENT CARBON	= 95.92	± 1.42	ASTM D5373
MEAN WEIGHT PERCENT HYDROGEN	= 1.91	± 0.15	ASTM D5373
MEAN WEIGHT PERCENT NITROGEN	= 0.80	± 0.15	ASTM D5373
PPM- ug/g NICKEL	= (93)	-----	ASTM D5056, D6376
PPM- ug/g IRON	= 227	± 77	ASTM D5056, D6376
PPM- ug/g VANADIUM	= (40)	-----	ASTM D5056, D6376
PPM- ug/g CALCIUM	= (34)	-----	ASTM D5056, D6376
PPM- ug/g SILICON	= (64)	-----	ASTM D5056, D6376

Numbers in brackets are given for reference only.

This Certified Reference Material is traced to NIST SRM 2718, 2775, 2776, 2719, 2718a and high purity materials like phenylalanine. The BTU is traceable to Benzoic Acid NIST 39j

The intended use of this material is for the verification of test analysis by the above listed or other valid methods. The precision value represents the expanded degree of uncertainty based on errors from analytical assay by a consensus of ISO 17025 accredited labs, at a 95% confidence level (k=2) utilizing ANOVA, ISO Guide 35, and the Guide to Uncertainty Measurement. 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. Normal testing procedures should be employed when using this standard; this includes using the *reproducibility* and *repeatability* factors based upon your test method. Refer to test method or instrument manufacturer for typical and minimum sample size.

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 are recommended to be dried per the test method used. This bottle contains 50g, fine -60 mesh (250u) green petroleum coke powder. While unable to determine a definite shelf life this reference should be reviewed every 20 years from date of certification. Once opened this certificate is valid for 2 years.

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. The above values relate only to the material used to produce this standard. This certificate cannot be reproduced except in full.

This is a Certified Reference Material (CRM), and is traceable to the above-mentioned standards and or methods. For good laboratory practice it is recommended that all reference standards be verified as fit for purpose prior to use. This standard was produced in accordance to ISO 17034 and Guide 31, (NON-ACCREDITED/NON-SCOPE).

EXPIRATION DATE
THIS CRM IS VALID FOR TWO YEARS FROM THE DATE OF OPENING

Certified June 12, 2018