ALPHA RESOURCES LLC

Value Beyond Measure

# Certificate of Analysis

## AR-1683
## ULTRA LOW SULFUR COAL CRM
## LOT # 683120 LID ID # 683120

**DRIED BASIS VALUE**

| | | |
|---|---|---|
| **MASS PERCENT SULFUR** | **=** | **0.055** |
| **EXPANDED UNCERTAINTY** | **=** | **±0.004** |

**METHOD: ARI-035**

**Combustion under Oxygen by Resistance Furnace with IR Detection *ASTM D4239 (below method scope range)**

**This Reference Material is traced to AR1683-831015, AR1682-682514, AR1684-684610, AR1683-683610, AR1684-684414, AR1682-682610**

**The intended use of this certified reference material is for the calibration and quality validation of sulfur by resistance furnace combustion, infra-red detection analysis as specified by ASTM D4239 or other valid test methods. This Certified Reference Material (CRM) was prepared by gravimetric blending and verified by analysis. The typical sample size used and minimum sample size for analysis is approximately 300-500mg. The analytical value was calculated from a number of data points (n=36) obtained on instrumentation using combustion by resistance furnace with IR detection similar to ASTM D4239. The precision value represents the expanded degree of uncertainty based on errors from analytical assay at a 95% confidence level (k=2) utilizing ISO Guide 35, ANOVA, and the Guide to Uncertainty Measurement. Metrological traceability is to the SI derived unit of mass fraction expressed as percent. 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 at Alpha Resources. This CRM is below actual test method limits and no known NMI references at this concentration are available.**

**The material used for this standard was identified by AR 041. The samples for testing were selected in accordance with ARI 031. The above values relate only to the material used to produce this standard. The analytical samples were dried under a nitrogen atmosphere for a minimum of 30 minutes at 107˚ C ± 3˚C, or until a steady mass is achieved. This bottle contains 50g fine -60 mesh (250µm) powder to be used per your test method. Values are valid for 15 years from the date of certification. Keep sealed immediately after use and store under normal laboratory conditions.**

**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 CRM, and is traceable to the above-mentioned reference material(s). For good laboratory practice, it is recommended that all reference materials be verified as fit for purpose prior to use. This CRM was produced in accordance to ISO 17034 (RMP) accreditation issued by ANSI-ASQ/ANAB. Refer to certificate and scope of accreditation AR1920.**

**Certified January 31, 2020**
**Updated: February 11, 2025**

Kent Dyer

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