ALPHA RESOURCES LLC

Value Beyond Measure

# Certificate of Analysis

## AR1036
## CARBONATE CARBON CRM
## LOT # 036419

**% CARBONATE CARBON**
**MEAN = 1.03**
**Expanded Uncertainty = ± 0.03**
**(k=2, @ 95% confidence) (n=29)**

**The intended use is for the Carbonate Carbon determination in materials using oxidation combustion with infrared detection or thermal decomposition under inert gas using thermal conductivity detection. The verification of this CRM was by oxidation combustion IR detection.**

**Standards Employed for traceability:**
**NIST 1d**
**ALPHA – AR4016-213A, AR4018-1013C, AR4015-516A, AR4005-514A, AR4013-51999**

**The mean analytical values were derived by data sets showing traceability to the above mentioned NMI and Alpha standards and reported in mass fraction. Metrological traceability is to the SI derived unit of mass fraction expressed as percent. The precision values are derived using ISO Guide 35, the Guide to Uncertainty Measurement, and ANOVA. Refer to your test method or instrument manufacturer for the expanded method derived 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.**

**There were limited primary standards of this type of matrix available at the time of certification. Sample size and minimum sample size for this data was 300mg nominal. Refer to your instrument manufacturer for minimum and typical sample analysis size. This bottle contains 50g of fine powder to be used directly from the bottle without preparation. Keep sealed and store under normal laboratory conditions. While unable to determine a definite shelf life this reference should be reviewed 20 years from certification.**

**The material used in production of this standard was sampled in accordance with ARI 032. The samples for round robin testing were selected in accordance with ARI 014. The above values relate only to the material used to produce this standard.**

**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 certificate cannot be reproduced except in its entirety.**

**This is a Certified Reference Material and is traceable to the above-mentioned standards. 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, refer to certificate AR-1920.**

**This certificate was revised on 2-24-2021 for title change.**

**Certified July 25, 2019**

Kent Dyer

**Chief Chemist**

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