

Alpha Resources, LLC

Certificate Of Analysis

AR-4013
CARBON AND SULFUR IN LIMESTONE
LOT # 616B

% CARBON
MEAN = 2.81
Standard Deviation = 0.05
Expanded Uncertainty = 0.10
(k=2, 95% confidence) (n=73)

% SULFUR
MEAN = 0.027
Standard Deviation = 0.005
Expanded Uncertainty = 0.010
(k=2, 95% confidence) (n=85)

The intended use is for Carbon and Sulfur determination using induction and resistance type combustion furnaces with infrared detection. Accelerants like vanadium pentoxide (V₂O₅) were used in the resistance furnace. Tungsten metal and iron chip were used in the induction analysis.

Standards Employed for traceability:

NCS	DC28011 (S), DC73326 (C/S), DC28008 (S), DC14014a (S)
NIST	1D (C)
ALPHA	AR4013lot51999, AR4014lot42899, AR4012lot52199, AR4006lot411B

Notes:

The mean analytical values were derived by data sets showing traceability to the above mentioned NMI and Alpha standards, and reported in mass fraction. The precision values represent the estimated uncertainty derived from analysis and may not represent your testing capabilities. 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, Technical Manager, 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 typical sample analysis size. This bottle contains 25g of fine powder to be used directly from the bottle without preparation, and has an indefinite shelf life.

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 (Working Standard), and is traceable to the above-mentioned standards. For good laboratory practice, it is recommended that all standards be verified prior to use.

This standard was produced in accordance to Guide 34. Alpha Resources has become accredited under the ISO Guide 34:2009 for RMP and holds a ISO 17025 accreditation. Refer to certificate and scope of accreditation for details.

Certified December 28, 2016



Technical Manager