

# Alpha Resources, LLC

## Certificate Of Analysis

AR 872  
CARBON STEEL RING STANDARD  
LOT # 317C

% CARBON  
MEAN = 0.159  
One Sigma Standard Deviation = +/- 0.002  
Expanded Uncertainty = +/- 0.005  
(k=2.5, @ 95% confidence limit) (n=49)

% SULFUR  
MEAN = 0.022  
One Sigma Standard Deviation = +/- 0.001  
Expanded Uncertainty = +/- 0.002  
(k=2, @ 95% confidence limit) (n=47)

Method of Analysis is ASTM E 1019-11 and ARI 033

Primary (NMI) Standards Employed:

NIST SRM	19h, 11b, 73c, 178, 293
JSS	151-18
EURO	237-2, 231-2, 232/2
NCS	HC11326

ALPHA AR872-714G, AR884-1114C, AR872-111C, AR870-811D, AR894-416B

The intended use of this reference standard is for the calibration and verification of induction combustion Carbon/Sulfur analysis by infra-red detection as described by ASTM E-1019. The mean analytical values were derived by 5 data sets showing traceability to the above mentioned NMI standards, and reported in mass fraction. The minimum and typical size for testing was 1g (1 ring) per ASTM E1019. The precision values represent the estimated uncertainty derived from the data sets and may not represent your testing capabilities. Refer to your test method for additional uncertainty information. 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.

The material used in production of this standard was identified 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. This bottle contains 454g, 1g rings (nominal weight), to be used directly from the bottle with no preparation needed. This standard has an indefinite shelf life. Keep sealed 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. This certificate cannot be reproduced except in full. Produced in accordance to ISO Guide 31 and ISO 17034.

This is a Certified Reference Material (working reference standard), and is traceable to the above-mentioned reference materials. For good laboratory practice, it is recommended that all standards be verified prior to use. These test results are accredited under the Alpha Resources LLC. laboratory's ISO/IEC 17025 and ISO Guide 34 accreditation (RMP) issued by ANSI-ASQ/ANAB. Refer to certificate and scope of accreditation(s) AT-1200 and AR-1920.

Certified June 15, 2017

  
Technical Manager