

# Alpha Resources, Inc.

## Certificate Of Analysis

AR 590  
ZIRCONIUM STANDARD  
LOT # 815C

**% CARBON**  
MEAN = 0.016  
One Sigma Standard Deviation = +/- 0.001  
Expanded Uncertainty = +/- 0.002  
(k=2, 95% confidence) (n=70)

**% HYDROGEN**  
MEAN = 0.0010  
One Sigma Standard Deviation = +/- 0.0002  
Expanded Uncertainty = +/- 0.0004  
(k=2, 95% confidence) (n=80)

Method of Analysis is ASTM E 1941-10, \*E 1447-09 modified for Zirconium (inert gas fusion TC detection)  
ARI 033, and ARI 036

Primary (NMI) Standards used for traceability:  
NIST SRM 352, 357, 352a, 2453, 360b, 352c, 345a, 173c, 360a  
BCR CRM 318, 276, 275

### Notes

The mean analytical values were derived by separate data sets showing traceability to the above mentioned reference standards, and reported in mass fraction. 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 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.

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 consists of 25g material in .25g pins (nominal) and is to be used directly from the bottle without preparation. Multiple pins may be used per test method requirements. This product has an indefinite shelf life. This reference material was produced in accordance to ISO Guide 34 and ISO Guide 31.

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.

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 ISO Guide 34 and Guide 31. 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.

\*This certificate has been revised on May 17, 2016 to correct statements on accreditations and test methods.

Certified, March 9, 2016



Kent Dyer, Technical Manager