

Alpha Resources, Inc.

Certificate Of Analysis

AR 647
TITANIUM STANDARD
LOT # 611F

% OXYGEN
MEAN = 0.172
One Sigma Standard Deviation = +/- 0.006
Expanded Uncertainty = +/- 0.012
(k=2, 95% confidence)

% NITROGEN
MEAN = 0.0033
One Sigma Standard Deviation = +/- 0.0006
Expanded Uncertainty = +/- 0.0012
(k=2, 95% confidence)

% HYDROGEN (*)
MEAN = 0.0095
One Sigma Standard Deviation = +/- 0.0010
Expanded Uncertainty = +/- 0.0020
(k=2, 95% confidence)

Method of Analysis is ASTM E 1409-08, E 1447-09, E 1937-04, ARI 034, and ARI 036

Primary (NMI) Standards used for traceability:

NIST SRM	2452, 2454, 2453, 173b, 173c
NCS	NS57103, NS57102, NS57104, NS57101
BCR CRM	276

Notes

The mean analytical values were derived by 4 data sets (n=40, O/N) showing traceability to the above mentioned NMI 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. (*)Due to anomalies in the hydrogen value discovered after certification. The hydrogen certified value and uncertainty has been revised on September 29, 2011. The data sets were expanded to 12 with n=120 data points in this revision.

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. This bottle consists of 10g material in .1g pins and is to be used directly from the bottle. Multiple pins may be used per test method requirements. This product has an indefinite shelf life.

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 is a Certified Reference Material (CRM), and is traceable to the above-mentioned standards. For good laboratory practice it is recommended that all standards be verified prior to use.

This calibration standard is accredited and meets the requirements of ISO/IEC 17025 as verified by the ANSI-ASQ National Accreditation board. Alpha Resources is an ISO/IEC 17025 accredited laboratory. For more information concerning our scope of accreditation contact Alpha Resources.

Certified July 26, 2011
Revised September 29, 2011



Kent Dyer, Technical Manager

P.O Box 199 3090 Johnson Road Stevensville, MI 49127 Phone (269) 465-5559 Fax (269) 465-3629

www.alpharesources.com