

Alpha Resources, Inc.

Certificate Of Analysis

AR 648
TITANIUM STANDARD
LOT # 614D

% OXYGEN
MEAN = 0.132
One Sigma Standard Deviation = +/- 0.011
Expanded Uncertainty = +/- 0.022
(k=2, 95% confidence) (n=60)

% NITROGEN
MEAN = 0.0075
One Sigma Standard Deviation = +/- 0.0012
Expanded Uncertainty = +/- 0.0024
(k=2, 95% confidence)(n=60)

% HYDROGEN
MEAN = 0.0137
One Sigma Standard Deviation = +/- 0.0004
Expanded Uncertainty = +/- 0.0008
(k=2, 95% confidence)(n=110)

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	2454, 2453
BCR CRM	024c, 059b, 356, 275, 276
NCS CRM	NS57103, NS57102

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. This certificate cannot be reproduced except in full.

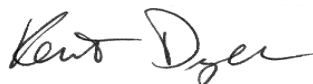
The material used in production of this standard was sampled in accordance with ARI 032. The samples for round robin testing were selected in accordance with ARI 014. The above values relate only to the material used to produce this standard. This bottle consists of 10g material in .1g pins and is to be used directly from the bottle 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 34-2009.

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 (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. These test results are accredited under the Alpha Resources Inc. laboratory's ISO/IEC 17025 accreditation issued by ANSI-ASQ National Accreditation Board/ACCLASS. Refer to certificate and scope of accreditation AC-1200.

This standard was produced in accordance to Guide 34 at the time of certification. These same methods for producing reference materials have now been reviewed by an accreditation body. As of February 2015 our facility has become accredited under the ISO Guide 34:2009 for RMP issued by ANSI-ASQ National Accreditation Board, certificate AR1920.

Certified, August 1, 2014



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