

Alpha Resources, LLC

Certificate Of Analysis

AR 637
TITANIUM STANDARD
LOT # 1116A

% OXYGEN
MEAN = 0.144
One Sigma Standard Deviation = +/- 0.009
Expanded Uncertainty = +/- 0.018
(k=2, @ 95% confidence) (n=55)

% NITROGEN
MEAN = 0.0092
One Sigma Standard Deviation = +/- 0.0018
Expanded Uncertainty = +/- 0.0036
(k=2, @ 95% confidence) (n=54)

% HYDROGEN
MEAN = 0.0013
One Sigma Standard Deviation = +/- 0.0001
Expanded Uncertainty = +/- 0.0003
(k=3, @ 95% confidence) (n=38)

Method of Analysis is ASTM E 1409-13, E 1447-09, ARI 034, and ARI 036

Primary (NMI) Standards used for traceability:

NIST SRM 173c, 360b
BCS CRM 356, 357
BCR CRM 059b, 318
NCS CRM NS57103, NS57102, NS57101

ALPHA -AR650-615C, AR650-711B, AR637-114C, AR635-415E, AR647-415D, AR590-815C, AR586-315E

The intended use of this standard is for the calibration and validation of inert gas fusion, InfraRed (Oxygen), and Thermal Conductivity (Nitrogen, Hydrogen) detection analyzers as described in the above ASTM methods. 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 10g material in .1g (nominal) pins, and is to be used directly from the bottle without preparation. Multiple pins may be used per test method requirements, with a minimum sample size of 1 pin. This product has an indefinite shelf life. This reference material was produced in accordance to ISO 17034 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. These test results are accredited under the Alpha Resources Inc. 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 March 8, 2017



Kent Dyer, Technical Manager