



Certificate of Analysis

AR 660

OXYGEN & NITROGEN STEEL PIN CRM

LOT# 522K

% OXYGEN

MEAN = 0.0038

Standard Deviation = ± 0.0001

Expanded Uncertainty = ± 0.0004

(k=2, @ 95% confidence, n=42)

% NITROGEN

MEAN = 0.0075

Standard Deviation = ± 0.0002

Expanded Uncertainty = ± 0.0005

(k=2, @ 95% confidence, n=42)

Method of Analysis is ASTM E 1019-18, and ARI-LAB-622

Primary (NMI/Guide 34/ISO17034) Reference Materials Employed:

NIST

12h

NCS

NS21007, NS20035b, NS11037

**ALPHA - AR660-1018A, AR660-1111D, AR660-T39074309, AR656-618A, AR660-317B,
AR668-1014B, AR656-314E, AR661-517C**

This reference standard is intended to be a calibration or QC validation of Oxygen and Nitrogen on inert gas fusion analyzers utilizing infrared (O) and thermal conductivity (N) detection as described in ASTM E1019. The analytical sample and minimum size used for testing was 1 pin (0.5g nominal). The precision values represent the estimated mean, standard deviation, and expanded uncertainty derived from using ISO Guide 35, ANOVA, and the Guide to Uncertainty Measurement. Metrological traceability is to the SI derived unit of mass fraction expressed as percent. Refer to your test method and or your instrument manufacturer for the expanded method derived uncertainty. 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, Chief Chemist, at Alpha Resources.

The material used in production of this standard was identified in accordance with ARI-LAB-603. The samples for round-robin testing were selected in accordance with ARI-LAB-625. The above values relate only to the material used to produce this reference standard. This reference contains 50g, 0.5g pins (nominal), to be used directly from the bottle with no preparation. While unable to determine a definite shelf life, this reference should be reviewed 25 years from the date of certification. Keep sealed and store under normal laboratory conditions. This reference material was produced in accordance with ISO 17034.

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 CRM and is traceable to the above-mentioned reference materials. For good laboratory practice, it is recommended that all reference materials be verified as fit for purpose prior to use. These test results are accredited under the Alpha Resources LLC laboratory's ISO/IEC 17025 and ISO 17034 accreditation (RMP) issued by ANSI-ASQ/ANAB. Refer to certificate and scope of accreditation(s) AT-1200 and AR-1920.

Certified November 29, 2022

Kent Dyer

Chief Chemist