



Certificate of Analysis

AR 546
HYDROGEN IN STEEL REFERENCE
LOT # 917C

TOTAL HYDROGEN (melted/fused)
MEAN VALUE = 0.95 (ug/g) (0.000095 wt. %)
STANDARD DEVIATION = 0.13 (ug/g) (\pm 0.000013 wt. %)
EXPANDED UNCERTAINTY = 0.29 (ug/g) (\pm 0.000029 wt. %)
(Expanded uncertainty $k=2$, @ 95% confidence, $n=47$)

Method of Analysis:
LECO RH-404, ELTRA ONH 2000 Inert Gas Fusion, TC Detection

Reference materials used for certification:

NCS NS20025b, NS11043
JSS GS-1d, GS 9-1
ALPHA - AR546-114A, AR555-1013A

Notes:

The intended use of this reference standard is for the calibration and continued quality verification of hydrogen in steel by inert gas fusion thermal conductivity detection analysis. The precision values represent the standard deviation and expanded uncertainty ($k=2$, @ 95% confidence), utilizing Guide to Uncertainty Management, ISO Guide 35, and ANOVA. This standard was produced in accordance to ISO Guide 31 and ISO 17034 (non-scope).

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. This standard is intended only to be used for Hydrogen gas analysis of steel and minimum/typical sample size is 1g. The above values relate only to the material used to produce this standard. The statistical analysis, overall direction, and coordination of the analytical measurements leading to certification were performed by K. E. Dyer Chief Chemist at Alpha Resources Inc. This bottle contains 100, 1g pins (nominal), to be used directly from the bottle. While unable to determine a definite shelf life this reference should be reviewed 25 years from the date of certification. Keep sealed and stored under normal laboratory conditions.

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 as fit for purpose prior to use.

Certified August 14, 2018

Chief Chemist