

# Alpha Resources, LLC

## Certificate Of Analysis

AR 556  
HYDROGEN IN STEEL REFERENCE  
LOT # 517A

TOTAL HYDROGEN (melted/fused)  
MEAN VALUE = 4.5 (ug/g) (0.00045 wt. %)  
STANDARD DEVIATION = 0.5 (ug/g) ( $\pm 0.00005$  wt. %)  
EXPANDED UNCERTAINTY = 1.0 (ug/g) ( $\pm 0.0001$  wt. %)  
(Expanded uncertainty  $k=2$ , @ 95% confidence,  $n=50$ )

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

Reference materials used for certification:

NCS	NS20041, NS20042
JSS	GS-7a, SS-5-18, GS 9-1

ALPHA – AR556-812C, AR556-916E, AR555-1013A, AR558-716B

### 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). This standard was produced in accordance to ISO Guide 31 and ISO 17034.

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. This certificate cannot be reproduced except in full. The statistical analysis, overall direction, and coordination of the analytical measurements leading to certification were performed by K. E. Dyer at Alpha Resources Inc. This bottle contains 100, 1g pins (nominal), to be used directly from the bottle. Values are valid for 20 years from the date of certification. This standard should be kept 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 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. This standard was produced under Alpha Resources Reference Material Production (RMP) Program, which has been accredited by ANSI-ASQ/ANAB, refer to scope of accreditation for further details AR-1920.

Certified August 15, 2017  
Updated February 14, 2025



Technical Manager