

ANALYTICAL REFERENCE MATERIALS INTERNATIONAL CERTIFICATE OF ANALYSIS

Grade: C-1018

Part Number (Q.A.NO.): IARM-28B

Certification Date: 10/15/92

Certificate No.: 28B-101592ARM-F

INTERPRETATION OF DATA

1. Certified values listed below reflect analysis results submitted by qualified analytical laboratories using a combination of methods and instrumentation that emulate actual methods and instrumental techniques currently utilized in the analytical community.
2. Any data reported and enclosed by a parentheses () is a "best estimate" and is NOT CERTIFIED. This data could not be quantified sufficiently for certification. It was however, reported by enough laboratories to be considered as potentially present in the matrix of the material being examined.
3. The "Interlaboratory Analysis Program" (ILAP) utilized in the establishment of the data is an ongoing program with permanent membership. Certain elements may be selected by a consensus of the members for more extensive testing. Therefore, the data in brackets [] indicates further testing is in process.
4. The "" Confidence Interval at 95% " is enclosed by a parentheses () below the individual element concentration.

IMPORTANT: A "USER REGISTRATION CARD" ACCOMPANIES ALL SHIPMENTS. THIS CARD SHOULD BE COMPLETED IMMEDIATELY UPON RECEIPT OF MATERIALS WITH THE APPROPRIATE USER INFORMATION. THIS IS THE ONLY WAY IN WHICH ARMI CAN GUARANTEE CUSTOMER UPDATES OR POSSIBLE DATA MODIFICATIONS!

<u>CARBON</u> 0.18 (0.0025)	<u>MANGANESE</u> 0.75 (0.0083)	<u>PHOSPHORUS</u> 0.010 (0.0006)	<u>SULFUR</u> 0.029 (0.0009)	<u>SILICON</u> 0.23 (0.0081)	<u>COPPER</u> 0.36 (0.0063)	<u>NICKEL</u> 0.13 (0.0030)	<u>CHROMIUM</u> 0.13 (0.0027)
<u>MOLYBDENUM</u> 0.029 (0.0008)	<u>TUNGSTEN</u> (<0.001)	<u>COBALT</u> 0.011 (0.0017)	<u>VANADIUM</u> 0.002 (0.0008)	<u>ALUMINUM</u> 0.003 (0.0012)	<u>TIN</u> 0.014 (0.0008)	<u>LEAD</u> (<0.01)	<u>ARSENIC</u> 0.008 (0.0008)
<u>TITANIUM</u> 0.002 (0.0007)	<u>NIObIUM</u> 0.002 (0.0008)	<u>ZIRCONIUM</u> (<0.001)	<u>BORON</u> 0.0002 (0.00008)	<u>NITROGEN</u> 0.0094 (0.0003)	<u>OXYGEN</u> 0.0070 (0.0003)	<u>CALCIUM</u> (0.002) (0.0009)	

The laboratories participating in the "Interlaboratory Analysis Program" (ILAP) and certification of this material are as follows:

Algoma Steel, Sault Ste. Marie, Canada
Anderson Laboratories, Inc., Greendale, WI
Armco Advanced Materials Co., Butler, PA
Armco Research & Technology, Middletown, OH
Bethlehem Steel Corp., Sparrows Point, MD

Chicago Spectro Service Laboratory, Inc., Chicago, IL
Dofasco, Inc., Hamilton, Canada
Leco Corporation, St. Joseph, MI
LTV Steel Corp., East Chicago, IN
Martin Marietta Astronautics, Denver, CO

Metal Analysis Inc., Huntington Park, CA
NASA/Stennis Space Center, SSC, MS
National Steel Corporation, Trenton, MI
USX-Fairfield Works, Fairfield, AL
Wheeling Pittsburgh Steel Corp., Mingo Junction, OH

TRACEABILITY TO NIST: Members of the "Interlaboratory Analysis Program" (ILAP) listed above validate test methods and instrument performance utilizing SRMs produced by the National Institute of Standards & Technology, (NIST). Validation may be in the form of one or both of two independent methods described as follows:

1. Selected laboratories from the above listing are furnished SRMs that have been chosen as the best available "Type Standards" in relation to the matrix composition of the test materials being analyzed. These SRMs are provided by and at the expense of Analytical Reference Materials International, Inc. The data resulting from these examinations therefore becomes the common "point of reference" for all testing and subsequent data results for all IARMS™ certified by Analytical Reference Materials International, Inc. thereby establishing a specific line of "traceability" to the U.S. Department of Commerce, National Institute of Standards & Technology, (NIST). **The specific SRMs applicable to the material covered by this certificate were SRM1761, SRM1763, SRM1764, SRM1765, SRM1766 and SRM1767.**
2. At the option of ARMI and/or in the absence of currently available SRMs that are matrix compatible with ARMI program materials, other NIST/NBS materials classically resident in the ILAP member lab may be used for the characterization of ILAP materials. Validation by this method requires that the ILAP member have on file with ARMI an affidavit verifying the use of the SRMs accompanied by a copy of the NIST/NBS Certificates of Analysis as they apply to that matrix group.

Either one or both of these methods establishes a specific line of traceability to NIST for those elements that are noted as "certified values" on the NIST Certificates of Analysis applicable to the SRMs referenced on the ARMI Certificate of Analyses.

SEE REVERSE SIDE FOR STATISTICAL DATA AND ADDITIONAL INFORMATION REGARDING THIS MATERIAL

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