

# Analytical Reference Materials International

## Certificate of Analysis

### Certified Reference Material

Grade: AA1100

Part Number (Q.A. NO.): IARM 101AG

Certification Date: 01/29/1998

Certificate No.: 01291998-101AG-ALC-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 "Inter-Laboratory 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 **"Estimated Uncertainty"** is enclosed by a **parentheses ( )** below the individual **element's concentration** and is based on a Confidence Interval at 95%. Included in this estimated uncertainty, are the combined effects of method imprecision, possible material inhomogeneity, and method biasing.

**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!

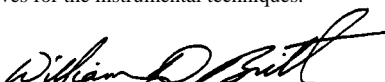
<u>Silicon</u>	<u>Iron</u>	<u>Copper</u>	<u>Manganese</u>	<u>Chromium</u>	<u>Nickel</u>	<u>Zinc</u>	<u>Titanium</u>
0.18 (0.012)	0.58 (0.016)	0.084 (0.0038)	0.029 (0.0011)	0.017 (0.0020)	0.029 (0.0034)	0.033 (0.0024)	0.030 (0.0010)
<u>Vanadium</u>	<u>Gallium</u>	<u>Zirconium</u>	<u>Tin</u>	<u>Lead</u>	<u>Phosphorus</u>	<u>Beryllium</u>	<u>Boron</u>
0.023 (0.0007)	0.021 (0.0007)	0.0029 (0.00031)	0.015 (0.0009)	0.012 (0.0012)	0.0041 (0.00030)	0.0009 (0.00010)	
<u>Magnesium</u>	<u>Bismuth</u>	<u>Calcium</u>	<u>Cadmium</u>	<u>Lithium</u>	<u>Sodium</u>	<u>Strontium</u>	<u>Antimony</u>
0.015 (0.0027)	0.019 (0.0042)	0.0023 (0.00015)	(0.0011)	0.0020 (0.00022)	0.0016 (0.00015)	0.0026 (0.00018)	0.0039 (0.00027)

**Method of Manufacture:** These standards are not derived from "Production Material". Material produced for the purpose of becoming a certified reference material is produced by a "Direct Chill Continuous Cast" method. Three billets measuring 75mm (3.00") in diameter by 1.50m (60.00") in length are cast for each material batch. Typically, the "DC Disk Standards" render better uniformity than other methods and have proven over time to produce the most reliable results for the analysis of both the simple as well as the complex alloys.

**Methods of Analysis:** Certified values listed above reflect analysis results using a combination of classical chemical methods and instrumental techniques that emulate actual methods and instrumental techniques currently utilized in the analytical community. These methods and techniques include classical chemistry, ICP, AA, Optical Emission and X-Ray spectrometry as well as certain proprietary methods developed specifically by ALCAN International Limited exclusively for the analysis of aluminum and its alloys.

**Homogeneity:** The total of the three billets cast is considered the "batch or series". Twelve (12) representative samples are selected from the batch. Each of the twelve samples is sparked seven (7) times following a given sequence on the Quantometer. These 84 results are statistically evaluated by an analysis of variance to determine the uniformity of composition within and among the entire batch series. **If this test reveals that one or more of the major alloying elements is not uniformly distributed, then the entire batch series is rejected.**

**Traceability to NIST:** Selected SRM's produced by the National Institute of Standards & Technology are routinely utilized in the verification of methods and instrumental techniques in relation to the matrix composition of the test materials being analyzed. Wherever possible, the SRM's are used in the calibration curves for the instrumental techniques.

Certified by:   
William D. Britt, President & General Manager  
Analytical Reference Materials International

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