Department of Commerce
Malcolm Baldrige
Secretary

ional Bureau of Standards
Ernest Ambler, Director

# National Bureau of Standards

# Certificate of Analysis

## Standard Reference Material 1240

### Aluminum Alloy 3004

(In Cooperation with the American Society for Testing and Materials)

This Standard Reference Material (SRM), is in the form of a disk, 64 mm (2 1/2 in.) in diameter and 19 mm (3/4 in.) thick. It is intended primarily for calibration by optical emission methods of analysis. Material from the same lot is available in the form of fine millings as SRM 853 and is intended primarily for use in checking chemical methods of analysis.

The certified portion is that portion extending 19 mm (3/4 in.) inward from the periphery. (The center portion, 25 mm (1 in.) in diameter, is not certified.) Note: For x-ray fluorescence methods of analysis, either cut or mask the specimen to include only the certified portion.

| Constituent | Si | Fe | Cu | Mn | Mg | Cr | Ni | Zn | Ti | V | Ga | Zr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Certified Value, % by weight[1] | 0.18 | 0.50 | 0.15 | 1.26 | 1.11 | <0.001 | 0.004 | 0.052 | 0.022 | 0.017 | 0.018 | 0.002 |
| Estimated Uncertainty[2] | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | --- | 0.001 | 0.001 | 0.001 | 0.001 | 0.002 | --- |
| Method / Lab | | Atomic Absorption | Atomic Absorption | Atomic Absorption | Atomic Absorption | Atomic Absorption | Atomic Absorption | Atomic Absorption | Emission Spectroscopy (ICP) | Emission Spectroscopy (ICP) | Atomic Absorption | Emission Spectroscopy (ICP) |
| 1 | [a] 0.18 | 0.50 | 0.15 | 1.28 | 1.12 | <0.001 | 0.003 | 0.052 | [b] 0.021 | [b] 0.018 | [b] 0.020 | [b] 0.002 |
| 2 | [c] .18 | .50 | .15 | 1.25 | 1.11 | < .001 | .004 | .051 | .022 | .016 | .016 | .002 |
| 3 | [d] .19 | .49 | [c] .14<br>.15 | 1.26 | [c] 1.13<br>1.09 | < .001 | [c] .004<br>.005 | [c] .051<br>.052 | .022 | [e] .016<br>.017 | .018 | .002 |

[1] The certified value listed for a constituent is the present best estimate of the "true" value based on the results of the cooperative program for certification.

[2] The estimated uncertainty listed for a constituent is based on judgment and represents an evaluation of the combined effects of method imprecision, possible systematic errors among methods, and material variability. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.)

[a] Gravimetry
[b] Emission spectroscopy, direct current plasma (DCP)
[c] Emission spectroscopy, inductively coupled plasma (ICP)
[d] Spectrophotometry
[e] Atomic absorption spectroscopy

NOTE: Values of <0.0001 percent beryllium, <0.001 percent tin, and 0.001 percent lead are given for information only.

The overall coordination of the technical measurements leading to certification were performed under the direction of J.I. Shultz, Research Associate, ASTM-NBS Research Associate Program.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by W.P. Reed and R. Alvarez.

Gaithersburg, MD 20899
July 8, 1985

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

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PLANNING, PREPARATION, TESTING, ANALYSIS:

The material for this SRM was prepared under contract with NBS by the Aluminum Company of America, Alcoa Center, Pa., coordinated by D.J. Levin. Titanium was added for grain refinement of the alloy.

Homogeneity testing was performed by optical emission spectroscopy at the Aluminum Company of America, Alcoa Center, Pa., D.J. Levin and by J.A. Norris, Inorganic Analytical Research Division of NBS.

Millings representative of the certified portion of the lot were cut and blended at NBS to form a composite.

Cooperative analyses for certification were performed on composite samples in the following laboratories:

Aluminum Company of America, Alcoa Technical Center, Alcoa Center, Pa., D.J. Levin.

Kaiser Aluminum and Chemical Corporation, Pleasanton, California, H.J. Seim, J.M. Winkler, G.M. Calkins, and T.A. Palmer.

Reynolds Aluminum, Reynolds Metals Company, Richmond, Virginia, W.E. Pilgrim and J.F. Green.