



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material[®] 858

Aluminum Alloy 6011 (Modified)

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

This Standard Reference Material (SRM) is in the form of fine millings, intended primarily for use in validating chemical methods of analysis. Material from the same lot is available in disk form as SRM 1258, intended primarily for use in optical emission and x-ray spectrometric methods of analysis.

Element	Analysts					Certified Mass Fraction (in %) ¹	Estimated Uncertainty ²
	1	2	3	4	5		
Silicon	0.78 ^a		0.79 ^a	0.80 ^b	0.79 ^c	0.79	0.01
Iron	0.080	0.077	0.077	0.78 0.080 ^d		0.078	0.003
Copper	0.85	0.83	0.85	0.84	0.85 ^e	0.84	0.01
Manganese	0.49	0.47	0.48	0.48	0.49 ^f	0.48	0.01
Chromium	0.0011		0.0013	0.0010		0.0011	0.0002
Nickel	0.0007		<0.001	0.0006		0.0006	0.0002
Zinc	1.02	1.06	1.04	1.04	1.06 ^g	1.04	0.02
Magnesium	1.00	1.02	1.01	1.01	1.02 ^g	1.01	0.01
Beryllium	<0.0001 ^h		<0.0001 ^h	<0.0001 ⁱ		<0.0001	
Titanium	0.041 ^h		0.042 ^j	0.043 ^j	0.044 ^k	0.042	0.002
Vanadium	0.0028 ^l		0.0029 ^l	0.0030 ^l		0.0030	0.0005

Note: One laboratory reported a value of <0.001 % lead.

¹The 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.

²The 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 for samples 0.5 g or more. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.)

This Certificate of Analysis has undergone editorial revision to reflect program and organizational changes at NIST and at the Department of Commerce. No attempt was made to reevaluate the certificate values or any technical data presented on this certificate.

The technical and support aspects involved in the original certification and issuance of this SRM were coordinated through the Standard Reference Materials Program by R.E. Michaelis and R.A. Alvarez. Revision of this certificate was coordinated through the NIST Standard Reference Materials Program by P.A. Lundberg and N.M. Trahey.

Gaithersburg, MD 20899

Certificate Issue Date: 22 November 1999

See Certificate Revision History on Last Page

Thomas E. Gills, Director
Office of Measurement Services

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

METHODS/TECHNIQUES

Gravimetry - Silicon

Atomic absorption spectrometry - Iron, Copper, Manganese, Chromium, Nickel, Zinc, Magnesium

Photometry - Titanium, Vanadium

^aAlkali dissolution of the sample

^bSame value obtained by atomic absorption spectrometry

^cAcid dissolution of the sample

^d1,10 Phenanthroline spectrophotometry

^eElectrodeposition

^fAmmonium peroxydisulfate oxidation-titration with standard solution of sodium arsenite

^gTitration with EDTA

^hAtomic absorption spectrometry

ⁱFluorimetric with morin after extraction with acetylacetone-chloroform

^jDianthipyrylmethane spectrophotometry

^kH₂O₂ spectrophotometry

^lN-benzoyl-N-phenylhydroxylamine spectrophotometry

PLANNING, PREPARATION, TESTING, ANALYSIS

The material for this SRM was prepared under contract with NIST by the Aluminum Company of America, Alcoa Center, PA.

Homogeneity testing was performed by optical emission spectrometry at the Aluminum Company of America, Alcoa Center, PA, D.J. Levin and by R.K. Bell, Assistant Research Associate, ASTM-NIST Research Associate Program.

Cooperative analyses for certification were performed in the following laboratories:

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

Kaiser Aluminum and Chemical Corp., Pleasanton, CA, H.J. Seim, R.C. Calkins, G.M. Calkins, R.C. Kinnie, and J.R. Skarset.

Kaiser Aluminum and Chemical Corp., Ravenswood Works, Ravenswood, WV, J.M. Hunter and H.E. Newsome.

National Institute of Standards and Technology, R.K. Bell, Assistant Research Associate, ASTM-NIST Research Associate Program.

Reynolds Aluminum, Research and Development, Reynolds Metals Company, Richmond VA, W.E. Pilgram.

Certificate Revision History: 22 November 1999 (editorial revision); 15 March 1995 (editorial revision); 6 June 1980 (original certificate date).
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Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: Telephone (301) 975-6776 (select "Certificates"), Fax (301) 926-4751, e-mail srminfo@nist.gov, or via the Internet <http://ts.nist.gov/srm>.