



**Reference Materials for the Analysis
of Aluminum and Aluminum Alloys**

ALCOA SPECTROCHEMICAL STANDARDS

www.Alcoa.com/scs



**ISO/IEC 17025:2005
Accredited**

**Registered to
ISO 9001:2008**

Revision 11 - June 2011



ALCOA SPECTROCHEMICAL STANDARDS

FOR THE ANALYSIS OF ALUMINUM
AND ALUMINUM ALLOYS

ALCOA INC.
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Registered to ISO 9001:2008
by BSI Management Systems

Accredited to ISO/IEC 17025:2005

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GENERAL INFORMATION

[An Introduction to Alcoa](#)

Alcoa is the world's leading producer of aluminum and alumina, serving customers in the packaging, automotive, aerospace, construction and other markets with basic materials and a variety of fabricated and finished products. Alcoa's business is truly global, with more than 350 facilities around the world. Our mining, refining, smelting and manufacturing operations are located in 40 countries. Alcoa refines bauxite to alumina, smelts it to create raw aluminum, then fabricates it into a wide variety of products. Building on our fundamental strength as a supplier of primary aluminum and alumina, we've developed into a flexible, diversified manufacturer that is highly valued for materials science, process technology and product design capabilities. An integral and invaluable supplement to the capabilities of Alcoa's worldwide operations is the detailed experience of Alcoa's Spectrochemical Standards business personnel in the production and use of aluminum spectrochemical standards.

[Alcoa Spectrochemical Standards](#)

Alcoa spectrochemical standards are a necessary accompaniment to the spectrochemical methods developed and used by the aluminum industry. With more than 60 years of experience supplying aluminum alloy standards, Alcoa spectrochemical standards have become recognized for their uniformity and certification accuracy. Because many laboratories depend on Alcoa standards, a quantity and variety of standards are maintained to meet customer demands. Should the standards listed in the catalog not meet the specific requirements of a particular customer, Alcoa experts may suggest alternative standards or the purchase of specialty

standards made to the customer's own specifications. This catalog lists the standards available at the time of printing. However, Alcoa reserves the right to discontinue any standard, to limit the quantity supplied to any customer, to modify compositions within registered alloy limits and to change prices at any time.

[Applications and Limitations of Alcoa Spectrochemical Standards](#)

Alcoa spectrochemical standards are intended primarily for use in methods employing point-to-plane spark excitation and chill-cast sample disks as described in certain ASTM procedures. Because of the effects of macro and micro segregation and structure on spectral behavior in these methods, metal in any other form (ingot, sheet, extrusion, castings, etc.) should be remelted and cast in disk form prior to analysis. Some exceptions to this rule may be made in determining minor impurities or in any analysis where errors arising from structural or segregation effects can be tolerated. The magnitude of such errors is difficult to predict and should be determined experimentally for each situation. Alcoa recognizes that the compositional uniformity and accuracy of certification may make these standards useful in the calibration and control of other analytical methods including classical wet chemical approaches, inductively coupled plasma, X-ray fluorescence spectrometry, etc. To support these methods, all standards included in the catalog are available as lathe turnings in 100 gram bottles. Regardless of the methods employed, it is recommended that the zone lying within a 12 mm radius of the center of the specimen be avoided because of the slight segregation that occurs (rather rarely) in that zone.

[Form, Preparation, and Certification](#)

Standards are prepared in the form of 64mm diameter, circular disks. Thickness is approximately 25mm, with the few exceptions indicated in the catalog listings. All standards are stenciled to show catalog number, production lot and section number. Metallurgical structure is controlled to produce spectral behaviors matching that of chill-cast disks when used according to the methods cited. Most of the standards for hypoeutectic aluminum-silicon alloys such as 356 are modified by the addition of strontium to the melts. Compositions are determined using two or more independent analytical methods which may include wet chemical analysis, inductively-coupled plasma, X-ray fluorescence, point-to-plane spark excitation, glow discharge mass spectrometry or other approaches deemed appropriate for a specific application. All standards are evaluated for uniformity both within and among specimens by extensive spectrochemical testing. Spectral behavior is measured by comparison with Alcoa master standards. Extensive statistical analysis is used to ensure the accuracy of the final composition certification, the chemical and physical uniformity, and the performance of the standards in use.

GENERAL INFORMATION

[Traceability to National Institute of Standards and Technology](#)

During the certification process NIST traceable standards, both solid and liquid, are employed, as well as NIST traceable weights for the calibration of balances used both in the standards production and the analytical methods used for certification. All standard certification documentation contain the following statement of traceability: "These certified reference materials (CRM's) are prepared and certified for the spectrochemical analyses of aluminum alloys using methodology similar to that described in ASTM methods E716 and E1251. All certifications are produced using at least two independent methods and detailed statistical analysis to assure homogeneity. Traceability to the National Institute of Standards and Technology (NIST) is maintained through the use of NIST standard reference materials (SRM) or reference materials directly traceable to NIST SRMs. Balances used during production and analyses are calibrated with and traceable to NIST standard weight sets."

[Limits of Uncertainty](#)

The certified values reported on the certificate of analysis are generally weighted mean values from analysis of representative samples, using at least two independent analytical methods. The given limits of uncertainty represent a combined uncertainty and seek to estimate, with a 95% confidence level, a range in which the true value may be expected to lie. While the homogeneity of the ingots and the mean values given as the certified compositions are determined using rigorous statistical techniques, the cited uncertainties represent not only this statistical treatment but also estimates of bias based on

extensive historical data and technical judgment. The uncertainties cited represent an expanded uncertainty given by $U=ku_c$ where u_c represents the combined standard uncertainty and k is a coverage factor chosen to represent a desired level of confidence. For this application $k=2$ and U expresses an estimate of a 95% confidence level. The use of this expression is consistent with guidelines given in the ISO document "Guide to The Expression of Uncertainty in Measurement" and NIST Technical Note 1297 "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results". In some cases no uncertainty is given because of limited data or the lack of a second independent measure. No uncertainties are provided for estimated compositions, i.e. bracketed numbers.

[Selection of Standards](#)

Tables 1 through 16 list standards classified by alloy using Aluminum Association designations when available and Alcoa designations in other cases. Under each alloy are listed those standards specifically prepared for that alloy. Among them, one will have a catalog number consisting of "SS" followed by the alloy designation. This SS standard has a composition typical of the alloy and is used both in the preparation of analytical curves and for the periodic adjustment of these curves. When only an SS standard is listed, it is to be assumed that the analytical curves can be established by this SS standard and a combination of standards of other alloys for which standards are listed or from the standards listed for single elements in Table 16. Range standards for wrought alloys are identified with a two letter prefix beginning with W (WA, WB, etc.). Range standards for casting alloys have a two letter prefix beginning with K (KA, KB, etc.). Table 16 includes standards for use in preparing calibration

curves and for a number of elements not adequately covered by the alloy standards in Tables 1 through 13. Compositions listed in this catalog are only approximate since successive lots under a given catalog number vary to some degree. The composition specifically applying to a given standard section is furnished when the standard is shipped. Certified compositions are usually reported utilizing the Aluminum Association rules for reporting compositions. Concentrations listed in parentheses are considered reference values only and are not certified.

GENERAL INFORMATION

[Trace Metal Standards](#)

Alcoa Trace Metal Standards supplement our regular alloy standards and are made with 99.999% pure aluminum. A unique method for trace metal additions allows alloys to be produced with highly controlled trace metal concentrations. Trace metal concentrations have been picked to provide both low end calibration points (<0.0001%) and points that are typical for trace metal content and that can be measured with good precision and accuracy by today's instrumentation. Table 14 provides a list of trace metal standards along with typical concentrations. Actual concentrations may vary from those shown but will always be certified using a combination of analytical techniques including Optical Emission Spectrometry, Inductively Coupled Plasma Spectrometry, Glow Discharge Mass Spectrometry, and other appropriate techniques.

For some of the most sought after aluminum standards, our nominal alloy standard has been modified to include trace metals of interest. Standards designated by the prefix "ST" have been made to be similar to a specific alloy family which is indicated by the number following the "ST" designation, e.g. ST1-1050. Note: Values given as less than, denoted by "<", indicate that those elements are typically below this value. No attempt is made to modify the base metal composition for these elements. However, these elements will be certified to the actual composition observed. Actual compositions may vary either above or below those indicated.

[Drift Correction Standards](#)

Table 15 shows a series of standards used for ongoing drift correction when instruments are kept in continuous calibration for a variety of alloys. These "SQ" standards do not correspond to any particular alloy matrix, and their structures may not match that of chill cast disks. Their recommended use is to provide reproducible spectral intensities for drift correction and their relationship to analytical curves must be determined by the user under the particular conditions of use. The compositions are designed to provide convenient check points on a large number of analytical curves with a minimum of tests. They are checked carefully for reproducibility of spectral response but are not certified with respect to true composition. Only approximate values such as given in Table 15 will be issued with these standards.

[Standards for Chemical Analysis](#)

With the proliferation of techniques such as inductively coupled plasma spectrometry and X-ray fluorescence spectrometry, Alcoa recognizes the need to supply its standards in a form more suitable for use with these and similar techniques. All standards in the catalog are available in lathe turnings for subsequent dissolution. Other sizes may be available upon special request.

[Specialty Standards](#)

Every effort is made to supply our customers with a wide variety of alloy standards. However, in order to serve our customers' needs, standards can be made to customer specifications and target compositions. These specialty standards are made to the same exacting quality as our catalog standards. (Minimum order quantities are required.) Experts in the production and use of Alcoa Spectrochemical Standards are available to discuss special needs at the phone numbers listed in the section on Purchase Procedures in this catalog.

[ASTM References](#)

"Standard Method for Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Argon Atmosphere, Point-To-Plane, Unipolar Self- Initiating Capacitor Discharge," ASTM Designation E1251.

"Standard Practices for Sampling Aluminum and Aluminum Alloys for Spectrochemical Analysis," ASTM Designation E716.

PURCHASE PROCEDURE

Where to Order

All orders can be placed through:

Alcoa Inc.

Analytical Chemistry Division

100 Technical Drive

Alcoa Center, PA 15069-0001 USA

Telephone: (724) 337-5816 or 1-800-858-4638

Fax: (724) 337-4090

Email: <mailto:standards@alcoa.com>

Wording of Orders

All orders for spectrochemical standards must include the following:

1. Customer order number and date
2. Address for invoicing
3. Address for shipping
4. Name and address of person to receive letter of standard composition.
5. Description of required standards including catalog number.
6. Additional Information:
 - a. State whether partial shipments are permitted.
 - b. Indicate taxes, shipping date, etc. as required.

Purchase orders must be mailed, Emailed or faxed prior to order processing. Verbal orders will not be accepted.

Pricing and Shipping

Prices are quoted by the sales office and are subject to change without notice. Standards are shipped F.O.B. destination via U.P.S. (domestic sales only). Requests of special handling on domestic orders and for shipments outside the United States will be subject to the discretion of Alcoa. Permission for partial shipment will insure prompt delivery of available standards in case some of the standards are out of stock. This catalog lists the standards available at this printing, but Alcoa reserves the right to discontinue any standard, to limit the quantity supplied to any customer, to modify compositions within registered alloy limits and to change prices at any time.

***American Express,
VISA, and MasterCard
Accepted***

Inquiries and Technical Assistance

It is urged that inquiry be made before placing an order if the availability, description, and applicability of the standards are not clear. Experts in the production and application of standards are available to assist on technical questions concerning the use of Alcoa standards and the analysis of aluminum and its alloys. Inquiries for technical assistance can be placed to the following:

Phone: (724) 337-5816 or 1-800-858-4638

Fax: (724) 337-4090

Email: standards@alcoa.com

Visit us on the web at:

www.alcoa.com/scs

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ACCREDITATIONS

ISO/IEC 17025: 2005

The testing methods used during the certification process have been accredited by the American Association of Laboratory Accreditation (A2LA) to the ISO 17025:2005 international standard for 'General Requirements for the Competence of Testing and Calibration Laboratories'. The accreditation also meets the requirements for the International Laboratory Accreditation Cooperation (ILAC) for ISO 17025:2005. As a consequence, the certificate of analysis for standards certified after August 2010 include the A2LA and ILAC logos. Our testing certificate number is [1019.01](#).

Scope

Spectrochemical Standards Analysis by Optical Emission Spectrometry (OES) by ASTM Test Methods E1251 and E716 performed by Analytical Chemistry and Physical Testing, Alcoa Technical Center is ISO/IEC 17025 Accredited by the American Association for Laboratory Accreditation (A2LA).

Spectrochemical Standards Analysis by Inductively Coupled Plasma (ICP) by AC&PT SOPs SCS ICP SSOP-SCS-ICP-1, -2, -3, -4, -5, and -6 performed by Analytical Chemistry and Physical Testing, Alcoa Technical Center is ISO/IEC 17025 Accredited by the American Association for Laboratory Accreditation (A2LA).



ISO 9001:2008

The scope of this ISO 9001:2008 quality system at the Alcoa Technical Center (ATC) includes administrative activities as well as the production and certification of Spectrochemical Standards. The operations process begins in the casting department where ingots are composed of various aluminum alloys. Then the process moves to the machine shop where the ingots are scalped, cut into sections, faced, and stenciled. After the sections are machined, they are then certified using Optical Emission Spectrometry and Inductively Coupled Plasma (ICP) analysis.

The quality system is designed with controls that assure that product quality meets or exceeds the requirements and expectations of our customers. It provides for the prevention of nonconforming product, early detection of discrepancies and corrective action to assure consistent delivery of quality product.

Scope

Alcoa Spectrochemical Standards holds certificate number [FM 535914](#) and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope: Manufacture and supply of Spectrochemical Standards.





**Table 1 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
HIGH PURITY ALUMINUM**



Typical Analysis - Weight Percent																	
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca	
1000	SS-1000*	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
	WA-1000	0.10x	0.10x	0.01x	0.01x	0.01x	0.01x	0.01x	0.01x	0.01x					0.01x		
	WB-1000	0.10x	0.10x	0.03x	0.03x	0.03x	0.03x	0.03x	0.03x	0.03x	0.03x				0.03x		
	WC-1000	0.10x	0.10x	0.08x	0.08x	0.08x	0.08x	0.08x	0.08x	0.08x	<0.0010	<0.0010	<0.0010	<0.0005	0.08x	<0.0005	
	WD-1000	0.004x	0.004x	0.004x	0.004x	0.004x	0.004x	0.004x	0.004x	0.004x	0.004x					0.004x	
	WE-1000	0.01x	0.01x	0.01x	0.01x	0.01x	0.01x	0.01x	0.01x	0.01x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	0.01x	<0.0005
	SS-1050	0.12x	0.30	0.04x	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.001x	0.008x	<0.0005	0.0005	0.001x	<0.0005
	SS-1075	0.07x	0.12x	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.003x	<0.0005	<0.0005	0.0015	<0.0005	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
1000	SS-1000*	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	WA-1000							0.01x			0.01x		0.01x	
	WB-1000							0.03x			0.03x		0.02x	
	WC-1000	<0.0010	<0.0010	0.02	<0.0005	<0.0005	<0.0010	0.08x	<0.0010	<0.0010	0.08x	<0.0010	0.04x	<0.0030
	WD-1000			0.004x				0.004x			0.004x		0.004x	
	WE-1000	<0.0010	<0.0010	0.01x	<0.0005	<0.0005	<0.0010	0.01x	<0.0010	<0.0010	0.01x	<0.0010	0.01x	<0.0030
	SS-1050	0.001x	0.001x	0.02x	<0.0005	<0.0005	<0.0005	<0.003x	0.001x	<0.0005	<0.001x	0.001x	0.01x	0.001x
	SS-1075	0.003x	0.003x	0.02x	<0.0005	<0.0005	<0.0005	<0.003x	0.003x	<0.0005	<0.001x	0.003x	0.03x	0.003x

*SS-1000 is greater than 99.999% pure.

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 2 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
11XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
1100	SS-1100	0.18x	0.50	0.15x	0.04x	0.03x	<0.0050	<0.0050	0.08x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-1100	0.12x	0.30	0.20x	0.08x	0.05x	<0.0050	<0.0050	0.02x	0.04x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WB-1100	0.22x	0.60	0.10x	0.02x	0.01x	<0.0050	<0.0050	0.04x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
1188	SS-1188	0.04x	0.06x	<0.0050	0.005x	0.01x	<0.0050	<0.0050	0.01x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
1199	WA-1199	0.002x	0.002x	0.001x	0.001x	0.001x	0.001x	0.001x	0.001x	0.001x	0.001x		<0.0010	0.0005	0.001x	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
1100	SS-1100	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-1100	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WB-1100	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
1188	SS-1188	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0010
1199	WA-1199	0.001x	0.001x	0.001x	<0.0005	<0.0005		0.003x	0.001x		0.001x	<0.0010	0.001x	0.001x

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 3 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
2XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
2011	SS-2011	0.30	0.55	5.5x	0.04x	0.04x	0.04x	0.04x	0.10x	<0.0050	<0.0010	<0.0010	<0.0010	<0.0005	0.50	<0.0005
	WA-2011	0.20x	0.70	4.9x	0.06x	0.02x	0.06x	0.02x	0.15x	<0.0050	<0.0010	<0.0010	<0.0010	<0.0005	0.60	<0.0005
	WB-2011	0.40	0.25	6.0x	0.02x	0.06x	0.02x	0.06x	0.05x	<0.0050	<0.0010	<0.0010	<0.0010	<0.0005	0.40	<0.0005
2014	SS-2014	1.0x	0.50	4.5x	0.80	0.55	0.04x	0.04x	0.12x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
2017	SS-2017	0.60	0.45	4.0x	0.60	0.60	0.05x	0.03x	0.07x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-2017	0.75	0.65	3.5x	0.40	0.75	0.02x	0.06x	0.03x	0.05x						
2018	SS-2018	0.70	0.40	4.2x	0.05x	0.65	0.05x	2.1x	0.12x	0.04x	<0.0010	<0.0010	<0.0010	<0.0005	0.05x	<0.0005
2024	SS-2024	0.20x	0.35	4.6x	0.65	1.6x	0.06x	0.04x	0.10x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-2024	0.30	0.30	4.0x	0.70	1.6x	0.06x	0.04x	0.06x	0.03x				0.001x		
	WB-2024	0.30	0.30	5.0x	0.70	1.6x	0.06x	0.04x	0.25	0.03x				0.000x		
2024	WE-2024	0.45	0.20x	4.6x	0.45	1.6x	0.10x	0.02x	0.25	0.01x				0.007x		
	WF-2024	0.15x	0.45	4.6x	0.80	1.6x	0.02x	0.07x	0.03x	0.06x				0.002x		

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
2011	SS-2011	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.50	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-2011	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.40	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WB-2011	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.60	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
2014	SS-2014	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
2017	SS-2017	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-2017			0.02x									0.01x	
2018	SS-2018	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.05x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
2024	SS-2024	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-2024													
	WB-2024													
2024	WE-2024													
	WF-2024													

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 3 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
2XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
2025	SS-2025	0.80	0.55	4.6x	0.80	0.05x	0.04x	0.04x	0.10x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
2117	SS-2117	0.50	0.40	2.6x	0.05x	0.30	0.03x	0.03x	0.05x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
2219	SS-2219	0.15x	0.20x	6.3x	0.28	0.02x	0.01x	0.01x	0.03x	0.06x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
2324	SS-2324	0.05x	0.05x	4.2x	0.50	1.5x	0.01x	0.01x	0.01x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
2618	SS-2618	0.20x	1.2x	2.2x	0.05x	1.6x	<0.0050	1.1x	0.05x	0.07x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
2025	SS-2025	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
2117	SS-2117	<0.0010	<0.0010	0.02	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
2219	SS-2219	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.12x	0.16x
2324	SS-2324	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
2618	SS-2618	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 4 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
3XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
3003	SS-3003	0.20x	0.50	0.15x	1.2x	0.03x	<0.0050	<0.0050	0.08x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-3003	0.40	0.65	0.09x	0.95	0.01x	0.03x	0.03x	0.05x	0.03x	<0.0010	<0.0010	<0.0010	0.001x	<0.0010	<0.0005
	WB-3003	0.15x	0.30	0.20x	1.5x	0.05x	<0.0050	<0.0050	0.02x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
3004	SS-3004	0.18x	0.50	0.15x	1.2x	1.1x	<0.0050	<0.0050	0.05x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-3004	0.22x	0.60	0.10x	1.0x	1.3x	0.01x	0.01x	0.15x	<0.0050	<0.0010	<0.0010	<0.0010	<0.0005	0.005x	<0.0005
	WB-3004	0.10x	0.40	0.20x	1.4x	0.90	0.02x	0.02x	0.10x	0.05x					0.002x	
3005	SS-3005	0.22x	0.60	0.15x	1.2x	0.40	0.02x	0.01x	0.03x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
3102	SS-3102	0.25	0.45	0.07x	0.18x	0.02x	0.02x	0.02x	0.10x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
3105	SS-3105	0.20x	0.50	0.15x	0.40	0.50	0.05x	0.02x	0.20x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
3003	SS-3003	<0.0005	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.001x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-3003	0.001x	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.006x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WB-3003	0.003x	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
3004	SS-3004	<0.0005	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.001x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-3004	0.001x	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.006x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WB-3004	0.003x		0.02x				0.02x					0.01x	
3005	SS-3005	<0.0005	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
3102	SS-3102	<0.0005	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.001x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
3105	SS-3105	<0.0005	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.001x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 5 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
4XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
4032	SS-4032	12.2	0.30	0.90	0.03x	1.1x	0.05x	0.90	0.10x	0.10x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
4032	SS-4032	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	0.02x	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 6 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
5XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
5005	SS-5005	0.15x	0.50	0.06x	0.03x	0.85	0.02x	0.02x	0.06x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-5005	0.12x	0.55	0.03x	0.01x	0.35	0.01x	0.01x	0.03x	0.01x					0.03x	
5042	SS-5042	0.10x	0.23x	0.03x	0.30	3.5x	<0.0050	<0.0050	0.01x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5050	SS-5050	0.18x	0.45	0.05x	0.04x	1.4x	0.03x	0.03x	0.04x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5052	SS-5052	0.15x	0.20x	0.06x	0.05x	2.6x	0.25	0.05x	0.08x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-5052	0.25	0.10x	0.10x	0.02x	2.2x	0.30	0.01x	0.12x	<0.0050						
	WB-5052	0.08x	0.30	0.02x	0.10x	2.8x	0.15x	0.03x	0.03x	0.03x						
5056	SS-5056	0.15x	0.20x	0.08x	0.10x	5.3x	0.11x	0.05x	0.05x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-5056	0.15x	0.20x	0.08x	0.10x	4.7x	0.11x	0.05x	0.05x	<0.0050				0.0001		
	WB-5056	0.15x	0.20x	0.08x	0.10x	5.8x	0.11x	0.05x	0.05x	<0.0050				0.003x		
	WC-5056	0.25	0.40	0.01x	0.05x	5.3x	0.20x	0.02x	0.02x	<0.0050	<0.0010	<0.0010	<0.0010	0.008x	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
5005	SS-5005	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-5005							0.03x			0.01x		0.01x	
5042	SS-5042	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5050	SS-5050	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5052	SS-5052	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-5052													
	WB-5052													
5056	SS-5056	<0.0010	<0.0010	0.02x	<0.0010	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-5056			0.02x									0.01x	
	WB-5056			0.02x									0.01x	
	WC-5056	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.08x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 6 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
5XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
5082	SS-5082	0.12x	0.25	0.04x	0.04x	4.5x	0.04x	0.01x	0.04x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5083	SS-5083	0.15x	0.20x	0.05x	0.80	4.5x	0.10x	0.01x	0.05x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5086	SS-5086	0.15x	0.25	0.05x	0.50	4.0x	0.12x	0.03x	0.05x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5154	SS-5154	0.15x	0.25	0.05x	0.03x	3.6x	0.25	0.03x	0.05x	0.08x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5182	SS-5182	0.15x	0.20x	0.05x	0.35	4.6x	0.03x	0.02x	0.05x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-5182	0.20x	0.30	0.01x	0.30	4.8x	0.05x	0.01x	0.02x	0.04x	<0.0010	<0.0010	<0.0010	0.001x	<0.0010	<0.0005
	WB-5182	0.08x	0.10x	0.07x	0.45	4.4x	0.01x	0.04x	0.10x	0.01x	<0.0010	<0.0010	<0.0010	0.001x	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
5082	SS-5082	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5083	SS-5083	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5086	SS-5086	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5154	SS-5154	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5182	SS-5182	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.001x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-5182	0.003x	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WB-5182	0.001x	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.006x	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 6 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
5XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
5252	SS-5252	0.03x	0.05x	0.04x	0.01x	2.5x	<0.0050	<0.0050	0.01x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5357	SS-5357	0.05x	0.08x	0.08x	0.25	1.1x	0.01x	0.01x	0.02x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
5454	SS-5454	0.15x	0.20x	0.07x	0.80	2.8x	0.10x	0.01x	0.05x	0.04x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-5454	0.08x	0.10x	0.02x	0.50	2.5x	0.05x	0.03x	0.15x	0.02x	<0.0010	<0.0010	<0.0010	0.001x	<0.0010	<0.0005
5456	SS-5456	0.15x	0.02x	0.06x	0.80	5.2x	0.10x	0.01x	0.05x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-5456	0.10x	0.25	0.10x	0.50	5.5x	0.15x	0.01x	0.25	0.05x	<0.0010	<0.0010	<0.0010	0.001x	<0.0010	<0.0005
5657	SS-5657	0.04x	0.06x	0.04x	0.02x	0.80	0.01x	0.01x	0.02x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
5252	SS-5252	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0030
5357	SS-5357	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5454	SS-5454	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-5454	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5456	SS-5456	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-5456	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
5657	SS-5657	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

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**Table 7 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
6000 ALLOYS RANGE STANDARDS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
6000 Range Standards	WA-6000	0.60	0.30	0.10x	0.03x	0.45	0.03x	0.03x	0.03x	0.03x						
	WB-6000	0.60	0.30	0.10x	0.03x	0.60	0.03x	0.03x	0.03x	0.03x						
	WC-6000	0.60	0.30	0.10x	0.03x	0.75	0.03x	0.03x	0.03x	0.03x						
	WD-6000	0.60	0.30	0.10x	0.03x	0.95	0.03x	0.03x	0.03x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WF-6000	0.60	0.30	0.10x	0.03x	1.2x	0.03x	0.03x	0.03x	0.03x						
	WG-6000	0.60	0.30	0.10x	0.03x	1.4x	0.03x	0.03x	0.03x	0.03x						
	WH-6000	0.25	0.30	0.10x	0.03x	0.90	0.03x	0.03x	0.03x	0.03x						
	WJ-6000	0.35	0.30	0.10x	0.03x	0.90	0.03x	0.03x	0.03x	0.03x						
	WK-6000	0.50	0.30	0.10x	0.03x	0.90	0.03x	0.03x	0.03x	0.03x						
	WL-6000	0.70	0.30	0.10x	0.03x	0.90	0.03x	0.03x	0.03x	0.03x						

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
6000 Range Standards	WA-6000													
	WB-6000													
	WC-6000													
	WD-6000	<0.0010	<0.0010	<0.020	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.015	<0.0030
	WF-6000													
	WG-6000													
	WH-6000													
	WJ-6000													
	WK-6000													
	WL-6000													

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 7 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
6000 ALLOYS RANGE STANDARDS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
6000 Range Standards	WM-6000	0.90	0.30	0.10x	0.03x	0.90	0.03x	0.03x	0.03x	0.03x						
	WP-6000	1.3x	0.30	0.10x	0.03x	0.90	0.03x	0.03x	0.03x	0.03x						
	WR-6000	0.60	0.25	0.02x	0.08x	0.90	0.01x	0.05x	0.08x	0.03x						
	WS-6000	0.60	0.35	0.05x	0.02x	0.90	0.03x	0.01x	0.04x	0.08x						
	WT-6000	0.60	0.15x	0.10x	0.04x	0.90	0.08x	0.03x	0.02x	0.01x						
	WU-6000	0.60	0.65	0.18x	0.04x	0.90	0.35	0.03x	0.15x	0.02x						
	WV6000	0.60	0.80	0.30	0.15x	0.90	0.15x	0.01x	0.08x	0.10x						
	WW-6000	0.60	0.50	0.45	0.08x	0.90	0.25	0.05x	0.04x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WX-6000	0.42	0.20x	0.03x	0.02x	0.65	0.32	0.01x	0.02x	0.01x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
WZ-6000	0.40	0.15x	0.03x	0.01x	0.70	<0.0050	<0.0050	<0.0050	<0.0050			<0.0005				

Typical Analysis - Weight Percent															
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr	
6000 Range Standards	WM-6000														
	WP-6000														
	WR-6000														
	WS-6000														
	WT-6000														
	WU-6000														
	WV6000														
	WW-6000	<0.0010	<0.0010	<0.020	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.015	<0.0030
	WX-6000	<0.0010	<0.0010	<0.020	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.015	<0.0030
WZ-6000													0.005x		

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 7 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
6XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
6010	SS-6010	1.0x	0.25	0.32	0.32	0.80	0.04x	0.03x	0.12x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
6053	SS-6053	0.70	0.30	0.05x	0.02x	1.2x	0.25	0.03x	0.05x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
6061	SS-6061	0.65	0.35	0.30	0.05x	1.0x	0.23	0.05x	0.08x	0.04x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-6061	0.60	0.35	0.30	0.05x	1.0x	0.05x	0.05x	0.12x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
6063	SS-6063	0.48	0.25	0.06x	0.02x	0.65	0.02x	0.02x	0.05x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
6066	SS-6066	1.5x	0.35	1.0x	0.90	1.2x	0.03x	0.03x	0.10x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
6070	SS-6070	1.3x	0.25	0.30	0.70	0.80	0.06x	0.02x	0.15x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
6010	SS-6010	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6053	SS-6053	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6061	SS-6061	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-6061	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6063	SS-6063	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6066	SS-6066	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6070	SS-6070	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



Table 7 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
6XXX ALLOYS



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
6101	WZ-6000	0.40	0.15x	0.03x	0.01x	0.70	<0.0050	<0.0050	<0.0050	<0.0050			<0.0005			
6151	SS-6151	1.0x	0.45	0.25	0.06x	0.65	0.22x	0.04x	0.08x	0.03x	<0.0010	<0.0010	<0.001	<0.0005	<0.0010	<0.0005
6201	SS-6201	0.75	0.25	0.03x	0.01x	0.75	<0.0050	<0.0050	0.02x	<0.0050	<0.0010	<0.0010	0.02x	<0.0005	<0.0010	<0.0005
6253	SS-6253	0.70	0.25	0.05x	0.02x	1.3x	0.22x	0.01x	2.0x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
6262	SS-6262	0.60	0.35	0.30	0.05x	1.0x	0.04x	0.03x	0.05x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	0.58	<0.0005
6351	SS-6351	1.0x	0.30	0.05x	0.70	0.65	0.03x	0.02x	0.03x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
6951	SS-6951	0.40	0.40	0.30	0.03x	0.70	0.02x	0.02x	0.10x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
6101	WZ-6000			0.02x									0.005x	
6151	SS-6151	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6201	SS-6201	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0030
6253	SS-6253	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6262	SS-6262	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	0.58	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6351	SS-6351	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
6951	SS-6951	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 8 - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
7XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
7001	SS-7001	0.10x	0.15x	2.1x	0.04x	3.1x	0.21x	0.01x	7.6x	0.03x	<0.0010	<0.0010	<0.0010	0.003x	<0.0010	<0.0005
7005	SS-7005	0.15x	0.20x	0.10x	0.50	1.3x	0.10x	0.02x	4.5x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
7021	SS-7021	0.12x	0.30	0.08x	0.05x	1.5x	0.03x	<0.0050	5.4x	0.04x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
7029	SS-7029	0.10x	0.10x	0.75	0.02x	1.7x	<0.0050	<0.0050	4.8x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
7039	SS-7039	0.15x	0.20x	0.08x	0.25	3.0x	0.20x	0.02x	4.0x	0.05x	<0.0010	<0.0010	<0.0010	0.003x	<0.0010	<0.0005
7046	SS-7046	0.12x	0.14x	0.15x	0.20x	1.3x	0.10x	<0.0050	7.1x	0.04x	<0.0010	<0.0010	<0.0010	0.002x	<0.0010	<0.0005
7050	SS-7050	0.08x	0.15x	2.4x	0.03x	2.3x	0.02x	0.02x	6.2x	0.04x	<0.0010	<0.0010	<0.0010	0.001x	<0.0010	<0.0005
7072	SS-7072	0.14x	0.28	0.03x	0.04x	0.03x	0.03x	0.03x	1.1x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
7075	SS-7075	0.16x	0.25	1.6x	0.08x	2.6x	0.22x	<0.0050	5.8x	0.04x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	WA-7075	0.15x	0.25	1.2x	0.10x	2.6x	0.25	<0.0050	5.8x	0.05x	<0.0010	<0.0010	<0.0010	0.001x	<0.0010	<0.0005
	WB-7075	0.15x	0.25	2.0x	0.10x	2.6x	0.25	<0.0050	5.8x	0.05x				0.002x		
	WC-7075	0.15x	0.25	1.6x	0.10x	2.2x	0.25	<0.0050	5.8x	0.05x	<0.0010	<0.0010	<0.0010	0.004x	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
7001	SS-7001	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
7005	SS-7005	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	0.14x
7021	SS-7021	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	0.13x
7029	SS-7029	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.02x	<0.0030
7039	SS-7039	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
7046	SS-7046	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	0.12x
7050	SS-7050	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	0.12x
7072	SS-7072	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
7075	SS-7075	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WA-7075	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	WB-7075													
	WC-7075	<0.0010	<0.0010	0.02x	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 8 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR WROUGHT ALLOYS
7XXX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
7075	WD-7075	0.15x	0.25	1.6x	0.10x	2.9x	0.25	<0.0050	5.8x	0.05x				0.004x		
	WE-7075	0.15x	0.25	1.6x	0.10x	2.6x	0.25	<0.0050	5.3x	0.05x				<0.0005		
	WF-7075	0.15x	0.25	1.6x	0.10x	2.6x	0.25	<0.0050	6.2x	0.05x				<0.0005		
	WG-7075	0.30	0.15x	1.6x	0.20x	2.6x	0.18x	<0.0050	5.8x	0.08x				0.001x		
	WH-7075	0.10x	0.35	1.6x	0.03x	2.6x	0.30	<0.0050	5.8x	0.01x				0.008x		
	SS-7047	0.04x	0.05x	0.02x	0.02x	1.5x	0.01x	<0.0050	7.5x	0.03x	0.37x	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
7076	SS-7076	0.15x	0.35	0.65	0.55	1.7x	0.02x	0.02x	7.6x	0.05x	<0.0010	<0.0010	<0.0010	0.002x	<0.0010	<0.0005
7079	SS-7079	0.15x	0.22x	0.65	0.20x	3.5x	0.16x	<0.0050	4.6x	0.03x	<0.0010	<0.0010	<0.0010	0.003x	<0.0010	<0.0005
7085	SS-7085	0.03x	0.05x	1.65	0.02x	1.5x	0.02x	<0.0050	7.5x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
7178	SS-7178	0.15x	0.20x	2.0x	0.08x	2.9x	0.25	0.02x	6.8x	0.05x	<0.0010	<0.0010	<0.0010	0.0001	<0.0010	<0.0005

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
7075	WD-7075													
	WE-7075													
	WF-7075													
	WG-7075													
	WH-7075													
	SS-7047	<0.0010	<0.0010	0.01	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.01x
7076	SS-7076	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
7079	SS-7079	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
7085	SS-7085	<0.0010	<0.0010	0.02	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	0.11x
7178	SS-7178	<0.0010	<0.0010	0.015	<0.0005	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 9 - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
2XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
206	SS-206	0.06x	0.08x	4.6x	0.35	0.28	0.01x	0.01x	0.03x	0.20x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
208	SS-208	3.0x	0.60	4.0x	0.15x	0.05x	<0.0050	0.08x	0.15x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
213	KA-213	2.0x	1.0x	7.0x	0.30	0.05x	<0.0050	0.20x	1.0x	0.05x						
	KB-213	3.5x	1.0x	7.0x	0.35	0.15x	<0.0050	0.30	1.2x	0.10x						
222	KA-222	0.75	1.0x	10.0	0.15x	0.30	<0.0050	0.15x	0.25	0.10x						
224	REFER TO ALLOY 2219															
238	SS-238	4.0x	1.0x	10.2	0.20x	0.30	<0.0050	0.20x	0.20x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
242	SS-242	0.50	0.55	4.0x	0.08x	1.5x	0.03x	2.0x	0.10x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-242	0.25	0.40	3.6x	0.02x	1.8x	<0.0050	2.2x	0.03x	0.06x					0.02x	
	KB-242	0.40	0.20x	4.4x	0.05x	1.2x	<0.0050	1.8x	0.05x	0.15x					0.05x	
A242	SS-A242	0.30	0.45	4.1x	0.05x	1.6x	0.20x	2.0x	0.10x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
206	SS-206	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	0.02x	<0.0010	0.01x	<0.0030
208	SS-208	<0.0010	<0.0010	0.012	<0.0010	<0.0010	<0.0010	0.10x	<0.0010	<0.0010	0.10x	<0.0010	0.01x	0.04x
213	KA-213										0.55			
	KB-213													
222	KA-222							0.20x			0.12x			
224	REFER TO ALLOY 2219													
238	SS-238	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
242	SS-242	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
	KA-242							0.02x			0.02x			
	KB-242							0.05x			0.05x			
A242	SS-A242	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 9 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
2XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
295	SS-295	0.90	0.70	4.5x	0.12x	0.05x	<0.0050	0.05x	0.10x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-295	0.55	1.0x	4.1x	0.10x	0.01x	<0.0050	0.02x	0.15x	0.07x						
	KB-295	1.3x	0.35	4.9x	0.03x	0.01x	<0.0050	0.08x	0.05x	0.17x						
296	SS-296	2.8x	0.60	4.5x	0.20x	0.06x	<0.0050	0.15x	0.25	0.10x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
295	SS-295	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	0.003x	<0.0010	0.01x	<0.0030
	KA-295							0.02x			0.004x			
	KB-295							0.05x			0.01x			
296	SS-296	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	0.01x	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 10 - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
3XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
305	REFER TO KC-355															
308	SS-308	5.5x	0.65	4.5x	0.10x	0.08x	<0.0050	0.10x	0.25	0.06x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
319	SS-319	6.2x	0.85	3.8x	0.40	0.10x	0.01x	0.20x	0.35	0.15x	<0.0010	<0.0010	<0.0010	<0.0005	0.05x	<0.0030
332	SS-332	9.2x	0.70	3.2x	0.25	1.0x	<0.0050	0.50	0.25	0.14x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
336	SS-336	12.0	0.65	1.0x	0.06x	1.2x	<0.0050	2.5x	0.05x	0.04x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-A332	12.4	0.50	1.0x	0.06x	<0.0050	<0.0050	2.7x	<0.0050	0.06x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
354	SS-354	9.0x	0.15x	1.8x	0.05x	0.55	0.01x	0.01x	0.05x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
355	SS-355	5.1x	0.35	1.3x	0.08x	0.54	0.04x	0.05x	0.10x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-355	4.5x	0.65	1.0x	0.05x	0.63	0.01x	0.03x	0.05x	0.18x						
	KB-355	5.5x	0.15x	1.5x	0.15x	0.40	0.02x	0.01x	0.15x	0.08x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KC-355	5.0x	0.15x	1.3x	0.08x	0.03x	0.03x	0.05x	0.03x	0.12x						
356	SS-356	7.1x	0.35	0.12x	0.05x	0.35	<0.0050	0.03x	0.10x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
305	REFER TO KC-355													
308	SS-308	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
319	SS-319	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	0.20x	<0.0010	<0.0010	0.20x	0.02x	0.02x	<0.0030
332	SS-332	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	0.10x	<0.0010	<0.0010	0.10x	0.02x	0.02x	<0.0030
336	SS-336	<0.0010	<0.0010	0.015	<0.0010	<0.0010	0.003x	<0.0030	0.001x	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	KA-A332	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	0.005x	<0.0030	0.003x	<0.0010	<0.0030	0.02x	0.01x	<0.0030
354	SS-354	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	0.02x	0.02x	0.01x	<0.0030
355	SS-355	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	KA-355											0.02x		
	KB-355	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	KC-355											0.02x		
356	SS-356	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



Table 10 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
3XX ALLOYS



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
A357 358 360	KA-356	6.5x	0.50	0.20x	0.03x	0.22x	<0.0050	<0.0050	0.18x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KB-356	7.5x	0.15x	0.05x	0.12x	0.45	<0.0050	<0.0050	0.04x	0.16x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KC-356	7.0x	0.08x	0.04x	0.02x	0.35	<0.0050	0.01x	0.03x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	SS-A357	7.1x	0.10x	0.05x	0.02x	0.60	0.02x	0.02x	0.03x	0.12x	<0.0010	<0.0010	<0.0010	0.06x	<0.0010	<0.0030
	KA-358	8.0x	0.20x	0.08x	0.05x	0.65	0.02x	0.02x	0.06x	0.12x				0.22		
	SS-360	9.6x	0.60	0.25	0.15x	0.55	<0.0050	0.17x	0.17x	0.06x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-360	10.0	0.35	0.40	0.10x	0.45	<0.0050	0.25	0.25	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KB-360	9.0x	1.0x	0.10x	0.25	0.65	<0.0050	0.10x	0.10x	0.10x						
	KC-360	9.6x	1.1x	0.30	0.15x	0.58	<0.0050	0.20x	0.25	0.02x						
	KD-360	9.0x	0.10x	0.75	0.05x	0.52	0.01x	0.02x	0.03x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
364	SS-364	8.8x	0.90	0.15x	0.06x	0.35	0.40	0.05x	0.05x	<0.0050	<0.0010	<0.0010	<0.0010	0.03x	<0.0010	<0.0030

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
A357 358 360	KA-356	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	0.003x	<0.0030	0.001x	<0.0010	<0.0030	0.05x	0.01x	<0.0030
	KB-356	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.06x	<0.0010	<0.0010	0.06x	0.02x	0.01x	<0.0030
	KC-356	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	SS-A357	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	KA358			0.02x								0.02x	0.01x	
	SS-360	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.05x	<0.0010	<0.0010	0.07x	0.02x	0.01x	<0.0030
	KA-360	<0.0010	<0.0010	<0.020	<0.0010	<0.0010	<0.0010	0.20x	<0.0010	<0.0010	0.03x	0.02x	<0.015	<0.0030
	KB-360							0.10x				0.10x	0.02x	
	KC-360											0.12x	0.02x	
	KD-360	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	0.003	<0.0030	0.1x	<0.0010	<0.0030	<0.0050	0.01x	<0.0030
364	SS-364	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	0.05x	0.02x	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 10 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
3XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
380	SS-380	8.9x	0.90	3.6x	0.40	0.20x	<0.0050	0.30	0.35	0.08x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-380	9.4x	1.1x	3.1x	0.15x	0.45	0.05x	0.45	0.15x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KB-380	7.6x	0.65	4.1x	0.60	0.05x	0.03x	0.10x	0.90	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	0.10x	<0.0030
	KC-380	9.0x	1.2x	3.6x	0.30	0.20x	0.06x	0.20x	0.60	0.07x						
	KD-380	9.2x	1.1x	3.6x	0.30	0.20x	0.06x	0.20x	2.7x	0.06x						
	KE-380	9.6x	1.1x	3.6x	0.20x	<0.0050	0.02x	0.03x	<0.0050	0.03x						
	KF-380	8.4x	0.70	2.6x	0.45	0.30	0.02x	0.10x	3.5x	0.11x	<0.0010	<0.0010	<0.0010	<0.0005	0.10x	<0.0030
	KG-380	9.2x	0.90	3.2x	0.30	0.10x	0.01x	0.30	3.0x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	0.05x	<0.0030
	KH-380	9.6x	1.2x	3.8x	0.15x	0.05x	<0.0050	0.40	2.2x	0.02x	<0.0010	<0.0010	<0.0010	<0.0005	0.15x	<0.0030
383	SS-383	11.0	1.0x	2.5x	0.35	0.25	0.06x	0.10x	2.5x	0.08x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
384	SS-384	11.5	1.0x	3.5x	0.30	0.10x	0.02x	0.25	0.60	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
390	SS-390	16.5	0.90	4.5x	0.25	0.60	0.05x	0.10x	0.50	0.10x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
380	SS-380	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	KA-380	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.1x	<0.0010	<0.0010	0.2x	0.02x	0.01x	<0.0030
	KB-380	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.20x	<0.0010	<0.0010	0.10x	0.02x	0.01x	<0.0030
	KC-380							0.05x			0.06x	0.02x		
	KD-380							0.05x			0.06x	0.02x		
	KE-380											0.02x		
	KF-380	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.10x	<0.0010	<0.0010	0.15x	0.02x	0.01x	<0.0030
	KG-380	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0050	0.20x	<0.0010	<0.0010	0.10x	0.02x	0.01x	<0.0030
	KH-380	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.05x	<0.0010	<0.0010	0.05x	0.02x	0.01x	<0.0030
383	SS-383	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.20x	<0.0010	<0.0010	0.15x	0.03x	0.01x	<0.0030
384	SS-384	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0050	0.12x	<0.0010	<0.0010	0.12x	0.02x	0.01x	<0.0030
390	SS-390	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	0.01x	0.08x	<0.0010	<0.0010	0.08x	<0.0050	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 11 - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
4XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
413	SS-413	12.0	0.60	0.12x	0.08x	0.05x	<0.0050	0.10x	0.15x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-413	11.0	0.75	0.08x	0.15x	0.02x	<0.0050	0.03x	0.03x	0.03x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KB-413	12.6	0.30	0.05x	0.05x	0.03x	<0.0050	0.05x	0.08x	0.10x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KC-413	11.8	1.2x	0.20x	0.10x	0.05x	<0.0050	0.15x	0.15x	0.05x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
443	SS-443	5.5x	0.50	0.08x	0.10x	0.05x	<0.0050	0.05x	0.10x	0.11x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
	KA-443	4.5x	0.65	0.05x	0.15x	0.08x	<0.0050	0.08x	0.15x	0.04x						
	KB-443	6.0x	0.30	0.15x	0.05x	0.03x	<0.0050	0.03x	0.05x	0.15x						
	KC-443	5.1x	1.1x	0.15x	0.10x	0.05x	<0.0050	0.10x	0.15x	0.10x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030
444	SS-A444	7.1x	0.15x	0.12x	0.05x	<0.0050	<0.0050	0.03x	<0.0050	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
413	SS-413	<0.0010	<0.0010	0.012	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	KA-413	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	0.04x	<0.0010	<0.0010	0.04x	0.02x	0.01x	<0.0030
	KB-413	<0.0010	<0.0010	<0.020	<0.0010	<0.0010	<0.0010	0.12x	<0.0010	<0.0010	0.12x	0.02x	<0.015	<0.0030
	KC-413	<0.0010	<0.0010	<0.020	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	0.08x	0.02x	0.01x	<0.0030
443	SS-443	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030
	KA-443							0.02x			0.02x	0.02x		
	KB-443							0.05x			0.05x	0.02x		
	KC-443	<0.0010	<0.0010	<0.020	<0.0010	<0.0010	<0.0010	0.20x	<0.0010	<0.0010	0.15x	0.02x	0.01x	<0.0030
444	SS-A444	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	0.02x	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 12 - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
5XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
513	SS-513	0.20x	0.30	0.05x	0.08x	4.0x	0.03x	0.03x	1.8x	0.03x	<0.0010	<0.0010	<0.0010	0.0001	<0.0010	<0.0010
514	SS-514	0.15x	0.25	0.05x	0.12x	4.1x	0.03x	0.03x	0.08x	0.12x	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0010
	KA-514	0.08x	0.35	0.10x	0.05x	3.5x	<0.0050	<0.0050	<0.0050	0.16x				0.001x		
	KB-514	0.25	0.10x	0.02x	0.20x	4.5x	<0.0050	<0.0050	<0.0050	0.05x				0.003x		
518	KA-518	0.20x	1.0x	0.08x	0.05x	8.1x	<0.0050	0.05x	0.10x	0.01x				0.004x		
520	SS-520	0.15x	0.20x	0.12x	0.05x	10.2	<0.0050	<0.0050	0.04x	0.10x	<0.0010	<0.0010	<0.0010	0.0001	<0.0010	<0.0010
	KA-520	0.20x	0.10x	0.17x	0.02x	9.5x	<0.0050	<0.0050	0.08x	0.05x				0.002x		
	KB-520	0.08x	0.30	0.08x	0.08x	10.6			0.02x	0.01x				0.005x		
535	SS-535	0.10x	0.10x	0.03x	0.18x	7.0x	0.02x	0.02x	0.03x	0.18x	<0.0010	<0.0010	<0.0010	0.0001	<0.0010	<0.0010

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
513	SS-513	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	<0.001	0.01x	<0.0030
514	SS-514	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	<0.0010	0.01x	<0.0030
	KA-514							0.03x			0.03x			
	KB-514							0.06x			0.06x			0.06x
518	KA-518										0.05x			
520	SS-520	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	<0.0010	0.01x	<0.0030
	KA-520													
	KB-520													
535	SS-535	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0030	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 13 - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
7XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
711	SS-711	0.15x	0.90	0.50	0.03x	0.40	0.03x	0.03x	6.5x	0.10x	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
712	SS-712	0.20x	0.50	0.15x	0.10x	0.65	0.50	<0.0050	5.9x	0.15x	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
713	SS-713	0.12x	0.55	0.80	0.20x	0.40	0.06x	0.05x	7.6x	0.20x	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
711	SS-711	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
712	SS-712	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030
713	SS-713	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 14 - ALCOA SPECTROCHEMICAL STANDARDS FOR CASTING ALLOYS
8XX ALLOYS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
850	SS-850	0.50	0.40	1.1x	0.05x	<0.0050	<0.0050	1.1x	<0.0050	0.12x	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010
851	SS-851	2.5x	0.45	1.0x	0.05x	0.03x	<0.0050	0.50	0.03x	0.08x	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010
852	SS-852	0.22x	0.35	2.0x	0.05x	0.84	<0.0050	1.2x	0.05x	0.04x	<0.0010		<0.0010	<0.0010	<0.0010	<0.0010

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
850	SS-850	<0.0010	<0.0010	0.012	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	6.3x	<0.0010	0.01x	<0.0030
851	SS-851	<0.0010	<0.0010	0.015	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	6.3x	<0.0010	0.01x	<0.0030
852	SS-852	<0.0010	<0.0010	0.02x	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	6.3x	<0.0010	0.01x	<0.0030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



**Table 15 - ALCOA SPECTROCHEMICAL STANDARDS FOR TRACE METALS
TRACE METALS**



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
1000	SS-1000	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1050	ST1-1050	0.15	0.33	0.03x	0.04x	0.03x	0.02x	0.01x	0.04x	0.03x	<0.0010	0.0005	<0.0010	0.0002	0.03x	0.002x
2XXX	ST2-2000	0.50	0.45	2.5x	0.50	0.50	0.05x	0.01x	0.15x	0.03x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010
3XXX	ST1-3000	0.20x	0.50	0.15x	1.2x	1.0x	0.01x	0.01x	0.05x	0.02x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010
	ST2-3000	0.20x	0.50	0.15x	1.2x	0.03x	0.01x	0.01x	0.05x	0.02x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010
3003	ST1-3003	0.30	0.33	0.15x	1.2x	<0.0010	<0.0005	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	ST2-3003	0.30	0.65	0.15x	1.2x	0.01x	0.015	0.02x	0.02x	0.02x	<0.0010	0.0005	<0.0010	0.0002	0.02x	0.002x
5XXX	ST1-5000	0.15x	0.30	0.05x	0.05x	1.8x	0.15x	0.03x	0.04x	0.02x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010
5052	ST1-5052	0.15x	0.30	0.10x	<0.0010	2.7x	0.25	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0005
	ST2-5052	0.15x	0.30	0.10x	0.05x	2.7x	0.25	0.02x	0.03x	0.03x	<0.0010	<0.0010	<0.0010	0.0002	0.02x	0.002x
6XXX	ST1-6000	0.55	0.30	0.15x	0.05x	0.80	0.15x	0.05x	0.08x	0.04x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
1000	SS-1000	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
1050	ST1-1050	0.0005	0.0005	0.025	0.001x	0.0015	0.0005	0.02x	0.003x	<0.0010	0.02x	0.0012	0.025	0.004x
2XXX	ST2-2000	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.001x	0.01x	0.001x
3XXX	ST1-3000	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.001x	0.01x	0.001x
	ST2-3000	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.001x	0.01x	0.001x
3003	ST1-3003	<0.0010	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ST2-3003	0.0005	0.0005	0.02x	0.001x	0.0015	0.0005	0.02x	0.003x	<0.0010	0.02x	0.0012	0.015	0.004x
5XXX	ST1-5000	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.001x	0.01x	0.001x
5052	ST1-5052	<0.0010	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ST2-5052	0.0005	0.0005	0.025	0.001x	0.0015	0.0005	0.02x	0.003x	<0.0010	0.02x	0.0012	0.015	0.004x
6XXX	ST1-6000	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.001x	0.01x	0.001x

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



Table 15 (cont'd) - ALCOA SPECTROCHEMICAL STANDARDS FOR TRACE METALS
TRACE METALS



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
6063	ST1-6063	0.45	0.22x	<0.0010	<0.0010	0.55	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0005	<0.0010	<0.0010
	ST2-6063	0.45	0.22x	0.05x	0.05x	0.55	0.015	0.03x	0.03x	0.03x	<0.0010	<0.0010	<0.0010	0.0002	0.02x	0.002x
7XXX	ST1-7000	0.15x	0.25	1.5x	0.25	2.5x	0.15x	0.02x	6.5x	0.04x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010
	ST2-7000	0.15x	0.25	0.15x	0.20x	1.3x	0.10x	0.02x	3.5x	0.04x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010
8079	ST1-8079	0.13x	1.2x	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ST2-8079	0.13x	1.2x	0.03x	0.003x	0.003x	0.003x	0.004x	0.015x	0.004x	<0.0010	0.0005	<0.0010	0.0002	0.004x	0.002x
3XX	ST1-300	7.5x	0.60	0.80	0.15x	0.30	0.01x	0.10x	0.10x	0.10x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010
	ST2-300	9.0x	1.1x	3.5x	0.50	0.20x	0.03x	0.10x	2.5x	0.10x	0.001x	<0.0010	<0.0010	0.0005	0.001x	<0.0010

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
6063	ST1-6063	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ST2-6063	0.0005	0.0005	0.025	0.001x	0.0015	0.0005	0.02x	0.003x	<0.0010	0.02x	0.0012	0.01x	0.004x
7XXX	ST1-7000	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.001x	0.01x	0.001x
	ST2-7000	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.001x	0.01x	0.001x
8079	ST1-8079	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	ST2-8079	0.0005	0.0005	0.016	0.001x	0.0015	0.0005	0.004x	<0.0010	<0.0010	0.005x	0.0012	0.002x	0.004x
3XX	ST1-300	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.02x	0.01x	0.001x
	ST2-300	0.001x	0.001x	0.02x	<0.0010	<0.0010	<0.0010	0.003x	0.001x	<0.0010	0.001x	0.02x	0.01x	0.001x

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Values given as less than, denoted by "<", indicate that those elements are typically below this value. No intentional addition is made for these elements, however these elements will be certified to the actual composition observed.



Table 16 - ALCOA SPECTROCHEMICAL STANDARDS FOR CALIBRATION AND NORMALIZATION
SQ STANDARD ALLOYS



Typical Analysis - Weight Percent																
Alloy	Catalog Number	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Be	Bi	Ca
CALIBRATION	SQ-10															
	SQ-11	0.2	0.2	0.5	0.4	3.0	0.25		6.6	0.10				0.005		0.02
	SQ-12	1.1	0.6	4.8	1.1	0.15		0.25	0.20		0.05			0.005	0.06	
	SQ-13	0.5	0.6	0.04	0.04	0.04	0.04	0.04	0.04	0.04				0.005	0.04	
	SQ-14	0.1	0.1	0.5	0.4	0.9			0.4	1.2	0.1			0.002	0.5	
	SQ-15	12.0	0.7	0.5	0.05	1.2	0.05	2.5			0.1					
	SQ-16	4.0	1.0	10.0	0.2	0.3			0.2	0.2						
	SQ-17	0.7	0.4	0.35	0.12	1.6	0.25	0.12	0.12	0.12	0.08				0.005	0.08
	SQ-18													0.02		
SQ-19												0.015				

Typical Analysis - Weight Percent														
Alloy	Catalog Number	Cd	Co	Ga	Li	Na	P	Pb	Sb	Sc	Sn	Sr	V	Zr
CALIBRATION	SQ-10													
	SQ-11		0.01	0.03										
	SQ-12	0.20	0.01	0.03				0.06			0.06		0.10	0.15
	SQ-13	0.04	0.01	0.03				0.04			0.04		0.04	0.04
	SQ-14							0.5			0.1			
	SQ-15												0.02	
	SQ-16													
	SQ-17			0.03					0.1			0.1		0.03
	SQ-18				0.02	0.02								
SQ-19							0.015		0.015	0.2				

Note: SQ Standards are 64mm diameter, 37mm thick except SQ-18 which is 25mm thick. These standards are to used for reproducibility of spectral response, but are not certified with respect to true composition. Only approximate values are issued for these standards.



Table 17 - ALCOA SPECTROCHEMICAL STANDARDS FOR INDIVIDUAL ELEMENTS



Silicon Series in Unalloyed Aluminum		
Catalog Number	Si	Fe
SI-1	0.50	(0.5)
SI-2	1.0x	(0.5)
SI-3	1.6x	(0.5)
SI-4	2.2x	(0.5)
SI-5	3.0x	(0.5)
SI-6	5.0x	(0.5)
SI-7	7.0x	(0.5)
SI-8	10.0	(0.5)
SI-9	12.5	(0.5)
SS-390	16.5	(0.5)

Iron Series in Unalloyed Aluminum			
Catalog Number	Si	Fe	Cu
FE-4	(0.1)	0.25	(0.01)
FE-6	(0.1)	0.60	(0.01)
FE-7	(0.1)	0.80	(0.01)
FE-8	(0.1)	1.0x	(0.01)
FE-9	(0.1)	1.2x	(0.01)
FE-10	(0.1)	1.5x	(0.01)
FE-11	(0.1)	2.0x	(0.01)
FE-12	(0.1)	2.5x	(0.01)
SS-A2800	0.25	3.0x	0.03x

Copper Series in Unalloyed Aluminum			
Catalog Number	Si	Fe	Cu
CU-1	0.15	0.25	1.0x
CU-2	0.15	0.25	2.5x
CU-3	0.15	0.25	4.5x
CU-7	0.15	0.25	20.0

Manganese Series in 3000 Alloy	
Catalog Number	Mn
MN-3	0.70
WA-3003	1.0x
SS-3003	1.2x
WB-3003	1.5x

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.

Concentrations listed in parentheses are considered reference values only and are not certified.



Table 17 - ALCOA SPECTROCHEMICAL STANDARDS FOR INDIVIDUAL ELEMENTS



Nickel Series in 242 Alloy	
Catalog Number	Ni
NI-4	1.0x
NI-5	1.5x
SS-242	2.0x

Zinc Series in 7072 Alloy	
Catalog Number	Zn
ZN-1	0.25
ZN-2	0.60
SS-7072	1.1x
ZN-4	2.6x
ZN-5	4.0x
ZN-6	7.0x
ZN-7	10.0

Titanium Series in Unalloyed Aluminum	
Catalog Number	Ti
WC-1000	0.08x
TI-2	0.15x
TI-3	0.30

Boron Series in 1075 Alloy	
Catalog Number	B
BN-1	0.0005-0.0034
BN-2	0.0035-0.0074
BN-3	0.0075-0.014
BN-4	0.015-0.025
BN-5	0.026-0.034

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.



Table 17 - ALCOA SPECTROCHEMICAL STANDARDS FOR INDIVIDUAL ELEMENTS



Boron Series in 7.5% Silicon Alloy	
Catalog Number	B
BN-11	0.0005-0.0034
BN-12	0.0035-0.0074
BN-13	0.0075-0.014
BN-14	0.015-0.025

Beryllium Series in 1100 Alloy	
Catalog Number	Be
BE-1	0.0005-0.0025
BE-2	0.0035-0.0065

Calcium Series in 1075 alloy	
Catalog Number	Ca
CA-1	0.0005-0.0034
CA-2	0.0035-0.0084
CA-3	0.0085-0.024
CA-4	0.025-0.060

Calcium Series in 7.5% Silicon Alloy	
Catalog Number	Ca
CA-11	0.0005-0.0024
CA-12	0.0025-0.0064
CA-13	0.0065-0.012
CA-14	0.013-0.020
CA-15	0.021-0.040

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.



Table 17 - ALCOA SPECTROCHEMICAL STANDARDS FOR INDIVIDUAL ELEMENTS



Cadmium Series in 1075 Alloy	
Catalog Number	Cd
CD-1	0.0005-0.0044
CD-2	0.0045-0.014
CD-3	0.015-0.034
CD-4	0.035-0.060

Cobalt Series in 1075 Alloy	
Catalog Number	Co
CO-1	0.001x
CO-2	0.007x

Gallium Series in 1000 Alloy	
Catalog Number	Ga
WD-1000	0.004x
WE-1000	0.01x
SS-1050	0.02x

Lithium Series in 1075 Alloy	
Catalog Number	Li
LI-1	0.0002-0.0009
LI-2	0.0010-0.0024
LI-3	0.0025-0.0064
LI-4	0.0065-0.010
LI-5	0.011-0.020
LI-6	0.021-0.030

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.



Table 17 - ALCOA SPECTROCHEMICAL STANDARDS FOR INDIVIDUAL ELEMENTS



Sodium Series in 1075 Alloy	
Catalog Number	Na
NA-1	0.0005-0.0024
NA-2	0.0025-0.0064
NA-3	0.0065-0.012
NA-4	0.013-0.020
NA-5	0.021-0.030

Sodium Series in 7.5% Si Alloy	
Catalog Number	Na
NA-11	0.0005-0.0024
NA-12	0.0025-0.0064
NA-13	0.0065-0.012
NA-14	0.013-0.020
NA-15	0.021-0.030

Phosphorus in 10.5% Silicon	
Catalog Number	P
P-1	0.005

Antimony Series in 1075 Alloy	
Catalog Number	Sb
AN-1	0.005x
AN-2	0.015
AN-3	0.04
AN-4	0.09

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.



Table 17 - ALCOA SPECTROCHEMICAL STANDARDS FOR INDIVIDUAL ELEMENTS



Antimony Series in 356 Alloy	
Catalog Number	Sb
AN-11	0.05x
AN-12	0.10x

Zirconium Series in 1050 Alloy	
Catalog Number	Zr
ZR-1	0.0035-0.014
ZR-2	0.015-0.044
ZR-3	0.045-0.070

Zirconium Series in 6151 Alloy	
Catalog Number	Zr
ZR-11	0.01x
ZR-13	0.08x
ZR-14	0.16x
ZR-15	0.26

Note: The 'x' shown as part of the typical analysis concentration is used as a decimal place holder. Actual certified values are reported to the number of digits shown, with a numerical value in place of the 'x'. Actual certified values may vary both above and below those indicated.