

Aluminium reference materials

Product listing May 2013

This product listing includes the aluminium standards available from LGC Standards and Analytical Reference Materials International (ARMI). ARMI became part of LGC Standards in 2012, and orders for the products in this listing should be placed with your local office listed on the previous page

Introduction	1-2
Rio Tinto Alcan Aluminum Alloys	3-23
Foundry Alloys	3-7
Wrought Alloys	8-21
Specialty Alloys	22-23
Rio Tinto Alcan Non-Metallic Standards	24-32
Bayer Process	24-26
Bauxite	24
Red Mud	25
Alumina	28
Electrolysis	27-32
Green Petroleum Coke, & Calcined Petroleum Coke	27
Anthracite, & Metallurgical Coke	28
Pitch	29
Raw Fluorspar, & Fluorspar Final Concentrate	30
Electrolytic Bath	31
Aluminum Fluoride, Scrubber Alumina, & Cryolite	32
Set-up Standards (SUSs)	33-35
SUS Introduction	33
ARMI	34
Alcoa	36

Introduction

Analytical Reference Materials International (ARMI) was founded in 1984 for the purpose of producing Certified Reference Materials (CRMs) for the Metals Industry. Since that time, ARMI has expanded its metals inventory to include CRMs for the following matrices:

Carbon & Low Alloy Steels
Tool Steels

Stainless Steels
High Temperature Steels

Nickel Alloys
Cobalt Alloys

Titanium Alloys
Copper, Brass & Bronze Alloys

Since January 1992, ARMI has been the worldwide distributor for the Rio Tinto Alcan (Formerly Alcan) line of aluminum CRMs. These CRMs are the finest standards in the world produced for the Aluminum Industry. Their quality and homogeneity is without equal in the world. And their analysis is one of the most thorough and complete in the world for a commercially produced product. ARMI carries Rio Tinto Alcan's full line of aluminum alloys, as well as high purity and binary CRMs. ARMI is the worldwide distributor for Alcan Aluminum CRMs. Please see our Aluminum producers catalog for additional information.

Rio Tinto Alcan's non-metallic standards are now included in our catalog. The standards available include:

Bauxite
Bayer Process Red Mud
Electrolytic Bath

Aluminum Fluoride
Alumina
Pitch

Fluorspar
Cryolite
Scrubber Alumina

Calcined Petroleum Coke
Metallurgical Coke
Green Petroleum Coke

All of these products are packaged in powder form. Stocks are limited for some items. Please contact us for price and availability.

ARMI also carries Aluminum Setting-Up Standards (SUSs). In addition to its internally produced SUSs, ARMI carries the full line of Alcoa

In addition to its listed CRMs, ARMI has access to additional aluminum standards from Rio Tinto Alcan's former affiliates and ARMI's associates throughout the world. ARMI also has the ability to have custom standards produced for any special chemistry requirement. Let the staff at ARMI help you fill your aluminum standard needs.

Thank you for considering Rio Tinto Alcan's and ARMI's products and we look forward to supplying your Certified Reference Material needs. If you have any questions require additional information or need assistance in locating a special CRM, please contact us. We will be happy to assist you in any way we can.

Let ARMI's staff help fill your standards needs!

Best Regards,



William D. Britt
President & General Manager

Rio Tinto Alcan Standards Introduction

In January of 1992, Analytical Reference Materials International (ARMI) and Rio Tinto Alcan (Formerly ALCAN International Limited), Arvida Research & Development Center of Canada, entered into a strategic alliance for the marketing, sales, and future development of aluminum spectrochemical Certified Reference Materials (CRMs) worldwide. As a result, all CRMs produced by RTA are available through and exclusively distributed by ARMI in Golden, Colorado, USA. The inventory consists of over 500 aluminum spectrochemical CRMs. In addition to the traditional spectrochemical disk for Optical Emission, all CRMs are also available in chips for classical chemistry and wet instrumental techniques, and thin disks for EDXRF/WDXRF.

Rio Tinto Alcan spectrochemical standards are not derived from production material. They are produced from a direct-chill continuous casting process resulting in bar stock of 75mm in diameter. Each billet is scalped and thereafter cut into 25mm thick slices of 57mm in finished diameter. Although this method of manufacture is expensive, the continuous-cast disk has resulted in excellent homogeneity leading to reliable results for the analysis of both the simple and the most complex aluminum alloys for over 50 years.

For homogeneity testing, 12 samples are selected from each billet cast and are each sparked 7 times on the spectrometer following a pseudo-random technique. The results obtained are statistically evaluated by an analysis of variance to determine the uniformity of composition within and among the samples tested. Once the series is determined to be homogenous, chips are prepared for wet chemical analysis. Every element to be certified is then analyzed using the most widely recognized methods. Each sample is analyzed at least in duplicate by two technicians using two different analytical techniques that include ICP, AA, X-Ray fluorescence, colorimetric, fluorimetric, and titrimetric methods. The individual values reported are statistically evaluated, and the mean values are compared to the results obtained by Optical Emission Spectrometry. Finally, the check samples are circulated among other Rio Tinto Alcan laboratories for verification. These laboratories perform their own chemical analysis and report their results to the Arvida Research Center. Worldwide comparison analysis involving top specialists in the field ensures high confidence in the values obtained.

Rio Tinto Alcan produces three basic categories of CRMs. Alpha characters located at the end of a part number indicate the alloy series or

Standard Alloys have a 2 alpha character suffix such as “-AC” and are alloys in which some 23+ elements including traces are certified.

Ultra Hi-Purity Alloys have a 3 alpha character suffix such as “-CAD” and are alloys produced from ultra hi-purity ingredients without any trace elements present.

Special Alloys are prefixed by an unusual designation such as “1S” and are located in a separate section of the catalog. These alloys include some binaries and special experimental compositions.

Rio Tinto Alcan Foundry Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
Standard	220-AA	0.14	0.16	5.94	0.049	0.23	---	---	0.035	0.021	---	---	---	---	---	---	---	---
		---	---	0.14	---	---	---	---	---	---	---	---	---	---	---	---	0.39	---
Standard	220-AB	0.012	0.048	4.50	0.005	0.011	---	---	0.016	0.009	---	---	---	---	---	---	---	---
		---	---	0.008	---	---	---	---	---	---	---	---	---	---	---	---	0.088	---
Standard	220-AC	0.037	0.020	4.98	0.010	0.068	---	---	0.023	0.011	---	---	---	---	---	---	---	---
		---	---	0.04	---	---	---	---	---	---	---	---	---	---	---	---	0.20	---
Standard	220-AD	0.10	0.095	5.55	0.021	0.15	---	---	0.034	0.019	---	---	---	---	---	---	---	---
		---	---	0.093	---	---	---	---	---	---	---	---	---	---	---	---	0.28	---
Standard	220-AE	0.13	0.087	5.94	0.027	0.24	---	---	0.049	0.032	---	---	---	---	---	---	---	---
		---	---	0.11	---	---	---	---	---	---	---	---	---	---	---	---	0.38	---
Standard	220-AF	0.24	0.26	6.95	0.060	0.32	---	---	0.066	0.050	---	---	---	---	---	---	---	---
		---	---	0.18	---	---	---	---	---	---	---	---	---	---	---	---	0.48	---
Standard	X332.0-AC	11.33	0.20	3.28	0.032	1.29	0.030	0.031	0.067	0.25	---	---	---	---	0.0011	0.005	0.0039	0.0013
		0.0021	0.021	---	---	---	0.0032	---	0.0062	0.0031	0.028	0.0030	0.020	0.0030	---	0.019	0.0030	---
High Purity	A355.0-CAA	(4.00)	(0.21)	(0.95)	<0.0001	(0.60)	<0.0001	<0.0001	<0.0001	<0.0001	---	---	0.0002	---	<0.0001	<0.0001	<0.0001	<0.0001
		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	<0.0001	0.0003	0.0001	<0.0001	---	<0.0001	<0.0001	---
Standard	208.2 224-AC	2.64	0.53	4.26	0.042	0.022	0.027	0.030	0.039	0.15	---	---	---	---	---	0.019	---	---
		---	0.016	---	---	---	---	---	---	---	0.021	---	0.024	---	---	0.014	---	---
High Purity	208.2 224-CAB	(2.28)	(0.45)	(3.95)	(0.002)	(0.002)	<0.001	(0.001)	<0.001	(0.001)	---	---	---	---	---	<0.001	---	---
		---	(0.001)	---	---	---	---	---	---	---	<0.001	---	<0.001	---	---	(0.002)	---	---
Standard	213 236-AE	2.03	1.22	6.94	0.11	0.06	0.028	0.045	0.040	0.12	---	---	---	---	---	0.026	---	---
		---	0.020	---	---	---	---	---	---	---	0.023	---	0.024	---	---	0.015	---	---
Standard	238.2 S250-AB	4.15	0.74	9.95	0.041	0.27	0.027	0.04	0.05	(0.05)	---	---	---	---	---	0.042	---	---
		---	---	---	---	---	---	---	---	---	0.04	---	0.038	---	---	---	---	---
High Purity	238.2 S250-CAC	(4.5)	(1.0)	(10.0)	0.005	(0.002)	(0.001)	(0.001)	(0.001)	0.003	---	---	---	---	---	(0.001)	---	---
		---	(0.002)	---	---	---	---	---	---	---	(0.001)	---	(0.001)	---	---	(0.002)	---	---
Standard	242.2 218-AR	0.18	0.49	4.00	0.037	1.50	0.030	2.00	0.035	0.12	---	---	---	---	---	0.040	---	---
		---	---	---	---	---	---	---	---	---	0.047	---	0.048	---	---	---	---	---
Standard	295.2 225-AH	0.85	0.39	4.48	0.057	0.020	0.031	0.032	0.032	0.17	---	---	---	---	---	0.033	---	---
		---	0.020	---	---	---	---	---	---	---	0.030	---	0.033	---	---	0.015	---	---
High Purity	305.2 125-CAP	(4.90)	(0.03)	(1.22)	0.0004	(0.54)	<0.001	<0.001	0.0006	0.001	---	---	<0.0001	---	<0.0001	<0.001	0.0004	---
		---	<0.001	---	---	---	<0.0001	---	<0.0001	0.0002	0.001	---	<0.001	<0.0001	---	0.0007	0.0003	---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Foundry Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
308	127-AB	4.59	0.39	4.85	0.027	0.030	0.022	0.027	0.035	0.033	---	---	---	---	---	(0.024)	0.006	---
Standard		---	0.016	---	---	---	0.0004	---	---	---	0.031	---	0.030	---	---	0.013	0.02	---
319	117-CAG	(4.3)	0.025	(3.00)	(0.60)	<0.001	<0.001	<0.001	<0.001	0.002	---	---	---	---	<0.0001	<0.001	---	---
High Purity		---	<0.001	---	---	---	<0.0001	---	---	---	<0.001	---	<0.001	---	---	<0.001	---	---
319.1	B319.1-AF	6.14	0.64	3.11	0.43	0.33	0.015	0.049	0.72	0.060	---	---	---	---	0.0017	0.022 <i>i</i>	0.0040 <i>i</i>	0.0013
Standard		---	0.024	---	---	---	0.0024 <i>i</i>	---	0.0026 <i>i</i>	0.0016 <i>i</i>	0.013	(0.002)	0.014	0.044 <i>i</i>	---	0.020	0.0030	---
319.1	B319.1-CAE	(6.30)	(0.65)	(3.34)	(0.43)	(0.32)	<0.0001	<0.0001	(0.70)	0.0001	---	---	0.0001	---	<0.0001	<0.0001	<0.0001	0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	0.0002	0.0002	0.0002	<0.0001	---	<0.0001	0.0001	---
319.1	B319.1-CAG	(6.30)	(0.65)	(3.34)	(0.43)	(0.32)	<0.0001	<0.0001	(0.70)	---	---	0.0002	---	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
High Purity		0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	0.0002	0.0002	0.0002	<0.0001	0.0001	---	<0.0001	0.0001	---
332	6495-AA	10.40	1.05	2.36	0.53	1.31	0.030	0.051	0.055	0.10	---	---	---	---	---	0.040	---	---
Standard		---	---	---	---	---	---	---	---	---	0.032	---	0.028	---	---	---	---	---
332.1	6195-AE	10.70	0.70	3.45	0.43	1.05	0.027	0.028	0.93	0.017	---	---	---	---	(0.001)	0.020	(0.01)	---
Standard		---	0.015	---	---	---	---	---	---	---	0.033	---	0.028	---	---	0.012	---	---
332.1	A143-AW	10.02	0.73	3.03	0.30	0.91	0.040	0.89	0.035	0.11	---	---	---	---	0.0018	0.032	0.006	---
Standard		---	0.013	---	---	---	0.0005	---	0.0004	---	0.036	---	0.031	---	---	0.015	---	---
332.1	A143-CAX	(10.0)	(0.48)	(3.04)	(0.30)	(0.90)	0.0004	(0.97)	0.0004	(0.14)	---	---	0.0001	---	<0.0001	0.0001	0.0001	<0.0001
High Purity		0.0007	0.0008	---	---	---	<0.0001	---	<0.0001	0.0002	0.0001	0.002	0.0001	<0.0001	---	0.007	0.0005	---
333	A333.0-AF	9.13	0.85	3.54	0.35	0.082 <i>i</i>	0.015	0.13	2.34	0.032	---	---	---	---	<0.0001	0.021	0.0043 <i>i</i>	---
Standard		---	0.030	---	---	---	0.0015 <i>i</i>	---	0.0033 <i>i</i>	0.001	0.015	0.0057	0.017	0.0029 <i>i</i>	---	0.030	0.018	---
333	A333.0-AI	9.70	0.90	3.47	0.33	0.14	0.11	0.15	2.56	0.12	---	---	---	---	0.0012	0.019	0.0021	0.0012
Standard		---	0.017	---	---	---	0.0022 <i>i</i>	---	0.0028 <i>i</i>	0.0032 <i>i</i>	0.13	0.0039	0.17	0.0031 <i>i</i>	---	0.020	0.0029	---
333	A333.0-CAC	(8.79)	(0.65)	(3.43)	(0.33)	0.0008	0.0011	0.0008	(2.30)	---	---	0.0002	---	<0.0001	<0.0001	0.003	<0.0001	0.0006
High Purity		<0.0001	---	---	---	<0.0001	---	<0.0001	0.001	0.0002	<0.0001	<0.0001	<0.0001	0.0080	---	0.0007	<0.0001	---
333	A333.0-CAH	(9.64)	(1.00)	(3.55)	(0.37)	0.0003	<0.0001	0.0001	(2.56)	---	---	0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	---	---	---	<0.0001	---	<0.0001	0.0005	0.0001	0.0028	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	---
339	339.0-AD	12.73	0.48	1.40	0.37	1.23	0.051	1.12	0.099	0.048	---	---	---	---	0.0013	0.04	0.0020	---
Standard		---	0.031	---	---	---	0.0009	---	0.0025	0.0061	0.046	0.0010	0.046	0.0021	---	0.032	0.0029	---
339	339.0-CAB	(12.50)	(0.50)	(1.40)	(0.27)	(1.17)	0.0004	(1.10)	0.0005	0.0007	---	---	---	---	<0.0001	0.0001	0.0004	---
High Purity		0.0014	0.0010	---	---	---	<0.0001	---	0.0011	0.0003	0.0001	0.0003	0.0001	0.0001	---	0.0008	0.0009	---
339.1	B162-AG	12.04	0.40	2.56	0.08	1.07	0.033	0.68	0.044	0.054	---	---	---	---	---	0.030	---	---
Standard		---	0.016	---	---	---	---	---	---	---	0.031	---	0.027	---	---	0.012	---	---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Foundry Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd	
350 High Purity	350-CAU	(0.006) ---	(0.009) <0.001	(0.004) ---	(0.001) ---	(10.00) ---	<0.001 ---	<0.001 ---	(0.002) ---	<0.001 ---	--- (0.002)	--- ---	--- <0.001	--- ---	--- ---	<0.001 (0.001)	---	---	
354.1 High Purity	6285-CAB	(8.9) ---	(0.002) <0.001	(1.90) ---	<0.001 ---	(0.48) ---	<0.001 ---	<0.001 ---	<0.001 ---	(0.001) ---	---	---	---	---	---	(0.001) (0.003)	---	---	
355 Standard	125-AL	4.95 ---	0.19 ---	1.20 ---	0.042 ---	0.025 ---	0.033 ---	0.028 ---	0.030 ---	0.15 ---	---	---	---	---	---	0.027 ---	---	---	
355.2 Standard	125-AQ	5.50 ---	0.24 0.011	1.22 ---	0.038 ---	0.037 ---	0.027 ---	0.032 ---	0.033 ---	0.15 ---	---	---	---	---	---	0.021 0.016	---	---	
355.2 Standard	125-AS	4.88 ---	0.25 0.013	1.28 ---	0.039 ---	0.61 ---	0.18 0.0005	0.028 ---	0.037 ---	0.12 ---	---	---	---	---	0.0009 ---	0.027 0.015	---	---	
355.2 Standard	125-AT	4.83 ---	0.63 0.009	1.17 ---	0.22 ---	1.08 ---	0.023 0.0006	0.032 ---	0.16 0.0014	0.068 ---	---	---	---	---	0.0011 ---	0.031 0.015	0.022 0.018	---	
356.2 Standard	356.2-AV	7.26 ---	0.201 0.019	0.080 ---	0.037 ---	0.39 ---	0.027 0.0020 <i>i</i>	0.031 ---	0.081 0.0026 <i>i</i>	0.18 0.0019	---	0.0029	0.014	0.0151 <i>i</i>	0.0011 <i>i</i>	0.0076 0.020	0.0037 <i>i</i> 0.0021	0.0011 <i>i</i>	
356.2 Standard	356.2-AW	7.27 ---	0.21 0.020	0.081 ---	0.033 ---	0.39 ---	0.027 0.0024 <i>i</i>	0.031 ---	0.082 0.0028 <i>i</i>	0.18 0.002	---	0.0082	0.0029	0.015	0.031 <i>i</i>	0.0010 ---	0.0086 0.020	0.0037 <i>i</i> 0.0021	0.0011
356.2 High Purity	356.2-CAR	(7.14) 0.00	(0.17) <0.0001	0.0001 ---	<0.0001 ---	(0.41) ---	<0.0001 <0.0001	<0.0001 ---	<0.0001 <0.0001	(0.11) 0.0001	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	0.0001 <0.0001	<0.0001	
356.2 High Purity	356.2-DAO	(7.358) (0.0000)	(0.164) (0.0002)	(0.068) (0.0142)	(0.0035) ---	(0.422) ---	(0.0031) ---	(0.0011) (0.0000)	(0.0045) ---	(0.011) (0.0000)	(0.113) (0.0014)	---	---	(0.0000) (0.0004)	---	(0.0000) (0.0122)	(0.0042) (0.0014)	(0.0008)	
363.1 Standard	6252-AE	5.41 ---	0.33 0.011	3.01 ---	0.60 ---	0.33 ---	0.034 ---	0.041 ---	3.46 ---	0.12 ---	---	---	---	---	---	0.029 0.012	---	---	
363.1 High Purity	6252-CAC	(5.5) ---	(0.02) (0.001)	(3.0) ---	(0.60) ---	(0.30) ---	<0.001 ---	<0.001 ---	(3.5) ---	(0.003) ---	---	---	---	---	---	<0.001 (0.004)	---	---	
369 Standard	161-AG	11.94 ---	0.39 0.020	0.060 ---	0.58 ---	0.54 ---	0.024 ---	0.029 ---	0.042 ---	0.044 ---	---	---	---	---	---	0.021 0.010	---	---	
369 High Purity	161-CAH	(12.00) <0.0001	(0.14) <0.0001	0.0001 ---	0.0001 ---	(0.34) ---	<0.0001 0.00	<0.0001 ---	<0.0001 0.0002	<0.0001 0.0004	---	---	0.0001 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	0.00 <0.0001	0.0001	
380.2 Standard	A380.2-AD	9.80 0.020	0.39 ---	3.63 ---	0.027 ---	0.026 <i>i</i> 0.0025 <i>i</i>	0.033 ---	0.030 0.0025 <i>i</i>	0.031 0.0021	---	---	---	---	0.0009 <i>i</i> 0.030	0.0078 ---	0.0027 <i>i</i> 0.022	0.0009 <i>i</i> 0.003	---	
380.2 High Purity	A380.2-CAC	(9.45) 0.0002	(0.39) <0.0001	(3.64) <0.0001	0.0008 ---	0.0005 ---	0.0003 ---	0.0006 <0.0001	0.0002 0.0001	<0.0001 0.0003	0.0011 0.0003	---	---	0.0002 0.0001	---	<0.0001 0.0002	<0.0001 0.0001	0.0001	

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Foundry Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
383.1	383.1-AB	11.24	0.97	2.67	0.35	0.12	0.10	0.22	2.65	0.15	---	---	---	---	0.0013	0.016	0.0033 <i>i</i>	0.0009
Standard		---	0.026	---	---	---	0.0030 <i>i</i>	---	0.0023 <i>i</i>	0.0020	0.10	0.0069	0.11	0.0034 <i>i</i>	---	0.036	0.017	
383.1	383.1-CAC	(10.93)	(1.03)	(2.69)	(0.38)	0.0001	0.0007	0.0005	(2.63)	0.0011	---	---	0.0004	---	<0.0001	<0.0001	<0.0001	0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0007	0.0004	0.0001	<0.0001	<0.0001	---	0.0002	<0.0001	
390	A390.1-AA	17.70	0.38	4.84	0.052	0.62	0.050	0.051	0.047	0.13	---	---	---	---	0.0011	0.0029	0.0016	0.0014
Standard		(0.0016)	0.016	---	---	---	---	---	---	0.0037	0.0035	0.0028	0.046	---	---	0.018	0.0032	
392	392.0-AB	(17.00)	---	(1.00)	---	(1.00)	---	(1.00)	---	---	---	---	---	---	---	---	---	---
Standard		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
413.2	160-DD	12.40	0.52	0.044	0.037	0.040	0.042	0.037	0.048	0.040	---	---	---	---	---	0.040	<0.001	---
Standard		---	---	---	---	---	---	---	(0.001)	---	0.042	---	0.042	---	---	---	---	
413.2	160-DF	12.23	0.52	0.047	0.036	0.034	0.045	0.038	0.047	0.040	---	---	---	---	---	0.044	0.003	---
Standard		---	---	---	---	---	---	---	0.002	---	0.038	---	0.039	---	---	---	---	
413.2	160-DP	11.77	0.30	0.053	0.033	0.024	0.027	0.030	0.043	0.048	---	---	---	---	---	0.018	---	---
Standard		---	0.014	---	---	---	---	---	0.004	---	0.026	---	0.025	---	---	0.014	---	
413.2	160-DQ	12.12	0.32	0.053	0.034	0.031	0.030	0.028	0.045	0.030	---	---	---	---	---	0.031	0.0020	---
Standard		---	0.012	---	---	---	0.0003	---	0.0001	---	0.028	---	0.029	---	---	0.011	---	
413.2	160-DS	12.12	0.37	0.042	0.042	0.024	0.020	0.025	0.024	0.020	---	---	---	---	0.0013	0.029	0.0020 <i>i</i>	---
Standard		---	0.025	---	---	---	0.0005 <i>i</i>	---	0.0006 <i>i</i>	---	0.025	---	0.026	0.010 <i>i</i>	---	0.013	---	
413.2	A413.2-AD	12.06	0.40	0.033	0.039	0.260	0.016	0.031	0.030	0.031	---	---	---	---	0.0009	0.0069	0.0025 <i>i</i>	0.0014
Standard		---	0.029	---	---	---	0.0029 <i>i</i>	---	0.0040 <i>i</i>	0.0026	0.0080	0.0039	0.014	0.064 <i>i</i>	---	0.019	0.0034	
413.2	A413.2-CAE	(11.74)	(0.34)	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	---	---	0.001	---	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
443.2	123-CAM	(4.90)	(0.34)	0.0010	0.0004	0.0012	<0.001	<0.001	<0.001	0.002	---	---	<0.0001	---	<0.0001	<0.001	0.0002	<0.0001
High Purity		0.0001	<0.001	---	---	---	<0.0001	---	<0.0001	0.0003	0.001	0.0001	<0.001	<0.0001	---	0.0009	0.0001	
443.2	443.2-AC	5.31	0.35	0.048	0.046	0.0022 <i>i</i>	0.027	0.028	0.041	0.155	---	---	---	---	0.0010	0.0085 <i>i</i>	0.0024 <i>i</i>	0.0010
Standard		---	0.021	---	---	---	0.0017 <i>i</i>	---	---	0.0032	0.0073	0.0033	0.012	0.0038 <i>i</i>	---	0.024	0.0026	
443.2	443.2-CAB	(5.46)	(0.35)	0.0002	<0.0001	0.0003	<0.0001	<0.0001	0.0002	<0.0001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	<0.0001	0.001	<0.0001	<0.0001	---	<0.0001	<0.0001	
511.2	A320-AC	0.54	0.20	0.057	0.036	4.10	0.020	0.032	0.047	0.15	---	---	---	---	0.005	0.037	---	---
Standard		---	0.018	---	---	---	---	---	---	---	0.042	---	0.038	---	---	0.012	---	
511.2	A320-CAB	(0.001)	---	(0.003)	<0.001	(3.90)	<0.001	<0.001	<0.001	<0.001	---	---	---	---	---	<0.001	---	---
High Purity		---	<0.001	---	---	---	---	---	---	---	(0.001)	---	<0.001	---	---	<0.001	---	

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Foundry Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
512	6475-CAB	(1.05)	---	(0.51)	<0.001	(5.0)	<0.001	<0.001	<0.001	<0.001	---	---	---	---	---	<0.001	---	---
High Purity		---	(0.001)	---	---	---	---	---	---	---	<0.001	---	<0.001	---	---	(0.002)	---	---
515.2	B320-AA	0.83	0.80	0.054	0.54	3.38	0.032	0.029	0.041	0.047	---	---	---	---	---	0.042	---	---
Standard		---	0.017	---	---	---	---	---	---	---	0.041	---	0.040	---	---	0.011	---	---
515.2	B320-CAB	(0.76)	(0.78)	(0.003)	(0.47)	(3.4)	<0.001	<0.001	<0.001	<0.001	---	---	---	---	---	<0.001	---	---
High Purity		---	<0.001	---	---	---	---	---	---	---	(0.002)	---	(0.001)	---	---	<0.001	---	---
535.0	A535.0-AA	0.12	0.17	0.053	0.17	7.30	0.053	0.052	0.044	0.16	---	---	---	---	0.0012	0.043 <i>i</i>	0.0025 <i>i</i>	0.0012
Standard		---	0.021	---	---	---	0.0033	---	0.0019 <i>i</i>	0.0010 <i>i</i>	0.044	0.0024	0.047	0.0025 <i>i</i>	---	0.020	0.0048	---
707	6392-AC	0.10	0.11	0.10	0.055	1.26	0.051	0.046	4.26	0.043	---	---	---	---	(0.006)	0.042	---	---
Standard		---	0.021	---	---	---	---	---	---	---	0.044	---	0.042	---	---	0.011	---	---
771.2	6348-AC	0.081	0.093	0.082	0.087	0.91	0.180	0.052	6.94	0.17	---	---	---	---	0.0012	0.055	0.0032	0.0012
Standard	Replaces AB	---	0.020	---	---	---	0.0024	---	0.0028 <i>i</i>	0.0032 <i>i</i>	0.044	0.0041	0.047	0.0034	---	0.023	0.0031	---
771.2	6348-CAD	(0.08)	(0.07)	0.0001	0.0001	(0.98)	(0.14)	<0.0001	(6.98)	(0.19)	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	0.0003	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	<0.0001
850	6363-CAB	---	(0.02)	(1.0)	<0.001	(0.9)	(1.7)	<0.001	(0.02)	---	<0.001	---	---	---	---	---	(0.002)	---
High Purity		---	---	<0.001	---	---	---	---	---	---	---	(0.07)	---	(7.0)	---	(0.002)	---	---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
1000 High Purity	HP-FK Replaces FJ	0.0001 <0.0001	<0.0001 <0.0001	<0.0001 ---	<0.0001 <0.0001	<0.0001 ---	<0.0001 0.00000	<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 Standard	1050-AJ	0.174 ---	0.297 0.019	0.040 ---	0.0374 ---	0.0264 <i>i</i> ---	0.0172 0.0022 <i>i</i>	0.0227 ---	0.0399 0.0013 <i>i</i>	0.0287 0.0014	---	---	---	---	0.0010 <i>i</i> ---	0.0081 0.0168	0.0016 <i>i</i> 0.0019	0.0011 ---
1100 Standard	1100-AK	0.18 ---	0.60 0.020	0.084 ---	0.029 ---	0.0123 ---	0.018 0.0019 <i>i</i>	0.030 ---	0.031 0.0045 <i>i</i>	0.030 0.0023	---	---	---	---	0.0011 ---	0.0056 0.0178	0.0013 <i>i</i> 0.0032	0.0011 ---
1100 Standard	1100-AY	0.17 ---	0.59 0.020	0.084 ---	0.029 ---	0.0096 <i>i</i> ---	0.019 0.0018 <i>i</i>	0.031 ---	0.032 0.0057 <i>i</i>	0.030 0.0027	---	---	---	---	0.0009 ---	0.0048 0.020	0.0008 <i>i</i> 0.0034	0.0013 ---
1100 Standard	X1100-AH	0.43 ---	0.42 0.022	0.088 ---	0.037 ---	0.015 ---	0.016 0.0014 <i>i</i>	0.031 ---	0.026 0.0021 <i>i</i>	0.028 0.0038	---	---	---	---	0.0010 ---	0.016 0.0215	0.0021 <i>i</i> 0.0032	0.0010 ---
1120 Standard	X1120-AC	0.10 ---	0.15 0.019	0.45 ---	0.15 ---	0.015 <i>i</i> ---	0.019 0.0020 <i>i</i>	0.022 ---	0.020 0.0021 <i>i</i>	0.019 0.0016	---	---	---	---	0.0010 <i>i</i> ---	0.007 0.021	0.0016 <i>i</i> 0.0019	0.0012 ---
1145 Standard	1145-AD	0.098 ---	0.38 0.021	0.038 ---	0.032 ---	0.030 ---	0.021 0.0022 <i>i</i>	0.031 ---	0.036 0.0024 <i>i</i>	0.028 0.0027	---	---	---	---	0.0011 ---	0.011 0.022	0.0024 <i>i</i> 0.0026	(0.0011)
1145 Standard	1145-AE	0.10 ---	0.40 0.019	0.028 ---	0.031 ---	0.022 <i>i</i> ---	0.020 0.0019 <i>i</i>	0.030 ---	0.030 0.0021 <i>i</i>	0.031 0.0025	---	---	---	---	0.0008 ---	0.0082 0.020	0.0014 <i>i</i> 0.0030	0.0011 ---
1170 Standard	1170-AK	0.086 ---	0.18 0.019	0.028 ---	0.030 ---	0.022 <i>i</i> ---	0.030 0.0016 <i>i</i>	0.032 ---	0.029 0.0020 <i>i</i>	0.029 0.0023	---	---	---	---	0.0009 ---	0.0079 0.020	0.0016 <i>i</i> 0.0018 <i>i</i>	0.0012 ---
1170 Standard	1170-AL	0.089 ---	0.155 0.015	0.026 ---	0.028 ---	0.022 <i>i</i> ---	0.026 0.0016 <i>i</i>	0.030 ---	0.027 0.0020 <i>i</i>	0.030 0.0036	---	---	---	---	0.0009 ---	0.0066 0.0205	0.0016 <i>i</i> 0.0027	0.0012 ---
1188 Standard	1188-AD	0.052 0.0011	0.053 0.020	0.0052 <i>i</i> ---	0.0066 0.0021	0.0051 <i>i</i> 0.0028	0.0070 0.0009 <i>i</i>	0.0073 0.0144	0.0070 0.0013 <i>i</i>	0.0072 0.0031	0.0030 0.0071	0.0028 0.0028	---	0.0009 <i>i</i> 0.0013 <i>i</i>	0.0009 <i>i</i> 0.0026	0.0058 0.020	0.0010 <i>i</i> 0.0026	0.0011 ---
1200 Standard	1200-AJ	0.2 ---	0.640 0.020	0.031 ---	0.034 ---	0.024 <i>i</i> ---	0.03 0.0027 <i>i</i>	0.029 ---	0.061 0.0018 <i>i</i>	0.03 0.0028	---	---	---	---	0.0010 <i>i</i> ---	0.008 0.020	0.0024 <i>i</i> 0.0028	0.0011 ---
2011 Standard	226-AD	0.16 ---	0.19 ---	4.88 ---	0.045 ---	0.039 ---	0.047 ---	0.039 ---	0.057 ---	0.16 ---	---	---	---	---	---	0.044 ---	---	---
2011 High Purity	2007-CAB	(0.45) 0.0002	(0.45) <0.0001	(4.30) ---	(0.65) ---	(0.55) ---	0.0002 <0.0001	0.0005 ---	<0.0001 <0.0001	0.0001 0.0001	---	---	<0.0001 0.006	---	<0.0001 0.0001	0.0003 0.0002	<0.0001 0.0003	<0.0001 ---
2011 Standard	2011-AC	0.12 ---	0.26 0.020	5.62 ---	0.023 ---	0.015 ---	0.019 0.0007 <i>i</i>	0.024 ---	0.047 0.0005 <i>i</i>	0.017 0.002	---	---	---	---	0.0004 ---	0.49 0.017	0.0009 <i>i</i> 0.0027	0.0011 ---
2011 High Purity	2011-CAB	(0.13) 0.0001	(0.30) <0.0001	(6.0) ---	<0.0001 ---	<0.0001 ---	<0.0001 <0.0001	0.0003 ---	0.0005 <0.0001	<0.0001 <0.0001	---	---	---	---	<0.0001 ---	(0.45) <0.0001	<0.0001 <0.0001	<0.0001 ---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
2014 Standard	2014-AD Last of Stock	0.88 ---	0.46 0.026	4.58 ---	0.81 ---	0.45 ---	0.018 0.0018 <i>i</i>	0.028 ---	0.029 0.0020 <i>i</i>	0.030 0.0038 <i>i</i>	---	---	---	---	0.0014 ---	0.025 0.031	0.0025 <i>i</i> 0.0035	0.0014
2014 High Purity	2014-CAC	(0.90) <0.0001	(0.48) 0.0001	(4.56) ---	(0.90) ---	(0.43) ---	<0.0001 <0.0001	0.0001 ---	<0.0001 <0.0001	<0.0001 0.0003	---	---	0.0001 0.0002	---	<0.0001 <0.0001	<0.0001 ---	<0.0001 <0.0001	<0.0001
2017 Standard	17S-BE	0.54 ---	0.40 0.020	4.33 ---	0.66 ---	0.69 ---	0.032 ---	0.041 ---	0.046 ---	0.039 ---	---	---	---	---	---	0.021 0.010	---	---
2017 Standard	2017-AC	0.57 ---	0.41 0.020	4.24 ---	0.63 ---	0.75 ---	0.017 0.0025 <i>i</i>	0.034 ---	0.015 0.0019 <i>i</i>	0.018 0.0031 <i>i</i>	---	---	---	---	0.0012 ---	0.019 0.022	0.0025 <i>i</i> 0.0026	0.0013
2017 High Purity	2017-CAB	(0.51) <0.0001	(0.41) <0.0001	(4.21) ---	(0.72) ---	(0.78) ---	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	<0.0001
2018 Standard	2018-AB	0.48 0.0017	0.34 0.020	4.14 ---	0.015 ---	0.62 ---	0.028 0.0017 <i>i</i>	2.15 ---	0.030 0.0009 <i>i</i>	0.027 0.0030	---	---	---	---	0.0011 ---	0.021 0.016	0.0025 0.0018	0.0012
2022 Standard	B206-AA	0.078 ---	0.16 0.017	4.68 ---	0.43 ---	0.30 <i>i</i> ---	0.028 0.0030 <i>i</i>	0.029 ---	0.029 0.0033 <i>i</i>	0.22 0.0030	---	---	---	---	0.0008 ---	0.009 0.020	0.0037 <i>i</i> 0.0030	0.0011
2024 Standard	2024-AF	0.25 ---	0.25 0.022	4.55 ---	0.66 ---	1.57 ---	0.028 0.0030 <i>i</i>	0.031 ---	0.073 0.0026 <i>i</i>	0.032 0.0023	---	---	---	---	0.0010 ---	0.008 0.022	0.0031 <i>i</i> 0.0024	0.0011 <i>i</i>
2024 High Purity	2024-CAE	(0.26) <0.0001	(0.30) 0.0001	(5.0) ---	(0.69) ---	(2.0) ---	<0.0001 <0.0001	<0.0001 ---	0.0002 <0.0001	<0.0001 0.0001	---	---	0.0001 0.0005	---	<0.0001 ---	<0.0001 0.0001	<0.0001 <0.0001	<0.0001
2117 Standard	16S-AN	0.37 ---	0.37 0.010	2.56 ---	0.052 ---	0.32 ---	0.032 ---	0.041 ---	0.054 ---	0.044 ---	---	---	---	---	---	0.040 0.007	---	---
2036 Standard	16S-AQ	0.26 ---	0.29 0.018	2.37 ---	0.25 ---	0.49 ---	0.028 0.0005	0.029 ---	0.05 ---	0.03 ---	---	---	---	---	0.0010 ---	0.028 0.015	---	0.03
2117 Standard	16S-AR	0.35 ---	0.38 0.017	2.50 ---	0.032 ---	0.30 ---	0.038 ---	0.011 ---	0.043 0.0043 <i>i</i>	0.003 ---	---	---	---	---	---	0.03 0.005	0.0087 <i>i</i> ---	---
2219 Standard	2219-AC	0.15 ---	0.21 0.015	6.70 ---	0.24 ---	0.013 ---	0.013 0.0012 <i>i</i>	0.016 ---	0.088 0.0012 <i>i</i>	0.050 0.0021	---	---	---	---	0.0011 ---	0.0067 0.092	0.0011 <i>i</i> 0.13	0.0020
2219 High Purity	2219-CAB	(0.15) 0.0001	(0.18) 0.0001	(6.53) ---	(0.29) ---	0.0001 ---	<0.0001 <0.0001	0.0002 ---	0.0005 <0.0001	0.0003 0.0001	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 0.0001	<0.0001 (0.14)	<0.0001
2618 Standard	2618-AC Replaces AA	0.23 (0.0022)	1.12 0.018	2.55 ---	0.18 ---	1.66 ---	0.019 0.0030 <i>i</i>	1.36 ---	0.077 0.0040 <i>i</i>	0.058 0.0021	---	---	---	---	0.0010 ---	0.011 0.019	0.0035 0.0027	0.0018
2618 High Purity	2618-CAB	(0.22) 0.0005	(1.13) 0.0007	(2.44) ---	(0.18) ---	(1.52) ---	0.0005 <0.0001	(1.43) ---	0.0005 <0.0001	0.0010 0.0001	---	---	0.0001 <0.0001	---	<0.0001 <0.0001	<0.0001 0.0006	<0.0001 0.0003	0.0001

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
3002	3002-AB	0.075	0.086	0.12	0.24	0.1500	0.021	0.021	0.048	0.020	---	---	---	---	0.0011	0.009	0.0027i	0.0013
Standard	Replaces AA	---	0.021	---	---	---	0.0018i	---	0.0017i	0.0041	0.008	0.0038	0.021	0.0030i	---	0.019	0.0020	
3003	D3S-BC	0.092	0.56	0.15	0.40	0.022	0.030	0.034	0.044	0.034	---	---	---	---	0.0008	0.030	0.0032i	---
Standard		---	0.014	---	---	---	0.0003i	---	0.0034i	0.0002	0.030	---	0.037	---	---	0.003	0.021	
3003	3003-AJ	0.45	0.22	0.130	1.07	0.0065	0.016	0.020	0.083	0.040	---	---	---	---	0.0011	0.0073	0.0017i	0.0011
Standard		---	0.020	---	---	---	0.0021i	---	0.0025i	0.0034	0.0086	0.0025	0.022	0.0021i	---	0.021	0.0027	
3003	3003-AK	0.24	0.63	0.090	1.14	0.011i	0.0142	0.023	0.0253	0.025	---	---	---	---	0.0010i	0.0078	0.0017i	0.0013
Standard		---	0.014	---	---	---	0.0023i	---	0.0014i	0.0016	0.0081	0.0020	0.0148	0.0019i	---	0.020	0.0020	
3003	X3003-AA	0.23	0.60	0.08	1.10	0.016	0.012	0.021	0.98	0.014	---	---	---	---	---	0.016	0.0024i	---
Standard		---	0.011	---	---	---	0.0004i	---	0.0008i	0.0025	0.016	---	0.018	---	---	0.010	0.007	
3003	X3003-AD	0.37	0.53	0.16	1.17	0.014	0.015	0.018	1.39	0.021	---	---	---	---	0.0011	0.0064	0.0019i	0.0011
Standard		---	0.021	---	---	---	0.0021i	---	0.0025i	0.0030	0.0077	0.0025	0.018	0.0019i	---	0.019	0.0024	
3003	X3003-CAB	(0.23)	(0.59)	<0.001	(1.09)	<0.001	<0.001	<0.001	(0.98)	<0.001	---	---	---	---	<0.0001	<0.001	<0.0001	---
High Purity		---	<0.001	---	---	---	<0.0001	---	<0.0001	0.0006	<0.001	---	<0.001	---	---	<0.001	<0.001	
3004	3004-AO	0.23	0.48	0.21	1.20	1.24	0.029	0.027	0.13	0.029	---	---	---	---	0.0012	0.0069	0.0038	0.0013
Standard	Replaces AK	---	0.022	---	---	---	0.0019i	---	0.0028i	0.0020	0.008	(0.0035)	0.013	0.0031	---	0.019	0.0033	
3004	3004-CAN	(0.22)	(0.62)	(0.17)	(1.23)	(1.27)	0.0001	0.0001	0.0008	0.0004	---	---	0.0002	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity	Replaces CAM	<0.0001	0.0008	---	---	---	<0.0001	---	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	---	0.0001	0.0002	
3005	3005-AC	0.19	0.42	0.12	1.12	0.49	0.021	0.023	0.049	0.020	---	---	---	---	0.0012	0.012	0.0032	---
Standard		---	0.022	---	---	---	0.0023i	---	0.0034i	0.0029	0.009	0.0041	0.017	0.0035i	---	0.020	0.0030	
3005	3005-AD	0.46	0.55	0.20	1.15	0.52	0.015	0.020	0.13	0.041	---	---	---	---	0.0011	0.0077	0.0026	0.0011
Standard		---	0.020	---	---	---	0.0023i	---	0.0022i	0.0035	0.0080	0.0024	0.019	0.0030	---	0.022	0.0031	
3005	3005-CAB	(0.19)	(0.44)	0.0001	(1.16)	(0.45)	0.0002	0.0003	<0.0001	0.0001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		0.0002	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0002	<0.0001	0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
3005	3005-CAF	(0.21)	(0.44)	0.0002	(1.16)	(0.43)	0.0001	0.0001	0.0010	0.0002	---	---	0.0002	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
3005	X3005-AB	0.081	0.21	0.53	1.51	0.12	0.016	0.021	0.025	0.020	---	---	---	---	0.0011	0.008	0.0017	0.0020
Standard		---	0.020	---	---	---	0.0018i	---	0.0018i	0.0030	0.009	0.0020	0.018	0.0021	---	0.020	0.0018	
3005	X3005-CAC	(0.19)	(0.22)	(0.59)	(1.56)	(0.16)	0.0001	<0.0001	0.0003	0.0001	---	---	0.0001	---	<0.0001	0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	0.0001	0.0002	
3012	X3012-AA	0.49	0.20	0.520	1.23	0.031	0.016	0.020	0.084	0.014	---	---	---	---	0.0012	0.0078	0.0015i	0.0014
Standard		---	0.020	---	---	---	0.0012i	---	0.0014i	0.0036	0.0085	0.002	0.022	0.0019i	---	0.020	0.0030	

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
3102 Standard	3102-AD Replaces AB	0.35 ---	0.54 0.019	0.086 ---	0.37 ---	0.028 ---	0.021 0.0014 <i>i</i>	0.019 ---	0.029 0.0010 <i>i</i>	0.0271 0.0030	---	---	---	---	0.0010 ---	0.008 0.0191	0.0016 0.0040	0.0012
3102 High Purity	3102-CAF	(0.29) <0.0001	(0.55) <0.0001	(0.07) ---	(0.31) ---	0.0002 ---	<0.0001 <0.0001	<0.0001 ---	0.0002 <0.0001	0.0001 0.0001	---	---	0.0001 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	<0.0001 <0.0001	<0.0001
3104 Standard	3104-AR	0.21 ---	0.42 0.021	0.23 ---	0.96 ---	1.19 ---	0.015 0.0024 <i>i</i>	0.031 ---	0.12 0.0030 <i>i</i>	0.030 0.0017	---	---	---	---	0.0012 ---	0.007 0.021	0.0026 <i>i</i> 0.0019	0.0013
3104 High Purity	3104-CAP	(0.23) <0.0001	(0.42) <0.0001	(0.23) ---	(0.99) ---	(1.13) ---	0.001 <0.0001	<0.0001 ---	0.0001 0.0001	0.0001 0.0003	---	---	0.0003 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	0.0001 <0.0001	<0.0001
3104 High Purity	3104-DAS	(0.17) ---	(0.42) (0.017)	(0.19) ---	(0.93) ---	(1.21) ---	(0.015) (0.0017)	(0.009) ---	(0.13) (0.0010)	(0.0085) (0.0020)	---	---	---	---	(0.0013) ---	(0.001) (0.014)	(0.0020) (0.0011)	(0.0011)
3105 Standard	B3S-AF	0.27 ---	0.48 0.015	0.043 ---	0.88 ---	0.35 ---	0.027 0.003	0.036 ---	0.051 ---	0.032 0.0001	---	---	---	---	0.007 ---	0.037 0.012	---	---
3105 Standard	3105-AE	0.28 ---	0.60 0.021	0.26 ---	0.56 ---	0.51 ---	0.089 0.0025 <i>i</i>	0.031 ---	0.19 0.0034 <i>i</i>	0.053 0.0034	---	---	---	---	0.0012 ---	0.0065 0.021	0.0024 0.0035	0.0014
3105 Standard	3105-AH	0.51 ---	0.590 0.021	0.25 ---	0.54 ---	0.52 ---	0.1600 0.0017 <i>i</i>	0.02 ---	0.1300 0.0022 <i>i</i>	0.0450 0.0031	---	---	---	---	0.00 0.021	0.008 0.021	0.0023 0.0026	0.0013
3105 High Purity	3105-CAF	(0.25) 0.0002	(0.54) <0.0001	(0.09) ---	(0.53) ---	(0.52) ---	(0.10) <0.0001	0.0004 ---	(0.14) <0.0001	<0.0001 0.0002	---	---	0.0002 <0.0001	---	<0.0001 ---	<0.0001 0.0001	<0.0001 0.0002	<0.0001
3105 High Purity	3105-CAI	(0.24) <0.0001	(0.54) <0.0001	(0.098) ---	(0.52) ---	(0.49) ---	(0.099) <0.0001	<0.0001 ---	(0.16) <0.0001	<0.0001 0.0001	---	---	0.0001 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	<0.0001 0.0003	<0.0001
3203 High Purity	3S-CBW	0.23 ---	0.45 0.015	0.08 ---	1.53 ---	0.021 ---	0.0380 0.0006 <i>i</i>	0.039 ---	0.044 0.0004 <i>i</i>	0.032 ---	---	---	---	---	0.004 ---	0.043 0.002	0.0050 <i>i</i> 0.03	---
3203 Standard	3203-AG	0.33 ---	0.54 0.022	0.052 ---	1.14 ---	0.032 ---	0.029 0.0017 <i>i</i>	0.033 ---	0.039 0.0021 <i>i</i>	0.029 0.0069	---	---	---	---	0.0011 ---	0.028 0.025	0.0022 <i>i</i> 0.0039	0.0016
3203 High Purity	3203-CAX	(0.30) <0.0001	(0.54) <0.0001	<0.0001 ---	(1.08) <0.0001	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	<0.0001
3204 Standard	3204-AA	0.23 ---	0.43 0.018	0.21 ---	0.91 ---	1.34 ---	0.027 0.0016 <i>i</i>	0.031 ---	0.028 0.0018 <i>i</i>	0.035 0.001	---	---	---	---	0.0010 ---	0.017 0.022	0.0024 <i>i</i> 0.0029	---
3916 Standard	3916-AA	0.220 ---	0.17 0.019	0.75 ---	1.38 ---	0.0025 <i>i</i> ---	0.030 0.0017 <i>i</i>	0.088 ---	0.030 0.0021 <i>i</i>	0.028 0.0034	---	---	---	---	0.0011 <i>i</i> ---	0.0087 <i>i</i> 0.020	0.0016 <i>i</i> 0.0029	0.0008
4002 Standard	4002-AD	4.38 ---	0.39 0.016	0.15 ---	0.032 ---	0.14 ---	0.019 ---	0.0027 ---	0.028 ---	0.019 ---	---	---	---	---	---	0.018 0.007	---	1.28

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
4002	4002-CAC	(4.00)	(0.30)	0.003	<0.001	0.003	<0.001	<0.001	<0.001	0.002	---	---	---	---	<0.0001	(0.003)	---	(1.10)
High Purity		---	<0.001	---	---	---	<0.0001	---	0.0003	0.0009	<0.001	---	0.0004	---	---	<0.001	---	
4002	X4002-AA	4.10	0.29	0.13	0.037	0.13	0.028	0.038	0.045	0.019	---	---	---	---	---	1.06 <i>i</i>	0.0065 <i>i</i>	0.041
Standard		---	0.031	---	---	---	0.0022 <i>i</i>	---	0.0016	0.006	0.034	---	0.029	0.008	---	0.027	0.014	
4002	X4002-CAB	(3.90)	(0.30)	(0.10)	0.0001	(0.11)	0.0001	0.0002	<0.0001	<0.0001	---	---	---	---	<0.0001	(1.00)	<0.0001	---
High Purity		---	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	<0.0001	---	<0.0001	<0.0001	---	0.0001	<0.0001	
4007	4007-AA	1.62	0.55	0.011	1.43	0.008	0.091	0.21	0.029	0.029	---	---	---	---	0.0011	0.007	0.0011 <i>i</i>	0.0012
Standard		---	0.019	---	---	---	0.0009 <i>i</i>	---	0.0012 <i>i</i>	0.0023	0.0041	0.0042	0.0022	0.0012 <i>i</i>	---	0.015	0.0022	
4045	X4045-AC	10.03	0.32	0.015	0.013	0.015	0.013	0.014	0.99	0.0129	---	---	---	---	0.0009	0.008	0.0024 <i>i</i>	0.0013
Standard		---	0.016	---	---	---	0.0019 <i>i</i>	---	0.0041 <i>i</i>	0.0058	0.008	0.0038	0.012	0.0029 <i>i</i>	---	0.0123	0.0031	
4045	X4045-CAB	(9.75)	(0.33)	(0.002)	(0.003)	<0.001	<0.001	(0.001)	(1.0)	(0.003)	---	---	---	---	<0.0001	<0.001	(0.003)	---
High Purity		---	<0.001	---	---	---	<0.0001	---	<0.0001	0.0008	<0.001	---	<0.001	<0.0001	---	<0.001	<0.0001	
4104	4104-AE	10.06	0.59	0.10	0.050	1.48	0.030	0.030	0.10	0.027	---	---	---	---	0.0012	0.11	0.0029	0.0013
Standard		---	0.019	---	---	---	0.0024	---	0.0024	0.0027	0.028	0.0028	0.033	0.0030	---	0.019	0.0025	
4104	4104-CAD	(10.0)	(0.60)	(0.10)	0.0010	(1.60)	0.0001	0.0004	0.0005	0.0002	---	---	0.0002	---	<0.0001	(0.10)	<0.0001	0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0002	0.002	0.0011	<0.0001	0.0001	---	<0.0001	<0.0001	
4145	4145-AB	10.66	0.54	4.12	0.050	0.050	0.050	0.054	0.058	0.046	---	---	---	---	0.0012	0.032	0.0023	0.0012
Standard		---	0.019	---	---	---	0.0016 <i>i</i>	---	0.0018 <i>i</i>	0.0033 <i>i</i>	0.031	(0.0038)	0.030	0.0031	---	0.020	0.0028	
4343	135-AQ	7.40	0.18	0.053	0.035	0.037	0.040	0.038	0.044	0.015	---	---	---	---	---	0.042	---	---
Standard		---	0.009	---	---	---	---	---	---	---	0.047	---	0.040	---	---	0.012	---	
4343	4343-AE	7.56	0.48	0.056	0.049	0.025	0.020	0.032	0.490	0.050	---	---	---	---	0.0035 <i>i</i>	0.020	0.0033 <i>i</i>	---
Standard		---	0.029	---	---	---	0.0029 <i>i</i>	---	0.0072 <i>i</i>	0.003	0.019	---	0.023	0.014 <i>i</i>	---	0.009	0.0150	
4343	4343-AF	7.84	0.50	0.050	0.052	0.031	0.032	0.029	0.050	0.031	---	---	---	---	0.0013	0.037	0.0028 <i>i</i>	0.0010
Standard		---	0.023	---	---	---	0.0022 <i>i</i>	---	0.0027 <i>i</i>	0.0042 <i>i</i>	0.021	0.0042	0.018	0.011 <i>i</i>	---	0.026	0.0029	
4343	4343-CAB	(7.60)	(0.41)	<0.001	<0.001	<0.001	<0.001	(0.001)	<0.001	<0.001	---	---	---	---	<0.0001	<0.001	<0.0001	---
High Purity		---	<0.001	---	---	---	<0.0001	---	<0.0001	0.0001	<0.001	---	(0.0005)	<0.0001	---	<0.001	<0.001	
4343	4343-CAG	(7.83)	(0.50)	<0.0001	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	(0.002)	<0.0001	<0.0001	---	<0.0001	<0.0001	
4343	X4343-AA	7.57	0.53	0.048	0.046	0.051	0.025	0.029	0.98	0.031	---	---	---	---	0.0016	0.019	0.0023 <i>i</i>	---
Standard		---	0.025	---	---	---	0.0004 <i>i</i>	---	0.0006 <i>i</i>	0.0019	0.016	---	0.017	---	---	0.028	0.026	
4621	462A1-AA	12.12	0.15	3.86	0.025	1.050	0.028	1.07	0.03	0.17	---	---	---	---	0.0011	0.009	0.0049	0.0012
Standard		---	0.018	---	---	---	0.0029	---	0.0053	0.0042N	0.0091	0.0023	0.013	0.0027	---	0.020	0.0035	

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
4643	4643-AD	3.81	0.16	0.036	0.042	0.10	0.027	0.035	0.030	0.053	---	---	---	---	0.0040	0.02	0.0054 <i>i</i>	---
Standard		---	0.029	---	---	---	0.0027 <i>i</i>	---	0.0047 <i>i</i>	0.004	0.020	---	0.023	0.0021 <i>i</i>	---	0.012	0.0006	
4643	4643-CAC	(3.78)	(0.18)	0.0001	<0.0001	0.0001	0.0001	0.0001	<0.0001	<0.0001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	0.0010	<0.0001	<0.0001	---	<0.0001	<0.0001	
5000	5000-CAB	(0.001)	---	(10.0)	<0.001	(0.001)	<0.001	<0.001	(0.003)	<0.001	---	---	---	---	---	<0.001	---	---
High Purity		---	(0.002)	---	---	---	---	---	---	---	(0.002)	---	<0.001	---	---	(0.002)	---	
5001	5001-BI	0.36	0.30	19.5	0.050	0.053	0.049	0.052	0.045	0.049	---	---	---	---	0.0012	0.052	0.0018	0.0013
Standard		---	0.020	---	---	---	0.0020 <i>i</i>	---	0.0011 <i>i</i>	0.0039 <i>i</i>	0.048	0.0040	0.047	0.0027 <i>i</i>	---	0.025	0.0030	
5001	5001-CBG	---	(0.02)	(20.0)	(0.001)	(0.002)	(0.001)	(0.003)	<0.001	(0.001)	---	---	---	---	---	<0.001	---	---
High Purity		---	(0.002)	---	---	---	---	---	---	---	(0.002)	---	(0.002)	---	---	(0.002)	---	
5005	5005-AE	0.16	0.49	0.066	0.039	0.91	0.027	0.017	0.026	0.018	---	---	---	---	0.0013	0.028	0.0032 <i>i</i>	0.0030
Standard		---	0.024	---	---	---	0.0022 <i>i</i>	---	0.0030 <i>i</i>	0.0045 <i>i</i>	0.014	0.0041	0.017	0.0038 <i>i</i>	---	0.024	0.0032	
5005	5005-CAB	(0.16)	(0.57)	0.07	<0.001	(0.87)	<0.001	<0.001	<0.001	<0.001	---	---	---	---	<0.0001	<0.001	<0.0001	---
High Purity		---	<0.001	---	---	---	<0.0001	---	<0.0001	0.0001	<0.001	---	<0.001	<0.0001	---	<0.001	<0.0001	
5005	5005-CAF	(0.17)	(0.58)	(0.080)	<0.0001	(0.87)	<0.0001	<0.0001	<0.0001	<0.0001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	<0.0001	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
5010	5010-AE	0.18	0.44	0.032	0.26	0.57	0.025	0.022	0.027	0.025	---	---	---	---	0.0014	0.023	0.0031 <i>i</i>	0.0016
Standard		---	0.026	---	---	---	0.0034 <i>i</i>	---	0.0031 <i>i</i>	0.0058 <i>i</i>	0.016	---	0.018	0.0020 <i>i</i>	---	0.024	0.0034	
5010	5010-CAF	(0.15)	(0.44)	0.0001	(0.21)	(0.46)	<0.0001	<0.0001	0.0001	0.0001	---	---	0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
5016	5016-AA	0.25	0.76	0.036	0.50	2.48	0.017	0.015	0.080	0.015	---	---	---	---	0.0038	0.019 <i>i</i>	0.0031 <i>i</i>	0.0012
Standard		---	0.023	---	---	---	0.0028 <i>i</i>	---	0.0026 <i>i</i>	0.0014 <i>i</i>	0.014	0.0025	0.014	0.0029 <i>i</i>	---	0.023	0.0033	
5016	B53S-AH	0.15	0.54	0.022	0.70	1.84	0.027	0.032	0.030	0.026	---	---	---	---	---	0.010	0.0084	---
Standard		---	0.014	---	---	---	0.0006	---	0.006	0.0002	0.028	---	0.029	---	---	0.017	---	
5017	5017-AA	0.37	0.40	0.28	0.70	1.95	0.016	0.030	0.026	0.036	---	---	---	---	0.0030	0.02	0.0050	---
Standard		---	0.026	---	---	---	0.0040	---	0.0044	---	0.026	---	0.027	0.0022	---	0.009	0.014	
5017	5017-AB	0.28	0.27	0.40	0.28	2.01	0.018	0.030	0.026	0.056	---	---	---	---	0.0035	0.013	0.0054	---
Standard		---	0.020	---	---	---	0.0046 <i>i</i>	---	0.0042	0.001	0.020	---	0.021	---	---	0.015	0.014	
5017	5017-CAC	(0.25)	(0.29)	(0.38)	(0.35)	(2.00)	0.0002	0.0003	<0.0001	0.0001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0001	0.0003	<0.0001	<0.0001	<0.0001	---	0.0001	<0.0001	
5017	5017-CAD	(0.36)	(0.38)	(0.19)	(0.80)	(2.0)	0.0003	0.0005	<0.0003	0.0004	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0003	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0003	<0.0001	0.0001	<0.0001	<0.0001	---	0.0002	0.0002	

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
5042 Standard	5042-AC	0.15 ---	0.25 0.020	0.031 <i>i</i> ---	0.35 ---	3.74 ---	0.060 0.0043 <i>i</i>	0.031 ---	0.030 0.0029 <i>i</i>	0.030 0.0008	---	---	---	---	0.0013 ---	0.009 0.018	0.0036 <i>i</i> 0.0016	0.0012
5042 High Purity	5042-CAB	0.0018 0.0001	(0.25) <0.0001	0.0001 ---	(0.33) ---	(3.68) ---	0.0001 <0.0001	0.0001 ---	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
5050 High Purity	K57S-CAF	(0.12) ---	(0.50) <0.0001	(0.003) ---	0.0002 ---	(1.35) ---	<0.001 <0.0001	<0.001 ---	0.0003 <0.0001	<0.001 0.0008	---	---	0.0004 <0.001	---	<0.0001 <0.0001	<0.0001 <0.001	0.0001 <0.0001	---
5052 High Purity	5052-DAK	(0.090) (0.0003)	(0.284) (0.019)	(0.041) ---	(0.057) ---	(2.40) ---	(0.197) (0.0000)	(0.0051) ---	(0.0125) (0.0001)	(0.015) (0.0007)	---	---	(0.0002) (0.0005)	---	(0.0000) (0.0000)	(0.0000) (0.0125)	(0.0001) (0.0023)	(0.0000)
5052 Standard	C57S-AB	0.076 ---	0.100 0.020	0.055 ---	0.0350 ---	2.44 ---	0.032 ---	0.03 ---	0.03 0.00320	0.033 ---	---	---	---	---	0.001 ---	0.01 0.011	---	---
5052 Standard	P57S-AA	0.20 ---	0.56 0.01	0.10 ---	0.90 ---	1.81 ---	0.049 0.0018	0.041 ---	0.100 0.0013	0.05 ---	---	---	---	---	---	0.040 0.02	0.0029 ---	---
5052 High Purity	5052-CAL	(0.08) <0.0001	(0.32) <0.0001	0.0001 ---	0.0001 ---	(3.0) ---	(0.21) <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	<0.0001
5056 Standard	5056-AD	0.12 ---	0.27 0.021	0.053 ---	0.13 ---	4.97 ---	0.086 0.0031	0.032 ---	0.040 0.0034	0.028 0.0014 <i>i</i>	---	---	---	---	0.0011 ---	0.010 0.020	0.0023 <i>i</i> 0.0023	0.0015
5056 High Purity	5056-CAC	(0.13) ---	(0.29) <0.001	0.0003 ---	(0.14) ---	(5.06) ---	(0.10) <0.0001	0.0005 ---	<0.001 <0.0001	0.0006 0.0001	---	---	<0.0001 <0.001	---	<0.0001 <0.001	<0.001 0.0001	<0.0001 0.0001	---
5082 High Purity	5082-CAB	(0.08) ---	(0.20) <0.001	<0.001 ---	<0.001 ---	(4.57) ---	<0.001 <0.0001	<0.001 ---	<0.001 0.0002	<0.001 0.0002	---	---	<0.0001 0.0004	---	<0.0001 <0.0001	<0.001 <0.001	<0.0001 <0.001	---
5083 Standard	5083-AF	0.17 ---	0.34 0.022	0.078 ---	0.74 ---	4.85 ---	0.15 0.0039 <i>i</i>	0.030 ---	0.050 0.0039 <i>i</i>	0.027 0.0014	---	---	---	---	0.0012 ---	0.008 0.021	0.0031 0.0035	0.0012
5083 High Purity	5083-CAE Replaces CAD	(0.15) <0.0001	(0.30) 0.0001	0.0001 ---	(0.68) ---	(5.0) ---	(0.13) <0.0001	<0.0001 ---	0.0001 <0.0001	0.0002 0.0001	---	---	0.0001 <0.0001	---	<0.0001 <0.0001	<0.0001 0.0001	<0.0001 <0.0001	<0.0001
5100 Standard	5100-BS	0.20 ---	3.9 0.032	0.06 ---	0.041 ---	0.026 ---	0.031 (0.0006)	0.046 ---	0.040 (0.0006)	0.038 (0.002)	---	---	---	---	---	0.040 0.013	(0.0033) 0.02	---
5100 High Purity	5100-CBR	0.024 ---	(3.7) <0.001	(0.003) ---	(0.002) ---	<0.001 ---	<0.001 ---	<0.001 ---	<0.001 ---	<0.001 ---	---	---	0.0002 ---	---	---	<0.001 <0.001	---	---
5154 Standard	A5154-AA	0.19 ---	0.19 0.017	0.040 ---	0.18 ---	3.40 <i>i</i> ---	0.031 0.0023	0.031 ---	0.032 0.0012 <i>i</i>	0.031 0.001	---	---	---	---	0.0011 ---	0.021 <i>i</i> 0.024	0.0027 0.0031	0.0015
5154 High Purity	5154-CAB	(0.12) <0.0001	(0.21) <0.0001	0.0004 ---	0.0003 ---	(3.56) ---	(0.22) <0.0001	0.0002 ---	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

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
5154	A5154-CAB	(0.21)	(0.19)	0.0017	(0.20)	(3.53)	0.0001	0.0003	0.0003	0.0001	---	---	0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	0.0001	---	<0.0001	0.0003	0.0001	<0.0001	0.0001	0.0002	---	<0.0001	<0.0001	
5182	5182-AV	0.12	0.27	0.041	0.34	5.02	0.029	0.014	0.047	0.048	---	(0.0001)	0.0012 <i>i</i>	---	0.0013	0.0070	0.0028 <i>i</i>	0.0013
Standard		---	0.021	---	(0.0001)	---	0.0023 <i>i</i>	---	0.0034 <i>i</i>	(0.0014)	0.0074	0.0010	0.014	0.0021 <i>i</i>	---	0.020	0.0031	
5182	5182-CBB	(0.13)	(0.25)	0.0001	(0.33)	(4.86)	0.0001	0.0008	0.0002	<0.0001	---	---	<0.0001	---	<0.0001	<0.0001	0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	<0.0001	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
5182	5182-DAU	(0.097)	(0.23)	(0.037)	(0.345)	(4.82)	(0.0011)	(0.0049)	(0.012)	(0.0059)	---	---	(0.0001)	---	(0.0000)	(0.0000)	(0.0002)	(0.0000)
High Purity		(0.0002)	(0.017)	---	---	---	(0.0000)	---	(0.0000)	(0.0003)	(0.0009)	---	(0.0005)	(0.0000)	---	(0.012)	(0.0022)	
5251	5251-AD	0.21	0.33	0.089	0.33	2.30	0.031	0.020	0.047	0.030	---	---	---	---	0.0013	0.015 <i>i</i>	0.0031 <i>i</i>	0.0015
Standard		---	0.021	---	---	---	0.0026 <i>i</i>	---	0.0026 <i>i</i>	0.001	0.015	0.0016	0.016	0.0022 <i>i</i>	---	0.021	0.0031	
5251	5251-AF	0.36	0.45	0.10	0.29	2.14 <i>i</i>	0.096	0.03	0.09100	0.098	---	---	---	---	0.00	0.006	0.0036	0.001
Standard		---	0.02	---	---	---	0.0040 <i>i</i>	---	0.0041 <i>i</i>	0.001	0.009	0.003	0.02	0.0036 <i>i</i>	---	0.0205	0.003	
5251	5251-CAE	(0.28)	(0.44)	0.0001	(0.41)	(2.20)	0.0001	0.0002	0.0003	<0.0001	---	---	0.0001	---	<0.0001	<0.0001	0.0002	<0.0001
High Purity		<0.0001	<0.0001	---	<0.0001	---	<0.0001	---	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
5454	5454-AC	0.25	0.40	0.10	0.75	3.16	0.030	0.033	0.030	0.064	---	---	---	---	0.0011	0.0048	0.0022 <i>i</i>	0.0014
Standard		0.0015	0.022	---	---	---	0.0030 <i>i</i>	---	0.0038 <i>i</i>	0.0013	0.0035	0.0032	0.0029	0.0020	---	0.020	0.0029	
5454	B53S-AD	0.16	0.58	0.15	0.76	2.50	0.023	0.031	0.033	0.042	---	---	---	---	0.001	0.019	---	---
Standard		---	0.015	---	---	---	---	---	---	---	0.023	---	0.026	---	---	0.018	---	
5454	B53S-AG	0.16	0.54	0.077	0.67	1.72	0.023	0.031	0.030	0.026	---	---	---	---	---	(0.016)	0.0083	---
Standard		---	0.014	---	---	---	0.0005	---	0.005	0.0002	0.027	---	0.029	---	---	0.017	---	
5454	5454-CAB	(0.13)	(0.15)	0.0004	(0.79)	(2.66)	(0.10)	0.0001	0.0004	0.0002	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.00	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
5457	5457-AA	0.078	0.082	0.13	0.25	0.93	0.014	0.021	0.020	0.029	---	---	---	---	0.0030	0.019	0.0016	---
Standard		---	0.021	---	---	---	0.0028 <i>i</i>	---	0.0044 <i>i</i>	0.003	0.019	---	0.022	0.007	---	0.011	0.012	
5457	5457-AB	0.100 <i>i</i>	0.12	0.16	0.42	0.99	0.026	0.027	0.030 <i>i</i>	0.028 <i>i</i>	---	---	---	---	0.0013	0.0081	0.0035 <i>i</i>	0.0010 <i>i</i>
Standard		---	0.020	---	---	---	0.0034 <i>i</i>	---	0.0031 <i>i</i>	0.0027	0.0078	0.0024	0.021	0.0037 <i>i</i>	---	0.022	0.0030	
5500	5500-CAU	(19.0)	(0.52)	(0.002)	(0.002)	(0.001)	<0.001	<0.001	0.002	0.01	---	---	---	---	---	0.002	0.0048	---
High Purity		---	0.002	---	---	---	---	---	---	---	0.006	---	0.001	---	---	0.002	---	
5556	A56S-CAF	(0.15)	(0.25)	0.003	(0.6)	(5.0)	<0.001	<0.001	<0.001	<0.001	---	---	---	---	<0.0001	<0.001	0.0004	---
High Purity		---	<0.001	---	---	---	<0.0001	---	0.0006	0.001	0.0002	---	<0.001	---	---	<0.001	---	
5657	5657-AA	0.052	0.077	0.050	0.030	0.740	0.020	0.020	0.029	0.022	---	---	---	---	0.0042	0.018	0.0066 <i>i</i>	---
Standard		---	0.030	---	---	---	0.0022 <i>i</i>	---	0.0027 <i>i</i>	0.004	0.019	---	0.022	---	---	0.027	---	

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
5754 Standard	X5754-AE	0.38 ---	0.35 0.029	0.057 ---	0.45 ---	3.18 ---	0.051 0.0036 <i>i</i>	0.031 ---	0.056 0.0045 <i>i</i>	0.053 0.0018	---	---	---	---	0.0011 ---	0.0045 0.021	0.0024 <i>i</i> 0.0024	0.0009
5754 High Purity	5754-CAF	(0.18) <0.0001	(0.34) <0.0001	0.0001 ---	(0.32) ---	(2.72) ---	0.0001 <0.0001	<0.0001 ---	0.0001 0.0002	0.0001 0.0004	---	---	0.0001 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	0.0001 <0.0001	<0.0001
5754 High Purity	X5754-CAF	(0.35) <0.0001	(0.34) <0.0001	0.0002 ---	(0.45) <0.0001	(3.05) ---	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
6005 Standard	6005-AB	0.82 ---	0.27 0.021	0.055 ---	0.053 ---	0.51 ---	0.019 0.0028 <i>i</i>	0.022 ---	0.020 0.0018 <i>i</i>	0.019 0.0029	---	---	---	---	0.0012 ---	0.012 0.023	0.0035 0.0028	0.0014
6005 Standard	A6005-AE Last of Stock	0.84 ---	0.22 0.022	0.12 ---	0.24 ---	0.61 ---	0.019 0.0019 <i>i</i>	0.031 ---	0.030 0.0015 <i>i</i>	0.031 0.0032	---	---	---	---	0.0013 ---	0.010 0.020	0.0031 0.0032	0.0012
6005 High Purity	A6005-CAF	(0.79) <0.0001	(0.22) <0.0001	(0.12) ---	(0.23) ---	(0.52) ---	<0.0001 <0.0001	<0.0001 ---	<0.0001 0.00010	0.0001 0.0002	---	---	0.0001 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	<0.0001 <0.0001	<0.0001
6006 Standard	6006-AB Replaces AA	0.45 ---	0.29 0.020	0.24 ---	0.17 ---	0.57 ---	0.016 0.0024 <i>i</i>	0.032 ---	0.044 0.0025 <i>i</i>	0.043 0.0034	---	---	---	---	0.0013 ---	0.015 0.020	0.0029 0.0030	0.0013
6006 Standard	6006-AC	0.71 ---	0.24 0.021	0.20 ---	0.20 ---	0.70 ---	0.090 0.0029 <i>i</i>	0.031 ---	0.029 0.0023 <i>i</i>	0.031 0.0034	---	---	---	---	0.0012 ---	0.0049 0.021	0.0034 0.0033	0.0012
6006 Standard	6006-CAD	(0.69) <0.0001	(0.18) <0.0001	(0.14) ---	(0.15) ---	(0.69) ---	(0.08) <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
6008 Standard	6008-AA	0.67 ---	0.21 0.021	0.30 ---	0.067 ---	0.60 ---	0.015 0.0024 <i>i</i>	0.030 ---	0.019 0.0029 <i>i</i>	0.030 0.004	---	---	---	---	0.0012 ---	0.0080 0.10	0.0035 0.0030	0.0014
6012 Standard	6012-AF	0.13 ---	0.21 0.016	6.05 ---	0.28 ---	0.020 ---	0.047 ---	0.045 ---	0.049 ---	0.14 ---	---	---	---	---	---	0.038 0.010	---	---
6016 Standard	6016-AA	1.17 ---	0.27 0.02	0.17 ---	0.12 ---	0.44 <i>i</i> ---	0.049 0.0017 <i>i</i>	0.20 ---	0.04000 0.0022 <i>i</i>	0.026 0.0027	---	---	---	---	0.0011 <i>i</i> ---	0.0072 <i>i</i> 0.020	0.0030 <i>i</i> 0.0028	0.0012
6052 High Purity	6052-CAE	(0.19) <0.0001	(0.60) <0.0001	(0.56) ---	<0.0001 ---	(0.52) ---	<0.0001 <0.0001	<0.0001 ---	(8.0) <0.0001	<0.0001 <0.0001	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 <0.0001	<0.0001 <0.0004	<0.0001
6061 Standard	6061-AR	0.73 ---	0.33 0.019	0.36 ---	0.081 ---	1.03 ---	0.21 0.0022 <i>i</i>	0.031 ---	0.040 0.0021 <i>i</i>	0.040 0.0017	---	---	---	---	0.0012 ---	0.0069 <i>i</i> 0.020	0.0032 <i>i</i> 0.0018	0.0013
6061 High Purity	6061-CAR	(0.70) <0.0001	(0.34) <0.0001	(0.31) ---	0.0001 <0.0001	(1.09) ---	(0.20) <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
6061 High Purity	6061-DAO	(0.646) (0.0002)	(0.239) (0.017)	(0.299) ---	(0.0081) ---	(0.962) ---	(0.142) (0.0000)	(0.0048) ---	(0.013) (0.0001)	(0.0136) (0.0008)	---	---	(0.0002) (0.0005)	---	(0.0000) (0.0000)	(0.0000) (0.012)	(0.0001) (0.0023)	(0.0000)

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No.	Part No.	Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ag	As	B	Ba	Be	Bi	Ca	Cd
Type	RTA-xxx	Co	Ga	Ge	Hg	In	Li	Mo	Na	P	Pb	Sb	Sn	Sr	Tl	V	Zr	
6063	6063-BA	0.47	0.24	0.11	0.079	0.55	0.015	0.029	0.029	0.029	---	---	0.0014	---	0.0011	0.006	0.0021 <i>i</i>	0.0014
Standard		---	0.020	---	---	---	0.0023 <i>i</i>	---	0.0019 <i>i</i>	0.0032	0.0084	0.0026	0.014	0.0027 <i>i</i>	---	0.020	0.0032	
6063	6063-CBB	(0.43)	(0.20)	0.0001	0.0008	(0.53)	<0.0001	<0.0001	0.0001	0.0001	---	---	0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity	Replaces CAW	<0.0001	<0.0001	---	---	---	<0.0001	---	0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
6063	6063-DAZ	(0.443)	(0.197)	(0.021)	(0.078)	(0.517)	(0.0039)	(0.0048)	(0.0128)	(0.010)	---	---	(0.0003)	---	(0.0000)	(0.0000)	(0.0001)	(0.0000)
High Purity		(0.0003)	(0.0179)	---	---	---	(0.0000)	---	(0.0001)	(0.0008)	(0.0011)	(0.0002)	(0.0006)	(0.0000)	---	(0.0122)	(0.0026)	
6066	6066-AF	0.97	0.60	0.96	0.71	0.97	0.018	0.032	0.28	0.032	---	---	---	---	0.0013	0.007	0.0028	0.0011
Standard		---	0.021	---	---	---	0.0034 <i>i</i>	---	0.0039 <i>i</i>	0.0032	0.0075	0.0026	0.014	0.0029	---	0.021	0.0032	
6066	6066-CAG	(1.05)	(0.61)	(0.96)	(0.67)	(1.00)	0.0002	0.0001	0.0001	0.0001	---	---	0.0004	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	<0.0001	
6070	6070-AC	1.25	0.26	0.33	0.74	0.75	0.019	0.019	0.021	0.021	---	---	---	---	0.0012	0.0063	0.0029	0.0010
Standard		---	0.020	---	---	---	0.0029 <i>i</i>	---	0.0033 <i>i</i>	0.0036	0.008	0.0027	0.0069	0.0036	---	0.016	0.0030	
6070	6070-CAB	1.35	(0.28)	(0.32)	(0.72)	(0.77)	<0.0001	<0.0001	0.0010	<0.0001	---	---	0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	---	---	<0.0001	---	<0.0001	0.0002	0.0002	0.0004	<0.0001	<0.0001	---	<0.0001	<0.0001	
6111	6111-AA	0.73	0.18	0.96	0.17	0.46	0.014	0.020	0.015	0.032	---	---	---	---	0.0036	0.015	0.0049 <i>i</i>	---
Standard		---	0.028	---	---	---	0.0034 <i>i</i>	---	0.0034 <i>i</i>	0.007	0.016	0.004	0.016	0.0030 <i>i</i>	---	0.028	0.017	
6111	6111-AE	0.60	0.24	0.75	0.20	0.77	0.072	0.028	0.027	0.065	---	---	---	---	0.0013	0.025	0.0023 <i>i</i>	0.0014
Standard		---	0.019	---	---	---	0.0025 <i>i</i>	---	0.0019 <i>i</i>	0.003	0.016	0.0031	0.018	0.0026 <i>i</i>	---	0.023	0.0031	
6111	6111-CAF	(0.64)	(0.15)	(0.69)	(0.17)	(0.69)	(0.068)	0.0001	<0.0001	(0.066)	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001
High Purity		<0.0001	<0.0001	---	<0.0001	---	<0.0001	---	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	0.0002	
6151	6151-AB	1.08	0.53	0.14	0.14	0.65	0.31	0.028	0.015 <i>i</i>	0.036	---	---	---	---	0.0013	0.0079 <i>i</i>	0.0030 <i>i</i>	0.0012
Standard		---	0.022	---	---	---	0.0020 <i>i</i>	---	0.0016 <i>i</i>	0.0024	0.0077	0.0017	0.014	0.0020 <i>i</i>	---	0.020	0.016	
6166	6166-CAB	(24.50)	0.11	(1.35)	---	(1.00)	(0.40)	(1.0)	---	0.013	---	---	---	---	---	---	(0.004)	---
High Purity		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
6181	A6181-AA	0.8600	0.2700	0.1400	0.1600	0.7300	0.0590	0.0310	0.0730	0.0300					0.0012	0.0070	0.0041 <i>i</i>	0.0011
Standard			0.2000				0.0022 <i>i</i>		0.0029 <i>i</i>	0.0020	0.0086	0.0030	0.0190	0.0028 <i>i</i>		0.2000	0.0029	
6201	6201-AD	0.68	0.25	0.021	0.018	0.72	0.019	0.022	0.021	0.020	---	---	---	---	0.0013	0.030	0.0033 <i>i</i>	0.0015
Standard		---	0.024	---	---	---	0.0028 <i>i</i>	---	0.0026 <i>i</i>	0.0046 <i>i</i>	0.019	0.0043	0.021	0.0031 <i>i</i>	---	0.022	0.0032	
6205	6205-AA	2.45	1.25	20.4	1.05	---	0.05	0.051	5.55	---	---	---	---	---	---	0.036	(0.02)	---
Standard		---	---	---	---	---	---	---	---	---	0.04	---	0.052	---	---	---	---	
6235	6235-AB	0.10	0.15	0.046	0.040	0.031	0.040	0.040	5.45	0.041	---	---	---	---	---	0.048	---	---
Standard		---	---	---	---	---	---	---	---	---	0.046	---	0.038	---	---	---	---	

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
6261 Standard	6261-AD	0.64 ---	0.22 0.020	0.27 ---	0.28 ---	0.84 ---	0.062 0.0020 <i>i</i>	0.031 ---	0.11 0.0026 <i>i</i>	0.079 0.0023	---	---	---	---	0.0011 ---	0.0072 <i>i</i> 0.022	0.0030 <i>i</i> 0.0034	0.0013
6261 High Purity	6261-CAB	(0.64) 0.0002	(0.26) <0.0001	(0.31) ---	(0.29) ---	(0.76) ---	0.0001 <0.0001	0.0001 ---	<0.0001 <0.0001	0.0005 0.0001	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 0.0001	<0.0001 <0.0001	<0.0001
6351 Standard	6351-AK	1.08000 ---	0.23 0.020	0.061 ---	0.56 ---	0.65 ---	0.033 0.0028 <i>i</i>	0.03100 ---	0.04900 0.0036 <i>i</i>	0.05100 0.00300	---	---	---	---	0.0012 ---	0.007 0.01900	0.0026 0.0025	0.0012
6351 High Purity	6351-CAL	(1.13) <0.0001	(0.32) <0.0001	<0.0001 ---	(0.63) <0.0001	(0.59) ---	<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	<0.0001
6449 High Purity	6449-CAB	(0.67) ---	(0.001) (0.001)	(0.34) ---	<0.001 ---	(0.89) ---	<0.001 ---	(0.002) ---	<0.001 ---	<0.001 ---	---	---	---	---	---	(0.45) <0.001	---	---
6463 Standard	6463-AC	0.35 ---	0.12 0.018	0.14 ---	0.019 ---	0.49 ---	0.020 0.0024 <i>i</i>	0.020 ---	0.020 0.0026 <i>i</i>	0.017 0.0048	---	---	---	---	0.0011 ---	0.012 0.020	0.0033 <i>i</i> 0.0031	0.0012
7003 Standard	7003-AC	0.14 ---	0.28 0.020	0.15 ---	0.12 ---	0.90 ---	0.18 0.0032	0.030 ---	6.23 0.0030 <i>i</i>	0.032 0.0031	---	---	---	---	0.0012 ---	0.007 0.019	0.0026 0.17	0.0016
7003 High Purity	7003-CAB	(0.001) ---	(0.002) <0.001	(0.004) ---	<0.001 ---	(0.70) ---	<0.001 <0.0001	<0.001 ---	(5.60) 0.0001	<0.001 ---	---	---	---	---	<0.001 ---	<0.001 <0.001	0.0001 ---	---
7004 Standard	7004-AA	0.17 ---	0.27 0.030	0.052 ---	0.52 ---	1.76 ---	0.034 0.0015	0.043 ---	5.15 0.0049 <i>i</i>	0.051 0.001	---	---	---	---	0.0013 ---	0.022 <i>i</i> 0.032	0.0040 0.14	0.0014
7004 Standard	74S-AC	0.014 ---	0.30 ---	0.054 ---	0.69 ---	1.92 ---	0.034 ---	0.041 ---	4.42 ---	0.041 ---	---	---	---	---	(0.006) ---	0.038 ---	---	---
7004 Standard	74S-AF	0.17 ---	0.17 0.02	0.08 ---	0.08 ---	3.41 ---	0.03 ---	0.03 ---	2.87 ---	0.07 ---	---	---	---	---	---	0.02 0.01	---	---
7004 High Purity	74S-CAB	0.003 ---	0.004 0.0002	0.002 ---	0.0001 ---	(1.90) ---	0.0001 <0.0001	0.0001 ---	(3.90) 0.0001	0.0001 0.0001	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 0.0001	0.0001 <0.0001	---
7004 High Purity	74S-CAH	(0.004) ---	(0.003) <0.001	0.001 ---	0.001 ---	(3.4) ---	<0.001 <0.0001	<0.001 ---	(2.9) <0.0001	<0.001 0.0003	---	---	---	---	<0.0001 ---	<0.001 <0.001	<0.001 ---	---
7010 High Purity	7010-CAB	(0.11) <0.0001	(0.140) <0.0001	(1.89) ---	(0.081) ---	(2.51) ---	0.0001 <0.0001	0.0001 ---	(6.45) <0.0001	0.0001 0.0001	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 0.0001	<0.0001 (0.15)	<0.0001
7010 High Purity	7010-CAD	0.10 <0.0001	(0.14) <0.0001	1.83 ---	(0.09) ---	2.4 ---	<0.0001 <0.0001	<0.0001 ---	6.22 <0.0001	0.0001 <0.0001	---	---	0.0001 0.0003	---	<0.0001 ---	0.0001 <0.0001	<0.0001 (0.14)	<0.0001
7018 Standard	7018-AC	0.20 ---	0.33 0.019	0.16 ---	0.30 ---	1.09 ---	0.12 0.0027 <i>i</i>	0.074 ---	4.87 0.0028 <i>i</i>	0.080 0.0021	---	---	---	---	0.0010 ---	0.0069 0.018	.0033/ 0.16	0.0012

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
7018 High Purity	7018-CAB	(0.20) 0.0001	(0.39) 0.0001	(0.15) ---	(0.29) ---	(1.03) ---	(0.14) <0.0001	0.0003 ---	(4.81) <0.0001	0.0002 0.0001	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 0.0001	<0.0001 (0.14)	<0.0001
7019 High Purity	7019-CAB	(0.14) 0.0001	(0.20) 0.0054	(0.17) ---	(0.24) ---	(2.04) ---	0.0029 <0.0001	0.0072 ---	(4.00) <0.0001	0.0021 0.0001	---	---	0.0001 0.0030	---	<0.0001 <0.0001	<0.0001 0.0010	<0.0001 (0.13)	0.0001
7021 Standard	7021-AA	0.22 ---	0.38 0.015	0.029 ---	0.037 ---	1.48 ---	0.033 ---	0.035 ---	5.42 ---	0.041 ---	---	---	---	---	---	0.027 0.012	0.033 0.16	---
7021 High Purity	7021-CAB	0.005 ---	0.006 ---	(0.003) ---	<0.001 ---	(1.60) ---	<0.001 <0.0001	<0.001 ---	(5.5) 0.0001	<0.001 ---	---	---	---	---	---	(0.002) ---	<0.0001 ---	---
7022 Standard	7022-AA	0.39 ---	0.47 0.021	0.89 ---	0.30 ---	3.44 ---	0.25 0.0016	0.039 ---	4.92 0.0055 <i>i</i>	0.023 0.001	---	---	---	---	0.0013 ---	0.015 0.023	0.0034 0.0028	---
7022 High Purity	7022-CAB	(0.39) <0.0001	(0.45) <0.0001	(0.89) ---	(0.29) ---	(3.47) ---	(0.24) <0.0001	0.0002 ---	(4.84) <0.0001	0.0001 0.0006	---	---	0.0001 <0.0001	---	<0.0001 0.0003	<0.0001 0.0001	<0.0001 <0.0001	<0.0001
7031 Standard	7031-AA	0.13 ---	1.15 0.015	0.029 ---	0.21 ---	0.013 ---	0.024 0.0032 <i>i</i>	0.019 ---	1.12 0.0033 <i>i</i>	0.025 0.005	---	---	---	---	0.0035 <i>i</i> ---	0.008 <i>i</i> 0.015	0.0028 <i>i</i> 0.007	---
7031 High Purity	7031-CAB	0.13 ---	(1.23) <0.0001	0.0005 ---	(0.21) ---	0.0002 ---	0.0005 <0.0001	0.001 ---	(1.04) <0.0001	0.0002 0.0003	---	---	<0.0001 <0.0001	---	<0.0001 <0.0001	<0.0001 0.0004	<0.0001 <0.0001	---
7050 High Purity	7050-CAD	(0.11) <0.0001	(0.15) <0.0001	(2.00) ---	(0.08) ---	(2.0) ---	<0.0001 <0.0001	<0.0001 ---	(7.0) <0.0001	0.0001 0.0001	---	---	0.0001 0.0002	---	<0.0001 0.002	<0.0001 0.0001	<0.0001 (0.14)	<0.0001
7072 Standard	72S-AV	0.10 ---	0.20 0.015	0.047 ---	0.040 ---	0.039 ---	0.035 <0.0001	0.040 ---	0.98 0.0022	0.034 (0.0001)	---	---	---	---	0.0007 ---	0.040 0.005	0.0049 ---	---
7072 High Purity	72S-CAU	(0.05) ---	(0.14) 0.010	0.003 ---	(0.002) ---	<0.001 ---	<0.001 <0.0001	0.003 ---	(1.3) <0.0001	(0.006) 0.0003	---	---	<0.0001 0.0006	---	<0.0001 ---	0.0001 0.015	0.0001 ---	---
7075 Standard	7075-AF	0.19 ---	0.17 0.019	1.75 ---	0.031 ---	2.66 ---	0.22 0.0028 <i>i</i>	0.027 ---	5.75 0.0029 <i>i</i>	0.092 0.001	---	---	---	---	0.0011 ---	0.007 0.020	0.0034 <i>i</i> 0.0024	0.0009 <i>i</i>
7075 Standard	75S-CCI	---	(0.001) (0.001)	(1.6) ---	(0.001) ---	(2.4) ---	(0.001) ---	(0.001) ---	(7.5) ---	(0.001) ---	---	---	---	---	---	(0.001) (0.001)	---	---
7075 Standard	X75S-AA	0.49 ---	0.170 ---	4.25 ---	0.033 ---	0.032 ---	0.034 ---	0.03 ---	6.71 ---	0.029 ---	---	---	---	---	---	0.037 ---	---	---
7075 High Purity	7075-CAC	(0.14) <0.0001	(0.31) <0.0001	(1.66) ---	0.0002 ---	(2.64) ---	(0.21) <0.0001	0.0001 ---	(5.64) <0.0001	<0.0001 0.0003	---	---	0.0001 <0.0001	---	<0.0001 <0.0001	0.0001 0.0001	<0.0001 <0.0001	<0.0001
7075 High Purity	7075-CAE	(0.18) <0.0001	(0.29) <0.0001	(1.65) ---	0.0005 ---	(2.58) ---	(0.21) <0.0001	0.0001 ---	(5.76) <0.0001	0.0002 0.0001	---	---	0.0001 0.0003	---	<0.0001 <0.0001	<0.0001 0.0001	<0.0001 <0.0001	0.0001

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
7079 Standard	7079-AA	0.20 ---	0.24 0.020	0.66 ---	0.25 ---	3.28 ---	0.22 0.0038	0.029 ---	4.55 0.0018	0.056 0.0015	---	---	---	---	0.0013 ---	0.020 0.021	0.0026 0.0037	0.0014 ---
7079 Standard	79S-AF	0.19 ---	0.27 0.02	0.64 ---	0.22 ---	3.38 ---	0.20 ---	0.040 ---	4.68 ---	0.067 ---	---	---	---	---	---	0.040 ---	---	---
7104 Standard	420-AA	0.16 ---	0.12 0.014	0.026 ---	0.033 ---	0.028 ---	0.028 ---	0.032 ---	4.70 ---	0.024 ---	---	---	---	---	---	0.034 ---	---	---
7104 High Purity	420-CAB	---	---	(0.002) (0.001)	<0.001 ---	<0.001 ---	<0.001 ---	<0.001 ---	(4.5) <0.0001	<0.001 ---	---	---	---	---	---	<0.001 (0.002)	---	---
7146 High Purity	7146-CAD	0.22 ---	0.33 0.014	0.0006 ---	0.0029 ---	1.39 ---	0.0011 <0.0001	0.0043 ---	6.40 0.0002	0.0065 <0.0001	---	---	---	---	<0.0001 ---	<0.0001 0.010	<0.0001 0.15	---
7146 High Purity	7146-CAE	0.23 ---	0.34 ---	---	---	1.41 ---	---	---	7.64 ---	---	---	---	---	---	---	---	---	0.001 ---
8001 Standard	A200-AA	0.20 ---	0.20 ---	1.15 ---	0.043 ---	0.027 ---	0.047 ---	1.14 ---	0.05 ---	0.049 ---	---	---	---	---	---	0.04 ---	---	3.1 ---
8001 High Purity	8001-CAB	---	(0.60) 0.013	(0.001) ---	---	<0.001 ---	---	(1.20) (0.001)	---	---	---	---	0.001 ---	---	---	---	---	0.034 ---
8001 High Purity	8001-CAC	---	---	---	---	---	---	1.22 ---	---	---	---	---	0.001 ---	---	---	---	---	0.004 ---
8006 Standard	8006-AG	0.22 ---	1.60 0.020	0.042 ---	0.55 ---	0.0030 <i>i</i> ---	0.020 0.0014 <i>i</i>	0.021 ---	0.046 0.0015 <i>i</i>	0.014 0.0034	---	---	---	---	0.0012 ---	0.009 0.021	0.0017 <i>i</i> 0.0030	0.0015 ---
8007 Standard	8007-AE	0.025 ---	1.61 0.031	0.049 ---	0.56 ---	0.014 ---	0.031 0.0007 <i>i</i>	0.029 ---	1.11 0.0018 <i>i</i>	0.011 0.0032	---	---	---	---	0.0021 <i>i</i> ---	0.020 0.020	0.0027 <i>i</i> ---	---
8007 Standard	8007-AG	0.20 ---	1.63 0.018	0.051 ---	0.47 ---	0.011 ---	0.030 0.0002	0.029 ---	1.10 <0.0001	0.014 0.002	---	---	---	---	0.0023 ---	0.017 0.019	0.0002 0.019	---
8007 High Purity	8007-CAF	0.002 ---	(1.57) <0.001	0.0008 ---	(0.55) ---	0.0008 ---	0.0007 <0.0001	0.0008 ---	(1.09) <0.0001	0.0002 0.0004	---	---	---	---	<0.0001 ---	<0.001 0.001	<0.0001 <0.001	---
8008 Standard	8008-AC Replaces AB	0.19 ---	1.12 0.024	0.17 ---	0.74 ---	0.013 ---	0.053 0.0017 <i>i</i>	0.028 ---	0.049 0.0017 <i>i</i>	0.030 0.0042	---	---	---	---	0.0012 ---	0.024 0.032	0.0022 <i>i</i> 0.0039	0.0014 ---
8011 Standard	A8011-AC	0.75 ---	0.74 0.019	0.028 ---	0.022 ---	0.014 <i>i</i> ---	0.020 0.0009 <i>i</i>	0.021 ---	0.021 0.0013 <i>i</i>	0.020 0.0029	---	---	---	---	0.0007 <i>i</i> ---	0.0075 0.019	0.0009 <i>i</i> 0.0022	0.0013 ---
8015 Standard	8015-AA	0.13 ---	1.05 0.015	0.030 ---	0.18 ---	0.012 ---	0.016 0.0026 <i>i</i>	0.020 ---	0.026 0.0041 <i>i</i>	0.021 0.004	---	---	---	---	0.0033 ---	0.02 0.010	0.0025 <i>i</i> 0.014	---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Wrought Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
8015 High Purity	8015-CAB	(0.13) ---	(1.10) <0.0001	0.0005 ---	(0.22) ---	0.0003 ---	0.0004 <0.0001	0.001 ---	0.0005 <0.0001	0.0002 0.0003	---	---	<0.0001 <0.0001	---	<0.0001 ---	<0.0001 0.0004	<0.0001 <0.0001	---
8018 Standard	8018-AB	0.76 ---	0.77 0.015	0.46 ---	0.069 ---	0.0075i ---	0.017 0.0015i	0.015 ---	0.015 0.0017i	0.043 0.0026	---	---	---	---	0.0010 ---	0.0076 0.016	0.0016i 0.0030	0.0016
8021 Standard	8021-AA	0.11 ---	1.43 0.032	0.014 ---	0.0075 ---	0.0048i ---	0.010 0.0014	0.010 ---	0.010 0.0010i	0.021 0.0028	---	---	---	---	0.0011 ---	0.010 0.022	0.0018 0.0033	0.0013
8030 Standard	8030-AC	0.066 ---	0.830 0.029	0.20 ---	0.0032 ---	0.018 ---	0.020 0.0016i	0.024 ---	0.014 0.0018i	0.003 0.006	---	---	---	---	0.0009 ---	0.027 0.020	0.0025i 0.0028	0.0018
8050 High Purity	8050-CAB	---	---	---	---	0.023 ---	---	---	(4.9) ---	---	---	---	---	---	---	---	(4.9) ---	---
8079 Standard	8079-AF	0.21 ---	1.08 0.020	0.020i ---	0.020i ---	0.0028i ---	0.020 0.0016i	0.020 ---	0.020 0.0015i	0.020 0.0017	---	---	---	---	0.0008i ---	0.0078 0.020	0.0015i 0.0019	0.0012
8079 Standard	8079-CAE	(0.21) <0.0001	(1.06) <0.0001	0.0001 ---	0.0001 <0.0001	0.0002 ---	0.0001 <0.0001	0.0001 ---	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
8081 High Purity	8081-CAB	(0.003) ---	(0.40) (0.001)	(0.97) ---	(0.005) ---	0.001 ---	---	(0.003) ---	(0.02) <0.0001	(0.002) ---	---	---	---	---	---	(0.001) (0.001)	<0.0001 ---	---
8112 Standard	8111-AC	0.49 ---	0.66 0.019	0.0035 ---	0.021 ---	0.013 ---	0.020 0.0023i	0.024 ---	0.015 0.0037i	0.020 0.005	---	---	---	---	0.0035 ---	0.015i 0.020	0.0020i 0.019	---
8112 Standard	71S-AR	0.24 ---	0.50 ---	0.55 ---	0.21 ---	0.39 ---	0.0430 ---	0.05 ---	0.81 ---	0.036 ---	---	---	---	---	---	0.037 ---	---	---
8112 Standard	8112-AA	0.52 ---	0.66 0.028	0.26 ---	0.11 ---	0.014 ---	0.024 0.0012i	0.020 ---	0.035 0.0026i	0.028 0.0056	---	---	---	---	0.0011 ---	0.011 0.028	0.0025i 0.015	0.0035
8112 Standard	8112-AB	0.071 ---	0.66 0.029	0.18 ---	0.18 ---	0.020 ---	0.029 0.0017	0.031 ---	0.050 0.0018	0.029 0.0036	---	---	---	---	0.0011 ---	0.011 0.029	0.0020 0.0030	0.0014
8280 High Purity	8280-CAC	(1.4) ---	(0.4) ---	(1.0) ---	<0.001 ---	(0.002) ---	<0.001 <0.0001	(0.45) ---	<0.005 (0.0003)	(0.002) 0.0002	---	---	---	---	---	(0.002) ---	(0.002) ---	---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Specialty Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Ti	Bi V	Ca Zr	Cd
Binary High Purity	1S-CAB	0.09	0.11	---	---	---	---	---	---	---	---	---	0.027	---	---	---	---	---
Binary High Purity	1S-CAF Replaces CAB	(0.065)	(0.135)	---	---	---	---	---	---	---	---	---	0.029	---	---	---	---	---
Binary High Purity	1S-CAM Replaces VF	0.16	0.25	---	---	---	---	---	---	---	---	---	0.0082	---	---	---	---	---
Binary High Purity - M	1S-CLM	(0.04)	(0.03)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CLP	(0.05)	(0.05)	---	---	---	---	---	---	---	---	---	0.40	---	---	---	---	---
Binary High Purity - M	1S-CNT	(0.05)	(0.17)	---	---	---	---	---	(0.012)	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CPJ	<0.01	<0.01	---	---	---	---	---	---	---	---	---	0.003	---	---	---	---	---
Binary High Purity - M	1S-CPN	(0.10)	(0.12)	---	---	---	---	---	0.40	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CPS	(0.07)	(0.07)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CQL	(0.05)	(0.06)	---	---	---	---	---	---	---	0.10	---	---	---	---	---	---	---
Binary High Purity - M	1S-CSN	(0.05)	(0.10)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CSO	(0.05)	(0.10)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CTX	1.06	(0.10)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity	1S-CVD	0.10	0.19	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	7.44	(0.03)	---	---	---	---	---	(0.03)	---	---
Binary High Purity	1S-CVE	0.10	0.19	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	9.18	(0.03)	---	---	---	---	---	(0.03)	---	---
Binary High Purity - M	1S-CVL	0.08	0.15	0.29	---	---	---	---	---	---	---	---	---	---	---	---	---	---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Specialty Aluminum Alloy CRMs

Please call for availability and current pricing - (303) 216-2621 or (800) 421-9454

AA No. Type	Part No. RTA-xxx	Si Co	Fe Ga	Cu Ge	Mn Hg	Mg In	Cr Li	Ni Mo	Zn Na	Ti P	Ag Pb	As Sb	B Sn	Ba Sr	Be Tl	Bi V	Ca Zr	Cd
Binary High Purity - M	1S-CWV	(0.06)	(0.16)	---	---	0.08	---	---	0.12	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CWW	0.06	0.15	---	0.08	---	0.24	---	---	---	---	---	---	---	---	---	0.11	---
Binary High Purity - M	1S-CXM	(0.07)	(0.140)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity - M	1S-CXN	(0.06)	(0.13)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.1800
Binary High Purity	1S-CXO	0.11	0.18	0.20	0.00	0.019	<0.001	0.013	0.021	(0.004)	---	---	(0.01)	---	0.0008	0.0160	0.01	---
Binary High Purity	1S-CXS	(0.08)	(0.090)	---	---	---	---	---	---	---	---	---	---	---	0.0032	---	0.0031	---
Binary High Purity	1S-CXT	(0.07)	(0.10)	---	---	---	---	---	---	---	---	---	---	---	0.0016	---	0.00	---
Binary High Purity	1S-CYF	(0.07)	(0.10)	---	---	---	---	---	---	---	---	---	---	---	0.0056	---	0.008	---
Binary High Purity	1S-CZL	(0.07)	(0.16)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity	1S-CZN	(0.10)	(0.20)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity	1S-CZS	(0.11)	(0.15)	---	---	---	---	---	---	---	---	---	---	---	0.00	---	---	0.001
Binary High Purity	1S-CZU	0.11	2.47	0.001	0.00	0.001	0.001	0.002	<0.0001	0.001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	---
Binary High Purity	1S-CZW	0.00	0.59	0.000	0.00	0.000	0.000	0.001	<0.0001	<0.0001	---	---	<0.0001	---	<0.0001	<0.0001	<0.0001	---
Binary High Purity	1S-CZZ	0.094	1.44	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Binary High Purity	1S-WN	0.15	0.80	0.0440	0.21	0.04	0.0400	0.04	0.0420	0.0280	---	---	---	---	---	0.04	---	---
		0.0050	0.003	---	---	---	---	---	---	---	0.038	<0.0001	0.045	---	---	0.0140	---	---

i = Individual Value () = Not Certified
 < = Less than 'Type' - M = Mushroom

Rio Tinto Alcan Bauxite Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Percentage by Weight (Dry basis)

Determined by XRF, ICP and gravimetry

	Loss of Mass LOM	Al as Al ₂ O ₃	Fe as Fe ₂ O ₃	Si as SiO ₂	Ti as TiO ₂	Na as Na ₂ O	Ca as CaO	S* as SO ₃	Cr as Cr ₂ O ₃	Zr as ZrO ₂	V as V ₂ O ₅	P as P ₂ O ₅	Mg as MgO	K as K ₂ O	Mn as MnO ₂	Zn as ZnO	Organic C as C
BXT-02	27.0	50.9	17.8	1.56	1.87	0.04	0.04	0.08	0.068	0.05	0.06	0.15	0.09	0.01	0.01	0.009	0.07
BXT-04	25.7	48.5	17.0	2.68	5.32	0.02	0.02	0.13	0.090	0.06	0.19	0.13	0.05	0.03	0.04	0.003	0.12
BXT-05	27.2	46.8	19.2	1.98	2.25	0.03	1.13	0.21	0.108	0.06	0.11	0.38	0.08	0.01	0.32	0.026	0.28
BXT-06	27.2	48.7	18.9	0.80	2.67	0.03	0.13	0.15	0.134	0.07	0.13	0.61	0.06	0.01	0.27	0.023	0.14
BXT-08	25.6	51.5	9.6	3.17	9.41	0.02	0.02	---	0.048	0.10	0.19	0.26	0.04	0.02	0.02	0.006	0.07
BXT-09	20.8	53.4	14.5	7.57	2.98	0.01	0.01	0.06	0.037	0.12	0.06	0.07	0.002	0.01	0.03	0.04	0.20
BXT-10	28.6	54	12.4	2.7	2.01	---	<0.01	---	0.03	0.07	0.06	0.05	---	<0.01	0.01	---	0.08
BXT-11	27.4	54.2	12.8	1.49	3.39	0.03	0.01	---	0.10	0.08	0.11	0.15	0.03	0.02	0.01	0.003	0.11
BXT-12	26.13	50.67	15.9	3.58	3.18	0.02	0.012	0.14	0.031	0.138	0.088	0.067	0.037	0.011	---	0.0021	0.243
BXT-13	28.52	53.4	11.44	4.82	1.54	0.01	0.02	0.09	0.016	0.08	0.04	0.02	0.01	0.01	0.01	0.002	0.051
BXT-14	28.35	51.2	13.17	5.86	1.11	0.01	0.01	0.11	0.01	0.131	0.01	0.062	0.01	0.01	0.02	0.005	0.162
BXT-15	12.20	51.1	24.9	3.09	3.83	---	3.34	---	0.20	0.089	0.089	0.053	0.16	0.040	0.020	0.005	---

* Tentative values

Percentage by Weight (Dry basis)

Determined by Laboratory Bomb Digests

	Extractable Al ₂ O ₃	Low Temp. Extractable SiO ₂ Si 150	Low Temp. Extractable Al ₂ O ₃ Al 150	High Temp. Extractable SiO ₂ Si 225	High Temp. Extractable Al ₂ O ₃ Al 225
BXT-02	---	1.1	46.5	1.3	49.5
BXT-04	---	2.3	42.5	2.5	46.3
BXT-05	---	1.5	42.4	1.7	44.5
BXT-06	---	0.5	45.5	0.7	47.4
BXT-08	---	2.9	41.7	3.0	48.5
BXT-09	---	5.9	26.4	6.8	46.5
BXT-10	---	2.0	51	2.4	52
BXT-11	---	0.8	44.6	1.1	51.8
BXT-12	49.1	2.76	45.4	3.54	48.4
BXT-13	53.3	4.2	49.2	4.5	53.3
BXT-14	50.4	1.1	49.0	5.2	46.0

Rio Tinto Alcan Red Mud Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Percentage by Weight (Dry basis)

Determined by Laboratory Bomb Digests

	Loss of Mass LOM	Al as Al ₂ O ₃	Fe as Fe ₂ O ₃	Si as SiO ₂	Ti as TiO ₂	Ca as CaO	Na as Na ₂ O	Al 143 or g Al ₂ O ₃	T.E.A.	Organic C as C
RM-01	12.0	16.8	53.8	5.4	5.9	3.5	1.4	0.6	4.6	0.36
RM-02	8.4	13.9	30.7	6.2	22.6	11.2	3.0	1.9	5.7	0.16
RM-05	8.9	21.9	35.6	15.7	7.1	0.9	8.3	1.7	6.9	0.22
RM-08	17.2	28.2	4.8	16.7	8.6	13.9	8.7	0.2	13.3	0.27

Rio Tinto Alcan Alumina Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Percentage by Weight (Dry basis)

Determined by XRF, ICP and gravimetry

	Loss of Mass LOM	Na as Na ₂ O	Si as SiO ₂	Fe as Fe ₂ O ₃	Ca as CaO	V as V ₂ O ₅	P as P ₂ O ₅	Ga as Ga ₂ O ₃	S as SO ₃	Ti as TiO ₂	Zn as ZnO
ALU-01	1.2	0.27	0.013	0.016	0.017	0.002	0.0005	0.011	0.12	0.004	0.001
ALU-03	0.77	0.44	0.010	0.011	0.010	0.001	---	0.009	0.05	0.006	0.001
ALU-04	0.49	0.46	0.021	0.017	0.020	0.003	---	0.009	0.07	0.009	0.001
ALU-05	0.83	0.37	0.014	0.008	0.033	0.001	---	0.007	0.13	0.002	0.010
ALU-06	1.31	0.36	0.017	0.008	0.043	0.001	---	0.005	0.11	0.001	0.009
ALU-07	0.89	0.46	0.025	0.023	0.049	0.004	---	0.006	0.17	0.004	0.001
ALU-08	0.57	0.42	0.007	0.022	0.008	0.003	---	0.014	0.09	0.002	0.001
ALU-09	0.60	0.42	0.018	0.008	0.026	0.001	0.0002	0.009	0.08	0.001	0.001
ALU-10	0.6	0.37	0.005	0.015	0.004	0.002	0.002	0.013	0.08	0.002	---
ALU-11	0.81	0.42	0.0056	0.0097	0.017	0.0005	0.0002	0.0139	0.03	0.0010	0.0086
ALU-12	1.02	0.36	0.021	0.0063	0.033	0.0021	0.0015	0.0057	0.185	0.0009	0.0094
BU	---	0.74	0.024	0.034	---	0.01	0.0005	0.016	0.17	0.006	(0.001)
BW	---	0.86	0.028	0.038	---	0.006	---	(0.015)	0.27	0.006	0.001

	Min. Bulk Density (g/cm ³)	Max. Bulk Density (g/cm ³)	Angle of repose	Air Permeability (Centidarcys)	SSA (g/cm ³)	Attrition Index (%)	Dustiness Index (kg/t)	α-Alumina (%)
ALU-10	0.967	1.19	---	---	55.60	29.4	0.54	---
ALU-11	---	---	---	---	70.30	11.2	---	---
ALU-12	---	---	---	---	82.90	27.2	---	14.3
ALU-87	0.96	1.15	33.6	4.3	---	1 *	---	---

Ro-Tap (Woven sieves)						
	>150 μm (%)	>106 μm (%)	>75 μm (%)	>53 μm (%)	>45 μm (%)	Median (μm)
ALU-10	0.0	8.7	55.7	80.8	86.6	75.9

Granulometric Analysis (Electroformed Sieve)								
	>150 μm (%)	>106 μm (%)	>75 μm (%)	>53 μm (%)	>45 μm (%)	Median (μm)	Q1 as μm	Q3 as μm
ALU-12	<0.02	5.3	52.6	90.0	96.4	76.0	87.9	62.9

Rio Tinto Alcan Petroleum Coke Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Green Petroleum Coke

Percentage by Weight (Dry basis)

Determined by XRF, ICP and gravimetry

	Fe	Mn	Ni	Si	Zn	Ca	V	S	Ti	Na	Ash	Volitile Matters
GPC-DF	0.028	0.0003	0.050	0.022	0.006	0.028	0.040	1.58	---	---	---	---
DG	0.023	0.0002	0.038	0.014	0.0011	0.0130	0.035	1.59	---	---	---	---
DH	0.019	0.0001	0.021	0.006	0.0008	0.004	0.034	2.40	---	---	---	---
DI	0.017	0.0001	0.004	0.013	0.0008	0.007	0.004	1.02	---	---	---	---
DJ	0.027	0.0005	0.003	0.12	0.0004	0.015	0.0030	0.64	---	---	---	---
DL	0.010	0.0003	0.012	0.018	0.0003	0.011	0.006	0.78	---	0.021	0.20	10.4

Calcined Petroleum Coke

Percentage by Weight (Dry basis)

Determined by XRF, XRD, ICP, AA, Combustion, & Gravimetry

	Na Cr	Mg Mn	Al Fe	Si Ni	S Zn	P Cu	K Pb	Ca Cl	V Ba	Ti Ash	Density (g/cm ³)	Crystallinity Lc - Å
PCC-02	---	---	---	---	---	---	---	---	---	---	0.860	0.86
PCC-04	---	---	---	---	---	---	---	---	---	---	0.860	0.86
PCC-07	0.0111 0.0012	0.0035 0.0071	0.0060 0.606	0.0165 0.153	1.93 0.0003	0.0007 0.0004	0.0198 0.0002	0.0495 0.0013	0.0271 0.0003	0.0016 1.235	1.380	27.51
PCC-08	0.0197 0.0024	0.0055 0.0138	0.0051 1.23	0.0248 0.0011	0.029 0.0003	0.0015 0.0005	0.0393 0.0002	0.0925 0.0014	0.0003 0.0009	0.0007 2.237	1.386	30.74
PCC-09	0.0047 0.0003	0.0233 0.0008	0.0211 0.0408	0.0299 0.0135	5.97 0.0022	0.0022 0.0004	0.0015 0.0004	0.0641 0.0037	0.0388 0.0008	0.0007 0.550	1.382	23.90
PCC-10	0.0073 0.0005	0.0024 0.0006	0.0177 0.0494	0.0440 0.0201	3.29 0.0005	0.0007 0.0002	0.0018 0.0002	0.0093 0.0031	0.0428 0.0008	0.0012 0.375	1.382	23.29

* Tentative values

Rio Tinto Alcan Anthracite & Met. Coke Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Anthracite

	Percentage by Weight (Dry basis)						Determined by XRF, ICP and gravimetry	
	Fe	Ni	Si	Ca	V	S	Ash	Real Density g/cm ₃
AU	0.32	0.004*	1.8	0.083	0.004*	0.57	7.8	1.76
DM	0.32	0.003*	1.9	0.17	0.004*	0.40	8.6	1.85

* Tentative Values

Metallurgical Coke

	Percentage by Weight (Dry basis)						Determined by XRF, ICP and gravimetry		
	Fe	Ni	Si	Zn	Ca	V	S	H	Ash
AS	0.45	---	2.3	---	---	---	0.84	---	---
AZ	0.77	---	2.4	---	0.099	0.005	1.05	---	---
BY	0.60	0.002	2.4	---	0.085	0.004	0.96	---	10.0
CA	0.40	---	2.64	---	0.066	<0.001	0.65	0.50	10.1
CB	0.36	0.011	1.62	---	---	0.003	0.54	---	7.5

Rio Tinto Alcan Pitch Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Pitch Elemental Composition

Percentage by Weight (Dry basis)

Determined by XRF, ICP and gravimetry

	Fe	Mn	Ni	Si	Zn	Ca	V	S	Na	Pb	Ti	P	C	H
Pitch-04	0.015	0.0009	0.0003	0.075	0.047	0.0076	0.0001	1.05	0.011	0.036	0.0003	0.0066	---	---
Pitch-05	0.059	0.0004	0.0004	0.154	0.016	0.0066	0.00020	0.54	0.0020	0.027	0.0025	0.0030	---	---
Pitch-06	0.027	0.0003	0.0003	0.082	0.0074	0.0042	0.00010	0.50	0.013	0.0081	0.0015	0.0003	---	---
Pitch-07	0.032	0.0010	0.0004	0.0080	0.074	0.0082	0.00003	0.57	0.011	0.051	0.00030	0.0018	---	---
Pitch-08	---	---	---	---	---	---	---	0.55	---	---	---	---	93.5	4.1

Not to be used for XRF calibration

Pitch Physical Properties

	%					g/mL	°C		
	Ash @ 700° C	Ash @ 900° C	Coking Value	Quinoline Insoluble	Toluene Insoluble	Real Density	Softening Point	EVT ₁	EVT ₁₀₀
Pitch-02	0.37	---	---	---	---	---	---	---	---
Pitch-08	0.17	1.16	60.9	14.4	28.5	1.34	111.6	167	121

Rio Tinto Alcan Fluorspar Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Raw Fluorspar

	Percentage by Weight (Dry basis)				Determined by Wet Chemistry ICP and XRF				
	F	Si	CO ₂	Fe	Al	Mg	Pb	P	
RF-CAA	35.4	8.3	3.3	0.46 *	---	---	---	0.0038	
RF-CAB	35.0	8.6	3.3	---	---	---	---	0.0038	
RF-CAC	35.6	8.5	2.6	0.57	---	---	---	0.0041	
RF-CAG	40.5	2.61	5.5 *	---	---	---	---	0.021	
RF-CAH	37.2	6.4	2.6 *	0.43	---	---	---	0.048	
RF-CAI	30.0	9.3	4.9 *	0.77 *	1.10 *	0.48 *	0.25 *	0.0070	
RF-CAJ	46.4	0.42 *	0.7 *	0.063 *	---	---	---	0.025	
RF-CAK	44.80	0.47	3.30	0.10	0.095 *	---	---	0.0052	

* Tentative Values

Fluorspar Final Concentrate

	Percentage by Weight (Dry basis)				Determined by Wet Chemistry ICP and XRF				
	F	Si	CO ₂	Fe	Al	Mg	Pb	P	
FC-CAA	47.2	0.72	0.37	0.028 *	---	---	---	0.0021	
FC-CAB	45.6	1.20	1.58	---	---	---	---	0.0021 *	
FC-CAC	47.2	0.51	0.53	0.03	---	---	---	0.0021	
FC-CAL	44.8	0.34	3.42	0.09	0.074 *	---	---	0.0048	
FC-CBI	45.4 *	0.58 *	1.98 *	0.077 *	---	0.42 *	---	---	

* Tentative Values

Rio Tinto Alcan Electrolytic Bath Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Percentage by Weight (Dry basis)

Determined by Wet Chemistry ICP and XRF

	Calcium as CaF ₂	Ratio NaF/AlF ₃	Excess AlF ₃	Magnesium as MgF ₂	Free Alumina	Alpha Alumina	Chloride as NaCl	Lithium as LiF
BA-01	6.2	1.06	12.4	---	7.0	1.5	---	---
BA-02	5.7	1.12	10.8	---	2.7	0.3	---	---
BA-03	5.7	1.46	0.9	---	4.1		---	---
BA-05	4.5	1.02	11.3	---	23.6	17.3	---	---
BA-06	4.5	1.00	12.2	---	23.3	16.7	0.25*	---
BA-07	8.3	1.23	6.9	---	6.8	5.3	---	---
BA-08	9.0	1.37	3.2	---	7.3	4.6	---	---
BA-09	9.5	1.44	1.3	---	7.8	5.8	---	---
BA-10	6.7	1.30	5.2	---	6.0	4.9	---	---
BA-11	8.1	1.46	1.06	---	5.3	2.9	---	---
BA-12	6.0	---	3.8#	0.21	4.2	2.8	---	2.72
BA-13	5.4	---	0.6#	0.24	4.2	0.7	---	2.47
BA-14	3.65	---	1.4#	3.40	3.3	1.9	0.25*	2.04
BA-15	6.9	---	5.7#	0.28	6.0	4.4	---	0.95
BA-16	6.3	---	3.7#	0.22	4.0	3.3	---	3.08
BA-17	5.4	---	0.6#	0.16	5.1	3.4	0.25*	2.61
BA-CCB	21.3	1.71	(3.9)	0.19	2.6	---	---	---
BA-CCE	4.0	1.51	(0.2)	0.19	10.6	---	---	---

* Tentative Values, # Not intended for XRD calibration

Rio Tinto Alcan Misc. Standards

Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454

Aluminum Fluoride

	Percentage by Weight (Dry basis)			Determined by Wet Chemistry, ICP and XRF			
	Fe	Si	Na	F	S	P	Ca
ALF-01	0.009	0.07	0.32	(62.0)	0.28	0.010	0.017
ALF-02	0.01	0.13	0.26	(63.0)	0.26	0.010	0.014
ALF-03	0.009	0.12	0.27	(64.3)	0.25	0.009	0.014
ALF-04	0.007	0.10	0.29	(63.0)	0.31	0.009	0.016
ALF-CAB	0.056	0.42	1.00	57.2	0.16	0.0026	0.024
ALF-CAC	0.049	0.68	0.92	61.8	0.20	0.0017	0.024
ALF-CAN	0.018	0.10	0.22	(62.4)	0.23	0.009	0.16
ALF-CAO	0.020	0.13	0.69	(57.7)	---	0.004	0.18

Scrubber Alumina

	Percentage by Weight (Dry basis)			Determined by Wet Chemistry, ICP and XRF		
	Fe	Si	Al	S	Na	F
SA-CDH	---	---	---	---	---	0.074

Cryolite

	Percentage by Weight (Dry basis)			Determined by Wet Chemistry, ICP and XRF		
	Fe	Si	Al	S	Na	F
C-CAA	0.053	0.26	13.5	1.71	30.6	40.5
C-CAB	0.067	0.16	11.9	2.59	30.1	44.3
C-CAC	0.039	0.24	11.9	2.16	32.9	44.7
C-CAG	0.013	0.035	12.2	1.28	31.9	47.7

SUS Introduction

Set-Up-Standards (Drift Correction)

Set-Up-Standards (SUSs) are used to “drift correct” the calibration curves. The process of drift correcting the curves has many names: normalization, standardization, and re-calibration. Regardless of the name given the process, the curves are adjusted back to their state at the time of the original calibration.

It is not important to have accurate chemistries for SUSs; chemistries at +/-10 percent are sufficient. Corrections to the calibration curves are made on intensities, not concentrations. It is important to have 1) homogeneous material, and 2) material that does not vary within a specific lot. It is perfectly fine to have chemistries vary from one lot to another of SUSs; it is a very fast and easy change over when one lot of the SUSs is exhausted.

Timing for implementing drift correction is critical. Some laboratories periodically run check or SPC standards to determine if the instrument is within the allowed tolerances. The stability and duty cycle of the instrument determine the period for checking drift. It should at least be checked every hour or before a batch of samples are run to assure quality of results.

If drift detection tolerances are not set up, it is imperative that drift correction, at a minimum, is accomplished every shift for laboratory instruments and hourly for mobile instruments. If the analyst is unsure about the state of the instrument, drift correction should immediately precede the analysis of any samples, for optimum accuracy.

Check Standards

The best way to assure routine analytical performance is to periodically run a CRM. The permitted tolerances can be established by running precision on the check standards right after calibrating. How often you run the check standards will depend on the stability of the spectrometer.

Statistical Process Control (SPC) Standards

SPC reference materials can be the same as Check Standards. SPC is a long established practice for appraising product quality. SPC for the analytical measurement process is analysis of good quality reference materials at regular time intervals, storing that data for various statistical applications (e.g., control charts with upper and lower control limits), and using the statistical summary to decide if corrective action is necessary. In addition, the data record can be used to prove that the instrument was “in control” over a certain period or during a specific sample analysis.

Set-Up Standards (SUSs)		Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454												
IARM	Grade	Ag	B	Be	Bi	Ca	Cd	Cr	Co	Cu	Fe	Ga	Li	Mg
Status		Mn	Na	Ni	P	Si	Sb	Sn	Sr	Ti	V	Zn	Zr	Mo
220F	QA 10	---	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	---	<0.0001	(0.0002)	(0.0003)	<0.0001	<0.0001	(0.0002)
Final		(0.0001)	<0.0001	<0.0001	(0.0001)	(0.0003)	(0.0001)	<0.0001	<0.0001	<0.0001	<0.0001	(0.0002)	<0.0001	<0.0001
221A	QA 11	---	---	(0.005)	---	(0.03)	---	(0.22)	(0.2)	(0.6)	(0.2)	(0.03)	---	(4.8)
Final		(0.4)	---	---	---	(0.2)	(0.01)	---	---	(0.1)	---	(6.8)	---	---
221B	QA 11	---	---	(0.005)	---	(0.03)	---	(0.22)	(0.2)	(0.6)	(0.2)	(0.03)	---	(4.8)
Final		(0.4)	---	---	---	---	(0.01)	---	---	(0.1)	---	(6.8)	---	---
221C	QA 11	---	---	(0.005)	---	(0.03)	---	(0.22)	(0.2)	(0.6)	(0.2)	(0.03)	---	(4.8)
Final		(0.4)	---	---	---	---	(0.01)	---	---	(0.1)	---	(6.8)	---	---
221D	QA 11	---	---	(0.005)	---	(0.03)	---	(0.22)	(0.2)	(0.6)	(0.2)	(0.03)	---	(4.8)
Final		(0.4)	---	---	---	---	---	---	---	(0.1)	---	(6.8)	---	---

() and < > Indicates non-certified value.

Alcoa Aluminum Set-Up Standards (SUSs)																Please call for availability and current pricing – (303) 216-2621 or (800) 421-9454
Grade	Ag	As	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	Li	Mg	
	Mn	Mo	Na	Ni	P	Pb	Sb	Sc	Si	Sn	Sr	Ti	V	Zn	Zr	
SQ-10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
SQ-11	---	---	---	(0.005)	---	(0.02)	---	(0.01)	(0.25)	(0.5)	(0.2)	(0.03)	---	---	(3.0)	
	(0.4)	---	---	---	---	---	(0.01)	---	(0.20)	---	---	(0.10)	---	(6.60)	---	
SQ-12	(0.05)	---	---	(0.005)	(0.06)	---	(0.20)	(0.01)	---	(4.8)	(0.6)	(0.03)	(0.01)	---	(0.15)	
	(1.1)	---	---	(0.25)	(0.015)	(0.06)	---	---	(1.1)	(0.06)	---	---	(0.10)	(0.20)	(0.15)	
SQ-13	---	---	---	(0.005)	(0.04)	---	(0.04)	(0.01)	(0.04)	(0.04)	(0.6)	(0.03)	---	---	(0.04)	
	(0.04)	---	---	(0.04)	---	(0.04)	---	---	(0.5)	(0.04)	---	(0.04)	(0.04)	(0.04)	(0.04)	
SQ-14	---	---	---	(0.002)	(0.5)	---	---	---	---	(0.5)	(0.1)	---	---	---	(0.9)	
	(0.4)	---	---	(0.4)	---	(0.5)	---	---	(0.1)	---	(0.1)	---	(1.2)	---	---	
SQ-15	---	---	---	---	---	---	---	---	(0.05)	(0.5)	(0.7)	---	---	---	(1.2)	
	(0.05)	---	---	(2.5)	---	---	---	---	(12.0)	---	(0.02)	(0.1)	---	---	---	
SQ-16	---	---	---	---	---	---	---	---	---	(10.0)	(1.0)	---	---	---	(0.3)	
	(0.2)	---	---	(0.2)	---	---	---	---	(4.0)	---	---	---	---	(0.2)	---	
SQ-17	---	---	---	(0.005)	(0.08)	---	---	---	(0.25)	(0.35)	(0.4)	(0.03)	---	---	(1.6)	
	(0.12)	---	---	(0.12)	---	(0.1)	---	---	(0.7)	(0.1)	---	(0.08)	(0.03)	(0.12)	---	
SQ-18	---	(0.01)	(0.02)	---	---	---	---	---	---	---	---	---	---	(0.02)	---	
	---	---	(0.02)	---	---	---	---	---	---	---	---	---	---	---	---	
SQ-19	---	(0.03)	---	---	---	---	---	---	(0.1)	(0.5)	(0.1)	(0.01)	---	---	(0.9)	
	---	---	---	---	(0.01)	---	(0.02)	(0.2)	(0.6)	---	---	---	(0.01)	(0.3)	(0.007)	

() Indicates non-certified value.