



ALCAN NON-METALLIC STANDARDS

Alcan International Limited
Arvida Research and Development Centre



Technical Information

All requests for technical information on the use, preparation, certification or source of Alcan standard samples should be addressed to:

Alcan International Limited
Arvida Research and Development Centre
Analytical Technologies
STANDARD SAMPLES

Phone: (418) 699-6585 ext. 2450
Fax: (418) 699-2919

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Introduction


The need for fast and accurate analysis of materials used or produced by today's industry led to the development of analytical techniques capable of accurate determination of multiple characteristics with ever-tighter tolerance limits.

Alcan has responded to these trends by continuously upgrading the availability of quality of the certified reference materials (CRM's) it produces and uses to control its processes and to certify its products. It has also made these CRM's available to its clients and the aluminum industry in general. They consist of typical raw materials, process intermediates and products whose composition and physico-chemical properties have been characterized through round robins under the supervision of the Arvida Research and Development Centre to ISO guide 25 criteria. A limited supply of environment-related standard samples is also available upon special request.

This catalogue contains an up-to-date list of Alcan non-metallic certified reference materials used to calibrate or standardize instrumental techniques such as XRF, ICP, AAS, XRD, DSC, particle size determination, etc. and to assure traceability of wet chemical analyses. The certified value and its uncertainty, expressed as one standard deviation are indicated where available, detailed information is given on the certificates of analysis. The increasing drive to ISO 9000 accreditation has made Alcan CRM's ideal components of quality assurance/quality control activities. The CRM's are offered for sale subject to availability from stock. Alcan reserves the right to discontinue any standard, limit the quantity supplied or change the price at any time. Every effort will be made to replace a standard that is not available with an appropriate substitute. Alcan cannot accept any liability for damage arising from the use of its CRM's.

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Preparation and Certification

Alcan non-metallic standards are powdered samples and are sold in quantities varying from 500 mg to 500 g according to their end-use. The standard samples are prepared from a bulk supply of a representative material, are well homogenized and tested for uniformity of composition using XRF or Electric Sensing Zone.

Alcan standard samples for composition are certified by using at least two independent, absolute methods of analysis, such as XRF, ICP, AAS or colorimetric, titrimetric and gravimetric techniques. If only one technique is available, two technicians using two separate setups

generate 10 independent results each. Alcan standard sample are certified against primary (absolute) calibrations and are NIST traceable. An inter-laboratory comparison is finally initiated to achieve uniform consensus values. All data are statistically analyzed to ensure that the certified characteristic is of the highest accuracy.

This catalog lists the nominal composition/characteristic of the presently available standard samples. The actual certified composition/characteristic along with the corresponding standard deviations are given on the certificate of analysis issued with each standard sample.

Bayer Process

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Bauxite

Percentage by Weight (Dry basis)									
Determined by XRF, ICP and gravimetry									
Bauxite	Loss of Mass LOM	Aluminum as Al_2O_3	Iron as Fe_2O_3	Silicon as SiO_2	Titanium as TiO_2	Zirconium as ZrO_2	Phosphorus as P_2O_5	Vanadium as V_2O_5	Sulphur* as SO_3
BXT-01	31.08 ± 0.02	58.3 ± 0.4	5.1 ± 0.2	0.95 ± 0.02	3.46 ± 0.07	0.09 ± 0.01	0.13 ± 0.02	0.07 ± 0.03	0.05
BXT-02	27.0 ± 0.1	50.9 ± 0.6	17.8 ± 0.2	1.56 ± 0.04	1.87 ± 0.04	0.05 ± 0.01	0.15 ± 0.02	0.06 ± 0.01	0.08
BXT-03	28.9 ± 0.2	54.1 ± 0.4	11.7 ± 0.2	3.79 ± 0.09	1.05 ± 0.09	0.06 ± 0.01	0.02 ± 0.01	0.04 ± 0.01	0.09
BXT-04	25.7 ± 0.1	48.5 ± 0.4	17.0 ± 0.2	2.68 ± 0.07	5.32 ± 0.06	0.06 ± 0.01	0.13 ± 0.02	0.19 ± 0.03	0.13
BXT-05	27.2 ± 0.2	46.8 ± 0.4	19.2 ± 0.2	1.98 ± 0.05	2.25 ± 0.04	0.06 ± 0.01	0.38 ± 0.02	0.11 ± 0.02	0.21
BXT-06	27.2 ± 0.3	48.7 ± 0.5	18.9 ± 0.3	0.80 ± 0.02	2.67 ± 0.04	0.07 ± 0.01	0.61 ± 0.03	0.13 ± 0.02	0.15
BXT-07	24.7 ± 0.2	44.6 ± 0.7	25.2 ± 0.6	2.41 ± 0.07	2.41 ± 0.07	0.07 ± 0.01	0.14 ± 0.02	0.07 ± 0.01	0.16
BXT-08	25.6 ± 0.2	51.5 ± 0.5	9.6 ± 0.3	3.17 ± 0.05	9.41 ± 0.05	0.10 ± 0.01	0.26 ± 0.01	0.19 ± 0.04	...
BXT-09	20.8 ± 0.1	53.4 ± 0.4	14.5 ± 0.3	7.57 ± 0.07	2.98 ± 0.06	0.12 ± 0.01	0.07 ± 0.01	0.06 ± 0.01	0.06

* Tentative values

Bauxite

Percentage by Weight (Dry basis)					Determined by XRF, ICP and gravimetry			
Bauxite	Chromium as Cr ₂ O ₃	Calcium as CaO	Magnesium as MgO	Manganese as MnO ₂	Zinc as ZnO	Potassium as K ₂ O	Sodium* as Na ₂ O	Organic Carbon as C
BXT-01	0.065 ± 0.005	0.57 ± 0.04	0.02 ± 0.01	0.02 ± 0.01	0.002 ± 0.001	0.01 ± 0.01	0.04	0.08 ± 0.01
BXT-02	0.068 ± 0.009	0.04 ± 0.02	0.09 ± 0.02	0.01 ± 0.01	0.009 ± 0.004	0.01 ± 0.01	0.04	0.07 ± 0.01
BXT-03	0.016 ± 0.02	< 0.01	0.01 ± 0.01	0.01 ± 0.01	0.002 ± 0.001	< 0.01	0.02	0.03 ± 0.01
BXT-04	0.090 ± 0.05	0.02 ± 0.01	0.05 ± 0.01	0.04 ± 0.01	0.003 ± 0.003	0.03 ± 0.01	0.02	0.12 ± 0.02
BXT-05	0.108 ± 0.003	1.13 ± 0.08	0.08 ± 0.02	0.32 ± 0.02	0.026 ± 0.003	0.01 ± 0.01	0.03	0.28 ± 0.03
BXT-06	0.134 ± 0.002	0.13 ± 0.03	0.06 ± 0.02	0.27 ± 0.04	0.023 ± 0.002	0.01 ± 0.01	0.03	0.14 ± 0.02
BXT-07	0.047 ± 0.004	0.01 ± 0.01	0.04 ± 0.01	0.08 ± 0.01	0.006 ± 0.002	0.01 ± 0.01	0.02	0.08 ± 0.01
BXT-08	0.048 ± 0.004	0.02 ± 0.01	0.04 ± 0.02	0.02 ± 0.01	0.006 ± 0.001	0.02 ± 0.01	0.02	0.07 ± 0.01
BXT-09	0.037 ± 0.004	0.01 ± 0.01	0.002 ± 0.002	0.03 ± 0.01	0.04 ± 0.01	0.01 ± 0.01	0.01	0.20 ± 0.03

* Tentative values

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Bauxite

Percentage by Weight (Dry basis)		Determined by Laboratory Bomb Digests		
Bauxite	Low Temperature Extractable Alumina Al 150	Low Temperature Extractable Silica Si 150	High Temperature Net Extractable Alumina Al 225	High Temperature Extractable Silica Si 225
BXT-01	54.3 ± 0.5	0.5 ± 0.1	57.2 ± 0.4	0.9 ± 0.1
BXT-02	46.5 ± 0.7	1.1 ± 0.1	49.5 ± 0.6	1.3 ± 0.1
BXT-03	51.0 ± 0.4	2.9 ± 0.2	51.0 ± 0.5	3.6 ± 0.1
BXT-04	42.5 ± 0.4	2.3 ± 0.1	46.3 ± 0.4	2.5 ± 0.2
BXT-05	42.4 ± 0.6	1.5 ± 0.1	44.5 ± 0.6	1.7 ± 0.1
BXT-06	45.5 ± 0.6	0.5 ± 0.1	47.4 ± 0.6	0.7 ± 0.1
BXT-07	39.7 ± 0.6	0.6 ± 0.2	39.5 ± 0.8	2.1 ± 0.2
BXT-08	41.7 ± 0.4	2.9 ± 0.1	48.5 ± 0.9	3.0 ± 0.1
BXT-09	26.4 ± 1.0	5.9 ± 0.4	46.5 ± 0.8	6.8 ± 0.7

Bayer Process Red Mud

Percentage by Weight (Dry basis)						Determined by Wet Chemical Methods, ICP and XRF				
Red Mud	Loss of Mass LOM	Aluminum as Al ₂ O ₃	Iron as Fe ₂ O ₃	Silicon as SiO ₂	Titanium as TiO ₂	Calcium as CaO	Sodium as Na ₂ O	Al 143 or g. Al ₂ O ₃	T.E.A	Organic Carbon as C
RM-01	12.0 ± 0.2	16.8 ± 0.4	53.8 ± 0.8	5.4 ± 0.1	5.9 ± 0.2	3.5 ± 0.2	1.4 ± 0.2	0.6 ± 0.1	4.6 ± 0.3	0.36 ± 0.03
RM-02	8.4 ± 0.2	13.9 ± 0.4	30.7 ± 0.8	6.2 ± 0.2	22.6 ± 0.8	11.2 ± 0.4	3.0 ± 0.1	1.9 ± 0.3	5.7 ± 0.2	0.16 ± 0.04
RM-03	12.1 ± 0.4	13.3 ± 0.3	49.2 ± 0.8	4.6 ± 0.1	6.5 ± 0.2	8.3 ± 0.2	1.4 ± 0.1	0.4 ± 0.1	6.4 ± 0.2	0.28 ± 0.02
RM-04	12.7 ± 0.5	20.6 ± 0.3	29.0 ± 0.5	13.9 ± 0.4	6.0 ± 0.2	7.7 ± 0.3	6.8 ± 0.4	1.2 ± 0.2	6.6 ± 0.3	0.43 ± 0.07
RM-05	8.9 ± 0.3	21.9 ± 0.4	35.6 ± 0.4	15.7 ± 0.2	7.1 ± 0.1	0.9 ± 0.1	8.3 ± 0.3	1.7 ± 0.3	6.9 ± 0.2	0.22 ± 0.02
CAN	17.3 ± 0.1	27.9 ± 0.8	4.7 ± 0.1	16.5 ± 0.3	8.5 ± 0.3	13.5 ± 0.4	8.5 ± 0.3	0.2 ± 0.2	13.8 ± 0.3	0.23 ± 0.01

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Alumina

Percentage by Weight (Dry basis)						Determined by XRF, ICP and gravimetry					
Bauxite	Loss of Mass LOM	Sodium* as Na ₂ O	Silicon as SiO ₂	Iron as Fe ₂ O ₃	Calcium as CaO	Vanadium as V ₂ O ₅	Phosphorus as P ₂ O ₅	Gallium as Ga ₂ O ₃	Sulphur as SO ₃	Titanium as TiO ₂	Zinc as ZnO
ALU-01	1.2 ± 0.1	0.27 ± 0.02	0.013 ± 0.002	0.016 ± 0.001	0.017 ± 0.001	0.002 ± 0.001	0.0005 ± 0.0003	0.011 ± 0.001	0.12 ± 0.02	0.004 ± 0.001	0.001 ± 0.001
ALU-02	0.78 ± 0.06	0.25 ± 0.01	0.007 ± 0.002	0.017 ± 0.002	0.009 ± 0.002	0.002 ± 0.001	0.0005 ± 0.0002	0.011 ± 0.001	0.12 ± 0.02	0.002 ± 0.001	0.002 ± 0.001
ALU-03	0.77 ± 0.08	0.44 ± 0.01	0.010 ± 0.002	0.011 ± 0.001	0.010 ± 0.001	0.001 ± 0.001	...	0.009 ± 0.001	0.05 ± 0.01	0.006 ± 0.001	0.001 ± 0.001
ALU-04	0.49 ± 0.09	0.46 ± 0.01	0.021 ± 0.005	0.017 ± 0.001	0.020 ± 0.001	0.003 ± 0.001	...	0.009 ± 0.001	0.07 ± 0.02	0.009 ± 0.001	0.001 ± 0.001
ALU-05	0.83 ± 0.08	0.37 ± 0.02	0.014 ± 0.002	0.008 ± 0.002	0.033 ± 0.001	0.001 ± 0.001	...	0.007 ± 0.001	0.13 ± 0.03	0.002 ± 0.001	0.010 ± 0.001
ALU-06	1.31 ± 0.05	0.36 ± 0.02	0.017 ± 0.003	0.008 ± 0.001	0.043 ± 0.002	0.001 ± 0.001	...	0.005 ± 0.001	0.11 ± 0.03	0.001 ± 0.001	0.009 ± 0.001
ALU-07	0.89 ± 0.10	0.46 ± 0.02	0.025 ± 0.003	0.023 ± 0.002	0.049 ± 0.001	0.004 ± 0.001	...	0.006 ± 0.001	0.17 ± 0.04	0.004 ± 0.001	0.001 ± 0.001
ALU-08	0.57 ± 0.09	0.42 ± 0.02	0.007 ± 0.001	0.022 ± 0.001	0.008 ± 0.002	0.003 ± 0.001	...	0.014 ± 0.001	0.09 ± 0.03	0.002 ± 0.001	0.001 ± 0.001
ALU-09	0.60 ± 0.05	0.42 ± 0.02	0.018 ± 0.002	0.008 ± 0.001	0.026 ± 0.001	0.001 ± 0.001	0.0002 ± 0.0001	0.009 ± 0.001	0.08 ± 0.03	0.001 ± 0.001	0.001 ± 0.001
ALU-10	0.6 ± 0.1	0.37 ± 0.01	0.005 ± 0.002	0.015 ± 0.001	0.004 ± 0.001	0.002 ± 0.001	0.002 ± 0.001	0.013 ± 0.001	0.08 ± 0.01	0.002 ± 0.001	...

Alumina : Physical Properties

Alumina	Monodimensional	
	Mode (µm)	Median (µm)
CGC-70	69 ± 1	69 ± 1
CGC-95	97 ± 2	96 ± 2

Sample	Min. Bulk Density (g/cm ³)	Max. Bulk Density (g/cm ³)	Angle of repose	Air Permiability (Centidarcys)	SSA (g/cm ³)	Flowability
ALU-87	0.96 ± 0.01	1.15 ± 0.01	33.6 ± 0.7	4.3 ± 0.3	...	1*
Alpha 85	0.80 ± 0.05	...	...	...	0.88 ± 0.02	...
ALU-11	...	...	...	...	71.3 ± 0.6	...
ALU-10	0.967 ± 0.001	1.19 ± 0.01	...	...	55.6 ± 2.6	...

Sample	Attrition Index (%)	Dustiness Index (kg/t)
AI-DWS-92	15 ± 1	...
ALU-10	29.4 ± 1.8	0.54 ± 0.03
Perra-88	...	1.4 ± 0.2

DSC-DTA Standards									
	DSC-1	DSC-2	DSC-3	DSC-4	DSC-5	DSC-6	DSC-7	DSC-8	DSC-9
Al(OH) ₃	0	0.5 ± 0.1	1.0 ± 0.1	2.0 ± 0.1	5.0 ± 0.4	10.0 ± 0.3	15.0 ± 0.3	20.0 ± 0.4	25.0 ± 0.2
	DSC-10	DSC-12	DSC-13	DSC-14	DSC-15	DSC-16			
AlOOH	0	1.0 ± 0.3	2.0 ± 0.2	5.0 ± 0.1	10.0 ± 0.2	20.0 ± 0.3			

* Tentative Values

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Alumina : Physical Properties-Particle Sizing

Alumina	Ro-TAP (Woven Sieves)						Wet Sieving				
	>150 µm (%)	>106 µm (%)	>75 µm (%)	>53 µm (%)	>45 µm (%)	Median (µm)	>45 µm (%)	>33 µm (%)	>20 µm (%)	>10 µm (%)	>5 µm (%)
AI-WDS-92	2.5 ± 0.4	14 ± 1	44 ± 2	76 ± 1	87 ± 1	70 ± 1	89 ± 1	96 ± 1	98 ± 1	...	...
C 71 RG	...	...	...	...	...	...	0.7 ± 0.2	2.3 ± 0.3	6.4 ± 1.0	23.4 ± 1.1	46.8 ± 1.7
ALU-10	0.0 ± 0.1	8.7 ± 1.6	55.7 ± 3.3	80.8 ± 1.6	86.6 ± 1.6	75.9 ± 1.4	...	...	...	...	...

Alumina	Electric Zone Sensing (Elzone-1 capillary)									
	>149 µm (%)	>105 µm (%)	>74 µm (%)	>53 µm (%)	>45 µm (%)	>33 µm (%)	>20 µm (%)	Median (µm)	Q ₂₅ (µm)	Q ₇₅ (µm)
CFX	1.7 ± 0.9	14.5 ± 2.1	55.7 ± 3.1	88.8 ± 0.8	95.2 ± 0.6	99.2 ± 0.1	99.9 ± 0.1	78 ± 2	94 ± 2	64 ± 1
CFY	0.8 ± 0.6	12.7 ± 1.6	44.4 ± 2.3	75.9 ± 1.7	85.6 ± 1.4	96.0 ± 0.7	99.8 ± 0.1	71 ± 1	90 ± 2	53 ± 1
CFZ	0.6 ± 0.3	8.7 ± 1.4	43.5 ± 1.9	80.7 ± 1.9	89.6 ± 0.8	96.6 ± 0.5	99.6 ± 0.1	71 ± 1	87 ± 1	57 ± 1

Electrolysis

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Green Petroleum Coke						
Percentage by Weight (Dry Basis)				Determined by XRF, ICP and gravimetry		
Green Coke	DF	DG	DH	DI	DJ	DL✓
Fe	0.028 ± 0.003	0.023 ± 0.002	0.019 ± 0.001	0.017 ± 0.001	0.027 ± 0.001	0.010 ± 0.001
Mn	0.0003 ± 0.0001	0.0002 ± 0.0001	0.0001 ± 0.0001	0.0001 ± 0.0001	0.0005 ± 0.0001	0.0003 ± 0.0001
Ni	0.050 ± 0.005	0.038 ± 0.002	0.021 ± 0.003	0.004 ± 0.001	0.003 ± 0.001	0.012 ± 0.001
Si	0.022 ± 0.002	0.014 ± 0.001	0.006 ± 0.001	0.013 ± 0.001	0.12 ± 0.01	0.018 ± 0.001
Zn	0.006 ± 0.001	0.0011 ± 0.0002	0.0008 ± 0.0001	0.0008 ± 0.0001	0.0004 ± 0.0001	0.0003 ± 0.0001
Ca	0.028 ± 0.001	0.0130 ± 0.0005	0.004 ± 0.001	0.007 ± 0.001	0.015 ± 0.001	0.011 ± 0.001
V	0.040 ± 0.003	0.035 ± 0.002	0.034 ± 0.002	0.004 ± 0.001	0.0030 ± 0.0005	0.006 ± 0.001
S	1.58 ± 0.03	1.59 ± 0.04	2.40 ± 0.03	1.02 ± 0.02	0.64 ± 0.01	0.78 ± 0.04
Ti	...	...	...	...	...	...
Na	...	...	...	...	...	0.021 ± 0.001
Ash	...	...	...	...	...	0.20 ± 0.03
Volatile Matters	...	...	...	...	...	10.4 ± 0.2

✓ Limited supply, available to Alcan Group Companies only

Calcined Petroleum Coke

Percentage by Weight (Dry Basis)					Determined by XRF, ICP and gravimetry				
Calcined Coke	CAA✓	CAB	BR	BS	PCC-01	PCC-02	PCC-03	PCC-04	PCC-05
Fe	0.029 ± 0.003	0.025 ± 0.003	...	0.038 ± 0.003	
Mn	
Ni	0.008 ± 0.001	0.011 ± 0.002	...	0.018 ± 0.003	Being certified for real density and ash.	...	Being certified for real density and ash.
Si	0.011 ± 0.001	0.019 ± 0.002	0.011 ± 0.001	0.033 ± 0.003	...	...		...
Zn	...	...	...	...	...	...		...
Ca	0.021 ± 0.001	0.11 ± 0.01	...	0.014 ± 0.002	...	...		...
V	0.018 ± 0.001	0.021 ± 0.001	0.027*	0.024 ± 0.001	...	...		...
S	...	2.49 ± 0.05	2.06 ± 0.04	2.10 ± 0.02	
Na	
Ash	
Real Density g/cm ³	
Bulk Density g/cm ³	0.898 ± 0.004	0.86 ± 0.01			

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* Tentative value

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Anthracite

Percentage by Weight (Dry Basis)				Determined by XRF, ICP and gravimetry				
Anthracite	Fe	Ni	Si	Ca	V	S	Ash	Real Density g/cm ³
AU	0.32 ± 0.02	0.004*	1.8 ± 0.1	0.083 ± 0.005	0.004*	0.57 ± 0.01	7.8 ± 0.1	1.76 ± 0.01
DM	0.32 ± 0.02	0.003*	1.9 ± 0.1	0.17 ± 0.01	0.004*	0.40 ± 0.02	8.6 ± 0.1	1.85 ± 0.01

*Tentative values

Metallurgical Coke

Percentage by Weight (Dry Basis)					Determined by XRF, ICP and gravimetry					
Metallurgical Coke	Fe	Mn	Ni	Si	Zn	Ca	V	S	H	Ash
AS✓	0.45 ± 0.03	...	...	2.3 ± 0.1	...	...	...	0.84 ± 0.02	...	...
AZ✓	0.77 ± 0.01	...	...	2.4 ± 0.1	...	0.099 ± 0.002	0.005 ± 0.001	1.05 ± 0.01	...	...
BY✓	0.60 ± 0.03	...	0.002 ± 0.001	2.4 ± 0.1	...	0.085 ± 0.002	0.004 ± 0.001	0.96 ± 0.02	...	10.0 ± 0.1
CA✓	0.40 ± 0.01	2.64 ± 0.03	...	0.066 ± 0.002	<0.001	0.65 ± 0.01	0.50 ± 0.02	10.1 ± 0.1
CB✓	0.36 ± 0.02	...	0.011 ± 0.002	1.62 ± 0.05	0.003 ± 0.001	0.54 ± 0.01	...	7.5 ± 0.1

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Pitch Elemental Composition

Percentage by Weight (Dry Basis)				Determined by XRF, ICP and gravimetry			
Pitch	Pitch-02	Pitch-03	Pitch-04	Pitch-05	Pitch-06	Pitch-07	Pitch-08
Fe	0.032 ± 0.002	0.042 ± 0.003	0.015 ± 0.002	0.059 ± 0.006	0.027 ± 0.002	0.032 ± 0.003	...
Mn	0.0004 ± 0.0001	0.0005 ± 0.0001	0.0009 ± 0.0001	0.0004 ± 0.0001	0.0003 ± 0.0001	0.0010 ± 0.0001	...
Ni	0.0004 ± 0.0001	0.0004 ± 0.0001	0.0003 ± 0.0001	0.0004 ± 0.0001	0.0003 ± 0.0001	0.0004 ± 0.0001	...
Si	0.041 ± 0.002	0.066 ± 0.006	0.075 ± 0.008 ¥	0.154 ± 0.007 ¥	0.082 ± 0.006 ¥	0.0080 ± 0.0005	...
Zn	0.0085 ± 0.0003	0.010 ± 0.001	0.047 ± 0.003	0.016 ± 0.001	0.0074 ± 0.0005	0.074 ± 0.007	...
Ca	0.0150 ± 0.0005	0.017 ± 0.003	0.0076 ± 0.0004	0.0066 ± 0.0009	0.0042 ± 0.0003	0.0082 ± 0.0006	...
V	0.0002 ± 0.0001	0.00010 ± 0.00005	0.0001 ± 0.0001	0.00020 ± 0.00006	0.00010 ± 0.00003	0.00003 ± 0.00001	...
S	0.53 ± 0.02	0.76 ± 0.04	1.05 ± 0.05	0.54 ± 0.02	0.50 ± 0.02	0.57 ± 0.02	0.55 ± 0.03
Na	0.042 ± 0.001	0.021 ± 0.002	0.011 ± 0.001	0.0020 ± 0.0006	0.013 ± 0.001	0.011 ± 0.001	...
Pb	0.0097 ± 0.0003	0.012 ± 0.001	0.036 ± 0.002	0.027 ± 0.002	0.0081 ± 0.0003	0.051 ± 0.005	...
Ti	0.0018 ± 0.0002	0.0015 ± 0.0001	0.0003 ± 0.0001	0.0025 ± 0.0002	0.0015 ± 0.0002	0.00030 ± 0.00003	...
P	...	0.0027 ± 0.0002	0.0066 ± 0.0009	0.0030 ± 0.0001	0.0003 ± 0.0001	0.0018 ± 0.0001	...
C	...	...	...	...	...	...	93.5 ± 0.4
H	...	...	...	...	...	...	4.1 ± 0.1

¥ Not to be used for XRF calibration

Raw Fluorspar

Percentage by Weight (Dry Basis)				Determined by Wet Chemistry, ICP and XRF				
Raw Fluorspar	F	Si	CO ₂	Fe	Al	Mg	Pb	P
CAA	35.4 ± 0.4	8.3 ± 0.4	3.3 ± 0.1	0.46*	...	...	...	0.0038 ± 0.0001
CAB	35.0 ± 0.4	8.6 ± 0.5	3.3 ± 0.2	...	...	...	...	0.0038 ± 0.0001
CAC	35.6 ± 0.5	8.5 ± 0.4	2.6 ± 0.2	0.57 ± 0.03	...	...	...	0.0041 ± 0.0001
CAG✓	40.5 ± 0.3	2.61 ± 0.05	5.5*	...	...	...	...	0.021 ± 0.002
CAH✓	37.2 ± 0.3	6.4 ± 0.2	2.6*	0.43 ± 0.03	...	...	...	0.048 ± 0.002
CAI✓	30.0 ± 0.3	9.3 ± 0.4	4.9*	0.77*	1.10*	0.48*	0.25*	0.0070 ± 0.0005
CAJ✓	46.4 ± 0.5	0.42*	0.7*	0.063*	...	...	...	0.025 ± 0.001
CAK✓	44.8 ± 0.5	0.47 ± 0.02	3.30 ± 0.01	0.10 ± 0.01	0.095*	...	...	0.0052 ± 0.0004

✓ Limited supply, available to Alcan Group Companies only

*Tentative values

Fluorspar Final Concentrate

Percentage by Weight (Dry Basis)				Determined by Wet Chemistry, ICP and XRF				
Fluorspar Final Concentrate	F	Si	CO ₂	Fe	Al	Mg	Pb	P
CAA	47.2 ± 0.7	0.72 ± 0.05	0.37 ± 0.02	0.028*	...	...	...	0.0021 ± 0.0005
CAB	45.6 ± 0.4	1.20 ± 0.05	1.58 ± 0.02	...	...	...	...	0.0021*
CAC	47.2 ± 0.4	0.51 ± 0.05	0.53 ± 0.05	0.03 ± 0.01	...	...	...	0.0021 ± 0.0001
CAL	44.8 ± 0.5	0.34 ± 0.02	3.42 ± 0.06	0.09 ± 0.01	0.074*	...	...	0.0048 ± 0.0002
CBG✓	43.5*	2.87*	2.99*	...	...	...	...	...
CBI	45.4*	0.58*	1.98*	0.077*	...	0.42*	...	...

✓ Limited supply, available to Alcan Group Companies only

*Tentative values

Electrolytic Bath

Percentage by Weight (Dry basis)				Determined by Wet Chemistry, XRD and XRF				
Bath	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 ± 0.1	1.06 ± 0.01	12.4 ± 0.2	...	7.0 ± 0.1	1.5 ± 0.1	...	...
BA-02	5.7 ± 0.1	1.12 ± 0.01	10.8 ± 0.3	...	2.7 ± 0.1	0.3 ± 0.1	...	...
BA-03	5.7 ± 0.1	1.46 ± 0.01	0.9 ± 0.1	...	4.1 ± 0.2	< 0.2	...	...
BA-04	7.4 ± 0.1	1.25 ± 0.01	6.4 ± 0.2	...	5.5 ± 0.1	3.2 ± 0.1	...	...
BA-05	4.5 ± 0.1	1.02 ± 0.01	11.3 ± 0.3	...	23.6 ± 0.4	17.3 ± 0.3	...	...
BA-06	4.5 ± 0.1	1.00 ± 0.01	12.2 ± 0.3	...	23.3 ± 0.4	16.7 ± 0.2	...	...
BA-07	8.3 ± 0.1	1.23 ± 0.01	6.9 ± 0.2	...	6.8 ± 0.1	5.3 ± 0.2	...	...
BA-08	9.0 ± 0.1	1.37 ± 0.01	3.2 ± 0.1	...	7.3 ± 0.1	4.6 ± 0.2	...	...
BA-09	9.5 ± 0.1	1.44 ± 0.01	1.3 ± 0.1	...	7.8 ± 0.1	5.8 ± 0.2	...	...
BA-10	6.7 ± 0.1	1.30 ± 0.01	5.2 ± 0.2	...	6.0 ± 0.1	4.9 ± 0.2	...	...

Electrolytic Bath (Cont.)

Percentage by Weight (Dry basis)				Determined by Wet Chemistry, XRD and XRF				
Bath	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-11	8.1 ± 0.1	1.46 ± 0.01	1.1 ± 0.1	...	5.3 ± 0.1	2.9 ± 0.1	...	...
BA-12	6.0 ± 0.1	...	3.8 ± 0.3 [▲]	0.21 ± 0.01	4.2 ± 0.2	2.8 ± 0.2	...	2.72 ± 0.05
BA-13	5.4 ± 0.1	...	0.6 ± 0.2 [▲]	0.24 ± 0.03	4.2 ± 0.2	0.7 ± 0.1	...	2.47 ± 0.04
BA-14	3.65 ± 0.04	...	1.4 ± 0.3 [▲]	3.40 ± 0.07	3.3 ± 0.1	1.9 ± 0.1	...	2.04 ± 0.06
BA-15	6.9 ± 0.1	...	5.7 ± 0.2 [▲]	0.28 ± 0.03	6.0 ± 0.1	4.4 ± 0.2	...	0.95 ± 0.02
BA-16	6.3 ± 0.1	...	3.7 ± 0.3 [▲]	0.22 ± 0.02	4.0 ± 0.1	3.3 ± 0.2	...	3.08 ± 0.02
BA-17	5.4 ± 0.1	...	0.6 ± 0.3 [▲]	0.16 ± 0.03	5.1 ± 0.1	3.4 ± 0.1	...	2.61 ± 0.04
CCB [✓]	21.3 ± 0.3	1.71 ± 0.01	-3.9 ± 0.3	0.19 ± 0.02	2.6 ± 0.1	...	...	...
CCC [✓]	9.2 ± 0.2	...	...	0.25 ± 0.03	4.0 ± 0.2	...	...	...
CCE [✓]	4.0 ± 0.1	1.51 ± 0.01	-0.2 ± 0.2	0.19 ± 0.02	10.6 ± 0.2	...	...	...

[✓] Limited supply, available to Alcan Group Companies only

[▲] Not intended for XRD calibration

Aluminum Fluoride

Percentage by Weight (Dry Basis)				Determined by Wet Chemistry, ICP and XRF			
Aluminum Fluoride	Fe	Si	Na	F	S	P	Ca
ALF-01	0.009 ± 0.002	0.070 ± 0.005	0.32 ± 0.02	62.0 ± 0.4	0.28 ± 0.01	0.0100 ± 0.0005	0.017 ± 0.002
ALF-02	0.010 ± 0.002	0.130 ± 0.005	0.26 ± 0.02	63.0 ± 0.4	0.26 ± 0.01	0.0100 ± 0.0005	0.014 ± 0.002
ALF-03	0.009 ± 0.002	0.120 ± 0.005	0.27 ± 0.02	64.3 ± 0.4	0.25 ± 0.01	0.0090 ± 0.0005	0.014 ± 0.002
ALF-04	0.007 ± 0.002	0.100 ± 0.005	0.29 ± 0.02	63.0 ± 0.4	0.31 ± 0.01	0.0090 ± 0.0005	0.016 ± 0.002
ALF-05	0.006 ± 0.002	0.090 ± 0.005	0.29 ± 0.02	63.3 ± 0.4	0.10 ± 0.01	0.0060 ± 0.0005	0.015 ± 0.002
CAA	0.056 ± 0.004	0.50 ± 0.01	1.16 ± 0.03	60.4 ± 0.5	0.11 ± 0.03	0.0017 ± 0.0001	0.026 ± 0.002
CAB	0.056 ± 0.004	0.42 ± 0.01	1.00 ± 0.05	57.2 ± 0.5	0.16 ± 0.03	0.0026 ± 0.0002	0.024 ± 0.001
CAC	0.049 ± 0.004	0.68 ± 0.01	0.92 ± 0.05	61.8 ± 0.5	0.20 ± 0.03	0.0017 ± 0.0002	0.024 ± 0.001
CAN	0.018 ± 0.002	0.100 ± 0.005	0.22 ± 0.02	62.4 ± 0.4	0.23 ± 0.01	0.0090 ± 0.0005	0.160 ± 0.005
CAO	0.020 ± 0.002	0.130 ± 0.005	0.69 ± 0.02	57.7 ± 0.4	...	0.0040 ± 0.0005	0.180 ± 0.005

Scrubber Alumina

Percentage by Weight (Dry Basis) Determined by Wet Chemistry	
Scrubber Alumina	F
CAD	2.30 ± 0.05
CAE	0.75 ± 0.05
CAF	1.95 ± 0.05
CDH ^δ	0.074 ± 0.004

Cryolite

Percentage by Weight (Dry Basis) Determined by Wet Chemistry, ICP and XRF						
Cryolite	Fe	Si	Al	S	Na	F
CAA	0.053 ± 0.007	0.26 ± 0.05	13.5 ± 0.3	1.71 ± 0.07	30.6 ± 0.4	40.5 ± 1.1
CAB	0.067 ± 0.01	0.16 ± 0.03	11.9 ± 0.3	2.59 ± 0.07	30.1 ± 0.4	44.3 ± 0.9
CAC	0.039 ± 0.007	0.24 ± 0.03	11.9 ± 0.3	2.16 ± 0.07	32.9 ± 0.4	44.7 ± 0.9
CAG	0.013 ± 0.001	0.035 ± 0.002	12.2 ± 0.3	1.28 ± 0.09	31.9 ± 0.4	47.7 ± 0.6

^δ Metallurgical Alumina

Pitch Physical Properties

Pitch	expressed as percentage					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 ± 0.3	...	...	...	...	...	...	...	...
PITCH-08	0.17 ± 0.01	1.16 ± 0.01	60.9 ± 0.7	14.4 ± 0.3	28.5 ^δ	1.34 ± 0.01	111.6 ± 0.4	167 ± 1	121 ± 2

^δ Certification in Progress



Environment / Industrial Hygiene

A limited supply of environment-related standard samples is also available upon special request. The increasing need for traceability of laboratory performance has made Alcan environmental reference materials an integral part of quality assurance / control activities.

Presently available are:

- Spent potliner and leached spent potliner standards for fluoride, cyanide and elemental analysis including carbon content.
- Roof hole dust standard for fluoride analysis.
- Pitch and pitch extracts for PAH analysis.

Alcan International Limited
Arvida Research and Development Centre

