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**ALCAN CONFIDENTIAL**

## Alcan Certified Reference Material Program

### ***Certificate of Analysis***

#### **ALUMINA FROM SAN CIPRIAN 1997- ALU-10**

##### **Certification:**

This reference material has been certified according to Alcan standard methods for which ARDC is accredited ISO 17025. 28 bottles randomly selected were analyzed for this preliminary certification. The measurement of uncertainty, which is represented by one standard deviation, includes the inter-bottled heterogeneity and the method precision. Results are updated by benchmark analysis in 2007.

##### **Usage:**

This certified reference sample is intended both for instrument calibration and method control. Before sampling, the bottle should be vigorously shaken. An extra amount of sample should then be dried at 105°C for two hours. Finally, the exact portion is extracted. Do not return the unused sample in the bottle.

##### **Traceability:**

This material is traceable to previous Alcan standards for physical analysis (S.S.A, attrition index,  $\alpha$ -alumina, LOM and granulometry). For elemental composition, this material is traceable to NIST pure compounds and to previous Alcan standards.

**ALCAN CONFIDENTIAL****Assigned values:**

	<b>Assigned Value (%)</b>	<b>Standard Deviation (%)</b>	<b>Test Method</b>
<b>Chemical analysis</b>			
Silicon as % SiO <sub>2</sub>	0.005	0.001	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Iron as % Fe <sub>2</sub> O <sub>3</sub>	0.015	0.001	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Sodium as % Na <sub>2</sub> O	0.36	0.01	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Zinc as % ZnO	0.0010	0.0001	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Calcium as % CaO	0.003	0.001	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Vanadium as % V <sub>2</sub> O <sub>5</sub>	0.0022	0.0004	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Titanium as % TiO <sub>2</sub>	0.0021	0.0003	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Gallium as % Ga <sub>2</sub> O <sub>3</sub>	0.0129	0.0003	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Sulfur as % SO <sub>3</sub>	0.078	0.005	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Phosphorus as % P <sub>2</sub> O <sub>5</sub>	0.0002	0.0001	Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
Manganese as % MnO <sub>2</sub>	---		Alcan SM 1447 (ICP/AES), SM 1011 (XRF-briquette)
<b>Physical analysis</b>			
LOM (300-1100°C) as % H <sub>2</sub> O and C	0.57	0.05	Alcan SM 1385, LECO TGA-601
S. S. A. as m <sup>2</sup> /g	55.5	2.6	Alcan SM 1466, Quantachrome NOVA 2000
Attrition index as %	30.7	1.9	Alcan SM 1390
α-Alumina as %	2.9	0.1	Alcan SM 1109, XRD

**ALCAN CONFIDENTIAL****Tentative values :**

	<b>Assigned Value (%)</b>	<b>Standard Deviation (%)</b>	<b>Test Method</b>
<b>Granulometric analysis (electroformed sieve)</b>			
> 150µm as %	< 0.04	0.05	Alcan MS 1215
> 106µm as %	9.6	1.1	Alcan MS 1215
> 75µm as %	57.6	2.6	Alcan MS 1215
> 53µm as %	83.2	0.9	Alcan MS 1215
> 45µm as %	88.9	1.2	Alcan MS 1215
Q1 as µm	94.4	2.1	Alcan MS 1215
Q3 as µm	61.2	0.7	Alcan MS 1215
Quartile as µm (n=8)	34.0	0.7	Alcan MS 1215
Median as µm n>11	80.4	1.7	Alcan MS 1215

Dr. Stéphane Paré reviewed by Patrick Dubé  
June 18, 2007