

## Technical Report

### **Certified reference material**

### **Part 2.27: Alumina—Preparation and certification of ASCRM 027**



This Australian Technical Report was prepared by Committee MN-009, Alumina and Materials used in Aluminium Production. It was approved on behalf of the Council of Standards Australia on 22 August 2013.  
This Technical Report was published on 10 September 2013.

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The following are represented on Committee MN-009:

- Australasian Institute of Mining and Metallurgy
- Australian Aluminium Council
- Minerals Council of Australia
- The Royal Australian Chemical Institute

Additional Interests:

- Alumina refineries
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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Technical Report through their representation on the Committee.

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# Technical Report

## Certified reference material

### Part 2.27: Alumina—Preparation and certification of ASCRM 027

First published as SA TR 2.27—2013.

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ISBN 978 1 74342 578 7

## PREFACE

In order to meet the needs of the aluminium industry, the Standards Australia Committee MN-009, Alumina and Materials used in Aluminium Production, has coordinated the preparation and certification of a reference alumina material. This material is intended for quality control and accuracy assessment of elemental analysis of alumina.

Statistical analysis of results provided by twenty-two laboratories enabled certified and indicative elemental concentration values to be determined.



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## 1 SCOPE

This document describes the preparation and certification of the certified reference material ASCRM 027 (smelting grade alumina).

## 2 REFERENCED DOCUMENTS

AS

2879 Alumina

2879.7 Part 7: Determination of trace elements—Wavelength dispersive X-ray fluorescence spectrometric method

2850 Chemical analysis—Interlaboratory test programs—For determining precision of analytical method(s)—Guide to the planning and conduct

## 3 ORIGIN OF BULK SAMPLE

100 kg of Alcoa supplied smelting grade alumina (SGA) was used to make this reference material. This SGA was chosen because it contains low but measurable concentrations of trace elements that in most SGAs are typically below limits of detection. As such, it addresses a limitation inherent in the most commonly used CRM to date i.e. NIST 699. These elements include phosphorous, vanadium, zinc, manganese, potassium, copper, chrome, nickel and beryllium.

## 4 PREPARATION OF SAMPLE

The bulk sample was screened through a 250 µm sieve, coarse material retained on the sieve was discarded. The sieved sample was dried at 105°C and finely ground in a non-ferrous jet mill by Ore Research and Exploration Pty Ltd in Victoria. The ground alumina had a D50 of 15 µm. The ground bulk material was homogenized then packaged into one thousand 100 g plastic laminated foil packets.

## 5 HOMOGENEITY TESTING

Fifty packets were randomly chosen and analysed for a suite of the most important alumina impurities. See Table 1 for the results of testing. This testing was done by Alcoa's Wagerup refinery laboratory using AS 2879.7.

**TABLE 1**  
**RESULTS OF HOMOGENEITY TEST**

	percent by mass						
	Fe <sub>2</sub> O <sub>3</sub>	Na <sub>2</sub> O	SiO <sub>2</sub>	CaO	TiO <sub>2</sub>	Ga <sub>2</sub> O <sub>3</sub>	K <sub>2</sub> O
Mean of 50 packets	0.0147	0.393	0.0120	0.0440	0.0031	0.0050	0.0003
Standard deviation of 50 packets	0.0004	0.008	0.0007	0.0005	0.0004	0.0001	0.0003
Analytical precision, standard deviation	0.0006	0.008	0.0007	0.0006	0.0004	0.0002	0.0005

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