Australian Standard®

REFRACTORIES AND REFRACTORY MATERIALS—CHEMICAL ANALYSIS

Part 3—HIGH ALUMINA MATERIALS

This Australian standard was prepared by Committee MN/7, Refractories and Refractory Materials. It was approved on behalf of the Council of the Standards Association of Australia on 19 November 1984 and published on 4 March 1985.

The following interests are represented on Committee MN/7:

Australian Institute of Mining and Metallurgy

Bureau of Steel Manufacturers of Australia

Cement and Concrete Association of Australia

CSIRO, Materials Testing Laboratories

Electricity Supply Association of Australia

Institute of Australian Foundrymen, NSW Division

Institute of British Foundrymen, Australian Branch

Refractory Manufacturers Association of Australia

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PREFACE

This standard was prepared by a subcommittee of the Association's Committee on Refractories and Refractory Materials, as the third part of a standard being prepared to supersede AS R28-1965, Methods for the Sampling and Chemical Analysis of Refractories and Refractory Materials. It deals with the chemical analysis of high alumina refractory materials. Separate parts of the standard deal with the analysis of other refractory materials in the series as follows:

Part 1 Silica refractory materials

Part 2 Aluminosilicate refractory materials

Part 4 Magnesite and dolomite materials*

Part 5 Chrome-bearing materials*.

Since this standard was circulated in draft form for comment in 1978, a revision of format has been undertaken to bring the details into complete compliance with the requirements of SAA MP34, Guide to the Layout and Preparation of Standard Methods of Chemical Analysis, as well as to incorporate other modifications.

In preparing this standard, the committee drew extensively upon the corresponding work of ISO/TC 33, Refractories, and the methods specified in BS 1902, Methods of Testing Refractory Materials. The committee also took into consideration the present practices of Australian industry and testing laboratories, details being established or verified, where necessary, by reference to the staff of refractories testing laboratories.

This part of the standard represents a new addition to the material covered in AS R28. It utilizes titrimetric, colorimetric and flame photometric methods of analysis and, like its companion parts, includes a flow sheet depicting the scheme of analysis. For selection of the gross sample, reference is made to AS 2497, Sampling Procedures for Acceptance Testing of Shaped Refractory Products, which was developed by another subcommittee of Committee MN/7.

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* In course of preparation.

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SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out methods for the sampling, preparation of sample and analysis of high alumina refractories and high alumina refractory materials. Procedures are described for determining—

(a) the loss on ignition; and

(b) the chemical composition, viz the amount of silicon, phosphorus, aluminium, iron, titanium, manganese, calcium, magnesium, sodium, potassium and lithium present, expressed as the oxides of these elements.

Table 1.1 illustrates the typical range of composition of high alumina refractories and the associated form of expression. This standard applies to materials whose composition lies within that range.

TABLE 1.1

TYPICAL COMPOSITION OF HIGH ALUMINA REFRACTORY MATERIALS

Constituent	Range, percent
Aluminium oxide as Al_2O_3	≥ 46*
Silicon dioxide as SiO_2	≤ 55
Calcium oxide as Cao	≤ 5
Iron (III) oxide as Fe_2O_3	≤ 5
Potassium oxide as K_2O	≤ 5
Titanium dioxide as TiO_2	≤ 3
Magnesium oxide as MgO	≤ 3
Phosphorus pentoxide as P_2O_5	≤ 1.5
Manganese oxide as MnO	≤ 1.0
Sodium oxide as Na_2O	≤ 0.5
Lithium oxide as Li_2O	≤ 0.5

* To determine aluminium oxide contents of less than 46 percent (m/m) see AS 2503, Parts 1 and 2.

1.2 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

AS 1152 Test Sieves*

AS 2243 Safety in Laboratories
Part 2—Chemical

AS 2417 Sampling Procedures for Acceptance Testing of Shaped Refractory Products

AS 2503 Chemical Analysis of Refractories and Refractory Materials
Part 1—Silica Refractory Materials
Part 2—Aluminosilicate Refractory Materials

AS CK19 Code of Recommended Practice for the Chemical Analysis of Materials by Ultraviolet Visible Spectrophotometry.

1.3 DEFINITION. For the purpose of this standard, the following definition applies:

High alumina refractory—an aluminosilicate refractory or refractory material in which the aluminium oxide content is greater than that of pure, calcined kaolinite, i.e. greater than 46 percent (m/m).

* In course of revision.