

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1774.19—2003

**Refractories and refractory materials—Physical test methods
Method 19: The determination of sieve analysis and moisture content**

RECONFIRMATION NOTICE

Technical Committee MN-007 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 4 April 2013.

The following are represented on Technical Committee MN-007:

Australasian Institute of Mining and Metallurgy
Australian Ceramic Society
Bureau of Steel Manufacturers of Australia
Cement Industry Federation
CSIRO Manufacturing & Materials Technology
Institute of Refractories Engineers
Refractories Manufacturers Association of Australia
The University of New South Wales

NOTES

Australian Standard™

AS 1774.19

Refractories and refractory materials—Physical test methods

Method 19: The determination of sieve analysis and moisture content

PREFACE

This Standard was prepared by the Standards Australia Committee MN-007, Refractories and Refractory Materials, as a revision of AS 1774.19—1978, *Methods of Physical Testing of Refractories and Refractory Materials*, Method 19: *The determination of sieve analysis and water content*.

The objective of this revision is to align the test with current practice.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

METHOD

1 SCOPE

This Standard describes procedures for determining the sieve analysis of refractory materials. It also describes a method for determining the moisture content.

2 APPLICATION

2.1 Wet sieve analysis (water)

The method set out in Clause 9.2 shall be used for all materials that contain water as an ingredient.

This method may also be used for materials that contain fine powders, which would otherwise blind the sieves, and are not affected by washing with water.

2.2 Wet sieve analysis (alcohol)

The method set out in Clause 9.3 may be used for all materials that cannot be washed with water (e.g. resin bonded materials) or materials that are affected by water (e.g. dolomite).

2.3 Dry sieve analysis

The method set out in Clause 9.4 shall be used for all materials that would be affected by washing with water or alcohol.

This method may also be used for granular materials with a particle size greater than 125 µm.

3 REFERENCED DOCUMENTS

The following documents are referenced in this Standard:

AS	
1152	Specification for test sieves
2243	Safety in laboratories (series)
2780	Refractories and refractory materials—Glossary of terms
4433	Guide to the sampling of particulate materials
4433.2	Part 2: Preparation of samples

4 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 2780 apply.

5 PRINCIPLE

5.1 Moisture content

A sample of known weight is dried. The loss in weight on drying is expressed as a percentage of the initial weight.

5.2 Sieve analysis

A sample of known weight is either taken as received and dried or it is washed over a fine sieve with a liquid and the retained portion is dried. The dry sample is then sieved through a nest of sieves for a specified time and the amount retained on each sieve is determined as a percentage of the dry weight except for resin bonded materials where the amount retained on each sieve is determined as a percentage of the initial weight.

6 SAFETY

For information on safety in laboratories reference should be made to the relevant parts of AS 2243.

7 APPARATUS

7.1 Drying oven

A fan forced ventilated oven capable of maintaining a temperature of $110 \pm 5^\circ\text{C}$.

7.2 Balance

A balance capable of weighing the required mass to an accuracy of 0.1 g.

7.3 Test sieves

A set of certified sieves, with a lid and a receiving pan, complying with the specifications in AS 1152.

The recommended sieve diameter is 200 mm and the recommended sieve series is 16 mm, 8 mm, 4 mm, 2 mm, 1 mm, 500 μm , 250 μm , 125 μm , 63 μm and 45 μm .

NOTE: If 50% or more is retained on a sieve, then an intermediate sieve size may be used.

7.4 Shaking device

A device capable of producing a lateral and vertical motion of the sieves to keep the particles moving continuously over the surface of the sieves, and preferably having a jarring action.

7.5 Brushes for cleaning sieves

Suitable brushes which will not damage the sieves.

7.6 Water spray jet

A means of supplying a controllable jet of water, and having a waste disposal system.

7.7 Alcohol

Commercial methylated spirits or other appropriate alcohols.

7.8 Alcohol spray jet

A wash bottle with plastic tube attachment supplying a controllable jet of alcohol, and having a waste disposal system.

8 SAMPLE PREPARATION

For guidance on sample preparation see AS 4433.2.

9 PROCEDURES

9.1 Moisture content

For samples that may contain water, determine the moisture content as follows:

- Weigh approximately 100 g of the sample and record the mass to 0.1 g (M_w).
- Dry the sample in a drying oven at $110 \pm 5^\circ\text{C}$, allow to cool and record the mass to 0.1 g (M_d).

Calculate the percentage of moisture (W) using the following equation:

$$W = \frac{(M_w - M_d)}{M_w} \times 100 \quad \dots (1)$$

where

W = moisture content, to the nearest 0.1%

M_w = mass of sample as received, in grams

M_d = mass of sample after drying, in grams

9.2 Wet sieving with water

The procedure for wet sieving with water shall be as follows:

- Weigh approximately the required mass and record the mass to the nearest 0.1 gram (M_a).

NOTE: The required mass of sample (M_a) will depend on the density and particle size of the material and on the sieve frame diameter.

- Calculate the initial dry mass (M_i) from the following equation:

$$M_i = \frac{M_a(100 - W)}{100} \quad \dots (2)$$

where

M_i = initial dry mass, in grams

M_a = mass of sample required, in grams

W = moisture content (%) as determined in Clause 9.1

- Transfer the sample to a certified 45 μm sieve using a jet of water or, if the material is too plastic, transfer to a beaker and cover the sample with water. Break up any lumps with a stirring rod to form a slurry and then transfer the slurry to the sieve using a jet of water.

NOTE: If the material is difficult to wet a few drops of detergent may be added to the water.