Australian Standard™

AS 1774.6

Refractories and refractory materials—Physical test methods

Method 6: Determination of true density

PREFACE

This Standard was prepared by the Standards Australia Committee MN-007, Refractories and Refractory Materials, to supersede AS 1774.6—1992, *Refractories and refractory materials—Physical test methods*, Method 6: *Determination of true density*.

The objective of this Standard is to provide testing laboratories a means of determining the true density of a refractory material.

This Standard is identical with and has been reproduced from ISO 5018:1983, *Refractory materials—Determination of true density.*

Statements expressed in mandatory terms in notes to the text are deemed to be requirements of this Standard.

As this Standard is reproduced from an international Standard, the following applies:

(a) Its number appears on the cover page while the International Standard number appears only on the cover.

(b) In the source text, 'this International Standard' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian Standards as follows:

Reference to International Standard		*Australian Standard*	
ISO		AS	
565	Test sieves—Woven metal wire cloth and perforated plate—Nominated sizes of apertures	1152	Specification for test sieves
R 836	Vocabulary for the refractories industry	2780	Refractories and refractory materials—Glossary of terms
5022	Shaped refractory products—Sampling and acceptance	2497	Sampling procedures for acceptance testing of shaped refractory products

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NOTES

1 Scope and field of application

This International Standard establishes a method for measuring the true density of refractory products and raw materials.

2 References

ISO 565, *Test sieves — Woven metal wire cloth and perforated plate — Nominal sizes of apertures.*

ISO/R 836, *Vocabulary for the refractories industry.*

ISO 5022, *Shaped refractory products — Sampling and acceptance.*

3 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1 true density : The ratio of the mass of a quantity of dried material to its true volume.

3.2 true volume : The volume of the solid material in a porous body.

4 Principle

4.1 The true density is determined by measuring the dry mass and the true volume of a sample of the material after it has been crushed and ground to such a particle size that as far as possible no closed pores remain. The volume of the ground material is determined using a pycnometer and a liquid of known density, the temperature of the liquid being controlled or carefully measured.

4.2 Unfired refractory products and basic products may require pre-treatment, the conditions of which shall be agreed between the parties concerned.

5 Apparatus

5.1 Pycnometer, of capacity from 25, 50 or 100 ml, fitted with a ground stopper having a capillary bore.

5.2 Balance, with an accuracy of ± 0,1 mg.

5.3 Vacuum equipment, capable of reducing the pressure to a value not greater than 25 mbar[1], with a means of measuring the pressure.

5.4 Thermostatically controlled bath, capable of being maintained at a temperature from 2 to 5 °C above the ambient temperature with an accuracy[2] of ± 0,2 K.

5.5 Test sieve, 63 µm aperture complying with the requirements of ISO 565.

5.6 Drying oven.

5.7 Desiccator.

6 Test material

6.1 The samples to be measured shall be selected in accordance with ISO 5022[3] or another standard sampling plan agreed by the interested parties.

6.2 In the case of a shaped refractory product, the number of test pieces to be tested for each item shall be agreed between the interested parties and shall be stated in the test report. To facilitate statistical evaluation when several bricks are tested, the same number of test pieces shall be taken from each brick.

6.3 The test material (test piece) shall be crushed and ground to pass completely through the test sieve (5.5).

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1) 1 bar = 10^5 Pa

2) This accuracy of temperature control is necessary because the method is very sensitive to variations in temperature. Because of the different coefficients of thermal expansion of the vessel and of the liquid, significant errors arise if there are variations in the temperature.

3) Sampling of unshaped refractory products and primary materials will form the object of a future International Standard.