

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1774.32—2002

**Refractories and refractory materials—Physical test methods
Method 32: Refractory products containing carbon—Test methods**

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

Refractories and refractory materials—Physical test methods

Method 32: Refractory products containing carbon—Test methods

PREFACE

This Standard was prepared by the Standards Australia Committee MN-007, Refractories and Refractory Materials, as a new Standard in the AS 1774 series of test methods.

This Standard incorporates Amendment No. 1 (July 2003). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of the Standard is to incorporate the firing and oxidation test methods of refractory products that contain carbon and which are not included in AS 1774.30, *Refractories and refractory materials—Physical test methods*, Method 30: *Drying and firing schedules*.

METHOD

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out methods for firing refractory products containing carbon in oxidizing and non-oxidizing conditions.

1.2 REFERENCED DOCUMENTS

AS	
1774	Refractory and refractory materials—Physical test methods
1774.30	Method 30: Drying and firing schedules
2243	Safety in laboratories (series)
2780	Refractories and refractory materials—Glossary of terms

1.3 DEFINITIONS

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

1.3.1 Carbonization firing

The firing of a refractory product containing carbon in a non-oxidizing atmosphere so that volatile components are removed and oxidation is prevented.

1.3.2 Oxidation test

The firing of a refractory product containing carbon in an oxidizing atmosphere so as to allow oxidation of carbon from the exposed faces.

1.3.3 Oxidized depth

The thickness of the visibly oxidized (whitened) layer on the cut face of a test specimen after firing in air.

1.4 SAFETY

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

1.5 GENERAL APPARATUS

1.5.1 Ceramic marker

Unreactive with the specimen in any manner that would influence the test results, and whose mark will be visible after the carbonization firing or the oxidation testing.

1.5.2 Balance

A balance capable of weighing the test specimen to an accuracy of 0.1 g.

1.5.3 Drying oven

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

SECTION 2 CARBONIZATION FIRING

2.1 PRINCIPLE

A dried test specimen is covered with coke inside a saggar. The test specimen is then heated in a furnace to a prescribed temperature for a specified time.

2.2 APPARATUS

2.2.1 Carbonization furnace

A furnace large enough to accommodate the required saggar and capable of heating at the rate required by AS 1774.30, and of maintaining the test zone at the required temperature to within 10°C. In addition it shall have provision for installing a thermocouple into the centre of the saggar. The furnace may be powered by electric or other means.

2.2.2 Saggar and lid

A saggar large enough to accommodate the test specimen(s) in accordance with Clause 2.4(d), and a snug fitting lid. The saggar shall be small enough, and have sufficiently high thermal conductivity, so as to heat up at the minimum rate specified in Clause 2.4(i). The lid shall have a hole in the centre to allow insertion of a sheathed thermocouple.

NOTES:

- 1 Typical saggar materials include stainless steel (for temperatures up to 1000°C) and high silicon carbide monolithics.
- 2 When there is deformation of the saggar and lid oxidation of the contents may occur. In such cases, it is recommended to seal the box, for example with mortar or by using a continuous sand seal into which the lid is placed.

2.2.3 Coke

Metallurgical coke of grain size 0.5 to 2 mm, which shall be pre-fired in the saggar for 2 h at 1000°C before use, and then stored under dry conditions.

NOTE: It is good practice to discard used coke after a certain number of uses, or a certain elapsed period of time, due to possible contamination.

2.2.4 Thermocouple

A sheathed thermocouple calibrated and accurate to within 5°C over the required temperature range.

2.2.5 Recorder

An instrument capable of recording the temperatures of the furnace and saggar thermocouples either continuously or at regular short intervals, to an accuracy of 5°C throughout the test.

2.3 TEST SPECIMENS

Test pieces shall be of the size specified for the subsequent testing required.

2.4 PROCEDURE

The procedure for carbonization firing shall be as follows:

- (a) Identify the carbonisation test specimen with a marker suitable for carbonization. Dry the test specimen at $110 \pm 5^\circ\text{C}$.