AS 1774.14—2008
ISO 8894-2:2007
Reconfirmed 2018

Australian Standard®

Refractories and refractory materials—Physical test methods

Method 14: Thermal conductivity

This Australian Standard® was prepared by Committee MN-007, Refractories and Refractory Materials. It was approved on behalf of the Council of Standards Australia on 7 October 2008.
This Standard was published on 4 December 2008.

The following are represented on Committee MN-007:

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

This Standard was issued in draft form for comment as DR 08160.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Australian Standard®

Refractories and refractory materials—Physical test methods

Method 14: Thermal conductivity

Originally as AS R31.14—1966.
Previous edition AS 1774.14—1992.
Second edition 2008.

Published by Standards Australia GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 8959 5

PREFACE

This Standard was prepared by the Standards Australia Committee MN-007, Refractories and Refractory Materials, to supersede AS 1774.14—1992, *Refractories and refractory materials—Physical test methods*, Method 14: *Thermal conductivity*.

The objective of this Standard is to provide the refractories industry with an internationally accepted method for the determination of the thermal conductivity of refractory products and materials.

This Standard is identical with, and has been reproduced from ISO 8894-2:2007, *Refractory materials—Determination of thermal conductivity—Part 2: Hot-wire method (parallel)*.

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

(a) Its number appears on the cover and title page while the international standard number appears only on the cover.

(b) In the source text 'this part of ISO 8894' should read 'this Australian Standard'.

(c) Replace the text in Clause 10, Item b) with 'a reference to this Australian Standard, i.e. AS 1774.14'.

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

The term 'informative' is used to define the application of the annex to which it applies and is only for information and guidance.

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AUSTRALIAN STANDARD

Refractories and refractory materials—Physical test methods

Method 14:
Thermal conductivity

1 Scope

This part of ISO 8894 describes a hot-wire (parallel) method for the determination of the thermal conductivity of refractory products and materials. It is applicable to dense and insulating shaped products and to powdered or granular materials (see 6.2), for thermal conductivities of less than 25 W/m·K. The limits are imposed by the thermal diffusivity of the test material and therefore by the dimensions of the test pieces. Higher thermal conductivities can be measured if larger pieces are used. Electrically conducting materials cannot be measured.

NOTE 1 The thermal conductivity of products with a hydraulic or chemical bond can be affected by the appreciable amount of water that is retained after hardening or setting and is released on firing. These materials can therefore require pretreatment. The nature and extent of such pretreatment, and the period for which the test piece is held at the measurement temperature as a preliminary to carrying out the test, are details that are outside the scope of this part of ISO 8894 and are agreed between the parties concerned.

NOTE 2 In general, it is difficult to make measurements on anisotropic materials and the use of this method for such materials is also agreed between the parties concerned.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
thermal conductivity
λ
density of heat flow rate divided by the temperature gradient

NOTE Thermal conductivity is expressed in watts per metre kelvin (W/m·K).

2.2
thermal diffusivity
a
thermal conductivity divided by the bulk density times the specific heat capacity

NOTE 1 $a = \frac{\lambda}{\rho \cdot c_p}$

where

λ is the thermal conductivity;

ρ is the bulk density;

c_p is the specific heat capacity at constant pressure per weight.

NOTE 2 Thermal diffusivity is expressed in square metres per second (m^2s^{-1}).