

Australian Standard™

Refractories and refractory materials—Physical test methods

Method 30: Drying and firing schedules

PREFACE

This Standard was prepared by the Standards Australia Committee MN-007, Refractories and Refractory Materials to supersede AS 1774.30—1998.

The objective of this Standard is to incorporate the drying and firing schedules for test samples using methods in the AS 1774 series into a single document. These schedules will be deleted from other AS 1774 Standards in favour of reference to this Standard.

This revision of the Standard specifies a time for references to ‘constant mass’ in the AS 1774 series and updates the cooling rate requirement.

METHOD

1 SCOPE

This Standard sets out the drying and firing schedules to be used for test samples of different refractory materials.

2 REFERENCED DOCUMENT

The following document is referred to in this Standard:

AS	
1774	Refractories and refractory materials—Physical test methods (series)
2780	Refractories and refractory materials—Glossary of terms

3 DEFINITIONS

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

4 PRINCIPLE

Refractory samples are heated and then cooled either in a drying oven or furnace at a prescribed rate.

5 SCHEDULES

5.1 Drying

NOTE: Any reference in the AS 1774 series that specifies drying to ‘constant mass’ means that two successive weighings taken at least two hours apart after the minimum drying time specified in Table 1 should not differ by more than 0.5%.

5.1.1 All refractories except undried mouldables

The drying time at $110 \pm 5^\circ\text{C}$ for a test sample shall be as shown in Table 1.

TABLE 1
MINIMUM DRYING TIME (SOAK)

Type	Drying time h
Dense	16
Medium	24
Lightweight	36
Extra lightweight	48

5.1.2 Undried mouldables

Drying times for a test sample shall be as shown in Table 2.

TABLE 2
DRYING TIMES (SOAK)

Type	Time at 25°C to 50°C h	Time at 75°C h	Time at 110°C h	Time at 400°C h
Ramming mixes	—	—	≥ 18	—
Normal	24	—	≥ 18	—
Phosphate-bonded	16	8	16	5

NOTE: Where phosphate-bonded mouldables are fired to a temperature that is higher than 400°C or where special curing is not required, the drying schedule can be stopped at 110°C .

5.2 Heating rate

For all test samples except for those undergoing temperature/displacement tests as in Clause 5.4 the rate of heating, after drying as per Clause 5.1, shall be—

- a maximum of $10^\circ\text{C}/\text{min}$ to a temperature of 400°C below the specified test temperature or 1000°C , whichever is the lower;
- $2^\circ\text{C}/\text{min}$ to $5^\circ\text{C}/\text{min}$ to a temperature of 100°C below the specified test temperature; and
- $1^\circ\text{C}/\text{min}$ to $2^\circ\text{C}/\text{min}$ for the last 100°C .

CAUTION: TOO HIGH A HEATING RATE MAY CAUSE LOW POROSITY MONOLITHICS TO EXPLODE. CRACKING OF OTHER REFRACTORIES MAY ALSO OCCUR UNDER SIMILAR SITUATIONS.

Typical heating times for a standard shape ($230 \text{ mm} \times 115 \text{ mm} \times 75 \text{ mm}$) are shown in Table 3.

TABLE 3
TYPICAL HEATING TIMES (RAMP)

Final temperature $^\circ\text{C}$	Heating time h
1000	3.5
1400	4
1600	6