AS 1774.24—1989

Australian Standard®

1991 ED.

Refractories and refractory materials—Physical test methods

Method 24: Resistance to thermal shock

1 SCOPE. This Standard describes a procedure for determining the resistance to thermal shock of a refractory when a face is exposed to specified temperature fluctuations in a prescribed manner.

This Standard is applicable to all dense, prefired refractories which—

(a) are chemically stable in an oxidizing atmosphere;

(b) when tested in accordance with AS 1774.3 have a modulus of rupture not less than 2 MPa; and

(c) are large enough for test specimens of the required dimensions to be cut.

NOTE: The thermal shock conditions specified in this Standard may not be severe enough for testing special refractories such as silicon carbides.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS
1774 Refractories and refractory materials—Physical test methods
1774.3 Method 3: The determination of cold modulus of rupture

2780 Refractories and refractory materials—Glossary of terms

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

3.1 Thermal shock—a rapid change in temperature that may contribute to cracking or spalling.

NOTE: The temperature change may typically be several hundreds of degrees Celsius in a matter of minutes.

3.2 Thermal shock resistance—the ability of a refractory to withstand sudden heating or cooling without deterioration of its mechanical strength or its structural integrity.

4 PRINCIPLE. A refractory test specimen of specified dimensions is subjected to thermal shock by exposure to prescribed heating and cooling through a selected face. The modulus of rupture is then determined on the specimen and is compared with that of an untested specimen cut from the same brick. The percentage retained strength (*PRS*) is calculated and reported as a measure of the specimen's resistance to thermal shock.

5 APPARATUS.

5.1 General description. The apparatus shall consist of a furnace, a movable test panel assembly (see Figure 1), a cooling fan, temperature measuring and recording equipment, and apparatus specified in AS 1774.3 for conducting the modulus of rupture test.

5.2 Furnace.

5.2.1 *Opening.* The furnace shall be designed so that it has an opening of sufficient dimensions to permit a snug fit of the test panel assembly (Clause 5.3) in the opening. The face of the panel shall be flush with the interior wall of the furnace, thereby exposing the panel face to the heating conditions in the furnace, while shielding any exposed part of the steel housing. The fit of test panel in the opening shall be such as to permit its ready removal and replacement during the cooling and reheating periods described in Clause 7.1, Steps (g) to (i).

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