STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR PHYSICAL TESTING OF REFRACTORIES AND REFRACTORY MATERIALS

AS 1774.12 REFRACTORINESS UNDER LOAD— TEMPERATURES OF DEFORMATION AT CONSTANT LOAD WITH RISING TEMPERATURE

1 SCOPE. This standard describes a procedure for determining the temperature(s) corresponding to specific deformations of a shaped refractory which is subjected to a constant compressive stress and an increasing temperature.

2 PRINCIPLE. A cylindrical test specimen is heated, while under a constant compressive stress, at a prescribed rate of temperature increase. The changes in length of the test specimen are recorded and their absolute values calculated to allow the temperatures corresponding to specified deformations to be determined.

3 DEFINITION. For the purpose of this standard, the following definition applies:

3.1 Deformation — a change in length of the test specimen after the onset of subsidence.

4 APPARATUS.

4.1 Main Apparatus.

4.1.1 *General description* (Refer to Fig. 1). The main apparatus shall consist of a furnace, a loading device for applying an axial compressive stress to the test specimen, a device to measure the differential change in length, and thermocouples to measure the temperature of the specimen and to control its rate of heating.

4.1.2 *Furnace.* The furnace shall essentially contain a vertical tube of internal diameter 70 mm ± 5 mm, heated externally and capable of raising the temperature of the test specimen in an oxidizing atmosphere at the specified rate. The test zone shall be not less than 75 mm in length and its temperature shall be uniform to within ±10°C as measured by the thermocouple/recorder system specified in Clauses 4.1.5 and 4.1.6.

4.1.3 *Loading assembly.* The loading assembly shall be capable of applying a stress of up to 350 kPa to an accuracy of 1 percent (of actual stress). The load may be applied from either above or below, along the vertical centreline of the assembly, at all stages of the test (note that Fig. 1 only shows the loading being applied from above).

The loading assembly shall consist of the following —

(a) *A loading device* which shall be capable of smoothly applying and maintaining the specified stress. A suitable loading device is shown in Fig. 1.

(b) *A fixed column and a loading column* which shall be of a suitable refractory material, whose deformation during the test shall not exceed 0.5 percent of its original length. One of the columns shall have a hole of approximately 16 mm diameter through the central axis. (See Fig. 2.)

ISBN 0 7262 3111 8