

British Standard

Testing of resin compositions for use in construction

Part 10. Method for measurement of temperature of deflection under a bending stress

Essais des compositions de résines à utiliser en construction

Partie 10. Méthodes de mesurage de la température de fléchissement sous contrainte de flexion

Prüfung von Kunstharzverbindungen im Bauwesen

Teil 10. Verfahren zur Bestimmung der Formbeständigkeit unter Biegebeanspruchung

Foreword

This Part of BS 6319 has been prepared under the direction of the Civil Engineering and Building Structures Standards Committee. It describes a method for measurement of the temperature of deflection under a bending stress, alternatively known as the heat distortion temperature (HDT), and is one of a series of Parts describing methods for measuring basic physical properties of resin based materials.

This method is derived from methods 121A and 121B of BS 2782 : Methods 121A to 121C : 1976 which have been adapted to the testing of resin compositions used in construction.

The precision of this test method has not been considered in detail because it has been derived from tests which are already established. The method is suitable for quality control and comparative purposes but it does not alone provide sufficient information for direct use in structural design.

This Part of BS 6319 should be read in conjunction with Part 1 which provides general information and describes a method for preparing test specimens.

Compliance with a British Standard does not of itself confer immunity from legal obligations. In particular, attention is drawn to the Health and Safety at Work etc. Act 1974.

1 Scope

This Part of BS 6319 describes a method of measurement for the temperature of deflection under a bending stress (alternatively known as heat distortion temperature) for resin based mortars and concretes cast in the form of rectangular prisms. The method is not applicable for compositions which contain aggregate larger than 1.7 mm (see note to 3.2).

NOTE 1. The effect of temperature on resin compositions is an important but complex subject and interpretation of test data requires care. Several relevant points are discussed in appendices A and B.

NOTE 2. The titles of the publications referred to in this standard are listed on page 3.

2 Principle

The principle of this method is the determination of the temperature, referred to in this standard as the heat distortion temperature (HDT), at which a specified deformation occurs when the test specimen, in the form of a rectangular prism, is subjected to a specified bending stress and conditions of uniform rate of temperature increase.

3 Test specimens

NOTE. A number of standard test methods have been published for the determination of the heat distortion temperature of plastics materials using specimens in the form of rectangular prisms which are subjected to three-point loading. These standards have adopted similar rates of raising the temperature of the specimen (2.0 ± 0.2 °C/min for the heat transfer medium), the same fibre stresses (1.8 MPa, 264 psi and 0.45 MPa, 66 psi) and, for a given specimen depth, the same deformation (0.25 mm for a specimen depth of 12.8 mm to 13.0 mm). However, no standard refers specifically to filled thermosetting resin compositions and, furthermore, for the types of materials which are specified, the recommended specimen dimensions often vary from standard to standard. The present method is derived from methods 121A and 121B of BS 2782 : Methods 121A to 121C : 1976.

3.1 Preparation of specimens

The preparation of specimens, including the conditioning, proportioning and mixing of materials, and the conditioning and filling of moulds shall be in accordance with BS 6319 : Part 1.

3.2 Dimensions of test specimens

Specimen dimensions of 110 mm (minimum) × 12.8 mm × 12.8 mm shall be used for compositions containing aggregate that, when sampled in accordance with BS 812 : Part 1, completely passes through a 1.7 mm BS 410 test sieve (mesh number 10).

NOTE. Although in principle, the specimen size can be increased in order to accommodate larger aggregate, practical difficulties can then arise due to the modifications which have to be made to the test procedure.

3.3 Curing of specimens

Any desired curing regime may be used and shall be declared in the test report. Any conditioning as part of the curing regime shall be declared in the test report.

4 Procedure

Using two specimens, weigh each to the nearest 0.1 g. Use either of the following procedures:

procedure A: the procedure given for method 121A in BS 2782 : Methods 121A to 121C;

procedure B: the procedure given for method 121B in BS 2782 : Methods 121A to 121C.

If only one bending stress is to be utilized use preferably procedure A (maximum fibre stress 1.8 MPa).

Adjust the initial temperature of the heating medium to the curing temperature, or to 20 °C, whichever is the lower.

5 Test report

The following information shall be included in the test report:

- (a) date of sample preparation;
- (b) date of test;
- (c) a complete identification of the material tested including the type, source, manufacturer's code numbers and history, etc.;
- (d) ambient conditions during the preparation of the specimens and the curing regime and conditioning adopted;
- (e) a reference to the procedure used, e.g. 'procedure A of BS 6319 : Part 10';
- (f) the individual test results and the mean heat distortion temperature under the specified bending stress;
- (g) the nature and initial temperature of the heat transfer medium;
- (h) the mass of each specimen to the nearest 0.1 g.