BRITISH STANDARD

BS 6319-2: 1983

Testing of resin compositions for use in construction —

Part 2: Method for measurement of compressive strength

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Cooperating organizations

The Civil Engineering and Building Structures Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following:

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Brick Development Association
British Constructional Steelwork Association
British Precast Concrete Federation Ltd.
British Steel Industry
Cement and Concrete Association*
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Plastics and Rubber Institute
Society of Chemical Industry
Coopted member

This British Standard, having been prepared under the direction of the Civil Engineering and Building Structures Standards Committee was published under the authority of the Board of BSI and comes into effect on
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The following BSI references relate to the work on this standard:
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Amendments issued since publication

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Contents

Foreword

This Part of this British Standard has been prepared under the direction of the Civil Engineering and Building Structures Standards Committee. This Part describes a method for measurement of compressive strength and is one of a series of Parts describing methods for measuring basic physical properties of resin based materials.

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

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 and 2, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of BS 6319 describes the procedure for the measurement of the compressive strength of specimens of resin based mortars and concretes in the form of cubes.

This method is not applicable to unfilled systems.

NOTE 1 The procedure described in BS 2782: Method 345A is suitable for unfilled systems.

NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 6319 the definitions in BS 6319-1 apply together with the following.

2.1
compressive stress (nominal)

the compressive force (in N/mm^2) carried by the test piece per unit area of original cross section

2.2
compressive strength

the maximum stress (in N/mm^2) carried by the test piece during a compressive test at the time of failure (see also note to **6.2.3**)

3 Principle

The principle of the test is the subjection of test pieces of a defined geometry to a compressive force until failure of the specimen occurs. Measurement of the compressive force is carried out to determine compressive strength.

4 Apparatus

4.1 *Compression testing machine*, of suitable capacity* for the test and complying with the requirements of BS 1881-115. It shall be capable of applying load at the rate specified in **6.2.3** and shall comply with the requirements for grade A of BS 1610 as regards repeatability and accuracy. If a compression cage is used to convert the action of a tensile or universal test machine to the compressive mode, a sub-assembly shall be used to provide the necessary self alignment facility to one platen.

The auxiliary platens shall comply with the requirements of BS 1881-115.

A spacing block or blocks may be interposed between the cube or the auxiliary platen and the lower machine platen to reduce the test space providing that the system is stable throughout the test and means are available for the cube to be correctly centered. Not more than two spacing blocks plus an auxiliary platen shall be used. Each spacing block shall be solid with a rectangular vertical section, and shall support the cube or the auxiliary platen over the whole of its area. The properties of the material, and the surface flatness, surface texture, and parallelism of the contact faces of each block shall comply with the requirements of BS 1881-115.

NOTE The size of specimen required by this standard means that the geometry, including the size of any ball seating, of the test machine is likely to be important.

4.2 *Moulds*. Moulds shall comply with the requirements of BS 6319-1 and shall be of a size to produce cuboid samples in accordance with clause **5**.

5 Test specimens

5.1 Preparation of specimens. The preparation of specimens, including the conditioning, proportioning, and mixing of the materials and the conditioning and filling of the mould shall be in accordance with BS 6319-1.

5.2 Dimensions of specimens. Specimens shall be cubes of sides 40 mm unless the material under test contains an aggregate that, when sampled in accordance with BS 812-1, will not pass through a 4.75 mm BS 410 test sieve. For such materials the dimension of the sides of the cube shall be between 7.0 and 8.0 times the nominal mesh size of the smallest BS 410 sieve through which 90 % of the aggregate will pass.

NOTE 1 This requirement ensures that the depth of material employed in the test is related to the depth of layer in which the material is intended to be used and will thus develop a similar exotherm.

NOTE 2 Prisms may be sawn into a number of samples provided that a high speed water-cooled saw is used and that the dimensional tolerances specified in BS 6319-1 are maintained.

6 Procedure

6.1 Sample. Test a minimum of three specimens at a time for each prescribed set of test conditions.

6.2 Testing

6.2.1 *Temperature*. Carry out the test at 20 ± 1 °C unless, for a specific purpose, an alternative temperature is deemed more appropriate. Maintain the test specimens at the test temperature conditions for not less than 16 h before testing commences.

6.2.2 *Placing the specimen in the testing machine*. Wipe clean the bearing surfaces of the testing machine and of any auxiliary platens. Remove any loose grit or other material from the surfaces of the cube that are to be in contact with the compression platens. Place the test cube in the machine in such a manner that the load is applied to opposite sides of the test cube as cast, i.e. not to the top and bottom. Place the cube on the lower machine platen and carefully centre.

Do not use packing at any of the interfaces between the cube, auxiliary platens, spacing blocks and machine platens.

6.2.3 *Loading*. Apply the load without shock and increase it continuously so that stress is applied at the rate of approximately 45 N/mm^2 per minute.

Record the maximum load applied to the cube up to the point of failure (see note).

NOTE It should be noted that some resin based materials may fail in the same way as concrete in that continuously increasing load application results in total collapse of the specimen. Some resin compounds, however, may yield with or without visible or audible signs of fracture.

This may be discerned when the continued steady application of effort does not produce a corresponding increase in load. At this point, strain in the specimen may be increasing and the load supported remain constant or decline. Further application of effort may result in a higher load. In such a case, failure should be deemed to have occurred at the load indicated when it was first apparent that strain was occurring in the specimen without a corresponding increase in load.

7 Calculation

Calculate the compressive strength of each cube by dividing the maximum load by the nominal cross-sectional area. Also calculate the mean compressive strength for a minimum of three specimens originating from the same mix. Express the values of compressive strength to the nearest 1.0 N/mm^2.

8 Test report

The following information shall be included in the report:

a) date and site of sample preparation;

b) date of test;

c) ambient conditions during the preparation and testing of the specimens, and the curing regime adopted;

d) a complete identification of the material tested, including type, source, manufacturer's code numbers and history;

e) nominal size of specimens;

f) mass of each specimen;

g) compressive strength of each specimen;

h) arithmetic mean compressive strength;

i) mode of failure, e.g. whether by brittle fracture, asymmetric failure or plastic deformation;

j) type of test machine used;

k) additional information, e.g. whether prepared from a manufacturer's sample pack or sampled from bulk deliveries.

Publications referred to

BS 410, *Specification for test sieves — Methods for sampling and testing of mineral aggregates, sands and fillers.*

BS 410-1, *Sampling, size, shape and classification.*

BS 812, *Methods for sampling and testing of mineral aggregates, sands and fillers.*

BS 812-1, *Sampling, size, shape and classification.*

BS 1610, *Methods for the load verification of testing machines.*

BS 1881, *Testing concrete.*

BS 1881-115, *Specification for compression testing machines for concrete.*

BS 2782, *Methods of testing plastics.*

BS 2782-3, *Mechanical properties.*

BS 2782: Method 345A, *Determination of compressive properties by deformation at constant rate.*

BS 6319, *Testing of resin compositions for use in construction.*

BS 6319-1, *Method for preparation of test specimens.*

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