

Methods of testing cement —

Part 3: Physical tests —

Section 3.4 Strength tests

IMPORTANT NOTE It is recommended that this Section be read in conjunction with the information in the “General Introduction” to BS 4550 and with the information in BS 4550-3.1, which are both issued separately.

UDC 666.94.01:620.1:539.4

This British Standard, having been prepared under the direction of the Cement, Gypsum, Aggregates and Quarry Products Standards Committee, was published under the authority of the Executive Board on 30 June 1978

© BSI 02-1999

The following BSI references relate to the work on this standard:
Committee reference CAB/1
Draft for comment 73/10751 DC

ISBN 0 580 10139 8

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, 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.

Amendments issued since publication

Amd. No.	Date of issue	Comments
4247	May 1983	
4498	March 1984	
5704	July 1988	Indicated by a sideline in the margin

Contents

	Page
1 Compressive strength of concrete cubes	1
1.1 Test principle	1
1.2 References	1
1.3 Apparatus	1
1.4 Temperature and humidity conditions	2
1.5 Preparation of specimens	2
1.6 Storage of specimens	2
1.7 Testing of specimens	3
1.8 Calculation	3
1.9 Report	3
2 Compressive strength of mortar cubes	3
2.1 Test principle	3
2.2 References	3
2.3 Apparatus	3
2.4 Temperature and humidity conditions	5
2.5 Preparation of specimens	5
2.6 Storage of specimens	5
2.7 Testing of specimens	6
2.8 Calculation	6
2.9 Report	6
Figure 1 — Typical rotating pan concrete mixer	7
Figure 2 — Suitable trowel	8
Figure 3 — Typical vibration machine for compacting mortar cubes	9
Table 1 — Temperature and humidity conditions	2
Table 2 — Mixes for concrete cubes	3
Table 3 — Masses of individual fractions of sand	3
Table 4 — Temperature and humidity conditions	5
Table 5 — Mixes for mortar cubes	5
Publications referred to	Inside back cover

1 Compressive strength of concrete cubes

1.1 Test principle. The strength of cement is determined by compressive strength tests on 100 mm concrete cubes, made with specified coarse and fine aggregates, mixed by machine and compacted manually with a compacting bar.

1.3 Apparatus. The following apparatus is required.

1.3.1 Moulds. The moulds shall be of 100 mm cube size complying with 3.1 of BS 1881-108:1983.

1.3.1.1 Size. The moulds shall be 100 mm cubes.

1.3.1.2 Construction. The mould shall be of ferrous metal (preferably cast iron or cast steel) and rigid enough to prevent distortion. The surface hardness of each internal face shall be at least 95 Rockwell (Scale B) hardness value. It shall be constructed in such a manner that it facilitates the removal of the moulded specimen without damage. The parts of the mould, when assembled, shall be positively and rigidly held together by suitable means, both during the filling and on subsequent handling of the filled mould.

Each mould shall be provided with a steel base plate which shall be rigidly attached to the mould and shall support it without leakage or distortion.

1.3.1.3 Tolerances. The mould shall be such that, when assembled ready for use, the dimensions and internal faces are accurate within the following limits.

a) *Dimensions.* The depth of the mould and the distance between either pair of opposite internal faces, each based on the average of four symmetrically placed measurements, shall be 100.00 ± 0.15 mm.

b) *Flatness.* The surface of each internal face shall lie between two parallel planes 0.03 mm apart. The joints between the sections of the mould and between the bottom surface of the mould and the top surface of the base plate shall lie between two parallel planes 0.06 mm apart.

c) *Squareness.* The surface of each internal face shall lie between two parallel planes 0.5 mm apart which are perpendicular to the bottom surface of the mould and also to the adjacent internal faces.

d) *Parallelism.* The top surface of the mould shall lie between two parallel planes 1.0 mm apart, parallel to the bottom surface.

e) *Surface texture.* The surface texture of each internal face shall be 3.2 μ m CLA.

1.3.1.4 Assembly. In assembling the cleaned mould ready for use, the joints between the sections of the mould and between the bottom of the mould and the base plate shall be sealed by a thin film of grease or other suitable method to prevent escape of water. Any excess grease shall be carefully removed. The internal faces of the assembled mould shall be thinly coated with mould oil to prevent adhesion of the concrete.

1.3.2 Mixer. The concrete mixer¹⁾ shall be of suitable capacity to mix a complete batch in one operation. It shall comprise a rotating mixing pan with a contra-rotating mixing paddle and a scraper blade. The sizes and tolerances shall be as shown in Figure 1.

The mixing pan (preferably removable) shall rotate at 18 ± 1 r/min. The mixing paddle (offset from the pan centre) shall rotate at 90 ± 5 r/min.

The mixing paddle and scraper blade shall be positively spring loaded to ensure they do not jam during mixing. Simple and positive means of vertical adjustment shall be provided on the mountings of the mixing paddle and scraper blade. The clearances F_1 , F_2 and G shall be checked every month or after every 100 mixing operations whichever represents the more frequent use.

The mixer shall preferably be fitted with an automatic timing device otherwise a stop clock shall be provided.

1.3.3 Trowel. The trowel shall have a cast steel blade; a suitable type is shown in Figure 2.

1.3.4 Compacting bar. The compacting bar shall be a steel bar weighing 1.8 ± 0.1 kg and having a ramming face 25.0 ± 0.5 mm square.

1.3.5 Tank. The tank shall contain clean tap water, which shall be renewed at least every seven days with water at the specified temperature.

Specimens made with high alumina, supersulphated or Portland-type cements shall not be placed in the same tank.

¹⁾ For information on the availability of suitable mixers apply to Enquiry Section, BSI, Linford Wood, Milton Keynes MK 14 6LE, enclosing a stamped addressed envelope for reply.