Quicklime, hydrated lime and natural calcium carbonate —

Part 103: Methods for physical testing

ICS 91.100.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/516, Cement and lime, to Subcommittee B/516/11, Lime, upon which the following bodies were represented:

Autoclaved Aerated Concrete Products Association
British Lime Association
British Lime Forum
Department of the Environment, Transport and the Regions
English Heritage
Mortar Producers' Association
Quarry Products Association

This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 June 1999

Amendments issued since publication

Amd. No.	Date	Comments

The following BSI references relate to the work on this standard:
Committee reference B/516/11
Draft for comment 96/103274 DC

ISBN 0 580 28255 4

Contents

Foreword

This part of BS 6463 has been prepared under the direction of Technical Committee B/516 Cement and lime. It supersedes BS 6463-3 and BS 6463-4, which are withdrawn.

The first edition of BS 6463 was published in four parts dealing primarily with test methods for the types of lime used in the construction industry to support the specification for building lime in BS 890. The test methods were also applicable to lime for use in other industries, e.g. water treatment, food, agriculture, steel and chemical. The European Committee for Standardization (CEN) has subsequently published a specification for building limes supported by methods of test. These European Standards have been implemented in the UK as DD ENV 459-1 and BS EN 459-2. In consequence BS 890:1995 refers to the test methods in BS EN 495-2 for building lime. BS 6463 has been revised to complement BS EN 459-2 and now includes additional methods of test on limes for building applications and tests suitable for use when these materials are used for other purposes.

This revision of BS 6463 is published in three parts, as follows:

— *Part 101*: *Methods for preparing samples for testing*;

— *Part 102: Methods for chemical analysis*;

— *Part 103: Methods for physical testing.*

Part 101 gives methods for the production of samples of quicklime, hydrated lime, lime putty and natural calcium carbonate. Emphasis is placed on the necessity for the sample to be truly representative of the bulk of the consignment from which it is taken. It adopts the method in BS EN 459-2 for the spot sampling of powders, milk of lime and lime putty for use in assessing conformity. Part 101 also adopts the method of BS 812:Section 103.1:1985 for preparing spot samples of granular and lump natural calcium carbonate.

Part 102 gives methods of chemical analysis of quicklime, hydrated lime, lime putty and natural calcium carbonate. The specifications calling up these methods indicate which are to be considered as the reference methods. The methods are written to be compatible as far as practicable with those given in the British Pharmacopoeia [1] and the Food Chemical Codex [2].

This part gives methods of physical testing which have been found to be useful in the UK and which are outside the scope of BS EN 459-2 and of EN 12485, *Chemicals used for treatment of water intended for human consumption — Calcium carbonate, high-calcium lime and half-burnt dolomite — Test methods*, being prepared by CEN/TC 164.

It is planned to provide data on repeatability and reproducibility of the methods in this part when a proposed inter-laboratory test programme has been completed. It is also planned to include a test method for the determination of the reactivity of ground quicklime intended for use in the autoclaved aerated concrete process, when the method currently used has been developed to give an acceptable level of repeatability.

Annex C gives the new location of the methods previously published in BS 6463-3 and BS 6463-4:1987.

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.

1 Scope

This part of BS 6463 describes methods for physical testing which have been found to be useful in the UK and which are outside the scope of BS EN 459-2.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 410:1986, *Specification for test sieves.*

BS 812-2:1995, *Testing aggregates — Part 2: Methods for determination of density.*

BS 812-100:1995, *Testing aggregates — Part 100: General requirements for apparatus and calibration.*

BS 812-103.1:1985, *Testing aggregates — Section 103.1: Sieve tests.*

BS 1752:1994, *Specification for laboratory sintered or fritted filters including porosity grading.*

BS 4359-1:1996, *Determination of the specific surface area of powders — Part 1: BET method of gas adsorption for solids (including porous materials).*

BS 4359-2:1982, *Determination of the specific surface area of powders — Part 2: Recommended air permeability methods.*

BS 6100-6, *Glossary of building and civil engineering terms — Part 6: Concrete and plaster.*

BS 6463-101, *Quicklime, hydrated lime and natural calcium carbonate — Part 101: Methods for preparing samples for testing.*

BS EN 196-1:1995, *Methods of testing cement — Part 1: Determination of strength.*

BS EN 196-6:1992, *Methods of testing cement — Part 6: Determination of fineness.*

BS EN 459-2, *Building lime — Part 2: Test methods.*

3 Definitions

For the purposes of this part of BS 6463, the definitions in BS 6100-6, BS 6463-101 and the following definitions apply.

3.1

dry bulk density

mass per unit volume of a material including both voids within it and between particles of it

3.2

apparent density

mass per unit volume of a material including voids within it

4 Sampling

Sample, prepare, pack and mark laboratory samples of quicklime, hydrated lime and natural calcium carbonate as described in BS 6463-101.

5 Determination of particle size distribution by air jet sieving

5.1 Principle

The particle size distribution of powdered quicklime, hydrated lime and natural calcium carbonate fillers and powders is determined using the air jet sieving apparatus. For practical purposes, the method is applicable for sieve apertures of 45 μm and larger for natural calcium carbonate and 53 μm and larger for quicklime and hydrated lime.

For powdered quicklime, the method is suitable for particles which substantially pass a 2.0 mm test sieve. Quicklimes with a nominal particle size of greater than 2.0 mm should be tested using the “dry sieving” method described in BS 812:Section 103.1:1985, clause **7**.

For hydrated lime, the method determines the particle size distribution of the agglomerates of very fine particles produced by the manufacturing process.

For natural calcium carbonate powders and fillers, the method is suitable for plant or oven dried materials which substantially pass a 500 μm test sieve. Natural calcium carbonate powders and fillers with a nominal particle size of greater than 500 μm should be tested using the “dry sieving” method described in BS 812:Section 103.1:1985, clause **7**.

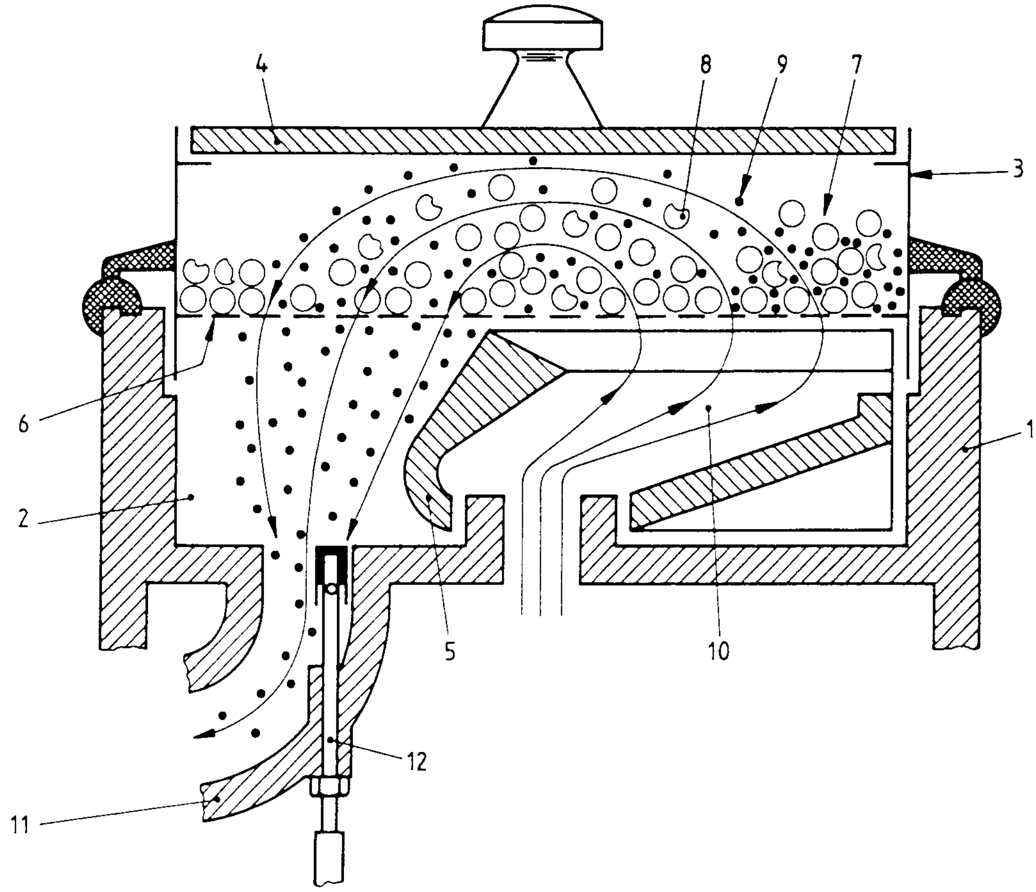
5.2 Apparatus

5.2.1 *Air jet sieving apparatus*, of the general form shown in Figure 1. The apparatus should be capable of giving a pressure difference of approximately 2.0 kPa to 2.5 kPa across the sieves.

5.2.2 *Test sieves*, 200 mm diameter conforming to BS 410 and calibrated as described in BS 812-100. The aperture size of each sieve should be appropriate to the specification of the material to be tested.

NOTE 1 The effective operation of some makes of air jet apparatus may require non-standard sieve frames and additional gaskets. This is permissible, provided the sieving medium and general method of construction conform to BS 410.

NOTE 2 Sieves used with quicklime and hydrated lime may require careful cleaning to remove any deposits which may build up on the sieving medium. Ultrasonic cleaning of sieves is recommended; acid washing should be avoided. If an ultrasonic bath is used the manufacturer’s instructions should be followed.



1. Housing
2. Dish
3. Sieve drum
4. Lid
5. Slit-nozzle
6. Sieve
7. Test sample
8. Oversize material
9. Undersize material
10. Air jet
11. Air discharge
12. Pressure gauge socket, with dust hood

Figure 1 — Typical air jet sieving apparatus

5.2.3 *Trays*, or other suitable containers of sufficient size to contain the test portion.

NOTE Non-porous paper may also be used to collect the material brushed from each sieve.

5.2.4 *Balance*, of suitable capacity, readable to at least 0.1 % of the mass of the test portion.

5.2.5 *Soft brush*, for breaking up agglomerates.

5.2.6 *Mallet (optional)*, rubber or plastics tipped (for use if there is a tendency for material to adhere to the lid of the apparatus).

5.2.7 *Ventilated drying oven (optional)*, thermostatically controlled to maintain a temperature of (105 ± 5) °C.

5.3 Preparation of test portion

Reduce the sample of quicklime, hydrated lime or natural calcium carbonate submitted to the laboratory for testing using the procedures described in BS 6463-101 to produce a test portion with a mass which is in accordance with Table 1.

For natural calcium carbonate powders which are not free-flowing, oven dry the test portion at a temperature of (105 ± 5) °C to a mass which is constant to 0.1 % of the mass of the test portion over a period of one hour.

Table 1 — Quantity of material for sieving on a 200 mm diameter test sieve

Nominal aperture size	Quicklime and hydrated lime		Natural calcium carbonate	
	Approximate mass of charge g	Maximum mass of residue g	Approximate mass of charge g	Maximum mass of residue g
2.00 mm 1.70 mm 1.40 mm	80	40	240	120
1.18 mm 1.00 mm 850 µm 710 µm	60	30	180	90
600 µm 500 µm 425 µm 355 µm	40	20	120	60
300 µm 250 µm 212 µm 180 µm	30	15	90	45
150 µm 125 µm 106 µm 90 µm	20	10	60	30
75 µm 63 µm	18	9	50	25
≤ 53 µm	16	7	40	20

5.4 Procedure

Determine the mass of the test portion and record it to the readability of the balance (**5.2.4**).

Select the test sieves required (**5.2.2**) in order of increasing aperture size. Fit the test sieve with the smallest aperture size onto the apparatus (**5.2.1**) and transfer all of the test portion onto the sieve mesh. Take care not to lose any of the test portion.

Fit the lid to the apparatus and turn it on. Check that the suction created is above the minimum value stated in the manufacturer's instructions and that the slit nozzle is rotating.

If material adheres to the lid of the apparatus, gently tap the centre of the lid with the mallet (**5.2.6**). Do not tap any other part of the apparatus.

If the material agglomerates under the action of the air jet, interrupt the sieving process, and break up the agglomerates on the sieve with the soft brush (**5.2.5**).

After (5.0 ± 0.2) min, switch off the apparatus and carefully remove the sieve. Transfer the material retained in the sieve and on the lid into a tray or other suitable container. Carefully clean the mesh of the sieve over the tray (or a large non-porous paper) using a soft brush.

Determine the mass of the retained residue, including the material brushed from the sieve mesh and record the mass to the readability of the balance.

Refit the sieve to the apparatus and transfer all of the retained residue back to the sieve mesh. Repeat the weighing and sieving stages until the sieving end point has been achieved and record the end point mass to the readability of the balance. The sieving end point is defined as being when not more than 0.2 % of the mass of the test portion passes the sieve in 1 min.

To ensure that the sieve mesh is not overloaded, if the mass of the residue on the sieve exceeds half the appropriate mass of charge given in Table 1, subdivide the residue and sieve each subdivision again separately. Add the mass of the subdivided residues together to give the total mass.

Repeat the procedure with each successively larger test sieve.

NOTE 1 The appropriate time for the initial sieving stage depends upon the nominal size of the material, the nature of the material, the size of the test sieve aperture and the mass of the test portion. The following values are given for guidance:

powdered quicklime	90 µm sieve	5 min
hydrated lime	75 µm sieve	5 min
limestone filler	45 µm sieve	3 min
limestone powder	125 µm sieve	2 min

NOTE 2 For the purposes of routine production control, it is permissible to establish sieving times which ensure that the sieving end point is reached at the end of the initial sieving time.

5.5 Calculation and expression of results

Calculate the percentage by mass passing the test sieve, P, from the equation:

$$P = \frac{100\ (m - w)}{m} \qquad (1)$$

where

m is the mass of the test portion in grams (g);

w is the mass of the residue retained on the test sieve in grams (g).

Express the results as the percentage of the mass of the total sample passing each of the sieves, to the nearest whole number.

6 Determination of particle density

Determine the particle density by the method described in BS EN 196-6:1992, annex NC for quicklime and hydrated lime. Use a method described in BS 812-2:1995, clause **5** for natural calcium carbonate, appropriate to the particle size.

NOTE Methods based on displacement by gas may be used provided that they can be shown to give equivalent results.

7 Determination of specific surface area

Determine the external surface area of powders by air permeability using the Rigden constant volume apparatus described in BS 4359-2:1982, appendix D fitted with a Lea and Nurse permeability cell as described in Figure 1a) of that standard.

If the internal and external surface area of the powder is required, the BET method described in BS 4359-1 should be used.

NOTE The Lea and Nurse constant flow apparatus described in BS 4359-2:1982, appendix B and also in BS EN 196-6:1992, annex NB may be used as an alternative to the Rigden constant volume apparatus provided that it has previously been shown that the average of four results from each method do not differ by more than 3 % of the average of the eight results obtained from the two methods.

8 Determination of workability of lime putty

8.1 Principle

Lime putty is prepared and the water content is adjusted to give standard consistence measured by the flow table method. The workability is determined as the number of drops on a standard flow table to give a specified spread.

When lime putty is produced by reacting quicklime with water, it is not practicable to produce directly a lime putty at standard consistence. In the method described in **8.3.2** a thicker putty is produced and water added to produce a putty at standard consistence measured by the flow table method.

8.2 Apparatus

8.2.1 *Mixer*, of the general form described in BS EN 196-1.

8.2.2 *Standard flow table and mould*, as described in annex B.

8.3 Procedure

8.3.1 ***Preparation of putty of standard consistence using hydrated lime***

Place (1.000 ± 0.001) l of water at (20 ± 5) °C into the mixing bowl, start the stirrer at the low speed and, over a period of (2.0 ± 0.3) min, add (1.000 ± 0.001) kg of the sample. When testing lime putty, take an equivalent mass of the putty. Allow the stirring to continue for a further (3.0 ± 0.3) min, remove the bowl from the mixer, cover with a plastics sheet to prevent loss of water and allow to stand for (24 ± 4) h.

Use the flow table for the determination of consistence of the putty as follows.

Wipe the internal surface of the mould with a clean damp cloth.

Place the mould in the centre of the table and hold it in position, while filling it in such a manner as to avoid the inclusion of voids. Remove excess material by drawing the blade of a palette knife across the top of the mould. Carefully withdraw the mould vertically giving it a light tap with the handle of the palette knife as it is lifted. Inspect the mould to ensure that there is no appreciable amount of putty adhering to its internal surface. If there is, repeat the procedure.

Turn the handle of the flow table steadily through one revolution. Determine the spread by measuring along three diameters at approximately 60° apart and determining the average. The standard consistence is indicated by an average of the lower part of the putty cone on the flow table of (110 ± 1) mm.

If, when first tested, the consistence is too stiff, discard the test sample and add a further increment of (50 ± 1) ml of water to the putty in the bowl. With experience this amount may be increased. Mix for (1.0 ± 0.3) min and repeat the measurement of consistence. Repeat this process using (50 ± 1) ml increments of water until a measured standard consistence of (110 ± 1) mm is attained.

If the total time of working the putty exceeds 10 min, discard the putty and repeat the procedure on a fresh sample but using more water or less hydrated lime.

When testing certain low surface area hydrated limes, the putty may be too wet when first tested. In this case, withdraw a small amount of the water present by removing the putty from the bowl and placing a part, or all of it, for a short period on a clean absorbent surface, or on a filter paper in a Buchner funnel which is being subjected to suction. Return the sample to the mixer bowl and mix for (1.0 ± 0.3) min. Repeat the test.

If necessary, further water may be removed, but if the total time of working the putty exceeds 10 min, discard the putty and repeat the procedure on a fresh sample but using less water or more hydrated lime.

8.3.2 *Preparation of putty of standard consistence using quicklime*

Place (3.000 ± 0.005) l of distilled or potable water at (85 ± 5) °C into the bowl of the mixer (**8.2.1**). Start the stirrer at the low speed and progressively add (1.000 ± 0.001) kg of the sample, over the shortest period necessary to avoid uncontrolled boiling. Allow the stirring to continue for a further (10.0 ± 0.3) min, remove the bowl from the mixer, cover with a plastics sheet, and allow to stand for (24 ± 4) h.

CAUTION. This reaction is highly exothermic. With highly reactive quicklimes, an addition time in excess of 5 min is generally necessary to avoid uncontrolled boiling and ejection of material. With all quicklimes, it is essential to keep the mixture stirred during the first 15 min, to avoid uncontrolled boiling. Face protection is strongly recommended.

Return the bowl to the mixer and, while mixing, add (50 ± 1) ml of water to the putty and mix for (1.0 ± 0.3) min.

Use the flow table for the determination of consistence of the putty as described in **8.3.1**.

Rinse out the mould with clean water and shake to remove superfluous water.

If the total time of working the putty exceeds 10 min, discard the putty and repeat the procedure on a fresh sample but using more water or less quicklime.

When testing certain less reactive quicklimes, the putty may be too wet when first tested. In this case withdraw a small amount of the water present by removing the putty from the bowl and placing a part, or all of it, for a short period on a clean absorbent surface, or on a filter paper in a Buchner funnel which is being subjected to suction. Return the sample to the mixer bowl and mix for (1.0 ± 0.3) min. Repeat the test.

If necessary, further water may be removed, but if the total time of working the putty exceeds 10 min, discard the putty and repeat the procedure on a fresh sample but using less water or more quicklime.

8.3.3 *Determination of workability of putty*

Ensure that the temperature of the material under test, the flow table and the immediate surroundings is (20 ± 5) °C during the test. Take care to avoid any undue exposure of the putty to the atmosphere.

Using the putty of standard consistence, prepared in accordance with **8.3.1** or **8.3.2**, fill the mould on the flow table and form a cone as described. Then turn the flow table handle at a steady and even rate of approximately one turn per second. Determine the spread by measuring along three diameters at approximately 60° apart and taking the average. Record the number of drops required to reach 190 mm spread. Repeat the test two more times.

8.4 Expression of results

Record the average number of drops to the nearest whole number as the workability.

9 Test report

Record the results of physical testing in a test report, giving the following information:

a) identification of the supplier of the sampled material;

b) the material supplied;

c) the type of sample;

d) the quantity of material represented by the sample;

e) the date, time and place of sampling;

f) whether a certificate of sampling is available;

g) the date, time and place of testing;

h) identification of the analyst(s);

i) a statement affirming that the sample was taken in accordance with BS 6463-101 and that the determination(s) were done in accordance with this part of BS 6463;

j) test results, expressed as described in this standard.

Record any unavoidable deviation from the appropriate procedure described in this standard. Annex A shows a typical test report.

Annex A (informative)

Typical test report

NOTE Copyright is waived by BSI in respect of annex A.

Test Report No.

Sample Report No.

Copy No.

1. Name and address of client

2. Full description of material

3. Type of sample1) spot composite

4. Quantity of material represented

5. Time, date and place of sampling

6. Date and place of testing

7. Particle size distribution2) sieve size cumulative % passing

8. Particle density (kg/m)2)

9. Specific surface area (m^2/kg)2)

10. Workability2) Average number of drops

11. I/we confirm that the sample was taken in accordance with BS 6463-101 and certify that it was tested in accordance with BS 6463-103.

Name(s) of tester (printed) Signature(s) Date

---

1) Ring appropriate items.

2) Insert value.

Annex B (normative)
Details of the flow table

NOTE The flow table is based on the one in the American Society for Testing and Materials specification C230-97 [3], with acknowledgements, in which working drawings may be found. The intention is that the table top and mould specified in this standard and the ASTM table top and mould specified in BS 4551, which are different, should be interchangeable in a similar frame by use of the same shaft. Manual operation is permitted in this standard.

B.1 General

The standard flow table (see Figure B.1) consists essentially of a horizontal smooth table top made of mild steel and ground and polished on the surface, with a diameter of (305 ± 2) mm and finished to a thickness of (3.20 ± 0.05) mm, mounted on a vertical shaft (15.82 ± 0.03) mm in diameter, which may be raised and then allowed to drop freely by a cam, the drop being (12.72 ± 0.13) mm for new tables and (12.72 ± 0.38) mm for tables in use.

The table top is loaded uniformly under the edge by an annular rim of cast iron 25.4 mm square in cross-section and of the same external diameter, securely fixed by six rivets symmetrically disposed.

On the underside of the table top is a central bush securely fixed by six rivets symmetrically disposed around its upper flange, which has a diameter of (76.20 ± 0.13) mm, the diameter of the lower flange being (44.50 ± 0.13) mm. The thickness of the upper flange should be not less than 6.4 mm, but may be adjusted to obtain the mass specified. The bush is in turn attached coaxial to the shaft by means of a screw thread. The internal bore of the bush is threaded ½-20 UNF-2B, conforming to BS 1580-1 and BS 1580-2. The upper end of the shaft is threaded ½-20 UNF-2A, conforming to BS 1580-1 and BS 1580-2.

Three circles having the diameters of (80.0 ± 0.2) mm, (110.0 ± 0.2) mm and (190.0 ± 0.2) mm, respectively, are engraved not more than 0.2 mm deep on the upper surface of the table top and concentric with it. The engraved lines are filled in with wax polish flush with the surface of the metal.

The length of the drop is defined by a hexagonal shoulder, 31.8 mm across the flats, integral with the shaft and having its upper and lower extremities reduced to (31.8 ± 0.1) mm diameter, coming into contact with the top of the cast iron supporting frame of the apparatus, the contact being therefore metal on metal. The shaft extends approximately 105 mm below the lowest extremity of the shoulder.

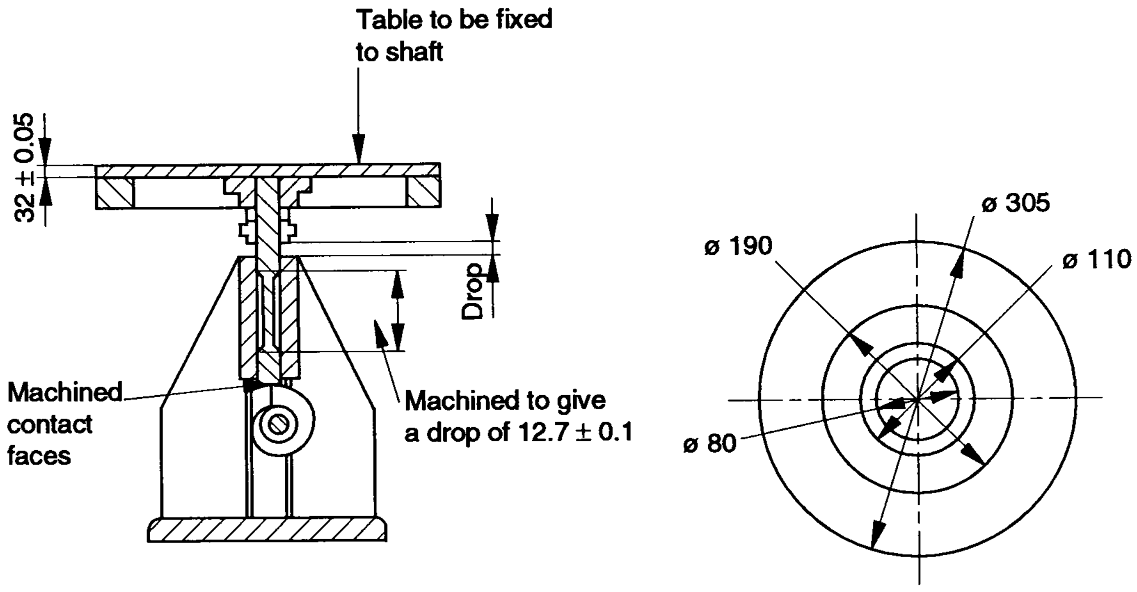
The total mass of the moving part (consisting of the table top, loading rim, shaft, etc.) which is free to drop is (6.58 ± 0.11) kg, the mass being symmetrical around the centre of the shaft.

The supporting frame of the flow table is integrally cast of fine-grained, high-grade cast iron. The frame casting has three integral stiffening ribs extending the full height of the frame and located at 120° centres. The top of the frame is drilled to a depth of approximately 6.4 mm and the face ground and lapped square with the bore to give a 360° contact with the shaft shoulder. The underside of the base of the frame is ground to secure a complete contact with the steel plate beneath.

The cam and vertical shaft are of medium carbon machinery steel, hardened where indicated in Figure B.1. The part of the shaft below the hexagonal shoulder consists of two hardened bearing surfaces each (25.4 ± 0.2) mm in length and (15.82 ± 0.03) mm in diameter, separated by a central portion where the diameter is reduced to facilitate lubrication. The overall length of the shaft below the shoulder is approximately 105 mm but adjusted to give the drop specified above.

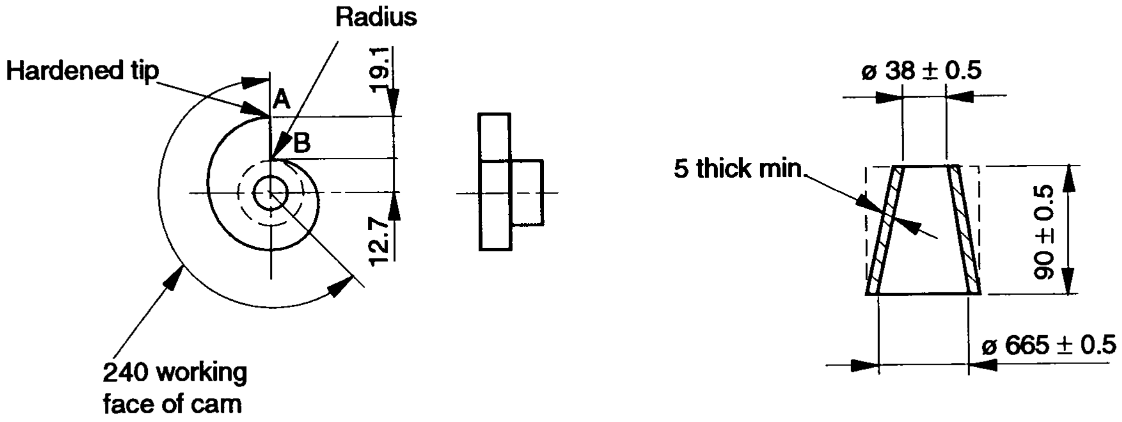
The shaft is straight and the difference between the diameter of the bore of the frame, other than in the central portion where the diameter of the shaft is reduced to facilitate lubrication, is not less than 0.05 mm and not more than 0.08 mm for new tables and is maintained at from 0.05 mm to 0.25 mm for tables in use. The end of the shaft does not fall upon the cam at the end of the drop, but makes contact with the cam not less than 120° from the point of drop. The face of the cam is a smooth spiralled curve of uniformly increasing radius from 12.7 mm at B to 31.8 mm at A in 360° so that there is no appreciable jar as the shaft comes into contact with the cam. The cam is so located and the contact faces of the cam and shaft are such that the table does not rotate more than one revolution in 25 drops. The surfaces of the frame and the shoulder which come into contact at the end of the drop are maintained smooth, plane and horizontal, and parallel with the upper surface of the table so that they make continuous contact over a full 360°.

The flow table is actuated by means of a handle attached to the cam shaft having an arm of (100 ± 2) mm radius, or through a flexible drive by an independently mounted motor.



a) Section

b) Plan



c) Cam

d) Conical mould

NOTE Curve from B to A is a smooth spiral of uniformily increasing radius from 12.7 to 31.8 in 360°.

Figure B.1 — Typical flow table and conical mould

B.2 Flow table mounting

The flow table frame is tightly bolted to a cast iron or steel plate at least 25 mm thick and at least 250 mm square. The top surface of this plate is machined to a smooth plane surface. The plate is anchored to the top of a concrete pedestal by four (12 ± 1) mm bolts that pass through the plate and are embedded at least 150 mm in the pedestal. The pedestal is cast inverted on the base plate. There is a positive contact between the base plate and the pedestal at all points. No nuts or other levelling devices are used between the plate and the pedestal. Levelling is effected by suitable means under the base of the pedestal.

The pedestal is 630 mm to 760 mm in height tapering from 250 mm to 280 mm square at the top to 380 mm to 410 mm square at the bottom. It is of monolithic construction, cast in concrete with a density of about 2 240 kg/m^3. A suitable cork pad gasket, with a thickness of (12 ± 2) mm and approximately 100 mm square, is inserted under each corner of the pedestal. Check the flow table frequently for levelness of the table top, stability of pedestal, and tightness of bolts and nuts in the table base and pedestal plate. A torque of (30 ± 1) N·m is recommended when tightening these fastenings.

Ensure that the table top, after the frame has been mounted in its pedestal, is level along two diameters at right angles to each other, in both the raised and lowered positions.

B.3 Flow table lubrication

Keep the vertical shaft of the table clean and lightly lubricated with a light oil (SAE 10). Ensure that no oil is present between the contact faces of the table top and the supporting frame. Oil on the cam face will lessen wear and promote smoothness of operation. The table should be raised and permitted to drop ten or more times just prior to use if it has not been operated for some time.

B.4 Mould

A truncated conical metal mould having walls not less than 5 mm thick, smooth inside, (90.0 ± 0.5) mm in height, with the narrower end (38.0 ± 0.5) mm and the wider end (66.5 ± 0.5) mm internal diameter. The ends of the mould, at right angles to its axis, should be smooth (see Figure B.1).

NOTE It is satisfactory to manufacture the mould out of 75 mm external diameter material resulting in a slight chamfer at the wider end.

Annex C (informative)
Location of physical test methods

C.1 The test methods formerly published in BS 6463-3:1997 and BS 6463-4:1997 can now be found in the standards listed in Table C.1.

Table C.1 — Physical test methods

Material and property	Previous standard	Current standard
Quicklime	BS 6463-3:1987	
Particle size	Clause **2**	BS 6463-103, clause **5**
Bulk density	Clause **3**	BS EN 459-2, **5.8**
Reactivity	Clause **4**	BS EN 459-2, **5.10**
Residue on slaking	Clause **5**	—
Preparation of putty of standard consistence	Clause **6**	BS 6463-103, **8.3.2**
Hydrated lime/lime putty	BS 6463-4:1987	
Particle size	Clause **2**	BS 6463-103, clause **5**
Coarse material	Clause **3**	prEN 12485, **4.1**
Particle density	Clause **4**	
— quicklime and hydrated lime		BS EN 196-6, annex NC
— natural calcium carbonate		BS 812-2, clause **5**
Surface area	Clause **5**	BS 6463-103, clause **7**
Expansion	Clause **6**	BS EN 459-2, **5.3.2**
Soundness	Clause **7**	BS EN 459-2, **5.3**
Preparation of putty of standard consistence	Clause **8**	BS 6463-103, **8.3.1**
Workability of putty	Clause **9**	BS 6463-103, **8.3.3**
Density of putty and volume yield	Clause **10**	BS EN 459-2, **5.8**
Water retention of putty	Clause **11**	BS EN 459-2, **5.6**
Compressive strength	Clause **12**	BS EN 459-2, **5.1**

Bibliography

Standards publications

BS 890:1995, *Specification for building limes.*
BS 1580-1 and -2:1962, *Specification for Unified screw threads — Parts 1 and 2: Diameters ¼ in and larger.*
BS 1580-2:1985, *Specification for Unified screw threads — Part 2: Diameters ¼ in and larger.*
BS 4551:1980, *Methods of testing mortars, screeds and plasters.*
BS 6463-3:1987, *Quicklime, hydrated lime and natural calcium carbonate — Part 3: Methods of test for physical properties of quicklime.*
BS 6463-4:1987, *Quicklime, hydrated lime and natural calcium carbonate — Part 4: Methods of test for physical properties of hydrated lime and lime putty.*
DD ENV 459-1:1995, *Building lime — Part 1: Definitions, specification and conformity criteria.*

Other references

[1] *British Pharmacopoeia*. London: Stationery Office Books, 1998.

[2] FISCHBACH, H. *Food Chemicals Codex*, 4th revised ed. National Academy Press, Washington, D.C., USA, 1996. Plus 1st supplement, 1998.

[3] ASTM C230-97. *Standard specification for flow table for use in tests of hydraulic cement.*

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000.
Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111.
Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002.
Fax: 020 8996 7001.

Copyright

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager.
Tel: 020 8996 7070.

BSI
389 Chiswick High Road
London
W4 4AL