

Quicklime, hydrated lime and natural calcium carbonate —

Part 103: Methods for physical testing

ICS 91.100.10

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Committees responsible for this British Standard

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- 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

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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 It supersedes BS 6463-3 and BS 6463-4, which are withdrawn.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 459-2 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.

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.

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.