British Standard

BRITISH STANDARD

BS 1199 and 1200:1976

Incorporating Amendment Nos. 1, 2 and 3

Specifications for

Building sands from natural sources

UDC 691.223:622.362.3

Co-operating organizations

The Aggregates, Natural Stone and Quarry Products industry Standards Committee under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

British Quarrying and Slag Federation*
British Ready Mixed Concrete Association*
Cement and Concrete Association*
Concrete Society*
Department of the Environment*
Department of the Environment, Building Research Establishment*
Department of the Environment, Transport and Road Research Laboratory*
English Slate Quarries Association
Federation of Civil Engineering Contractors*
Institution of Civil Engineers
Institution of Municipal Engineers*
Institute of Quarrying
Institution of Structural Engineers*
National Environmental Research Council — Institute of Geological Sciences
National Federation of Building Trades Employers
Royal Institute of British Architects
Sand and Ballast Hauliers and Allied Trades Alliance Ltd
Sand and Gravel Association Ltd*
Society of Chemical Industry

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

British Ceramic Research Association
British Precast Concrete Federation
Cement Makers' Federation
Concrete Block Association
Greater London Council
Mortar Producers' Association Ltd

This British Standard, having been prepared under the direction of the Aggregates, Natural Stone and Quarry Products Industry Standards Committee, was published under the authority of the Executive Board on 30 July 1976

First published December 1944
First revision December 1955
Second revision July 1976

The following BSI references relate to the work on this standard:
Committee reference STB/11

ISBN 0 580 08667 4

Amendments issued since publication

Amd. No.	Date of issue	Comments
4510	May 1984	
4834	April 1985	
5126	April 1986	Indicated by a sideline in the margin

Contents

Foreword

This British Standard has been revised under the authority of the Aggregates, Natural Stone and Quarry Products Industry Standards Committee.

The changes which have been made were occasioned by the revision of BS 812 in 1967 and BS 410 in 1969, coupled with the metrication programme.

Specific requirements relating to organic impurities have been omitted, pending a full technical revision, because of insufficient experience of applying the results from the method given in the 1967 revision of BS 812 and the possibility that this may be withdrawn.

Because of metrication, the size of the largest particles has been increased slightly and therefore attention may need to be given to its effects. This matter may have to be taken into account in the light of experience at the next revision of the standard.

Sands appropriate for use in floor screeds are specified in BS 882 and as a consequence sands for this purpose are no longer included in BS 1199.

As part of BSI's programme of metrication, this standard is expressed in metric terms.

A full technical revision of these standards is under consideration.

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 6, 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.

Sands for external renderings and internal plastering with lime and Portland cement

0 Introduction

The method of determining the grading of sands is restricted to that of washing and decantation followed by dry sieving, and the method of dry sieving only is no longer permitted. The washing and sieving method specified is considered to be more reproducible and to produce a more realistic measure of the particle size distribution of the sand. It also determines the clay and silt content which is now incorporated in the grading requirements. This change to washing and sieving necessitates revision of the grading limits as those previously given in this edition were based on results from dry sieving.

This is not intended to lead to changes in the gradings of sand in use, but it will have the effect of bringing the majority of sands in satisfactory use within the scope of BS 1199. BS 1199 now specifies two grading ranges of sand. Experience currently available suggests that satisfactory renderings can be achieved using either grade. Where there is a choice, however, the use of the coarser grade is preferred because finer sands require a higher water to cement ratio which can lead to greater shrinkage than if a coarser grading is used.

Some variability in the measured properties of building sands from any source has to be expected. This is caused by sampling and testing errors in addition to the natural variability of the material itself. The application of statistical methods has been considered, but has not been included at the present time.

1 Scope

This British Standard relates to naturally occurring sands, crushed stone sands and crushed gravel sands used for external renderings and internal plastering using mixes of lime and sand (with or without the addition of cement or gypsum plaster), cement and sand (with or without the addition of lime).

2 References

The titles of the British Standards referred to in this standard are listed on the inside of the back cover.

3 Definitions

For the purpose of this British Standard, the following definitions apply.

3.1
sand

a material mainly passing a 5.00 mm BS test sieve which may be either a natural sand or one obtained by crushing hard rocks or gravels

3.2
natural sand

a sand produced by the natural disintegration of rock

3.3
crushed stone sand and crushed gravel sand

sands produced by crushing a hard stone or rock and a gravel respectively

4 Sampling and testing

4.1 Sampling and testing of sands shall be carried out in accordance with the requirements of the appropriate sections of BS 812.

4.2 The grading of sands shall be determined by the method of sieve analysis by washing and decantation followed by dry sieving as described for the modified procedure in **7.1.6** of BS 812-1:1975 but using the following nominal aperture size test sieves, complying with the requirements of BS 410.

6.3 mm, 5.00 mm square hole perforated plate;

2.36 mm, 1.18 mm, 600 μm, 300[1)] μm, 150[1)] μm, 75[1)] μm woven wire.

When testing is carried out, compliance of the material with this British Standard shall be judged using the average of two single test results obtained by testing different test portions.

5 Quality of sands

5.1 Sands shall consist of natural sand, crushed stone sand or crushed gravel sand, or a combination of any of these. They shall be hard, durable, clean and free from adherent coatings, such as clay, and from any appreciable amount of clay in pellet form.

Sands shall not contain harmful materials such as iron pyrites, salts, coal or other organic impurities, mica, shale or similar laminated materials, or flaky or elongated particles in such a form or in sufficient quantity to affect adversely the hardening, the strength, the durability or the appearance of the final product or any materials in contact with it.

The various sizes of particles of which a sand is composed shall be uniformly distributed throughout the mass.

5.2 *Text deleted*

[1)] Full tolerances

6 Grading

The sand shall be of type A or type B and graded within the limits given in Table 1, when determined according to clause **4**.

Table 1 — Sands for external renderings, internal cement and lime plastering

BS sieve	Percentage by mass passing BS sieves	
	Type A	Type B
mm	%	%
6.30	100	100
5.00	95 – 100	95 – 100
2.36	60 – 100	80 – 100
1.18	30 – 100	70 – 100
µm		
600	15 – 80	55 – 100
300	5 – 50	5 – 75
150	0 – 15	0 – 20
75	not greater than 5	not greater than 5

NOTE Sands complying with the grading requirements in Table 1 for sieve apertures in the range 6.3 mm to 600 µm but exceeding the requirements for the percentage passing the 300 µm, 150 µm and 75 µm sieves may also be considered as being satisfactory where there is evidence of acceptable performance in use. Although insufficient information exists to provide generalized and authoritative guidance on the use of such materials, local experience of their performance in use may help in the evaluation of their suitability for particular applications.

Table 2 *Table deleted*

6.2 A sand whose grading falls outside the above limits on sieves other than the 5.00 mm sieve in Table 1 and the 2.36 mm sieve in Table 2, by a total amount not exceeding 5 % shall be regarded as being within those limits. This 5 % can be split up, for example, as 1 % on each of three sieves and 2 % on another, or 4 % on one sieve and 1 % on another.

NOTE 1 Sands which just fall outside the above limits due to a small excess of coarse particles can often be made to comply with this British Standard by screening through a suitably sized sieve. Finishing coat sands as specified in Table 2 can often be obtained by screening undercoat sands in a similar manner.

The required grading for either undercoats or finishing coats can often be attained by blending together sands which are by themselves unsuitable.

NOTE 2 The most suitable grading of sand for an external rendering will depend, to some extent, upon the finishing treatment. The sand grading specified will, in general, be suitable for the undercoats and for some finishing coats such as the smooth (floated) finishing coats, the scraped finishes and for pebble-dash or dry-dash. For some textured finishes, such as those produced by treatment of the freshly applied final coat with a tool, it may be desirable to remove the coarser particles (e.g. by screening through a 2 mm sieve), while for others such as "torn texture", some proportion of material coarser than 5 mm may be needed. For roughcast (wet dashing or harling) the grading and maximum size, will vary according to the texture required and the type of aggregate: the proportion of coarse material (over 5 mm) to fine should be about 1 : 2.

7 Supplier's certificate and cost of tests

The supplier shall satisfy himself that the output at the source of production complies consistently with the requirements of this British Standard and, if requested, shall give a certificate to this effect to the purchaser or his representative.

If the purchaser or his representative requires independent tests or the certification of individual consignments, the samples shall be taken before or immediately after delivery at the option of the purchaser or his representative, and these tests shall be carried out in accordance with the appropriate requirements of this British Standard on the written instructions of the purchaser or his representative.

Unless otherwise specified with the enquiry and order, the supplier shall supply free of charge the material required for testing and the cost of the tests (unless otherwise stipulated) shall be borne:

a) by the supplier, in the event of results showing that the material does not comply with the standard;

b) by the purchaser, in the event of results showing that the material does so comply.

8 Additional information to be furnished by the supplier

When requested by the purchaser or his representative, the supplier shall provide any of the following additional particulars.

8.1 Source of supply

8.1.1 County.

8.1.2 Parish.

8.1.3 Name of quarry or pit.

8.1.4 For material dredged from seas, estuaries or rivers, the precise locality from which the material was obtained shall be stated.

8.2 Group classification (determined according to the group classification of aggregates given in BS 812).

8.3 External characteristics

8.3.1 Shape
8.3.2 Surface texture } (described according to the classification of particle shape and of surface texture given in BS 812).

8.4 Physical properties

8.4.1 Relative density and water absorption (determined according to those methods for the determination of relative density and water absorption given in BS 812 appropriate to sand).

8.4.2 Bulk density in kilograms per cubic metre (determined according to the method for determination of bulk density of aggregate given in BS 812).

8.5 Grading. A typical sieve analysis determined according to the requirements of clause **4**.

Sands for mortar for plain and reinforced brickwork, blockwalling and masonry

0 Introduction

By the issue of Amendment No. 1, published May 1984, the method of determining the grading of sands is restricted to that of washing and decantation followed by dry sieving, and the method of dry sieving only is no longer permitted. The washing and sieving method specified is considered to be more reproducible, and to produce a more realistic measure of the particle size distribution of the sand. It also determines the clay and silt content which is now incorporated in the grading requirements. This change to washing and sieving necessitates revision of the grading limits as those previously given in this edition were based on results from dry sieving.

Amendment No. 1 is not intended to lead to changes in the gradings of sand in use but it will have the effect of bringing the majority of sands in satisfactory use within the scope of BS 1200. There are advantages to be had from widening the scope in this way, provided it is recognized that the mix has to be properly designed (see notes to Table 1) and that for mortars made with type G sands, a higher cement content is generally necessary than for mortars made with type S sands in order to achieve the required strength and durability.

With the issue of Amendment No. 1 no distinction is now made between sands for general purpose mortars and those for reinforced brickwork mortars, since for masonry designed in accordance with modern structural methods the same sand would be used for brickwork mortar, whether or not reinforced elements are present. Furthermore, information available suggests that demand for sands conforming to Table 2 of this edition is neglible and Table 2 has, therefore, been deleted from this standard.

Some variability in the measured properties of building sands from any source has to be expected. This is caused by sampling and testing errors in addition to the natural variability of the material itself. The application of statistical methods has been considered but has not been included at the present time. It is anticipated that such methods will be included in the next full revision, by which time more analytical data should be available.

1 Scope

This British Standard relates to naturally occurring sands, crushed stone sands and crushed gravel sands used for mortars for brickwork (plain and reinforced) for building with clay or concrete blocks and for masonry.

2 References

The titles of the British Standards referred to in this standard are listed on the inside back cover.

3 Definitions

For the purposes of this British Standard, the following definitions apply.

3.1
sand

a material mainly passing a 5.00 mm BS test sieve, which may be either a natural sand or one obtained by crushing hard rocks or gravels

3.2
natural sand

a sand produced by the natural disintegration of rock

3.3
crushed stone sand and crushed gravel sand

sands produced by crushing a hard stone or rock and a gravel respectively

4 Sampling and testing

4.1 Sampling and testing of sands shall be carried out in accordance with the requirements of the appropriate sections of BS 812.

4.2 The grading of sands shall be determined by the method for sieve analysis by washing and decantation followed by dry sieving as described for the modified procedure in **7.1.6** of BS 812-1:1975 but using the following nominal aperture size test sieves, complying with the requirements of BS 410.

6.3 mm, 5.00 mm square hole perforated plate;

2.36 mm, 1.18 mm, 600 μm, 300[2)] μm, 150[2)] μm, 75[2)] μm woven wire.

When testing is carried out, compliance of the material with this British Standard shall be judged using the average of two single test results obtained by testing different test portions.

[2)] Full tolerances

5 Quality of sands

5.1 Sands shall consist of natural sand, crushed stone sand or crushed gravel sand, or a combination of any of these. They shall be hard, durable, clean and free from adherent coatings, such as clay, and from any appreciable amount of clay in pellet form.

Sands shall not contain harmful materials such as iron pyrites, salts, coal or other organic impurities, mica, shale or similar laminated materials, or flaky or elongated particles in such a form or in sufficient quantity to affect adversely the hardening, strength or durability of the mortar nor, in addition to the above, for reinforced brickwork, any materials which might attack the reinforcement.

NOTE The presence of pyrites may cause objectionable rust staining on the face of mortar joints. The harmful material is difficult to detect and, if requested, the producer should provide evidence in the form of examples of existing work that the sand is satisfactory in this respect.

The various sizes of particles of which a sand is composed shall be uniformly distributed throughout the mass.

5.2 *Text deleted*

6 Grading

6.1 The grading of the sand when determined according to clause **4** shall be within the limits given in Table 1 appropriate to its type. Additionally, for the upper limit for the percentage by mass of type G sand passing the 75 µm sieve, no test result shall be greater than 10 % for uncrushed sands and 15 % for crushed stone sands and not more than 1 in 10 consecutive results shall be greater than 8 % for uncrushed sands and 12 % for crushed stone sands.

Table 1 — Sands for mortar for plain and reinforced brickwork, blockwalling and masonry

BS sieve	Percentage by mass passing BS sieves	
	Type S	Type G
mm		
6.30	100	100
5.00	98 – 100	98 – 100
2.36	90 – 100	90 – 100
1.18	70 – 100	70 – 100
µm		
600	40 – 100	40 – 100
300	5 – 70	20 – 90
150	0 – 15	0 – 25
75	0 – 5[a]	0 – 8[b]

[a] 0 – 10 % for crushed stone sands
[b] 0 – 12 % for crushed stone sands

NOTE 1 Satisfactory mortars may be prepared from sands of either type, provided arrangements in accordance with appropriate codes of practice are made for their use. The mix proportions by volume of mortars made using sands complying with Table 1 of this standard are given in Table 6 of CP 121-1:1973. Where for a given mortar type and designation, a range of recommended sand contents is indicated in Table 6 of CP 121-1:1973, the lower sand volume should be used with type G materials. Additionally, where sands are to be used in mortars for masonry designed in accordance with BS 5628-1, attention is drawn to the 28 day compressive strength requirements for mortar cubes given in Table 1 of that standard.

NOTE 2 Sands complying with the grading requirements given in Table 1 for sieve apertures in the range 6.3 mm to 600 µm but containing such an amount of fine particles so as to exceed the requirements for the percentage passing the 300 µm, 150 µm and 75 µm sieves, may nevertheless be considered by the specifier as being satisfactory if acceptable evidence of performance in use with respect to strength and durability has been offered. Although insufficient information exists to provide generalized and authoritative guidance on the use of such materials, local experience of their performance in use, or the results of specialized tests (e.g. Appendix A of BS 5628-1:1978, may help in the evaluation of their suitability for particular applications.

Table 2 *Table deleted*

6.2 *Text deleted*

7 Supplier's certificate and cost of tests

The supplier shall satisfy himself that the output at the source of production consistently complies with the requirements of this British Standard and, if requested, shall give a certificate to this effect to the purchaser or his representative.

If the purchaser or his representative requires independent tests or the certification of individual consignments, the samples shall be taken before or immediately after delivery, at the option of the purchaser or his representative, and these tests shall be carried out in accordance with the appropriate requirements of this British Standard on the written instructions of the purchaser or his representative.

Unless otherwise specified with the enquiry and order, the supplier shall supply free of charge the material required for testing and the cost of the tests (unless otherwise stipulated) shall be borne:

a) by the supplier, in the event of results showing that the material does not comply with the standard;

b) by the purchaser, in the event of results showing that the material does so comply.

8 Additional information to be furnished by the supplier

When requested by the purchaser or his representative, the supplier shall provide any of the following additional particulars.

8.1 Source of supply

8.1.1 County.

8.1.2 Parish.

8.1.3 Name of quarry or pit.

8.1.4 For material dredged from seas, estuaries or rivers, the precise locality from which the material was obtained shall be stated.

8.2 Group classification (determined according to the group classification of aggregates given in BS 812).

8.3 External characteristics

8.3.1 Shape

8.3.2 Surface texture

} (described according to the classification of particle shape and of surface texture given in BS 812).

8.4 Physical properties

8.4.1 Relative density and water absorption (determined according to those methods for the determination of relative density and water absorption given in BS 812 appropriate to sand).

8.4.2 Bulk density in kilograms per cubic metre (determined according to the method for determination of bulk density of aggregate given in BS 812).

8.5 Grading. A typical sieve analysis determined according to the requirements of clause **4**.

This standard makes reference to the following British Standards:
BS 410, *Test sieves.*
BS 812, *Methods for sampling and testing of mineral aggregates, sands and fillers.*
BS 882, *Specification for aggregates from natural sources for concrete.*
BS 5628, *Code of practice for the structural use of masonry.*
BS 5628-1, *Unreinforced masonry.*
CP 121, *Walling.*
CP 121-1, *Brick and block masonry.*

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