

CONFIRMED
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Specification for

Ready-mixed building mortars

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The Cement Gypsum Aggregates and Quarry Products Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following:

Association of Consulting Engineers	Department of Transport
Association of County Councils	Federation of Civil Engineering Contractors
Association of District Councils	Gypsum Products Development Association
Association of Metropolitan Authorities	Institute of Quarrying
Autoclaved Aerated Concrete Products Association	Institution of Civil Engineers
British Precast Concrete Federation Ltd.*	Institution of Highway Engineers
British Quarrying and Slag Federation*	Institution of Municipal Engineers
British Railways Board	Institution of Public Health Engineers
British Ready Mixed Concrete Association	Institution of Structural Engineers*
British Steel Industry	Institution of Water Engineers and Scientists
Cement Admixtures Association*	National Federation of Building Trades Employers*
Cement and Concrete Association	Natural Environment Research Council, Institute of Geological Science
Cement Makers' Federation*	Royal Institute of British Architects*
Chemical Industries Association	Royal Institution of Chartered Surveyors
Concrete Society Limited	Sand and Ballast Hauliers and Allied Trades Alliance
County Surveyor's Society*	Sand and Gravel Association Limited*
Department of the Environment (Building Research Establishment)	Society of Chemical Industry*
Department of the Environment (PSA)*	Stone Federation*
Department of the Environment (Transport and Road Research Laboratory)	

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the Technical Committee entrusted with the preparation of this British Standard:

Aggregate Concrete Block Association	Calcium Silicate Brick Association Limited
Brick Development Association	Mortar Producers Association Ltd.
British Ceramic Research Association	National Federation of Plastering Contractors
British Civil Engineering Test Equipment Manufacturers' Association	Plasterers' Craft Guild

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 and comes into effect on 31 July 1981

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Foreword

Since 1971, when the first British Standard for factory made ready-mixed lime : sand for mortar was published as BS 4721, two additional types of ready-mixed building mortars have become generally available. The standard has been extended to cover these additional types and is now divided into four sections.

The second section of the standard is a revision of the 1971 edition which is therefore withdrawn. It now includes reference to gauging with gypsum for internal use and specifies the requirements for ready-mixed lime : sand for mortars and plasters to which specified amounts of Portland cement or gypsum are added on site. Water is also added on site to achieve the required consistence. The ready-mixed lime : sand for mortar may contain admixtures and/or pigments if required.

The third section of the standard specifies factory made ready-to-use retarded mortars for masonry, plastering and rendering. The mortars may be either of cement : lime : sand or cement : sand and are supplied in a ready-to-use condition, including requisite water. No further treatment on site is necessary. The presence of the cement-set retarder extends the useful working life of the mortar by a specified time. The mortar may contain admixtures and/or pigments if required. Mortars produced in compliance with section 3 and those produced on site by the correct use of lime : sand complying with section 2 have nominal volume proportions in accordance with the mortar designations of CP 121.

The fourth section of the standard specifies factory made ready-to-use retarded mortars for screeds. These are mixtures of sand and cement and are supplied in a ready-to-use condition including requisite water. No further treatment on site is necessary. The presence of a cement-set retarder extends the useful working life of the mortar by a specified time.

A fifth section for screeds using lightweight aggregates 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 12, 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.

Section 1. General

1 Scope

This British Standard specifies requirements for certain ready-mixed materials for mortars and ready-to-use mortars. It does not specify requirements for dry packaged mortar mixes, which are covered in BS 5838-2.

Section 2 of the standard specifies categories of factory-made mixtures composed essentially of lime, sand and water. These mixtures have the general description of ready-mixed lime : sand for mortar.

Section 3 of the standard specifies designations of factory made cement : lime : sand and cement : sand mortars, containing a cement-set retarding admixture for use in masonry work, external rendering and internal plastering.

Section 4 of the standard specifies designations of factory made cement : sand mortars containing a cement-set retarding admixture for use in screeds. This section of the standard does not cover screeds using special aggregates to provide thermal and lightweight properties.

An appendix to the standard gives guidance for the users of these materials and is intended to be read in conjunction with relevant British Standards publications.

NOTE For the sake of clarity, the aggregate used is referred to throughout as sand, but it should be noted that this covers both natural and synthetic materials.

2 References

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

3 Definitions

For the purposes of this British Standard, the definitions given in BS 4049 apply, with the addition of the following.

3.1 designation (of mix)

classification, using numerals, of mortars of different compositions by volume, but with nominally equivalent strengths

3.2 category (of mix)

classification of lime : sand for mortars by reference to their composition, in terms of the lime : sand ratio by volume

3.3 screed

a layer of mortar or other materials applied to a sub-floor or roof and brought to a defined level

4 Testing and sampling

If the purchaser requires tests, he shall state this to the supplier prior to taking a sample, in order that the manufacturer may be represented when the sample is taken and tested and that the testing laboratory may be mutually agreed.

Section 2. Ready-mixed lime : sand for mortars

5 General

5.1 Lime in the form of lime putty or dry hydrated lime is added to damp sand to produce ready-mixed lime : sand for mortar. This process is normally undertaken in a factory away from the building site. The mortar can also contain a pigment to change its colour.

5.2 After delivery to site it may be stored under suitable conditions until required for use: it is then mixed with either ordinary Portland cement, sulphate-resisting Portland cement or Portland-blastfurnace cement. For certain internal plasters, gypsum may be used. Under no circumstances shall both Portland cement and gypsum be added to the same batch of mortar.

5.3 The physical properties of a given category of lime : sand for mortar are assessed in the laboratory by adding to it specified amounts of ordinary Portland cement and water and testing the resulting mortar. This should not be confused with testing trial mixes of the actual mortars to be used on site.

NOTE Guidance on ordering and use of mixes to meet the requirements of a given building specification are given in the appendix to this standard.

6 Categorization

For the purpose of enquiries and order, ready-mixed lime : sand for mortar shall be categorized by referring to the ratio (by nominal volume proportions) of lime : sand present in the mix. The mix chosen shall be appropriate to the designation of mortar or plaster required.

NOTE Recommendations on the required cement or gypsum additions are given in Appendix A in Table 7 and Table 9 for volume proportioning or Table 8 and Table 10 for mass proportioning.

7 Materials

7.1 The ready-mixed lime : sand for mortar shall contain lime, sand and water as specified in **7.2** to **7.5**. Any pigments used shall be in accordance with **7.6** and air entraining agents or other admixtures in accordance with **7.7** and **7.8** respectively.

7.2 The lime shall be in the form of quicklime, dry hydrated lime or lime putty and shall comply with the requirements of BS 890. When quicklime is used it shall be slaked and the resulting lime putty made sound when tested in accordance with BS 890, before mixing with the sand.

7.3 When natural aggregate is used, the sand shall be natural sand, crushed rock sand or crushed gravel sand.

- a) Where the mix is supplied for mortar for masonry, the sand shall comply with the appropriate requirements of BS 1200:1976 and its grading with Table 1 of that standard for unreinforced brickwork and blockwork and with Table 2 of that standard for reinforced brickwork and blockwork.
- b) Where the mix is supplied for mortar for external rendering or internal plastering undercoats, the sand shall comply with the appropriate requirements of BS 1199:1976 and its grading with Table 1 of that standard.

Table 1 — Available lime content of lime: sand mixes

Category	Limits of available calcium hydroxide (percentage on dry mass)	
	Minimum	Maximum
Nominal proportions of lime : sand by volume		
	%	%
1 : 12	1.5	4.0
1 : 9	2.0	5.5
1 : 6	3.5	8.0
1 : 4½	4.5	9.5
1 : 4	6.5	10.5
1 : 3	9.0	14.0

7.4 Synthetic aggregate may be used alone or in combination with natural aggregates, subject to written evidence from the supplier that it will have no adverse effect on the durability or appearance of the mortar nor on any adjacent material or component, and that its grading is within the limits laid down for natural aggregate in **7.3**.

7.5 The water shall be of quality deemed suitable for concrete when tested by the methods in BS 3148.

7.6 Pigments used for colouring or modifying the colour of mortar shall comply with the requirements of BS 1014. The amount of pigment added shall not be such that it prevents the test mortar from complying with the requirements listed in Table 2.

7.7 Air entraining agents shall comply with the requirements of BS 4887 and the amount of agent added shall be limited such that the air content of the test mortar complies with the requirements of Table 2.

7.8 Admixtures containing calcium chloride shall not be used. Other admixtures may be incorporated for purposes of improving properties, subject to written evidence from the supplier that they will have no adverse effect on the durability or appearance of the mortar, nor on any adjacent material or component.

8 Sampling of the ready-mixed lime : sand for mortars

8.1 The ready-mixed lime : sand for mortar shall be sampled before delivery or within 72 h of delivery, either at the manufacturer’s works or the user’s site.

NOTE It is preferable to sample the material whilst it is in motion during the loading or unloading of the vehicle transporting the material to the site.

8.2 The sampling shall be carried out in accordance with clause 4 of BS 4551:1980. The reduced sample sent to the laboratory shall be not less than 15 kg and tests shall be made within 7 days from the time of taking the samples.

9 Available lime content of the ready-mixed lime : sand for mortars

The available lime content of the ready-mixed lime : sand for mortar, based on a sample prepared in accordance with **5.2** of BS 4551:1980 and chemically analysed by the method given in **6.3.1.3** of BS 4551:1980, shall be within the limits for the appropriate category shown in Table 1 of this standard.

10 Physical properties of the ready-mixed lime : sand for mortars

10.1 Physical properties shall be measured by carrying out the tests listed in **10.4** and shall be within the limits given in Table 2.

10.2 The sample shall be taken as described in clause 8 and shall, on receipt at the laboratory, be rendered homogeneous and sub-samples of masses required for the tests shall be prepared by coning and quartering or by means of a sample divider such as a riffle box. The quantity of material required for the various tests shall be assessed by reference to Table 4 of BS 4551:1980.

10.3 The tests shall be carried out on a mortar prepared with the lime : sand sub-sample taken as in **10.2**, using the method described in **9.4** of BS 4551:1980. The required quantity of ordinary Portland cement (which, at the time of use, shall comply with the requirements of BS 12) to be mixed with the sub-sample of the lime : sand mix shall be determined by reference to the appropriate category in Table 2 and to the mass of dry solids in the sub-sample, calculated as follows:

Mass of dry solids = mass of sub-sample × $\frac{100 - W}{100}$