



BSI Standards Publication

Workmanship on building sites –

Part 11: Internal and external wall and floor tiling – Ceramic and agglomerated stone tiles, natural stone and terrazzo tiles and slabs, and mosaics – Code of practice

Publishing and copyright information

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Summary of pages

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Foreword

Publishing information

This part of BS 8000 is published by BSI and came into effect on 31 January 2011. It was prepared by Technical Committee B/539, *Ceramic tiles and other rigid tiling*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 8000 supersedes BS 8000-11.1:1989 and BS 8000-11.2:1989, which are withdrawn.

Relationship with other publications

BS 8000 is published in the following parts:

- *Part 1: Code of practice for excavation and filling;*
- *Part 2: Code of practice for concrete work;*
- *Part 3: Code of practice for masonry;*
- *Part 4: Code of practice for waterproofing;*
- *Part 5: Code of practice for carpentry, joinery and general fixings;*
- *Part 6: Code of practice for roof, slate, tile covering and cladding;*
- *Part 7: Code of practice for glazing;*
- *Part 8: Code of practice for plasterboard partitions and dry linings;*
- *Part 9: Cementitious levelling screeds and wearing screeds – Code of practice;*
- *Part 10: Code of practice for plastering and rendering;¹⁾*
- *Part 11: Internal and external wall and floor tiling – Ceramic and agglomerated stone tiles, natural stone and terrazzo tiles and slabs, and mosaics – Code of practice;*
- *Part 12: Code of practice for decorative wallcoverings and painting;*
- *Part 13: Code of practice for above ground drainage and sanitary appliances;*
- *Part 14: Code of practice for below ground drainage;*
- *Part 15: Code of practice for hot and cold water services (domestic scale);*
- *Part 16: Code of practice for sealing joints in buildings using sealants.*

The content of BS 8000-11 is consistent with that of BS 5385.

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- the exclusion of recommendations on using cement:sand mortar (not semi-dry mix) over a separating layer;
- updated references to take account of the new harmonized European product specifications;

¹⁾ BS 8000-10 has been withdrawn.

- the specifications for sands (fine aggregates) are now provided by European Standards for the specification of aggregates. Throughout this standard, the term commonly used in the UK building and tiling industry, “sand”, is interchangeable with the term “fine aggregate”, used in the European specifications;
- alignment with the revised versions of BS 5385 (all parts).

Use of this document

The purpose of this code of practice is to encourage good workmanship by providing:

- the most frequently required recommendations on workmanship for building work in a readily available and convenient form to those working on site;
- assistance in the preparation and administration of contracts;
- recommendations on how designers’ requirements for workmanship can be satisfactorily realized;
- guidance on good practice for supervision and for training purposes;

NOTE This guidance is not intended to supplant the normal training in craft skills.

- a reference for quality of workmanship;
- recognition that design, procurement and project information are likely to be conducive to good workmanship.

During the preparation of this Code of Practice the Construction Project Information Committee (CPIC) produced a *Common Arrangement of Work Sections (CAWS) for Building Works* [1]. This Code of Practice has generally been arranged in accordance with the *Common Arrangement* so that it can be used easily with project specifications and bills of quantities using CAWS.

As a Code of Practice, this part of BS 8000 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this part of BS 8000 is expected to be able to justify any course of action that deviates from its recommendations.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This part of BS 8000 gives recommendations on basic workmanship on building sites, both commercial and domestic, and covers those tasks that are frequently carried out in relation to internal/external wall and floor tiling and slabs.

It makes recommendations and gives guidance on basic workmanship for conventional types of building work. The recommendations given are not necessarily comprehensive; particular project documents, e.g. project specifications, might need to cover particular recommendations not dealt with by this code of practice.

The recommendations given in this British Standard apply to the fixing of ceramic and agglomerated stone tiles, natural stone and terrazzo tiles and slabs, and mosaics to walls and floors using adhesive and mortar. BS EN 12440 sets out requirements for natural stone used in construction. Design aspects of wall and floor tiling are given in BS 5385. Design, installation and maintenance of natural stone cladding and lining are dealt with in BS 8298. Harmonized European product specifications are now available for natural stone tiles (BS EN 12057) and slabs (BS EN 12058), ceramic tiles (BS EN 14411), agglomerated stone (BS EN 15285) and adhesives (BS EN 12004).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5385-1:2009, *Wall and floor tiling – Part 1: Design and installation of ceramic, natural stone and mosaic wall tiling in normal internal conditions – Code of practice*

BS 5385-2, *Wall and floor tiling – Part 2: Design and installation of external ceramic and mosaic wall tiling in normal conditions – Code of practice*

BS 5385-3, *Wall and floor tiling – Part 3: Design and installation of internal and external ceramic floor tiles and mosaics in normal conditions – Code of practice*

BS 5385-4, *Wall and floor tiling – Part 4: Design and installation of ceramic and mosaic tiling in special conditions – Code of practice*

BS 5385-5, *Wall and floor tiling – Part 5: Design and installation of terrazzo, natural stone and agglomerated stone tile and slab flooring – Code of practice*

BS 6100-6:2008, *Building and civil engineering – Vocabulary – Part 6: Construction parts*

BS 8000 (all parts), *Workmanship on building sites*

BS 8298, *Code of practice for design and installation of natural stone cladding and lining*

BS EN 12004:2007, *Adhesives for tiles – Requirements, evaluation of conformity, classification and designation*

BS EN 12440, *Natural stone – Denomination criteria*

BS EN 12057, *Natural stone products – Modular tiles – Requirements*

BS EN 12058, *Natural stone products – Slabs for floors and stairs – Requirements*

BS EN 13888, *Grout for tiles – Requirements, evaluation of conformity, classification and designation*

BS EN 14411:2006, *Ceramic tiles – Definitions, classification, characteristics and marking*

BS EN 15285:2008, *Agglomerated stone – Modular tiles for flooring and stairs (internal and external)*

3 Materials – handling and preparation

3.1 Checking materials and components

3.1.1 On delivery

The delivery of materials and components should be arranged to minimize handling. Precautions should be taken to guard against the possibility of damage.

Delivery tickets and certificates should be checked against the specification; marks and labels should be examined and the condition of materials and components should be inspected. Materials should be within their storage life. If necessary, the supplier should be referred to immediately.

3.1.2 Before use

Before using materials and components the following checks should be made.

- a) Materials and components should be clean, undamaged and sufficient for the task in hand.
- b) Tile sizes, thicknesses and colours should be as specified.
- c) For mosaics bonded to synthetic strips or other types of backing material, the glue should be confined to the immediate area of the mesh or strips and not spread over the backs of the tesserae.

NOTE 1 If the mesh and glue cover more than 25% of the back of the tesserae they could interfere with adhesion between the mosaic and the mortar or adhesive bed unless the glue and the mortar or adhesive are compatible.

- d) With large tiles and slabs any reinforcing mesh should be well adhered to the underside, and the mesh and adhesive should not obscure more than 25% of the underside of the tile or slab unless they are mechanically fixed.
- e) Adhesives, grouts, primers and sealants should be as specified and within their storage life, and should be suitable for the conditions to which the tiling is likely to be subjected when in service. The background should be as specified and thus compatible with the specified primers and adhesives.
- f) Sand should be as specified.

- g) Cement should be as specified and within its storage life.
- h) Lime should be free from lumps.

NOTE 2 It is the responsibility of users, where relevant, to obtain material safety data sheets and observe the suppliers' recommendations for transportation, storage, use and disposal of materials.

3.2 Handling and site storage of materials and components

3.2.1 Tiles, slabs and mosaics

Tiles, slabs and mosaics should be handled with care to avoid breakage and chipping.

These materials should be stored in their original packaging in a clean, dry, frost-free (if necessary) lockable storage to avoid excessive handling, theft or damage. They should be stacked on a firm, level base. On solid floors these products should be stacked on a sheet of polyethylene, pallets or timber to prevent any rising damp affecting the tiles and packaging.

NOTE Damp packaging might cause staining and other damage to tiles.

Tiles and slabs should be transported from store in their original packaging to the location where they are to be fixed. A check should be made to ensure that the weight and size of the component materials is such that they can be safely handled by available manual or mechanical means.

3.2.2 Cement, lime, adhesives and jointing materials

Cement, lime, adhesives and jointing materials should be handled with care to avoid damage to packaging. Where cement, lime, adhesives or jointing materials are to be kept for later use, they should be:

- a) stored in a dry, weatherproof, frost-free enclosed shed or building with a dry floor. If the floor is concrete, they should be stored on a timber platform, e.g. pallet;
- b) kept in separate stacks for different materials;
- c) stacked away from walls and covered with tarpaulin or polyethylene sheet;
- d) stacked so that consignments can be used in the order of delivery.

Powder materials should be checked for deterioration when taking them out of storage and discarded if they contain lumps.

Adhesives and liquid admixtures should not be subjected to temperatures outside the tolerance range given in the manufacturer's instructions; any that have been subjected to such temperatures should be discarded.

Small quantities of materials for immediate use, which are not stored in a shed or building, should be stood on a timber platform well clear of the ground, e.g. on a pallet, and covered with tarpaulin or polyethylene so that all the bags and containers are wholly protected from adverse climatic conditions, e.g. wind, rain and frost.

NOTE Even if materials in powder form are protected from rain, moisture in the air can gradually cause their deterioration. Even in good conditions cement-based materials will go lumpy if left for periods in excess of the product shelf life and consequently their strength will decrease.

3.2.3 Sand

Sand should be stored in separate stock piles on hard, clean bases which permit free drainage. All stocks of sand should be protected from rain, frost and any form of contamination by covering them with tarpaulin or polyethylene.

Sand in packs or containers should be handled with care to avoid damage to packaging.

3.2.4 Flammable materials

Flammable materials should be handled in accordance with the manufacturer's instructions.

If the total quantity of flammable materials exceeds 50 L at any one time, the material should be stored in either:

- a) metal lockers;
- b) a detached store of fire-resistant construction;
- c) the open air, away from buildings and covered over with fire-resistant material to provide protection from weather; or
- d) a well ventilated room of fire-resistant construction.

"NO SMOKING" signs should be displayed.

NOTE For the storage of highly flammable liquids, attention is drawn to the Highly Flammable and Liquefied Petroleum Gases Regulations 1972 [2].

3.3 Preparation of work

COMMENTARY ON 3.3

Unless specifically stated otherwise, all these recommendations apply equally to internal and external work.

3.3.1 Programme

All parties should be consulted to ensure that sufficient time is allowed for fixing tiling and that, for floors, the need to prevent traffic on newly tiled areas does not disrupt the programme for other work (see 5.1.2.1).

3.3.2 Pipes, conduits and similar items

Installation work should not commence until all conduits, pipes, electrical cables, electrical boxes, etc. that lie beneath the tile bed have been fixed securely in position and any supplementary work is complete.

3.3.3 Conditions in building

Internal tiling should not be started unless the part of the building where tiling is to be fixed is weathertight.

3.3.4 Cold weather working

Installation work should not be carried out with cement:sand or cement-based adhesives when the air temperature is at or below 5 °C and falling, or unless it is at least 3 °C and rising, or while any materials or substrate are frozen.

For internal tiling, the air temperature should be maintained at a minimum of 5 °C during construction, and for four or five days after tile fixing is complete to prevent freezing.

Unless mechanical fixing is being used, external work should be covered immediately to exclude frost.

Tiling work should not be carried out with reaction resin adhesives and primers (including aqueous dispersion-based primers) when the air and surface temperatures are below 10 °C, unless the manufacturer's instructions recommend otherwise.

The manufacturer's instructions should be followed for each product, as different proprietary products have different working temperatures. Setting and curing times can be significantly longer at lower temperatures, and this should also be taken into consideration.

3.3.5 Lighting on site

Where work is carried out in artificial light, lighting should be adequate and, where practicable, the direction and intensity of temporary lighting should be similar to that of the final permanent lighting.

NOTE Individual tiles which are very slightly out of planarity (lipped) with the general surface might show up badly when lighting falls from a different direction.

3.4 Preparation of materials and components

3.4.1 Machine mixing cement:sand mortar for bedding

When mixing cement:sand mortar by machine, the following steps should be taken.

- a) Where possible use a mixer of forced-action type, especially when mixing semi-dry ingredients.

NOTE Free-fall drum mixers have been found to produce inconsistent mixing of semi-dry materials.

- b) Batch materials by weight unless otherwise instructed.
- c) If batching by volume, measure the materials with gauge boxes or other suitable containers of known volume. Base the measurements on a 25 kg bag of cement with a volume of 17.5 L.
- d) Mix materials well, until the consistency is uniform.
- e) Always obtain agreement from the project engineer before pumping a floor screed as it might be necessary to alter the mix proportions.

3.4.2 Hand mixing cement:sand mortar for bedding

When mixing cement:sand mortar by hand, the following steps should be taken.

- a) Batch materials by weight unless otherwise instructed.
- b) If batching by volume measure the materials with the gauge boxes or other suitable containers of known volume. Base the measurements on a 25 kg bag of cement having a volume of 17.5 L.
- c) Mix materials dry to a uniform colour before adding water. Add water to achieve the required workability. After water has been added mix until the consistency is uniform.