

BS 8000-3:2020



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Workmanship on construction sites

Part 3: Masonry — Code of practice

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Foreword

Publishing information

This part of [BS 8000](#) is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 May 2020. It was prepared by Subcommittee B/525/6, *Use of masonry*, under the authority of Technical Committee B/525, *Building and civil engineering structures*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of [BS 8000](#) supersedes [BS 8000-3:2001](#), which is withdrawn.

Relationship with other publications

[BS 8000](#) is a series of standards describing the execution of works for a range of construction activities. They are issued to fill a gap in the authoritative information that is available to those specifying, supervising and instructing in connection with those activities and to assist in describing processes to ensure a better and common understanding of them and so improve construction quality.

The various parts of [BS 8000](#) draw content from, and relate to, other relevant British Standards and codes. This part of [BS 8000](#) makes recommendations and gives guidance on masonry. It is intended to be read in conjunction with [BS 8000-0](#), which encourages liaison between and awareness of adjoining/dependent trades and processes in the construction sequence (whether or not they are subject to one of the specialist titles in the series).

The content of BS 8000-3 is consistent with that of BS EN 1996-1-1:2005+A1, BS EN 1996-1-2, BS EN 1996-2:2006, BS EN 1996-3 and the relevant National Annexes and PD 6697:2019.

The user's attention is also drawn to *Directional driving rain indices for the United Kingdom – Computation and mapping* [1].

In this part of [BS 8000](#), commentary on the relevant principles accompanies the recommendations that are made. The commentary is intended to provide further guidance.

Information about this document

The recommendations given are not fully comprehensive as particular project documents, e.g. project specifications, might need to cover particular recommendations not dealt with by this standard. This standard might not be applicable to the use of some proprietary systems.

The purpose of BS 8000-3 is to encourage good workmanship by providing:

- a) the most frequently required recommendations on workmanship for building work in a readily available and convenient form to those working on site;
- b) assistance in the efficient preparation and administration of contracts;
- c) recommendations on how designers' requirements for workmanship can be satisfactorily realized;
- d) guidance on good practice on building sites for supervision and for training purposes (this guidance is not intended to supplant the normal training in craft skills);
- e) a reference for quality of workmanship on building sites; and
- f) the recognition that design, procurement and project information are intended to be conducive to good workmanship on site.

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

- 1) The content has been rearranged to align the structure with the wider suite of workmanship standards and follow the workflow of a generic construction project.
- 2) The content has been updated to align with changes to related product and design standards.
- 3) The content has been updated to align with current products, construction techniques and methods of working.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at bsigroup.com/standards, or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

Use of this document

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.

While this standard is concerned with workmanship, at some points it is necessary to refer to masonry design standards.

Presentational conventions

The provisions of 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.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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 for workmanship in the construction of brick, block and stone masonry.

This part of [BS 8000](#) has been drafted in accordance with the recommendations in [BS 8000-0](#).

NOTE 1 The general principles of workmanship on construction sites are given in [BS 8000-0](#).

This part of [BS 8000](#) does not specifically address health and safety issues; however, it does, where appropriate, highlight the importance of health and safety procedures and draw attention to the relevant legislation/advice.

At the time of publication this part of [BS 8000](#) does not cover maintenance and restoration.

The intended users of this British Standard are designers, specifiers, contractors, quality controllers, inspectors and operatives.

NOTE 2 This British Standard contains information of relevance to educators.

NOTE 3 For design aspects of masonry, the user is referred to BS EN 1996-1-1:2005+A1, BS EN 1996-1-2, BS EN 1996-2:2006, PD 6697:2019 and [BS 8103-2](#).

NOTE 4 Attention is drawn to any additional technical information that relates to proprietary systems, such as that supplied by the manufacturer.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document.¹⁾ For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[BS 8000-2.1](#), *Workmanship on building sites – Part 2: Code of practice on concrete work – Section 2.1: Mixing and transporting concrete*

[BS 8000-2.2](#), *Workmanship on building sites – Part 2: Code of practice for concrete work – Section 2.2: Sitework with in situ and precast concrete*

BS EN 771 (all parts), *Specification for masonry units*

BS EN 845-3, *Specification for ancillary components for masonry – Part 3: Bed joint reinforcement of steel meshwork*

BS EN 12059, *Natural stone products – Dimensional stone work – Requirements*

[PD 6697:2019](#), *Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2*

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

3 Terms and definitions

For the purposes of this part of [BS 8000](#), the following terms and definitions apply.

3.1 actual dimension

either work size of the unit or, where applicable for solid walls, sum of the work size of the units together with the work size of the joints between them

[SOURCE: PD 6697:2019, 3.1]

3.2 brickwork

assemblage of brick masonry units laid in a specified pattern and joined together with mortar

3.3 capping

construction that protects the top of a wall, but does not shed rainwater clear of the surfaces of the wall beneath

[SOURCE: PD 6697:2019, 3.3]

3.4 cavity tray

damp-proof course that bridges a wall cavity to lead moisture to the external face of a wall

[SOURCE: PD 6697:2019, 3.4]

3.5 closer

portion of a masonry unit used to maintain bond

[SOURCE: PD 6697:2019, 3.5]

3.6 coping

construction that protects the top of a wall, balustrade or parapet and sheds rainwater clear of the surfaces beneath

[SOURCE: PD 6697:2019, 3.7]

3.7 course

single layer of masonry units of uniform height, including the bed joint

[SOURCE: PD 6697:2019, 3.8]

3.8 damp proof course

material that is included within a masonry panel to control the movement of water through the panel

3.9 efflorescence

crystalline deposit of salts on a surface as a result of the evaporation of water from a salt solution

[SOURCE: PD 6697:2019, 3.11]

3.10 fair-faced

surface built neatly and evenly without applied finish

[SOURCE: PD 6697:2019, 3.12]

3.11 flush joint

mortar joint with its face finished level with the face of adjacent masonry units

[SOURCE: PD 6697:2019, 3.14]

3.12 jamb

vertical part of a wall at an opening

[SOURCE: PD 6697:2019, 3.17]

3.13 masonry

assemblage of masonry units laid in a specified pattern and joined together with mortar

[SOURCE: BS EN 1996-1-1:2005+A1, 1.5.2.1]

3.14 masonry unit

preformed component, intended for use in masonry construction

[SOURCE: BS EN 1996-1-1:2005+A1, 1.5.4.1]

3.15 recessed joint

mortar joint with its face finished back from the arrises and face of the adjacent masonry units

3.16 rubble

stone of irregular shape and size

[SOURCE: PD 6697:2019, 3.23]

3.17 sample panel

panel of masonry erected adjoining the reference panel during ongoing project works for the purpose of assessing the visual characteristics of masonry units taken from subsequent project deliveries

3.18 site reference panel

masonry panel usually constructed at the start of a project for the purpose of establishing the visual characteristics of the masonry

3.19 slip tie (general purpose)

wall tie fitted across a movement joint in masonry to transmit shear forces, but with one end debonded to allow the joint to close or open

[SOURCE: PD 6697:2019, 3.27]

3.20 special shaped brick

brick with shape or size other than a standard parallel faced rectangular prism

[SOURCE: PD 6697:2019, 3.28]

3.21 string course

moulded course, that may be one of a number of courses, that projects from a wall

[SOURCE: PD 6697:2019, 3.30]

3.22 weathered/weathering

having an upper surface sloped to throw off water

[SOURCE: PD 6697:2019, 3.31]

3.23 weephole

hole through a wall that drains water to its outer face

[SOURCE: PD 6697:2019, 3.32]

4 Health and safety

All health and safety procedures, protocols and guidance related to construction operations that a construction site has in place should be complied with at all times.

NOTE 1 [BS 8000-0](#) lists health and safety issues highlighted in general guidance from the Health and Safety Executive (HSE). This is intended as a convenient prompt to users of this standard (and its other parts), not as a comprehensive list of health and safety issues. For more detailed information on health and safety issues, see www.hse.gov.uk.

NOTE 2 Attention is drawn to the Construction (Design and Management) Regulations 2015 (CDM) [2].

5 Accuracy

5.1 General

COMMENTARY ON 5.1

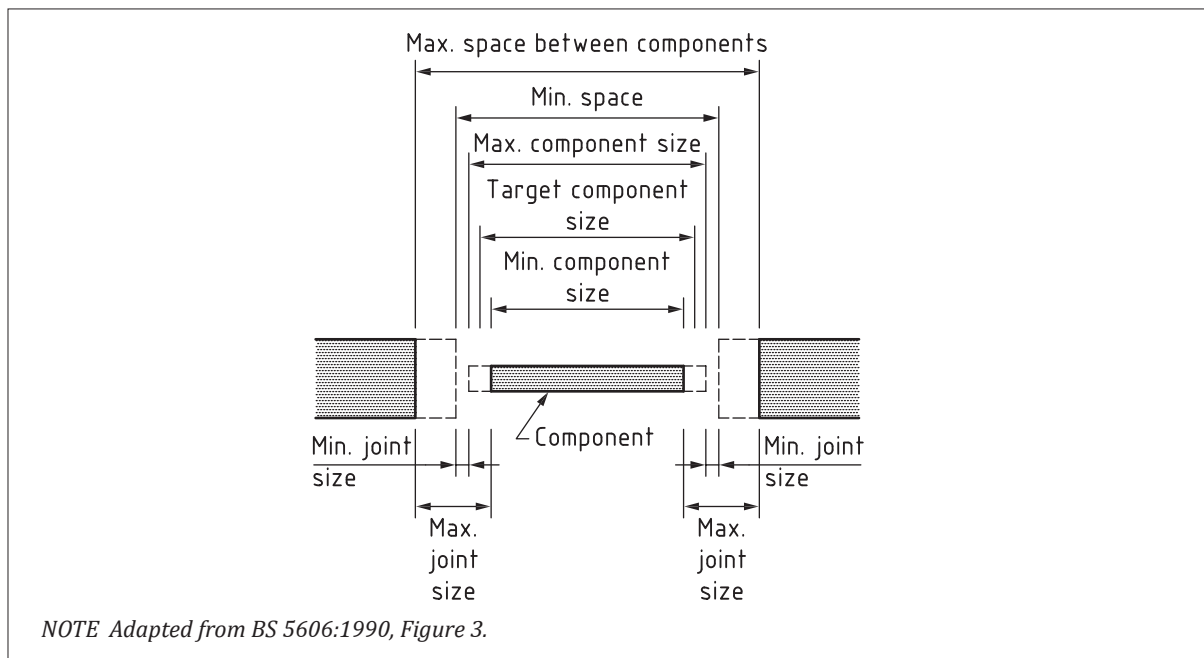
Each of the individual parts of [BS 8000](#) deals with the trade, material and other particular issues to do with accuracy and fit in the completion of the work.

The issue of accuracy should be addressed in the following ways:

- a) from a functional perspective: for example, structural integrity is likely to be dependent on achieving a certain degree of accuracy and fit;
- b) from a durability (longevity) perspective: for example, poorly fitting components might accelerate weathering damage; and
- c) from an appearance perspective: for example, where panel components that are clearly intended to align fail to do so.

NOTE 1 All of the above are important but expectations and relative importance can vary and emphasis might shift depending on the type of work or project and the quality required. In any process there is some degree of dimensional variability, and the magnitude of this variability alters from process to process and is generally characteristic of that process.

NOTE 2 Figure 1 illustrates the principles involved in considering accuracy in terms of tolerances and fit.

Figure 1 — Dimensional variability for components, prepared space and joints

5.2 Specifying accuracy

COMMENTARY ON 5.2

Specifying accuracy is important as often no specific parameters are enumerated in contract documents (such as drawings or specifications) but are either specified by references to standards, manufacturers' installation instructions, other authoritative guidance or "good practice". In the absence of any reference, the legal principle of "normal skill and care" applies.

Accuracy should be specified by the designer.

The requirements for degrees of accuracy should be stated within drawings and/or specifications so that allowance can be made.

5.3 Achieving accuracy

COMMENTARY ON 5.3

Achieving accuracy is a process issue which includes fully understanding the design intent. For example, a critical fixing in concrete might be more reliably achieved from a process point of view by an alternative to "casting-in" and normally, provided the performance, functional and visual aspects of the design can be assured, such an alternative process is permissible.

All requirements for accuracy should be complied with.

5.4 Nominal dimensions

Dimensions that are either given or are normally expressed as nominal should be accommodated in designs and allowed for in assembly and construction.

5.5 Grid lines and setting out

COMMENTARY ON 5.5

It is common practice in construction design to relate dimensions to grid lines. However, while this might be clear on a paper drawing or a 3D rendering, as construction sites become progressively more congested and sight lines become obscured, this practice becomes less practical to translate into setting-out processes. Establishing reasonably accessible horizontal and vertical lines and datum points is generally the responsibility of the principal construction contractor, with subsequent setting-out the responsibility of the specialist or trade contractor.

Responsibility for establishing useful line and level setting out points/planes for both current and following operations should be clearly defined.

Correct setting out procedures should be applied along with systematic recording, reporting and monitoring of the accuracy achieved during construction. Measuring and other setting out equipment commensurate with the degree of accuracy required should be used.

6 Materials, handling and preparation

6.1 Brick and block

6.1.1 Receipt

6.1.1.1 General

The site should be kept clean and tidy so that checking, handling and storage of materials and components can be carried out speedily and effectively. The site should be accessible so that the delivery vehicle can be safely manoeuvred to the desired point of delivery.

6.1.1.2 Site reference panel

Prior to construction, the contractor should provide, upon request, a reference panel representing the facing masonry units for the project.

Materials and workmanship in the reference panel should be representative of the final construction.

NOTE 1 An alternative method is to benchmark an area of the permanent works.

Site reference panels should be constructed prior to the permanent works and retained and protected during the construction period.

The reference panel should be erected on a level, firm foundation in a dry location, having good natural daylight. It should be sited so that it can be retained for further inspection and reference and should, therefore, be protected from damage and adverse weather conditions. If necessary, provision should be made for lateral stability of the panel.

The reference panel should be of a size agreed by all parties but not less than 1 m², and the masonry units should be:

- a) supplied by the manufacturer or supplier so that they are representative of the average quality of the whole order to be delivered; or
- b) randomly sampled in accordance with BS EN 771 (all parts).

The reference panel should be built to the specification and contract requirements of the finished work so that it exposes for assessment those faces that are intended to be visible in the finished work. Masonry units should be laid to the bond selected for the finished work to the horizontal and vertical gauge proposed (using mortar of the same class and colour) and finished with the same joint profile.

NOTE 2 In practice it is not possible to write a universally applicable definition of the acceptable appearance of facing masonry, as this varies significantly with the type of masonry unit chosen. The appearance of masonry is additionally dependent on the choice of unit, mortar, joint profile and workmanship. The characteristics of the surface of the masonry unit are relevant only in so far as they prohibit the achievement of the specified required appearance. Consequently, cracks or chips in the exposed face or arrises of a smooth faced regular shaped unit used with a recessed mortar joint might be unacceptable, but a similar number of such features might be quite acceptable on a handmade product used with a flush joint.

6.1.1.3 Checking

Upon delivery the construction materials should be checked against the specification and site reference panel by whoever is receiving the delivery. Marks, labels and the condition of materials and components should be examined as delivered and any discrepancies reported to the supplier immediately. Masonry units that are delivered wrapped or banded should be checked at the time of delivery.

In particular, it should be checked that:

- a) materials and components are clean and are not damaged or unduly wet; and
- b) the colour and texture of facing masonry units match the agreed reference panels.

NOTE It is desirable that colour differences between consignments of masonry facing units do not result in banding or patchiness of colour in finished walling. Distributing units from different packs throughout the site helps to blend units of different colour within the consignment. Ascertaining in advance whether the manufacturer can blend the units in their factory is useful. Where several consignments are delivered to site over a long period of time, blending on site might not solve the problem of colour variation between consignments. It is worthwhile consulting with the supplier to identify whether this requires further consideration.

The acceptability of minor defects such as cracks, chips or surface blemishes of facing masonry units when delivered to site should be assessed. Sample panels from masonry unit deliveries should be compared with a previously constructed site reference panel, which is representative of what can be expected to be delivered and is large enough to encompass known and acceptable variations in units. This method should be used to assess consistency of supply in respect of colour and texture. The panels should be viewed from a distance of 3 m, which is sufficient to reliably compare their aesthetic characteristics.

If required, the sample panels should be representative of individual batches of units in the same way and of the same size as the reference panel, allowing the mortar time to cure so that the appearance can be fairly judged in a protected environment.

6.1.2 Storage

6.1.2.1 General

Any additional requirements received from the manufacturer for the handling and site storage of materials should be followed. Where practical, materials should be stored in batches of a size sufficient to minimize the potential for banding.

6.1.2.2 Storage conditions

A firm, level, clean and well-drained base should be provided to protect the bottom of the stack from becoming wet from ground moisture. Temporary works should be installed to protect the stacks from rain and frost, soiling from the ground and passing traffic.

6.1.3 Sorting

6.1.3.1 Blending

Before laying, units should be blended such that the overall appearance of the finished work is consistent with the appearance required (see also [6.1.1.3](#)).

To achieve an acceptable blend, units should be taken from at least three stacks, and should be drawn from the packs in vertical rather than horizontal lines.

6.1.3.2 Selection

Units needed for special situations (e.g. soldier course or narrow piers) should be selected for consistency of size.

Clay bricks should be free from:

- a) deep and extensive cracks;
- b) damage to edges and corners; and
- c) the inclusion of pebbles and expansive particles of lime.

6.1.4 Preparation for work

6.1.4.1 General

Materials should only be removed from the storage area when they are needed at the point of use.

6.1.4.2 Material distribution

When materials and components are distributed to the work position, the method for distributing components and materials should not cause damage, deterioration or wetting.

6.2 Stone (manufactured and natural)

6.2.1 Receipt

Stone masonry units should be checked with respect to the required dimensions.

Shrink wrapping around stone should be left in place but punctured to allow air circulation to minimize the likelihood of the stone suffering algal growth.

6.2.2 Storage

Stone should be stacked clear of the ground to prevent contamination from moisture and contaminants in the ground. Stone masonry units should not be stacked directly on to timber battens as this can result in staining from the tannins in the timber. There should always be compressible strips between the timber and the stone. Straw should not be used.

Stone should be covered with a protective sheet over insulating material. The protective materials should contain nothing that might damage or stain the stone. Stone should be protected against staining from other building materials, e.g hardwoods, oils and fuels.

NOTE 1 If masonry units are too wet they can be difficult to lay and the finished work can develop efflorescence or leaching from the joints causing white stains. The risk of unacceptable shrinkage cracking (for example, concrete block masonry and calcium silicate brick masonry) is greater when units have been wetted unnecessarily because of a lack of protection.

Storage should be set aside for the stone.

Stone should be stored on firm, level surfaces and, to avoid contamination, should be sited away from wet or muddy areas.

Storage should be as near as practicable to the areas of working in order to minimize handling, damage and waste. Pallets should not be stacked on top of each other. If it is necessary to store the material on site for any length of time, it should be protected from the elements and the environment.

Lifting equipment should be made available to move and fix the heavy stones.

NOTE 2 Attention is drawn to the Manual Handling Operations Regulations 1992 [3].

6.2.3 Preparation for work

The positions of the main features, such as quoins, door jambs etc., should be checked and a marked off gauge-lath should be prepared, making allowance for the joints. In intricate work, trial assembly of stones should be laid dry for the first two courses to check bonding and jointing.

Stone masonry units should conform to BS EN 771-6, which includes all rectangular blocks and rubble and squared rubble stone.

Stone used as jambs, sills, heads and other dimensional stone should conform to BS EN 12059.

6.2.4 Insulation

When built-in insulation is specified for cavity walls, whether partial or full fill, it should be installed by the bricklayer or mason in accordance with the manufacturer's specification.

When used with natural stone, only partial fill should be used as full fill can result in staining of the face of natural stone.

6.2.5 Handling

Masonry units should be unloaded by machine or by hand to minimize soiling, chipping and breakage. Prepacked masonry units should be handled with wrapping and banding in place unless it is not practicable to do so. Mechanical handling equipment should be used where practicable.

6.3 Ancillary and other components

The manufacturer's recommendations for storage and handling should be followed.

Lintels and copings of precast concrete and pressed metal should be stacked on level bearers so that they are clear of the ground. The stacks should be covered to protect them from staining and splashing of mud, and any additional advice in the manufacturer's recommendations should be followed.

Metal and plastics components, e.g. wall ties, straps, should be stored under cover to protect them from damage and distortion.

Damp proof course (DPC) materials should be stored in the dry, under cover and protected against damage. In addition, the following recommendations for flexible materials should be followed.

- a) Rolls should be stood on their ends to form a stable stack not more than three packs or more than 1 m high.
- b) Bitumen and other thermoplastic materials should be kept away from any direct heat source.
- c) The required number of rolls for the next day's use should be stored in a warm place prior to use, since some DPC materials can become stiff in cold weather conditions.
- d) All labels on adhesives should be checked for any particular storage recommendations (e.g. avoidance of high or low temperature) and for any hazards relating to solvent vapours.

Thermal insulation materials should be stored under cover and protected against damage. All ancillary components, e.g. lintels, flue linings, tiles, cavity closers and edge trims, should be handled with care to avoid cracking, damage to edges, damage to surfaces and coatings, distortion and soiling.