BRITISH STANDARD

Precast concrete masonry units –

Part 2: Guide for specifying precast concrete masonry units

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 6073 is published by BSI and came into effect on 30 November 2008. It was prepared by Subcommittee B/519/1, *Masonry units*, under the authority of Technical Committee B/519, *Masonry and associated testing*. A list of organizations represented on these committees can be obtained on request to its secretary.

Supersession

This part of BS 6073 supersedes BS 6073-2:1981, which is withdrawn.

Relationship with other publications

This part of BS 6073 was originally developed as a method for specifying masonry units in accordance with BS 6073-1, which has been withdrawn and superseded by BS EN 771-3 and BS EN 771-4.

This new edition of BS 6073-2 is intended to provide a guide to the understanding and application of BS EN 771-3 and BS EN 771-4 for specifiers.

Use of this document

As a guide, this part of BS 6073 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 6073 is expected to be able to justify any course of action that deviates from its recommendations.

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 British Standard gives guidance for specifying precast concrete masonry units conforming to BS EN 771-3 and BS EN 771-4.

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 5628-3:2005, *Code of practice for the use of masonry – Part 3: Materials and components, design and workmanship*

BS EN 771-3:2003+A1:2006, *Specification for masonry units – Part 3: Aggregate concrete masonry units (dense and lightweight aggregates)*

BS EN 771-4:2003+A1:2005, *Specification for masonry units – Part 4: Autoclaved aerated concrete masonry units*

BS EN 1996-1-1, *Eurocode 6: Design of masonry structures – Part 1-1: Common rules for reinforced and un-reinforced masonry structures*

3 Terms and definitions

For the purposes of this part of BS 6073, the following terms and definitions apply.

3.1 masonry unit
pre-formed component intended for use in masonry construction

3.2 common masonry unit
masonry unit normally intended for use with no faces left visible

3.3 close textured masonry unit
masonry unit with a texture suitable for direct decoration

3.4 facing masonry unit
masonry unit intended for use with one or more faces left visible and which may or may not be exposed to external climatic conditions

3.5 exposed masonry unit
facing masonry unit exposed to external climatic conditions without render or other equivalent protection

3.6 aggregate concrete masonry unit
masonry unit manufactured from cementitious binder, aggregates and water and which may contain admixtures and additions and colouring pigments and other materials incorporated or applied during or subsequent to unit manufacture

3.7 autoclaved aerated concrete (AAC) masonry unit
masonry unit manufactured from hydraulic binders such as cement and/or lime, combined with siliceous-based fine material, cell-generating material and water

NOTE AAC is commonly known as aircrete in the UK.

3.8 coursing unit
masonry unit, commonly of brick size, used to assist in achieving the storey height of a wall in conjunction with full height blocks

3.9 block
masonry unit which when used in its normal aspect exceeds the length or width or height specified for a coursing unit

3.10 accessory unit
masonry unit which is shaped to provide a particular function

3.11 work size
size of masonry unit specified for its manufacture, to which the actual size conforms within permissible deviations

4 General

When specifying masonry units, the basic characteristics listed in items a) to e) of both BS EN 771-3:2003+A1, **6.1**, and BS EN 771-4:2003+A1, **6.1**, should be included. Where relevant, additional characteristics from those listed should also be specified.

*NOTE BS EN 771-3:2003+A1, **6.1**, and BS EN 771-4:2003+A1, **6.1**, specify requirements for the description and designation on masonry units.*

5 Basic characteristics (BS EN 771-3:2003+A1, 6.1, and BS EN 771-4:2003+A1, 6.1)

5.1 General

It is important to specify that the masonry units conform to BS EN 771-3 or BS EN 771-4, as appropriate, and to further specify:

- the type of unit (see Clause **3**);
- the work size dimensions (see **5.2**);
- the tolerance category (see **5.3**);
- the configuration (see **5.4**);
- the mean compressive strength (see **5.5**);
- the dry density (see **5.6**).

5.2 Work size dimensions

The work size of masonry units should be specified in terms of length, width (thickness) and height, e.g. 440 mm × 100 mm × 215 mm.

NOTE 1 Previous UK practice called for work size to be specified in terms of length, height and thickness.

Table 1 and Table 2 show the work sizes of aggregate concrete masonry units commonly supplied in the UK. Tables 3 and 4 show the work sizes of aircrete masonry units commonly supplied in the UK.

NOTE 2 To obtain the coordinating size of a masonry unit, add the nominal joint width, which is normally 10 mm, to the length and height of the unit.

NOTE 3 Other widths might be available and in use. No single manufacturer necessarily produces the complete range of face sizes and widths given in Table 1 to Table 4.

Table 1 **Work sizes of aggregate concrete blocks (BS EN 771-3)**

Length mm	**Width** mm						**Height** mm
	75	90	100	140	190	215	
390	—	×	×	×	×	—	190
440	×	×	×	×	×	×	215

Table 2 **Work sizes of aggregate concrete coursing units (BS EN 771-3)**

Length mm	**Width** mm		**Height** mm
	90	100	
290	×		90
215		×	65
190	×		90
190	×		65
440	×	×	140
440	×	×	65

Table 3 **Work sizes of aircrete blocks (BS EN 771-4)**

Length mm	**Width** mm	**Height** mm
440	Available in a range from 50 mm to 350 mm	215
610		215
620		215

NOTE Other heights are available for foundation blocks and for thin layer mortar construction.

Table 4 **Work sizes of aircrete coursing units (BS EN 771-4)**

Length mm	**Width** mm	**Height** mm
215	Available in a range from 90 mm to 150 mm	65
215		70

5.3 Tolerance category

BS EN 771-3 permits four tolerance categories to be declared by the manufacturer for regular shaped units, non-regular shaped units and accessory units.

NOTE Alternative tolerances for non-regular shaped units and accessory units may be as declared by the manufacturer.

The majority of units manufactured in the UK conforming to BS EN 771-3 are supplied to tolerance categories D1 or D2. Tolerance categories D3 and D4 are for use with thin joint mortar and not currently used in the UK. The tolerance category for aggregate concrete units should therefore be specified in accordance with Table 5.

For regular shaped units, BS EN 771-4 has one tolerance category for general purpose mortar or lightweight mortar (GPLM) and two tolerance categories for thin layer mortar. The tolerance category for aircrete units should therefore be specified in accordance with Table 6.

Table 5 **Limit deviations in millimetres for aggregate concrete units (BS EN 771-3)**

Dimensions	**Tolerance category**	
	D1	**D2**
Length	+3 −5	+1 −3
Width	+3 −5	+1 −3
Height	+3 −5	±2

NOTE BS EN 771-3 permits closer tolerances to be declared for one or more dimensions.

Table 6 **Limit deviations in millimetres for aircrete units (BS EN 771-4)**

Dimensions	**Mortar type**		
	General purpose and lightweight mortar	**Thin layer mortar**	
	(GPLM)	**(TLMA)**	**(TLMB)**
Length	+3 −5	±3	±1.5
Width	±3	±2	±1.0
Height	+3 −5	±2	±1.5
Flatness of bed faces	n/a	n/a	⩽1.0
Plane parallelism of bed faces	n/a	n/a	⩽1.0

NOTE BS EN 771-4 permits closer tolerances to be declared for one or more dimensions.

5.4 Configuration

BS EN 1996-1-1 categorizes units according to their void size, void percentages and shell and web dimensions and permits the manufacturer to either:

a) provide the purchaser with detailed information on void percentages, number of voids, volume of largest void, thickness of shells and webs etc., to enable the purchaser to establish the appropriate grouping to BS EN 1996-1-1; or

b) declare the unit grouping.

In the UK the unit grouping is declared by the manufacturer and the specifier should request the appropriate unit grouping, if other than Group 1 is needed. Units are generally either Group 1 or Group 2.

NOTE 1 All aircrete units conforming to BS EN 771-4 are Group 1 units.

NOTE 2 Volume limits for each unit grouping are given in Table 7.

Table 7 **Grouping of units – volume limits**

Unit grouping	Limits for voids (by volume)
Group 1	⩽25% formed voids
Group 2	>25% ⩽60% formed vertical voids
Group 3	>25% ⩽70% formed vertical voids
Group 4	>25% ⩽50% formed horizontal voids

5.5 Compressive strength

The compressive strength of masonry units should generally be specified in accordance with Table 8. These values correlate with the values given in BS 5628-1:2005, Table 2, and BS 5628-2:2005, Table 3, and with those given in BS 8103-2 and UK Building Regulations relating to structure.

NOTE Other compressive strengths might be available and in use. No single manufacturer necessarily produces the complete range of strengths given in Table 8.

Table 8 **Commonly available unit strengths of aggregate concrete and aircrete units (BS EN 771-3 and BS EN 771-4)**

Compressive strength N/mm^2
2.9
3.6
7.3
8.7 [A)]
10.4 [B)]
17.5 [B)]
22.5 [B)]
30.0 [B)]
40.0 [B]

[A)] Only for aircrete units to BS EN 771-4.
[B)] Only for aggregate concrete units to BS EN 771-3.

5.6 Dry density

The gross dry density of the units should be specified in kg/m^3. The permitted tolerance for aggregate concrete units is ±10% and for aircrete units it is ±50 kg/m^3.

Aggregate concrete units are generally in the gross density range of 650 kg/m^3–2 400 kg/m^3. Aircrete units are generally in the gross density range of 300 kg/m^3–1 000 kg/m^3.

NOTE The net dry density of masonry units is not generally needed.

6 Additional characteristics (BS EN 771-3:2003+A1, 6.1, and BS EN 771-4:2003+A1, 6.1)

6.1 Thermal properties

Where the masonry units are intended to be used in applications where thermal properties are relevant, either the thermal conductivity of the concrete should be specified in W/mK or the thermal resistance of the units in m^{2}K/W.

6.2 Durability

Where the units are intended to be used in applications exposed to frost, the durability of the units should be specified in accordance with BS 5628-3:2005, Table 12.

7 Other properties

7.1 General

Information might be available from manufacturers for the following properties, which are not generally needed for specification in the UK:

- water absorption;
- moisture movement;
- water vapour permeability;
- reaction to fire;
- shear bond strength.

7.2 Water absorption

Where the units are intended to be used as exposed units, the water absorption in g/m^{2}s may be specified. In cases where water absorption is specified, it should be specified:

- for a period of 10 min for aggregate concrete units;
- for a period of 10, 30 or 90 min for aircrete units.

7.3 Moisture movement

It is very difficult to calculate the likely amount of moisture movement in masonry and hence, when masonry is designed, an allowance is generally made instead for a small amount of moisture movement to take place.

Where the units are intended to be used in structural applications, the reference test moisture movement in mm/m may be obtained from the manufacturer.

NOTE Different methods are used to assess moisture movement in units conforming to BS EN 771-3 and BS EN 771-4 so the resulting values are not directly comparable.

7.4 Water vapour permeability

Where the units are intended to be used in external applications, the water vapour diffusion coefficient may be specified in accordance with tabulated values given in BS EN 1745 or alternatively in accordance with BS EN ISO 12572.

7.5 Reaction to fire

Where the units are intended to be used in applications that are expected to be non-combustible, reaction to fire may be specified.

NOTE UK Building Regulations relating to fire regard masonry units as being non-combustible.

7.6 Shear bond strength

Where the units are intended to be used in structural applications, the shear bond strength of the unit in combination with mortar may be specified in N/mm^2.

BS EN 998-2:2003 specifies values for general purpose and lightweight mortar (0.15 N/mm^2) or thin layer mortar (0.3 N/mm^2).

8 Manufacturing control

Masonry units should be specified as either:

- Category I units, which have a declared mean compressive strength with a probability of failure to reach this strength not exceeding 5%; or
- Category II units, which are not intended to conform to the level of confidence of Category I units.

NOTE Masonry units are generally manufactured as Category II units unless otherwise specified.

Bibliography

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5628-1:2005, *Code of practice for the use of masonry – Part 1: Structural use of un-reinforced masonry*

BS 5628-2:2005, *Code of practice for the use of masonry – Part 2: Structural use of reinforced and pre-stressed masonry*

BS 8103-2, *Structural design of low-rise buildings – Part 2: Code of practice for masonry walls for housing*

BS EN 998-2:2003, *Specification for mortar for masonry – Part 2: Masonry mortar*

BS EN 1745, *Masonry and masonry products – Methods for determining design thermal values*

BS EN ISO 12572, *Hygrothermal performance of building materials and products – Determination of water vapour transmission properties*

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