



Specification for precast concrete units

Part 2: Light-weight masonry units

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Foreword

With a view to have a comprehensive set of unified Dubai Municipality Standards which would be consistent and appropriate to local conditions and yet be at par with International Standards, the Dubai Central Laboratory Department is formulating standards taking guidance as much as possible from International and Regional Norms.

Local Order 44 issued in 1990 on “Standard Specifications of Concrete Blocks Used in the Emirate of Dubai” and its related Administrative Orders specify the requirements for the manufacture and use of pre-cast concrete blocks. Since it was issued, there has been new developments in terms of materials, block types and manufacturing technology which necessitated revision to the Order.

In view of the above, this DM Standard Specification (DMS 1) is being formulated in four parts as follows:

- Part 1: Normal-weight masonry and filler blocks
- Part 2: Light-weight masonry units
- Part 3: Autoclaved aerated concrete masonry units
- Part 4: Paving blocks

As seen, parts 1 to 3 are formulated by type of material to be inline with BS EN 771 series.

Amendments issued since publication		
Amd No.	Date	Text affected
DMS 1: P 2: AMD 1	May 2004	Indicated by a side bar on the right margin



1. Scope

This standard specifies materials and minimum performance levels for precast light-weight concrete masonry blocks.

2. References

This standard incorporates provisions from other references. These references are cited undated at the appropriate points in the text, but latest edition of these references applies (including amendments). The titles of these references are listed on the last page.

3. Definitions

3.1 masonry block

a precast concrete block intended for use in the construction of walls.

3.2 solid block

a block which contains no formed holes.

3.3 cellular block

a block which has one or more formed holes which do not pass through the block.

3.4 hollow block

a precast concrete block that has one or more formed holes which pass through the block.

3.5 lightweight concrete

concrete having an oven-dry net density of not less than 800 kg/m³ and not more than 2000 kg/m³. it is produced using lightweight aggregate for all or part of the total aggregate.

3.6 lot

the term "Lot" refers to any number of precast concrete blocks of any configuration or dimension manufactured by the producer using the same materials, concrete mix, manufacturing process, and curing method.

4. Requirements on materials

4.1 Binders and binder constituents

Precast concrete blocks shall be made using one or more of the following binders:

- Portland cement to BS 12
- Sulphate-resisting portland cement to BS 4027

4.2 Aggregates

4.2.1 The light-weight aggregates used shall conform to requirements of BS 3797, except for the grading requirement.

4.2.2 The normal-weight fine aggregates used shall conform to the requirements of BS 882, except for the grading requirement.

4.3 Admixtures

4.3.1 The admixtures used shall be free from chlorides and conform to BS EN 934: Part 2.



4.4 Water

The water used shall be clean and free from any deleterious and organic matter, and conform to BS EN 1008.

5. Precast concrete masonry blocks

5.1 General requirements

Masonry blocks shall comply with BS 6073: Parts 1 & 2 except in respect to requirements for size and performance for which clauses 5.2 and 5.3 of this standard are applicable.

5.2 Sizes

5.2.1 Work size

The size of a masonry block specified for its manufacture, to which its actual size should conform within specified permissible deviations. The purchaser shall specify the work size.

5.2.2 Dimensions

The dimensions of blocks shall be declared by the manufacturer.

5.2.3 Shell and web thickness

For hollow and cellular blocks the external shell thickness and web thickness shall conform to the requirements prescribed in Table 1.

Table 1 – Minimum web and shell thickness of blocks

Nominal thickness (mm)	Shell thickness (mm)	Web thickness (mm)
100	20	20
150	20	20
200	25	25

5.2.4 Tolerances

When measured in the manner described in BS 6073: Part 1 appendix A, the length, height or thickness of each block from the sample shall not exceed ± 3 mm from the stated dimensions.

5.3 Performance requirements for masonry blocks

5.3.1 Gross density of blocks

Block manufacturers shall declare the gross density of each type and configuration of their masonry blocks. When tested in accordance with appendix C of BS 6073: Part 2, the gross density of each type and configuration of the masonry blocks shall not exceed the declared value by more than $\pm 10\%$.

5.3.2 Chloride and sulphate content

When tested in accordance with BS 1881 : Part 124, the acid soluble chloride (Cl) and sulphate (SO₃) content of masonry blocks shall not exceed 0.1% and 0.6% by mass of dry concrete respectively.



5.3.3 Strength

5.3.3.1 Compressive strength determination

When tested in accordance with appendix B of BS 6073: Part 2, for a sample of ten masonry blocks, the average compressive strength and that of an individual specimen, based on the gross area, shall be not less than the values given in Table 2.

Table 2 - Minimum compressive strength of masonry blocks

Type of masonry blocks	Strength N/mm ²	
	Average	Individual
Lightweight aggregate concrete masonry blocks	3.2	2.6
NOTE 1: Designers may specify blocks of higher strengths than those given in this table if required.		

5.3.4 Drying shrinkage

When tested in accordance with appendix D of BS 6073: Part 1, for a sample of four masonry blocks, the average drying shrinkage shall not exceed 0.06%.

5.3.5 Thermal conductivity

For blocks intended to be used in elements subject to thermal requirements, thermal conductivity of blocks shall be declared by the manufacturer according to BS EN ISO 10456 at 35°C and 60% relative humidity (RH).

When tested in accordance with ASTM C 518 at 35°C and 60% RH lightweight concrete material thermal conductivity shall not exceed the declared value.

5.4 Sampling for tests

5.4.1 Number of Specimens

The number of specimens required for each specified test shall be :

- Dimension and Compressive strength 10
- Concrete density 3
- Chloride, Sulphate 1
- Drying shrinkage 4

5.4.2 Selection of test specimens

A representative sample of masonry blocks required for test purposes shall be selected at random from every designated lot of 20,000 blocks or fraction thereof. Each specimen shall be marked so that it may be identified at any time.



Publications referred to

BS 12	Specification for Portland cement
BS 882	Aggregates from natural resources for concrete
BS EN 1008	Mixing water for concrete
BS 1881: Part 124	Method for analysis of hardened concrete
BS 3797	Specification for lightweight aggregates for masonry units and structural concrete.
BS 4027	Specification for sulfate-resisting Portland cement
BS EN 934-2	Admixtures for concrete, mortar and grout – Part 2: Concrete admixtures – Definitions, requirements, conformity, marking and labelling
BS 6073: Part 1	Specification for precast concrete masonry units
BS 6073: Part 2	Method for specifying precast concrete masonry units
BS EN ISO 10456	Building materials and products – Procedures for determining declared design thermal values
ASTM C 518	Standard test method for steady-state thermal transmission properties by means of the heat flow meter apparatus