



# **Specification for clay masonry blocks**

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## Foreword

With a view to having 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.

This Standard sets the minimum requirements for clay masonry blocks

Amendments issued since publication		
Amd No.	Date	Text affected



## 1 Scope

This standard specifies minimum performance levels for fired-clay hollow masonry blocks for general use.

## 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 Block

A hollow block manufactured from clay intended to be used for non-load-bearing masonry.

### 3.2 Thermal insulation material

A rigid or semi-rigid material with a low thermal conductivity property not exceeding 0.05 W/(m.K).

### 3.3 Insulated block

A block with a thermal insulation material inserted in one or more of its cavities.

### 3.4 Lot

The term “Lot” refers to any number of blocks of a specific configuration and dimension produced using the same clay material and technology.

## 4 Materials

### 4.1 Clay

Blocks covered by this standard shall be manufactured from clay and subjected to a heat treatment. The heat treatment must develop sufficient inter-particulate bonds to provide the strength and other property requirements of this specification.

### 4.2 Thermal insulation material insert

Thermal insulation materials used as inserts shall comply with Dubai Municipality requirements for that material. In absence of such requirements the thermal insulation material shall comply with the requirements of a local, regional or international standard specification recognized by Dubai Municipality.

Thermal insulation inserts made of polystyrene shall comply with the requirements of clause (6) of this Standard and shall be certified by Dubai Municipality.

## 5 Block properties

### 5.1 Sizes

#### 5.1.1 Dimensions

Block dimensions shall conform to the requirements of Table 1.



Table 1 - Dimensions of blocks

Block sizes		
Length (mm)	Height (mm)	Thickness (mm)
400	200	100
400	200	200
400	200	250

Note: Other dimensions and patterns satisfying the requirements of this Standard can be declared by the manufacturer.

**5.1.2 Tolerances**

When measured in the manner described in BS EN 772: Part 16, the length, height or thickness of each block from the sample shall not exceed  $\pm 3$  mm from the declared dimensions.

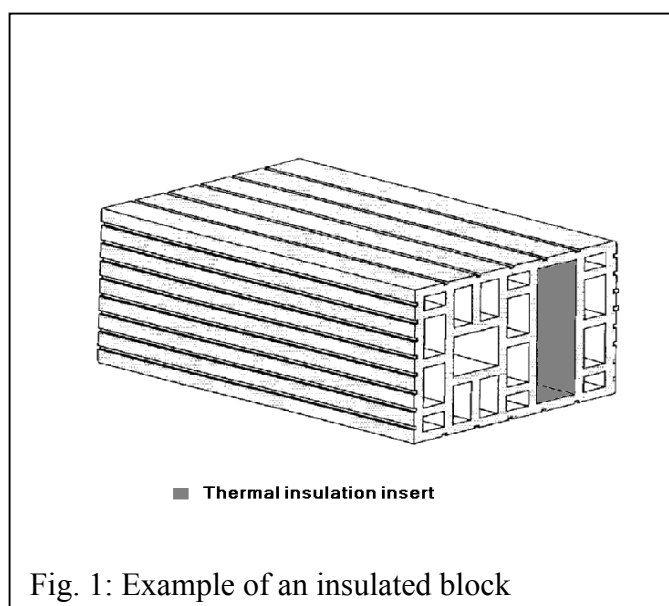
**5.2 Configurations**

**5.2.1 Blocks for general use**

The shape of blocks and the directions and percentage of voids shall be declared by the manufacturer.

**5.2.2 Insulated blocks**

Insulated blocks shall have at least one continuous cavity, in its height as laid, in which a thermal insulation material can be inserted to enhance it's thermal properties when used as thermal insulating blocks for the wall construction. Fig. 1 shows an example of an insulated block.





### 5.3 Density

The gross density of blocks shall be declared by the block manufacturer. When tested in accordance with BS EN 772: Part 13, for a sample of three blocks, the average gross density shall not differ from the declared value by more than  $\pm 10\%$ .

### 5.4 Compressive strength

When tested at the air dry condition in accordance with BS EN 772: Part 1, for a sample of six blocks, the average compressive strength and that of an individual specimen, based on the gross area, shall be not less than the following:

Average compressive strength:	3.2 N/mm <sup>2</sup>
Individual compressive strength:	2.6 N/mm <sup>2</sup>

Notes: Soft-board shall be used to replace the mortar capping. Blocks shall be tested in the same direction as laid in construction.

### 5.5 Water absorption

When tested in accordance with Annex C of BS EN 771: Part 1, for a sample of five blocks, the maximum block water absorption shall not exceed the following:

Average water absorption:	20%
Individual water absorption:	25%

### 5.6 Efflorescence

When tested in accordance with ASTM C 67, for a sample of 10 blocks, the rate of efflorescence shall be “not effloresced”.

## 6 Thermal insulation material properties

### 6.1 Size

Thermal insulation material insert shall have the same length and cross section of the cavity dimensions of the block where it will be inserted.

### 6.2 Thermal conductivity

Thermal conductivity of the thermal insulation material insert shall be declared by its manufacturer according to BS EN ISO 10456 at 35°C and 60% relative humidity (RH).

When tested in accordance with BS EN 12667 or ASTM C 518 at 35°C & 60% RH the thermal conductivity of the thermal insulation material insert shall not exceed the declared value.

### 6.3 Apparent density

When tested in accordance with BS EN 1602, for a sample of five thermal insulation inserts, the average apparent density shall be not less than 22 kg/m<sup>3</sup>.

### 6.4 Reaction to fire

Thermal insulation material insert shall be of the flame-retardant type. When tested in accordance with BS EN 11925-2, the flame spread shall not exceed 150 mm within 60 s. Alternatively, the Oxygen index shall not be less than 24% by volume when tested in accordance with ASTM D 2863.



### 7 Thermal properties of insulated blocks

Thermal conductivity of the insulated blocks shall be declared by the block manufacturer according to BS EN ISO 10456 at 35°C and 60% relative humidity (RH).

When tested in accordance with BS EN 12664 or BS EN 12667 or BS EN 1934 or BS EN ISO 8990 or ASTM C 1363, at 35°C and 60% RH, insulated block thermal conductivity shall not exceed the declared value.

As an alternative, thermal conductivity of the insulated block shall be calculated according to BS EN ISO 6946 taking into consideration the block configuration, clay and insert thermal conductivities declared by their manufacturers at 35°C & 60% RH.

### 8 Sampling for tests

#### 8.1 Number of Specimens

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

- |  |                                       |
|--|---------------------------------------|
| - Block dimensions and compressive strength:                       | 6 blocks                              |
| - Block density:   | 3 blocks                              |
| - Block water absorption   | 5 blocks                              |
| - Block efflorescence  | 10 blocks                             |
| - Block thermal conductivity or clay material thermal conductivity | As required by the testing laboratory |
| - Thermal insulation insert thermal conductivity                   | 1 insert                              |
| - Thermal insulation insert apparent density                       | 5 inserts                             |

#### 8.2 Selection of test specimens

A representative sample of 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 EN 771: Part 1	Specifications for masonry units – Part 1: Clay masonry units
BS EN 772: Part 1	Methods of test for masonry units – Part 1: Determination of compressive strength
BS EN 772: Part 13	Methods of test for masonry units – Part 13: Determination of net and gross dry density of masonry units (except for natural stone)
BS EN 772: Part 16	Methods of test for masonry units – Part 16: Determination of dimensions
BS EN 1602	Thermal insulation products for building applications – determination of apparent density
BS EN 1934	Thermal Performance of Buildings - Determination of Thermal Resistance by Hot Box Method Using Heat Flow Meter - Masonry
BS EN 11925: Part 2	Reaction to fire tests – Ignitability of building products subjected to direct impingement of flame – Part 2: Single flame source test
BS EN 12664	Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods – dry and moist products of medium and low thermal resistance
BS EN 12667	Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods – products of high and medium thermal resistance
BS EN ISO 6946	Building components and building elements – Thermal resistance and thermal transmittance – Calculation method
BS EN ISO 8990	Thermal insulation — Determination of steady-state thermal transmission properties — Calibrated and guarded hot box
BS EN ISO 10456	Building materials and products – Procedures for determining declared design thermal values
ASTM C 67	Standard Test Method for Sampling and Testing Bricks and Structural Clay Tile



## **Dubai Municipality Standard**

**DMS 17: 2006**

ASTM C 518	Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
ASTM C 1363	Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus
ASTM D 2863	Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)



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