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Specification for masonry units - Part 2: Calcium silicate masonry units

Festlegungen für Mauersteine - Teil 2: Kalksandsteine

Spécifications pour éléments de maçonnerie - Partie 2 : Eléments de maçonnerie en silico-calcaire

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Specification for masonry units - Part 2: Calcium silicate masonry units

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Festlegungen für Mauersteine - Teil 2: Kalksandsteine

This European Standard was approved by CEN on 10 March 2011.

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Foreword

This document (EN 771-2:2011) has been prepared by Technical Committee CEN/TC 125 “Masonry”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2011, and conflicting national standards shall be withdrawn at the latest by November 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 771-2:2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of the EU Construction Products Directive (89/106/EEC).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This European Standard also takes into account the general rules for reinforced and unreinforced masonry in Eurocode 6.

EN 771, *Specification for masonry units* consists of:

- *Part 1: Clay masonry units*
- *Part 2: Calcium silicate masonry units*
- *Part 3: Aggregate concrete masonry units (Dense and light-weight aggregates)*
- *Part 4: Autoclaved aerated concrete masonry units*
- *Part 5: Manufactured stone masonry units*
- *Part 6: Natural stone masonry units*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the characteristics and performance requirements of calcium silicate masonry units for which the main intended uses are inner walls, outer walls, cellars, foundations and external chimney masonry.

This European Standard is intended to apply to all calcium silicate masonry units, including those of an overall nonrectangular parallelepiped shape, specially shaped and accessory units.

It defines the performance related to e.g. strength, density and dimensional accuracy, measured according to the corresponding test methods contained in separate European Standards.

It provides for the evaluation of conformity of the product to this European Standard. The marking requirement for products covered by this document is also included.

This European Standard does not specify standard sizes for calcium silicate masonry units, nor standard work dimensions and angles of specially shaped and accessory units.

It does not cover units with more than 60 % volume of voids, nor products made from shale as a major raw material.

It does not cover storey height panels.

It does not cover units intended for use as a damp proof course, nor units with an incorporated thermal insulation material bonded to the faces of the unit susceptible to be exposed to fire, nor chimney flue units.

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.

EN 772-1, *Methods of test for masonry units — Part 1: Determination of compressive strength*

EN 772-2, *Methods of test for masonry units — Part 2: Determination of percentage area of voids in aggregate concrete masonry units (by paper indentation)*

EN 772-9, *Methods of test for masonry units — Part 9: Determination of volume and percentage of voids and net volume of clay and calcium silicate masonry units by sand filling*

EN 772-13, *Methods of test for masonry units — Part 13: Determination of net and gross dry density of masonry units (except for natural stone)*

EN 772-16:2011, *Methods of test for masonry units — Part 16: Determination of dimensions*

EN 772-18:2011, *Methods of test for masonry units — Part 18: Determination of freeze-thaw resistance of calcium silicate masonry units*

EN 772-20, *Methods of test for masonry units — Part 20: Determination of flatness of faces of aggregate concrete, manufactured stone and natural stone masonry units*

EN 772-21, *Methods of test for masonry units - Part 21: Determination of water absorption of clay and calcium silicate masonry units by cold water absorption*

EN 1052-3, *Methods of test for masonry — Part 3: Determination of initial shear strength*

EN 1745, *Masonry and masonry products — Methods for determining thermal properties*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN ISO 12572, *Hygrothermal performance of building materials and products — Determination of water vapour transmission properties (ISO 12572:2001)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
masonry unit
preformed component intended for use in masonry construction

3.2
calcium silicate masonry unit
masonry unit made predominantly from lime and siliceous materials, hardened by high pressure steam

3.3
shale
fine grained sedimentary rock, finely laminated and consisting of mainly quartz and clay minerals

3.4
co-ordinating size
size of the co-ordinating space allocated to a masonry unit including allowances for joints and tolerances

3.5
work size
size of a masonry unit specified for its manufacture, to which the actual size conforms within permissible deviations

3.6
actual size
size of a masonry unit as measured

3.7
regular shaped masonry unit
masonry unit with an overall rectangular parallelepiped shape

3.8
specially shaped masonry unit
masonry unit which is not a rectangular parallelepiped

3.9
accessory unit
masonry unit which is shaped to provide a particular function, e.g. to complete the geometry of the masonry

NOTE It may be obtained by cutting a large unit.

3.10
interlocking feature
shaped matched projections and indentations on masonry units

EXAMPLE Tongue and groove systems.

3.11
hole
formed void which may or may not pass completely through a masonry unit

3.12
perforation
formed void which passes completely through a masonry unit

3.13
cell
formed void which does not pass through a masonry unit

3.14
frog
depression formed in one or both bed faces of a unit, the total volume of all such depressions which does not exceed a certain limit of the overall volume of the unit, i.e. length × width × height

3.15
recess
depression or indentation in one or more surfaces of a masonry unit

EXAMPLE Mortar pocket, rendering keyway.

3.16
shell
peripheral material between the hole(s) and the outer surfaces of a masonry unit

3.17
web
solid material between the holes in a masonry unit

3.18
normalized compressive strength of masonry units
compressive strength of masonry units converted to the air dry compressive strength of an equivalent 100 mm wide and 100 mm high masonry unit

NOTE See procedure given in EN 772-1.

3.19
mean compressive strength of masonry units
arithmetic mean of the compressive strengths of masonry units

3.20
characteristic compressive strength of masonry units
compressive strength corresponding to the 5 % fractile of the compressive strength of masonry units

3.21
declared value
value that a manufacturer is confident of achieving, bearing in mind the precision of the test and the variability of the manufacturing process

3.22
Category I masonry units
units with a declared compressive strength with a probability of failure to reach it not exceeding 5 %

NOTE This may be determined via the mean or characteristic value.

3.23
Category II masonry units
units not intended to comply with the level of confidence of Category I units

3.24
combined thickness of webs and shells
sum of the thicknesses of the shells and webs from one face or header of a masonry unit to the opposite face or header respectively along whichever path, via the formed voids, gives the smallest value, expressed as a percentage of the unit width or length respectively

3.25
grip hole
hole in a masonry unit to enable it to be more readily grasped and lifted by hand or machine

3.26
product group
products from one manufacturer having common values for one or more characteristics

3.27
consignment
shipment from the supplier

4 Materials and manufacture

Calcium silicate masonry units are produced predominantly from a mixture of lime and natural siliceous materials (sand, crushed or uncrushed siliceous gravel or rock or a mixture thereof), hardened by high pressure steam.

Calcium silicate masonry units produced with a majority of other siliceous materials are permitted if these materials have no deleterious effect on the properties of the product. The presence of such a material shall be declared.

5 Requirements for calcium silicate masonry units

5.1 General

The requirements and properties specified in this European Standard shall be defined in terms of the test methods and other procedures referred to in this European Standard.

It should be noted that the test methods are not always applicable to specially shaped and accessory units as defined in 3.8. and 3.9.

The conformity criteria given in the following subclauses relate to initial type testing (see 8.2) and, when relevant, to consignment testing (see Annex A). For the compressive strength of Category I units, use a 50 % fractile (p = 0,50) for mean values and a confidence level of 95 %.

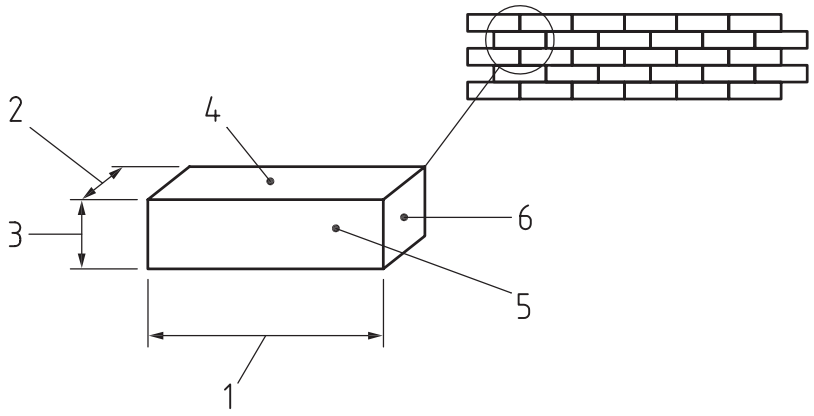
For production evaluation, the manufacturer shall define the conformity criteria in the factory production control documentation (see 8.3).

5.2 Dimensions and tolerances

5.2.1 Dimensions

The dimensions of a calcium silicate masonry unit shall be declared in mm for length, width and height, in that order. They shall be given in terms of work size.

NOTE In addition the co-ordinating size may be given. See Figure 1.



Key

1	Length	3	Height	5	Face
2	Width	4	Bed	6	Header

NOTE This relates to the normal use of the masonry unit in the wall.

Figure 1 — Dimensions and surfaces

When a specified number of calcium silicate masonry units is sampled from a consignment in accordance with Annex A and tested in accordance with EN 772-16, the tolerances shall be indicated as in 5.2.2.1. The determination of length, width and height shall be by one measurement taken approximately in the centre of each specimen (EN 772-16:2011, 7.1, procedure d)). When there is a need to exclude irregular surfaces (tongues and grooves, grip holes, etc.) in providing the dimension, EN 772-16:2011 procedure e) shall be used.

Dimensions and tolerances of accessory units need only be declared by the manufacturer, if the accessory units are placed on the market as individual products and do not form part of a customised consignment. When a specified number of accessory units is sampled from a consignment in accordance with Annex A, dimensions and tolerances shall be as given in Annex C.

5.2.2 Dimensional tolerances

5.2.2.1 Tolerances

The dimensional tolerance category shall be declared in accordance with Table 1. The actual deviations for the mean length, width and height and the actual deviations for individual length, width and height shall not be greater than the permissible deviations as specified in Table 1 for the declared dimensional tolerance category.

Actual deviations for the mean are differences between declared work sizes and the mean measured values. Actual deviations for individual values are differences between the mean measured values and the measured individual values.

These dimensional tolerances shall not apply to the direction perpendicular to a treated face of a sliced, fractured or structured unit.

Table 1 — Dimensional tolerance categories and tolerances for calcium silicate masonry units (in millimetres)

Dimensions	Dimensional tolerance categories for calcium silicate masonry units			
	T1	T2	T3	Tm
Mean height of sample	work size height ± 2	work size height ± 1	—	a deviation in mm declared by the manufacturer (may be closer or wider then the other categories)
Mean length of sample	work size length ± 2	work size length ± 2	work size length ± 2	
Mean width of sample	work size width ± 2	work size width ± 2	work size width ± 2	
Individual height	mean height of sample ± 2	mean height of sample ± 1,0	work size height ± 1,0	
Individual length	mean length of sample ± 2	mean length of sample ± 2	work size length ± 3	
Individual width	mean width of sample ± 2	mean width of sample ± 2	work size width ± 3	
Flatness of bed faces	—	—	1,0	
Plane parallelism of bed faces	—	—	1,0	

5.2.2.2 Flatness of bed faces

When calcium silicate masonry units are sampled from a consignment in accordance with Annex A and tested in accordance with EN 772-20, the deviation from flatness of the bed faces shall not exceed the declared value.

5.2.2.3 Plane parallelism of bed faces

When calcium silicate masonry units are sampled from a consignment in accordance with Annex A and tested in accordance with EN 772-16:2011 by procedure d), the deviation from plane parallelism shall not exceed the declared value.

5.3 Configuration

When relevant to the uses, for which calcium silicate masonry units are put on the market, the configuration shall be declared. The declaration may be made by reference to one or another of the groups defined in EN 1996-1-1 or EN 1996-1-2 and/or it may include one or more items such as those in the following list, as relevant:

— shape and features, including the direction of perforations (by means of a drawing or illustration, when relevant);

— volume of all formed voids as a percentage of the length × width × height of the unit;

— volume of the largest of any formed voids as a percentage of the length × width × height of the unit;

— volume of grip holes as a percentage of the length × width × height of the unit;

— thickness of webs;

— thickness of shells;