SLOVENSKI STANDARD

SIST EN 771-3:2004

01-januar-2004

Specifikacija za zidake – 3. del: Betonski zidaki (kompaktni in lahki agregati)

Specification for masonry units - Part 3: Aggregate concrete masonry units (Dense and light-weight aggregates)

Festlegungen für Mauersteine - Teil 3: Mauersteine aus Beton (mit dichten und porigen Zuschlägen)

Spécifications pour éléments de maçonnerie - Partie 3: Eléments de maçonnerie en béton de granulats (granulats courants et légers)

Ta slovenski standard je istoveten z: EN 771-3:2003

ICS:

91.100.30

SIST EN 771-3:2004 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 771-3

July 2003

ICS 91.100.30

English version

Specification for masonry units - Part 3: Aggregate concrete masonry units (Dense and light-weight aggregates)

Spécifications pour éléments de maçonnerie - Partie 3: Blocs en béton de granulats (granulats courants et légers)

Festlegungen für Mauersteine - Teil 3: Mauersteine aus Beton (mit dichten und porigen Zuschlägen)

This European Standard was approved by CEN on 9 April 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 771-3:2003 E

Contents

Foreword

This document (EN 771-3:2003) 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 January 2004, and conflicting national standards shall be withdrawn at the latest by April 2005.

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

For relationship with EU Directives, see informative Annex ZA which is an integral part of this document.

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

The Annexes A and B of this European Standard are normative, Annex C is informative.

EN 771 *Specification for masonry units* consists of:

— *Part 1: Clay masonry units.*

— *Part 2: Calcium silicate masonry units.*

— *Part 3: Aggregates 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the characteristics and performance requirements of aggregate concrete masonry units made from dense and lightweight aggregates or a combination of both for which the main intended uses are common, facing or exposed masonry in load bearing or non load bearing building and civil engineering applications. The units are suitable for all forms of walling, including single leaf, external leaf to chimneys, cavity wall, partitions, retaining, and basement. They can provide fire protection, thermal insulation, sound insulation and sound absorption.

This European Standard includes concrete masonry units of an overall non rectangular parallelepiped shape, especially shaped and accessory units.

It defines the performance related to e.g. strength, density, dimensional accuracy, and provides for the evaluation of conformity of the product to this European Standard. The marking requirements for products covered by this European Standard is also included.

This European Standard does not specify standard sizes for aggregate concrete masonry units, nor standard work dimensions and angles of specially shaped aggregate concrete masonry units. It does not cover storey height panels, chimney flue linings nor units intended for use as a damp proof course. It does not cover units with an incorporated thermal insulation material bonded to the faces of the unit susceptible to be exposed to fire.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 772-1:2000, *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 772-6, *Methods of test for masonry units — Part 6: Determination of bending tensile strength of aggregate concrete masonry units*

EN 772-11, *Methods of test for masonry units — Part 11: Determination of water absorption of aggregate concrete, manufactured stone and natural stone masonry units due to capillary action in the initial rate of water absorption of clay masonry units*

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 772-14, *Methods of test for masonry units — Part 14: Determination of moisture movement of aggregate concrete and manufactured stone masonry units*

EN 772-16: 2000, *Methods of test for masonry units — Part 16: Determination of dimensions*

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 998-2:2001, *Specification for mortar for masonry — Part 2 : Masonry mortar*

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

EN 1745, *Masonry and masonry products — Methods for determining declared and design thermal values*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test 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 Definitions, terms and symbols

3.1 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply.

3.1.1
masonry unit
preformed component intended for use in masonry construction

3.1.2
common masonry unit
masonry unit normally intended for use with no faces left visible

3.1.3
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

3.1.4
exposed masonry unit
facing masonry unit exposed to external climatic conditions without render or other equivalent protection

3.1.5
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

3.1.6
co-ordinating size
size of a co-ordinating space allocated to a masonry unit including allowances for joints

3.1.7
work size
size of a unit specified for its manufacture, to which the actual size conforms within permissible deviations

3.1.8
actual size
size of a unit as measured

3.1.9
regular shaped masonry unit
masonry unit with an overall rectangular parallelepiped shape

NOTE Examples of different shapes of concrete masonry units are shown in Annex C.

3.1.10
specially shaped masonry unit
masonry unit which is not a rectangular parallelepiped

3.1.11
accessory unit
unit which is shaped to provide a particular function, e.g. to complete the geometry of the masonry

3.1.12
interlocking features
shaped matched projections and indentations on masonry units, e.g. tongue and groove systems

3.1.13
hole
formed void which may or may not pass completely through a masonry unit

3.1.14
frog
depression formed in one or both of the 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

3.1.15
recess
depression or indentation in one or more surfaces of a masonry unit (e.g. mortar pocket, rendering keyway, grooves to provide a discontinuity in the mortar joint, grip hole)

3.1.16
shell
peripheral solid material between the hole(s) and the face or the header of a unit

3.1.17
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

3.1.18
Category I masonry units
units with a declared compressive strength with a probability of failure to reach it not exceeding 5 %. This may be determined via the mean or characteristic value

3.1.19
Category II masonry units
units not intended to comply with the level of confidence of Category I units

3.1.20
normalized compressive of masonry units
compressive strength of masonry units converted to the air dry compressive strength of an equivalent 100 mm wide × 100 mm high masonry unit

NOTE See the procedure given in Annex A of EN 772-1:2000

3.1.21
mean compressive strength of masonry units
arithmetic mean of the compressive strengths of masonry units

3.1.22
characteristic compressive strength of masonry units
compressive strength corresponding to a 5 % lower fractile of the compressive strength of masonry units

3.2 Symbols

l length, in mm;

l_d length of the diagonal, in mm;

w width, in mm;

h height, in mm;

f_b normalized compressive strength, in N/mm²;

f_c characteristic compressive strength in N/mm²;

f_m mean compressive strength in N/mm²;

f_{bi} individual result compressive strength, in N/mm²;

4 Materials

4.1 General

The specifications of the materials to be used shall be included in the production control documentation (see 8.3). If appropriate European Standards are available, they shall be used except that aggregates need not comply with grading requirements. If not available, the manufacturer shall specify the materials and have data on their suitability.

5 Requirements for aggregate concrete 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.

NOTE A declared value may be chosen from the classification system, if any, of the place of manufacture/use of the units.

It should be noted that the standard test methods are not always applicable to specially shaped and accessory units as defined in 3.1.10 and 3.1.11.

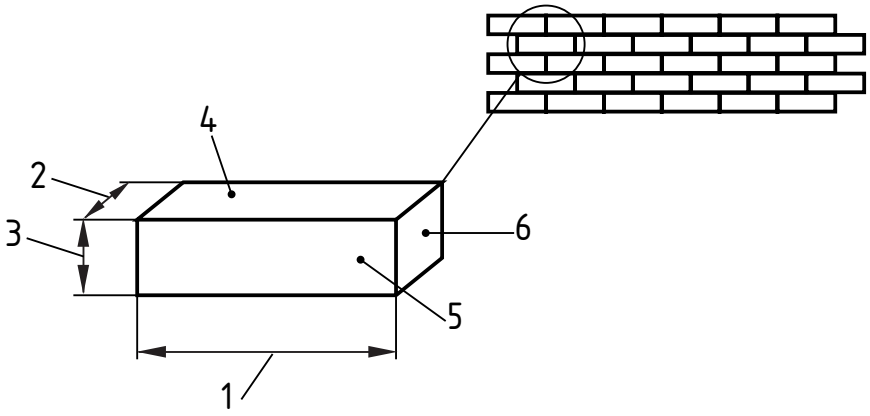
The conformity criteria given in the following sub-clauses relates to initial type testing (see 8.2) and, when relevant, to consignment testing (see Annex A). For the compressive strength of Category I units use a 50 % fractile (p = 0,50) for mean values or 5 % fractile (p = 0,05) for characteristic 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 manufacturer shall declare the dimensions of the concrete masonry units in mm for *length*, *width* and *height*, in that order (see Figure 1). They shall be given in terms of work size.

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



Key

1 Length 2 Width 3 Height

4 Bed 5 Face 6 Header

NOTE 2 This relates to the normal use of the masonry unit in the wall.

Figure 1 — Dimensions and surfaces

5.2.2 Tolerances

The tolerances on declared work sizes of individual regular shaped units shall conform to Table 1. Closer tolerances may be declared for one or more dimensions. The manufacturer shall declare the tolerance category of the units.

Table 1 — Limit deviations in millimetres

Tolerance category	D1	D2	D3
length	+ 3 – 5	+ 1 – 3	+ 1 – 3
width	+ 3 – 5	+ 1 – 3	+ 1 – 3
height	+ 3 – 5	± 2	± 1,5

Tolerances for non-regular shaped and accessory units shall be as given in Table 1 or as declared by the manufacturer.

These tolerances shall not apply to the dimensions between the surfaces of units which are manufactured to be non planar.

If sampled in accordance with clause A.2 and tested in accordance with EN 772-16: 2000 (method A) the results evaluated in accordance with clause B.1 shall conform to the declared tolerance category.

5.3 Configuration

5.3.1 General

The shape and features shall be declared by the manufacturer. The requirements for shape and features given in 5.3.2 to 5.3.4 will normally apply to regular shaped units but need not apply to the surfaces or arises of units with special shapes or to accessory units.

Units may be provided with recesses or interlocking features and with sharp, rounded or chamfered arises.

NOTE The manufacturer may also declare, whether the units comply with the limits for one or another of the groups specified in relevant parts of Eurocode 6.

If sampled in accordance with clause A.2 and tested in accordance with EN 772-16, and EN 772-2 if necessary, the results evaluated in accordance with clause B.2 shall conform to the declared values.

5.3.2 Shell thickness

The minimum thickness of the shells of units shall be declared. If sampled in accordance with clause A.2 and tested in accordance with EN 772-16, the results evaluated in accordance with clause B.2 shall conform to the declared values.

5.3.3 Holes

The percentage of holes, if any, in the units shall be declared. If sampled in accordance with clause A.2 the percentage volume of holes in units shall be determined by measurement in accordance with EN 772-16 and calculation, or in the case of holes which pass completely through a unit, the percentage of holes may be determined in accordance with EN 772-2 and calculation, the results evaluated in accordance with clause B.2 shall conform to the declared values.

5.3.4 Frog

The total volume of frogs shall not exceed 20 % of the overall volume of the unit, i.e. length × width × height.

5.3.5 Flatness of surfaces of facing units

When the surface of facing units are declared by the manufacturer to be plain, they shall not deviate from a plane by more than $(0{,}1\sqrt{l_d})$ mm or 2 mm whichever is the greater, where l_d is the length of the diagonal of the surface of the unit declared plane, based on the actual size of the unit.

The requirements for flatness shall not apply to the surfaces of units which are manufactured to be non-planar.

If sampled in accordance with clause A.2 and tested in accordance with EN 772-20, the results evaluated in accordance with clause B.2 shall comply with the value given above.

5.3.6 Surface appearance of facing units

When required the surface of facing units may have compliance established on the basis of comparison with any approved samples. Comparison shall be made from a distance of 3 m in normal daylight conditions This compliance shall be established before the units are used.

5.4 Density

5.4.1 Gross dry density of the units

The gross dry density of the units shall be declared in kg/m³ by the manufacturer.

NOTE This declaration may be made for the evaluation of:
— loading;
—
— airborne sound insulation;
— thermal insulation;
— fire resistance.

5.4.2 Net dry density of the concrete

When relevant to the uses for which the unit is put on the market and in all cases for units to be used in elements subject to acoustic requirements, the manufacturer shall declare the net dry density of the concrete of units in kg/m³.

5.4.3 Tolerances

The mean values of the samples tested shall not deviate by more than ± 10 % from the declared values. Closer deviations may be declared.

If sampled in accordance with clause A.2 and tested in accordance with EN 772-13 the results evaluated in accordance with clause B.3 shall comply with the declared values.

5.5 Mechanical strength

5.5.1 Compressive strength

5.5.1.1 General

The strength of the masonry units in compression shall be declared in N/mm² by the manufacturer (declared value – for definition, see 3.1.17). The declared value shall be either the characteristic (5 % fractile) f_c or the mean (50 % fractile) f_m compressive strength of the units.

In addition, the manufacturer shall declare:

— whether the concrete masonry unit is Category I or Category II (see clause ZA.2);

— the normalized compressive strength when relevant.

NOTE EN 772-1 gives instructions on how to convert the declared compressive strength into the normalized compressive strength.

If sampled in accordance with clause A.2 and tested in accordance with EN 772-1 the results, evaluated in accordance with B.4.1 for characteristic strength or B.4.2 for mean strength, shall be not less than the declared value.

The declaration shall relate to and indicate the orientation(s) of the units as tested, the method(s) of bedding the units and whether any voids present are intended to be fully filled with mortar. The manufacturer shall declare the conditioning regime and the surface preparation used.

Units shall be conditioned in accordance with 7.3.2 a) or 7.3.5 of EN 772-1:2000, but when conditioned in accordance with 7.3.5 the values shall be brought to the air dry condition in accordance with Annex A of EN 772-1:2000.