



# SLOVENSKI STANDARD

## SIST EN 771-3:2011

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**Nadomešča:**

**SIST EN 771-3:2004**

**SIST EN 771-3:2004/A1:2005**

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### **Specifikacija za zidake - 3. del: Betonski zidaki (kompaktni in lahki agregati)**

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

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

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

**Ta slovenski standard je istoveten z: EN 771-3:2011**

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#### **ICS:**

91.100.30	Beton in betonski izdelki	Concrete and concrete products
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**SIST EN 771-3:2011**

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EUROPEAN STANDARD  
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**EN 771-3**

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## Specification for masonry units - Part 3: Aggregate concrete masonry units (Dense and lightweight aggregates)

Spécifications pour éléments de maçonnerie - Partie 3:  
Éléments de maçonnerie 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 10 March 2011.

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 CEN-CENELEC Management Centre or to any CEN member.

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**EN 771-3:2011 (E)****Foreword**

This document (EN 771-3:2011) 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of an identical text or by endorsement, at the latest by November 2011, and conflicting national standards shall be withdrawn at the latest by November 2011.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 771-3:2003.

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 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* [SIST EN 771-3:2011](https://standards.iteh.ai/catalog/standards/sist/eb229a1b-6522-4001-b93c-04d5d4ccdca/sist-en-771-3-2011)
- *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 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 aggregate 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 are 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

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 772-1:2011, *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, autoclaved aerated concrete, manufactured stone and natural stone masonry units due to capillary action and 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 772-16:2011, *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 1052-2, *Methods of test for masonry — Part 2: Determination of flexural strength*

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*

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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, definitions and symbols****3.1 Terms and definitions**

For the purposes of this document, 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

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**3.1.4****exposed masonry unit**

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

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**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

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**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

EXAMPLE 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  $\times$  width  $\times$  height

**3.1.15****recess**

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

EXAMPLE 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****web**

solid material between the formed voids in a masonry unit

**3.1.18****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

**3.1.19****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.

**3.1.20****Category II masonry units**

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

**3.1.21****normalized compressive strength of masonry units**

compressive strength of masonry units converted to the air dry compressive strength of an equivalent 100 mm wide  $\times$  100 mm high masonry unit

NOTE See the procedure given in EN 772-1.

**3.1.22****mean compressive strength of masonry units**

arithmetic mean of the compressive strengths of masonry units

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**EN 771-3:2011 (E)****3.1.23****characteristic compressive strength of masonry units**

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

**3.1.24****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

**3.1.25****product group**

products from one manufacturer having common values for one or more characteristic

**3.1.26****consignment**

shipment from the supplier

**3.1.27****grip hole**

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

**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/mm<sup>2</sup>

$f_c$  characteristic compressive strength, in N/mm<sup>2</sup>

$f_m$  mean compressive strength, in N/mm<sup>2</sup>

$f_{bi}$  individual result compressive strength, in N/mm<sup>2</sup>

$\lambda_{10,dry,unit}$  thermal conductivity of a masonry unit in a dry state at an average temperature of 10 °C

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**4 Materials**

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 subclauses 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 %.

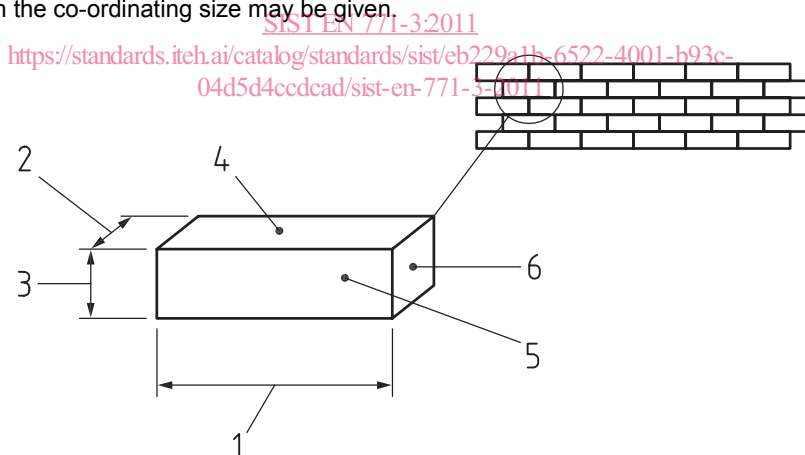
For production evaluation, the manufacturer shall define the conformity criteria in the factory production control documentation (see 8.3).

### 5.2 Dimensions and tolerances

#### 5.2.1 Dimensions

The manufacturer shall declare the dimensions of the aggregate 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	3	Height	5	Face
2	Width	4	Bed	6	Header

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

Figure 1 — Dimensions and surfaces

**EN 771-3:2011 (E)****5.2.2 Dimensional tolerances****5.2.2.1 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**

<b>Tolerance category</b>	<b>D1</b>	<b>D2</b>	<b>D3</b>	<b>D4</b>
Length	+3	+1	+1	+1
	-5	-3	-3	-3
Width	+3	+1	+1	+1
	-5	-3	-3	-3
Height	+3	± 2	± 1,5	± 1,0
	-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 A.2 and tested in accordance with EN 772-16:2011 (method a)), the results evaluated in accordance with B.1 shall conform to the declared tolerance category.

**5.2.2.2 Flatness of bed faces**

When aggregate concrete masonry units are declared as tolerance category D4 for use with thin layer mortar, the manufacturer shall also declare the maximum deviation from flatness of the bed faces.

If sampled in accordance with A.2 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 aggregate concrete masonry units are declared as tolerance category D4 for use with thin layer mortar, the manufacturer shall also declare the maximum deviation from plane parallelism of the bed faces.

If sampled in accordance with A.2 and tested in accordance with EN 772-16:2011 (method d)), the deviation from plane parallelism of the bed faces shall not exceed the declared value.

**5.3 Configuration and appearance****5.3.1 Configuration**

When relevant to the uses for which aggregate concrete 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 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 any formed voids (by means of a drawing or illustration, when relevant);
- volume of all formed voids as a percentage of the length  $\times$  width  $\times$  height of the unit;
- volume of the largest of any formed voids as a percentage of the length  $\times$  width  $\times$  height of the unit;
- volume of grip holes as a percentage of the length  $\times$  width  $\times$  height of the unit;
- thickness of webs;
- thickness of shells;
- combined thickness of webs and shells from face to face;
- combined thickness of webs and shells from header to header;
- area of voids on a bed face as a percentage of the length  $\times$  width of the unit.

The requirements for shape and features 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.

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

Each declared value shall be stated as either an upper limit or a lower limit or as a range of values. When aggregate concrete masonry units are sampled from a consignment in accordance with A.2 and tested in accordance with EN 772-16 and EN 772-2, if necessary, the mean value derived from measurements of the test sample shall be within the range or limit declared.

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### 5.3.2 Appearance

#### 5.3.2.1 Flatness of surfaces of facing units

When the surface of facing units are declared by the manufacturer to be plane, 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 A.2 and tested in accordance with EN 772-20, the results evaluated in accordance with B.2 shall comply with the value given above.

#### 5.3.2.2 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  $\text{kg/m}^3$  by the manufacturer.