



**SLOVENSKI STANDARD**  
**SIST EN 771-5:2004**

**01-april-2004**

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**Specifikacija za zidake – 5. del: Zidaki iz umetnega kamna**

Specification for masonry units - Part 5: Manufactured stone masonry units

Festlegungen für Mauersteine - Teil 5: Betonwerksteine

Spécifications pour éléments de maçonnerie - Partie 5: Eléments de maçonnerie en pierre reconstituée en béton

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English version

## Specification for masonry units - Part 5: Manufactured stone masonry units

Spécifications pour éléments de maçonnerie - Partie 5:  
Éléments de maçonnerie en pierre reconstituée

Festlegungen für Mauersteine - Teil 5: Betonwerksteine

This European Standard was approved by CEN on 3 November 2003.

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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.

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## Contents

|  |           |
|--|-----------|
| Foreword .....   | 3         |
| <b>1</b> Scope .....   | <b>4</b>  |
| <b>2</b> Normative references .....  | <b>4</b>  |
| <b>3</b> Terms and definitions .....   | <b>5</b>  |
| <b>4</b> Materials .....   | <b>7</b>  |
| 4.1 General .....  | 7         |
| <b>5</b> Requirements for manufactured stone masonry units .....   | <b>7</b>  |
| 5.1 General .....  | 7         |
| 5.2 Dimensions and tolerances .....  | 7         |
| 5.3 Configuration .....  | 8         |
| 5.4 Density .....  | 9         |
| 5.5 Compressive strength .....   | 10        |
| 5.6 Thermal properties .....   | 11        |
| 5.7 Durability .....   | 11        |
| 5.8 Water absorption by capillary .....  | 11        |
| 5.9 Moisture movement .....  | 11        |
| 5.10 Water vapour permeability .....   | 12        |
| 5.11 Reaction to fire .....  | 12        |
| 5.12 Shear bond strength .....   | 12        |
| 5.13 Flexural bond strength .....  | 12        |
| <b>6</b> Description, designation and classification of manufactured stone masonry units .....   | <b>13</b> |
| 6.1 Description and designation .....  | 13        |
| 6.2 Classification .....   | 13        |
| <b>7</b> Marking .....   | <b>13</b> |
| <b>8</b> Evaluation of conformity .....  | <b>14</b> |
| 8.1 General .....  | 14        |
| 8.2 Initial type tests .....   | 14        |
| 8.3 Factory production control .....   | 15        |
| <b>Annex A</b> (normative) <b>Sampling for initial type testing and for independent testing of consignments</b> .....                            | <b>16</b> |
| <b>Annex B</b> (normative) <b>Normalised compressive strength</b> .....  | <b>18</b> |
| <b>Annex ZA</b> (informative) <b>Clauses of this European Standard addressing the provisions of the EU Construction Products Directive</b> ..... | <b>19</b> |

## Foreword

This document (EN 771-5:2003) 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 June 2004, and conflicting national standards shall be withdrawn at the latest by September 2005.

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 EU Directive(s).

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

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

Annex A and annex B of this European Standard are normative.

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, 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 manufactured stone masonry units for which the main intended uses are facing or exposed masonry in load bearing or non-load bearing building and civil engineering applications. The units are suitable for all forms of coursed or random masonry walling, including single leaf, cavity, partition, retaining and the external masonry to chimneys. They can provide fire protection, thermal insulation, sound insulation and sound absorption.

This standard covers concrete masonry units manufactured to resemble natural stone using casting or pressing techniques with or without textured surfaces produced, by casting, splitting, washing, blasting or tooling and with or without variable outline effects. It covers homogeneous masonry units and those consisting of different facing and backing concrete mixes but excludes those manufactured with an adhesive bonded decorative face. This standard does not cover masonry units intended to conform to EN 771-3.

It defines the performance related to e.g. strength, density, dimensional accuracy, surface appearance 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 apply to storey height panels, masonry units used for chimney flues or units manufactured with an adhesive bonded decorative face. It does not include products intended to be used as a damp proof course nor does it specify standard sizes for manufactured stone masonry units or work dimensions and angles of specially shaped units. It does not cover units with an incorporated thermal insulation material bonded to the faces of the unit susceptible to be exposed to fire.

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## 2 Normative references

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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 772-11, *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 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, *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: 2003, *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 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 Terms and definitions

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

#### 3.1

##### **masonry unit**

preformed component intended for use in masonry construction

#### 3.2

##### **facing masonry unit**

masonry unit intended for use with one or more faces visible in use which may or may not be exposed

#### 3.3

##### **exposed face**

face intended to be exposed to external climatic conditions

#### 3.4

##### **manufactured stone masonry unit**

facing masonry unit having at least one exposed face with a close structure formed from either one or two homogeneous mixtures of aggregate, cementitious binder and other materials moulded under pressure and/or vibration and with or without further processing, intended to resemble and be used as an alternative to natural stone

#### 3.5

##### **two-part masonry unit**

masonry unit manufactured with different facing and backing concretes

#### 3.6

##### **co-ordinating size**

size of the co-ordinating space allocated to a masonry unit including an allowance for joints

#### 3.7

##### **work size**

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

#### 3.8

##### **actual size**

size of a masonry unit as measured

#### 3.9

##### **regular shaped masonry unit**

masonry unit with an overall rectangular parallelepiped shape

#### 3.10

##### **specially shaped masonry unit**

masonry unit which is not a rectangular parallelepiped

**3.11**

**accessory unit**

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

**3.12**

**interlocking features**

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

**3.13**

**recess**

depression or indentation in one or more surfaces of a masonry unit (e.g. mortar pocket, rendering keyway, grip hole)

**3.14**

**normalised compressive strength 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 procedure given in annex B of this standard.

**3.15**

**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

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**3.16**

**profiled surface**

surface with pronounced relief

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**3.17**

**textured surface**

surface which, either during or after manufacture, is subjected to mechanical, physical or chemical processing

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**3.18**

**Category I masonry units**

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

**3.19**

**Category II masonry units**

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

**3.20**

**mean compressive strength of masonry units**

arithmetic mean of the compressive strengths of masonry units

**3.21**

**characteristic compressive strength of masonry units**

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



## 4 Materials

### 4.1 General

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

## 5 Requirements for manufactured stone 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 standard test methods are not always applicable to specially shaped masonry units and accessory units as defined in 3.10 and 3.11 respectively.

The conformity criteria given in the following sub-clauses 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 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).

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### 5.2 Dimensions and tolerances

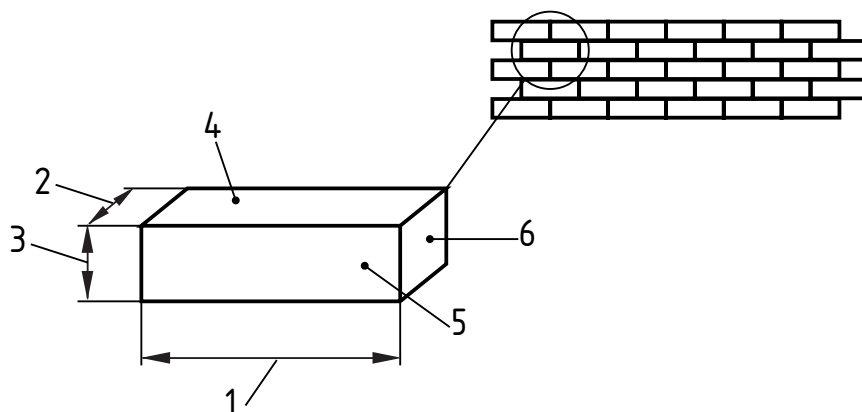
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#### 5.2.1 Dimensions

The manufacturer shall declare the dimensions of the manufactured stone masonry units in millimetres for length, width and height, in that order (see Figure 1), and shall declare the tolerance category (see 5.2.2). They shall be given in terms of work size.

NOTE In addition the co-ordinating size can be given.

They shall not exceed 650 mm in any co-ordinating dimension excluding the thickness of any profile on a non-planar face.



**Key**

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

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

**Figure 1 — Dimensions and surfaces**

**5.2.2 Tolerances**

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The actual dimensions of individual regular units shall conform to the declared work size dimensions subject to the tolerance given in Table 1, except where surfaces are deliberately non-planar, in which case the manufacturer shall declare the tolerances. The manufacturer may declare closer tolerances for one or more dimensions. [standards.iteh.ai/catalog/standards/sist/754ce8f9-fdae-423a-8a73-f3aea568dd45/sist-en-771-5-2004](https://standards.iteh.ai/catalog/standards/sist/754ce8f9-fdae-423a-8a73-f3aea568dd45/sist-en-771-5-2004)

**Table 1 — Limit deviations in millimetres**

| Tolerance category | D1         | D2         | D3                             |
|--------------------|------------|------------|--------------------------------|
| Length             | + 3<br>- 5 | + 1<br>- 3 | Manufacturer's declared values |
| Width              | + 3<br>- 5 | + 1<br>- 3 |                                |
| Height             | + 3<br>- 5 | + 1<br>- 3 |                                |

Tolerances for specially shaped and accessory units shall be declared by the manufacturer.

If sampled in accordance with A.2 and tested in accordance with EN 772-16, the mean value of the measurements taken of any one dimension of a single unit shall not vary from the manufacturer's work size by more than the tolerances given above for the declared tolerance category.

**5.3 Configuration**

**5.3.1 General**

Units may be homogenous or two-part but in the case of two-part masonry units the facing mix shall have a thickness of not less than 20 mm. There shall be no delamination between the facing and the

backing concretes. Units for load bearing applications shall be solid or with not more than 25 % of formed voids by surface area and may be provided with or without recesses or interlocking features. They are group 1 masonry units for the purposes of Eurocode 6. When compliance with the maximum area of voids cannot be assessed by visual inspection, masonry units shall be sampled in accordance with A.2, measured in accordance with EN 772-16 and the values calculated. The area of the voids in the bed face of any unit shall not exceed 25 % of the bed face area unless declared by the manufacturer (see 6.1 c)).

### 5.3.2 Surface appearance

The exposed surfaces of manufactured stone masonry units shall be plain, profiled or textured as declared by the manufacturer. Compliance of textured or profiled surfaces may be established on the basis of comparison with any approved samples. Comparison shall be made from a distance of 3 m in normal daylight conditions.

### 5.3.3 Flatness of surfaces

Where the surfaces of the unit are declared by the manufacturer to be plain (see 5.3.2), 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 declared plain. If sampled in accordance with A.2 and tested in accordance with EN 772-20, no individual measurement of the deviation from a plane shall exceed the value given above.

## 5.4 Density

When relevant to the uses for which the unit is put on the market, and in all cases for masonry units intended to be used in elements subject to acoustic requirements, the manufacturer shall declare its gross dry density. For two-part units the net dry density of each part shall be declared.

NOTE This declaration can be made for the evaluation of

- loading
- sound insulation;
- thermal insulation;
- fire resistance.

The deviation from the manufacturer's declared mean gross dry density and mean net dry density shall not be more than 7,5 %.

For the gross dry density of homogeneous units and of two-part units, whole units or representative samples shall be used. For the net dry density of the constituent concretes of two-part units samples of the unformed mix may be taken and moulded in a manner to obtain a level of compaction similar to that attained in the units.

If sampled in accordance with A.2 and tested in accordance with EN 772-13, the mean value of the dry density (gross or net) of the six units tested shall be within 7,5 % of the manufacturer's declared value.