SLOVENSKI STANDARD
SIST EN 771-1:2011+A1:2015

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Specifikacija za zidake - 1. del: Opečni zidaki

Specification for masonry units - Part 1: Clay masonry units

Festlegungen für Mauersteine - Teil 1: Mauerziegel

Spécification pour éléments de maçonnerie - Partie 1: Briques de terre cuite

Ta slovenski standard je istoveten z: **EN 771-1:2011+A1:2015**

ICS:

91.100.25 Gradbeni izdelki iz terakote Terracotta building products

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EUROPEAN STANDARD

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Spécification pour éléments de maçonnerie - Partie 1: Briques de terre cuite

Festlegungen für Mauersteine - Teil 1: Mauerziegel

This European Standard was approved by CEN on 3 March 2011 and includes Amendment 1 approved by CEN on 11 January 2015.

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

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European foreword

This document (EN 771-1:2011+A1:2015) 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of an identical text or by endorsement, at the latest by February 2016, and conflicting national standards shall be withdrawn at the latest by May 2017.

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 [A1] EN 771-1:2011 [/A1].

This document includes Amendment 1 approved by CEN on 2015-01-11.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [/A1].

[A1] This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports basic requirements for construction works of the EU Construction Products Regulation (Regulation (EU) No 305/2011).

For relationship with EU Regulation/Directive(s), see informative Annex ZA, which is an integral part of this document. [/A1]

This European Standard also takes into account the general rules for unreinforced and reinforced 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

〚A1〛 This European Standard specifies the characteristics and performance requirements for masonry units manufactured from clay for which the main intended uses are protected or unprotected masonry structure (see definitions 3.3 and 3.4) (e.g. facing and rendered masonry, loadbearing or non-loadbearing masonry structures, including internal linings and partitions, for building and civil engineering). 〚A1〛

〚A1〛 *deleted text* 〚A1〛

This European Standard includes those clay masonry units of an overall non-rectangular parallelepiped shape.

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

〚A1〛 It provides for the assessment and verification of constancy of performance (AVCP) of the product to this European Standard. 〚A1〛

The marking requirement for products covered by this European Standard is included.

This European Standard does not specify standard sizes for clay masonry units, nor does it specify standard work dimensions, angles and radii of specially shaped clay masonry units. 〚A1〛 This European Standard does not include method of measurement of angles and radii characteristics of specially shaped clay masonry units. 〚A1〛

This European Standard does not cover requirements for the following: units for paving, flue liners and storey height clay masonry units and clay masonry units with an incorporated thermal insulation material bonded to the faces of the unit susceptible to be exposed to fire. It does, however, include clay masonry units for external chimney masonry.

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 772-3, *Methods of test for masonry units — Part 3: Determination of net volume and percentage of voids of clay masonry units by hydrostatic weighing*

EN 772-5, *Methods of test for masonry units — Part 5: Determination of the active soluble salts content of clay masonry units*

EN 772-7, *Methods of test for masonry units — Part 7: Determination of water absorption of clay masonry damp proof course units by boiling in water*

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 772-11, *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 772-16, *Methods of test for masonry units — Part 16: Determination of dimensions*

EN 772-19, *Methods of test for masonry units — Part 19: Determination of moisture expansion of large horizontally perforated clay 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.

NOTE Annex B to this European Standard is informative and gives descriptions of such matters as applications, exposure and durability.

3.1
masonry unit
preformed component intended for use in masonry construction

3.2
clay masonry unit
masonry unit made from clay or other argillaceous materials with or without sand, fuel or other additives fired at a sufficiently high temperature to achieve a ceramic bond

3.3
protected masonry
〚A1〛 masonry which is protected against water penetration and is not in contact with soil and ground water

Note 1 to entry: It can either be masonry in external walls which is protected, (e.g. by a layer of suitable render or by cladding), or it can be the inner leaf of a cavity wall or it can be an internal wall. It may or may not be loadbearing. 〚/A1〛

〚/A1〛

3.4
unprotected masonry
masonry which may be exposed to rain, freeze/thaw and/or may be in contact with soil and ground water without a suitable protection

Note 1 to entry: It can either be masonry in external walls which is fully unprotected, or which is intended to be provided by a limited protection (e.g. by a thin layer of render). It may or may not be loadbearing. 〚/A1〛

3.5
〚A1〛 **P unit**
clay masonry unit for use in protected masonry 〚/A1〛

3.6
[A1⟩ U unit
clay masonry unit for use in unprotected masonry ⟨A1]

3.7
co-ordinating size
size of the co-ordinating space allocated to a masonry unit including allowances for joints and tolerances

3.8
work size
size of a masonry unit specified for its manufacture, to which the actual size conforms within permissible deviations

3.9
actual size
size of a masonry unit as measured

3.10
regular-shaped masonry unit
masonry unit with an overall rectangular parallelepiped shape

3.11
specially shaped masonry unit
masonry unit which is not a rectangular parallelepiped

3.12
accessory unit
masonry unit which is shaped to provide a particular function, e.g. to complete the geometry of the masonry

3.13
interlocking features
shaped matched projections and indentations on masonry units

EXAMPLE Tongue and groove systems.

3.14
vertical perforation
formed void that passes completely through a masonry unit perpendicular to the bed face

3.15
horizontal perforation
formed void that passes completely through a masonry unit parallel to the bed face

3.16
cell
formed void that does not pass through a masonry unit

3.17
frog
depression formed in one or both bed faces of a unit

3.18
recess
depression or indentation in one or more surfaces of a masonry unit

EXAMPLE Mortar pocket, rendering keyway, grip hole.

3.19
grip hole
hole in a masonry unit to enable it to be more readily grasped and lifted by hands or machine

3.20
shell
peripheral material between a perforation and the surface of a masonry unit

3.21
web
solid material between the perforations in a masonry unit

3.22
declared value
value that a manufacturer is confident in achieving, bearing in mind the precision of test and the variability of the manufacturing process

3.23
mean compressive strength of masonry units
arithmetic mean of the compressive strengths of masonry units

3.24
normalized compressive strength
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 EN 772-1.

3.25
damp proof course unit
clay masonry unit which, when laid in two courses with broken bond in a strong cementitious mortar, will resist rising damp in masonry

3.26
high precision clay masonry unit
clay masonry unit with small dimensional tolerance especially in unit height

3.27
vertically perforated or hollow clay masonry unit
clay masonry unit with one or more formed voids that pass completely through a masonry unit perpendicular to the bed face

3.28
horizontally perforated or hollow clay masonry unit
clay masonry unit with one or more formed voids that pass completely through a masonry unit parallel to the bed face

3.29
clay masonry unit for concrete or mortar infill
clay masonry unit with special perforation suitable for concrete or mortar infill

3.30
clay masonry unit for masonry panels
clay masonry unit suitable for production of reinforced masonry or masonry storey height panels with vertical channels for mortar or concrete infill

3.31
clay masonry subject to severe exposure
masonry or elements of masonry which, under end use conditions, are subjected to saturation with water (driving rain, ground water) combined with frequent freeze/thaw-cycling, due to climatic conditions and absence of protective features

3.32
clay masonry subject to moderate exposure
masonry or elements of masonry which, under end use conditions, are exposed to moisture and freeze/thaw-cycling, excluding constructions subjected to severe exposure

3.33
clay masonry subject to passive exposure
masonry or elements of masonry which, under end use conditions, are not intended to be exposed to moisture and freezing conditions

3.34
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.

3.35
Category II masonry units
units not intended to comply with the level of confidence of Category I units

3.36
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

3.37
product group
products from one manufacturer having common values for one or more characteristics

3.38
consignment
shipment from the supplier

〈A1〉

3.39
product type
set of representative performance levels or classes of a construction product, in relation to its essential characteristics, manufactured using a given combination of raw materials or other elements in a specific production process 〈A1〉

4 Materials and manufacture

See 3.2, 8.3.4 and 8.3.5.

5 Requirements for clay masonry units

5.1 General

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

NOTE It should be noted that the test methods are not usually applicable to specially shaped and accessory units as defined in [A1⟩ 3.11 and 3.12 ⟨A1].

[A1⟩ In general, for specially shaped clay masonry units it will be satisfactory to declare the properties as that determined on units of a rectangular parallelepiped shape and of the same product type which has been subjected to a similar manufacturing process. ⟨A1]

The conformity criteria given in the following subclauses relate to [A1⟩ product type determination ⟨A1] (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).

The manufacturer shall declare whether the unit fulfils the requirements for [A1⟩ P ⟨A1] units (see Figure 2) or [A1⟩ U ⟨A1] units (see Figure 3).

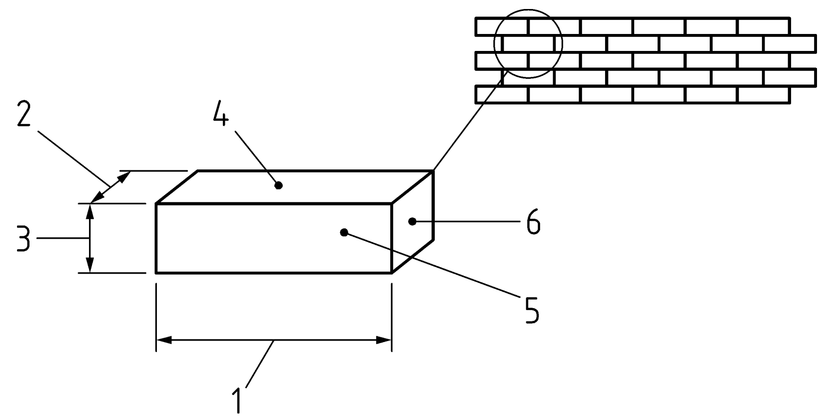
5.2 [A1⟩ P units: intended to be used in protected masonry ⟨A1]

5.2.1 Dimensions and tolerances ([A1⟩ P ⟨A1] units)

5.2.1.1 Dimensions ([A1⟩ P ⟨A1] units)

The dimensions of a clay masonry unit shall be declared by the manufacturer in mm for length, width, and height, in that order (see Figure 1). They shall be given in terms of work size.

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



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

The measurement procedure shall be in accordance with EN 772-16.

5.2.1.2 Dimensional tolerances (〈A1〉 P 〈A1〉 units)

5.2.1.2.1 Tolerances (〈A1〉 P 〈A1〉 units)

The manufacturer shall also declare which of the tolerance categories for mean values in 5.2.1.2.2 the clay masonry units fulfil.

When relevant to the uses for which the unit is placed on the market, the manufacturer shall also declare which of the range categories in 5.2.1.2.3 a given consignment of the clay masonry units fulfils.

NOTE This additional declaration may be made for example in relation to:

— achievement of the required accuracy (planarity, bonds and thin layer joints) of the masonry;

— use of detailed project drawings to achieve these requirements.

5.2.1.2.2 Tolerances of the mean value (〈A1〉 P 〈A1〉 units)

When clay masonry units are sampled from a consignment in accordance with Annex A and tested in accordance with EN 772-16, the difference for all dimensions between the declared value and the mean value derived from measurements of the test sample shall not be greater than the declared one of the following categories, where the value shall be rounded to the whole mm:

Category	Maximum range
T1:	± 0,40 $\sqrt{(\text{work size dimension})}$ mm or 3 mm whichever is the greater
T1+:	± 0,40 $\sqrt{(\text{work size dimension})}$ mm or 3 mm for length and width whichever is the greater and
	± 0,05 $\sqrt{(\text{work size dimension})}$ mm or 1 mm for the height whichever is the great
T2:	± 0,25 $\sqrt{(\text{work size dimension})}$ mm or 2 mm whichever is the greater
T2+:	± 0,25 $\sqrt{(\text{work size dimension})}$ mm or 2 mm for length and width whichever is the greater and
	± 0,05 $\sqrt{(\text{work size dimension})}$ mm or 1 mm for the height whichever is the greater
or Tm:	a deviation in mm declared by the manufacturer (may be wider or closer than the other categories).

5.2.1.2.3 Range (〈A1〉 P 〈A1〉 units)

When declared and regular-shaped clay masonry units are sampled from a consignment in accordance with Annex A and tested in accordance with EN 772-16, the maximum range for any given dimension (i.e. the difference between the largest and smallest determined dimensions on individual units) to be found within the test sample shall be within the declared one of the five categories indicated below, where the value shall be rounded to whole mm:

Category	Maximum range
R1:	0,6 $\sqrt{(\text{work size dimension})}$ mm
R1+:	0,6 $\sqrt{(\text{work size dimension})}$ mm for length and width and 1,0 mm for the height
R2:	0,3 $\sqrt{(\text{work size dimension})}$ mm

R2+: 0,3 $\sqrt{(\text{work size dimension})}$ mm for length and width and 1,0 mm for the height

or Rm: a range in mm declared by the manufacturer (may be wider or closer than the other categories).

5.2.1.2.4 Flatness of bed faces (〈A1〉 P 〈A1〉 units)

When clay masonry units are intended to be used with thin layer mortar, the manufacturer shall declare the maximum deviation from flatness of the bed faces.

When regular-shaped clay 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.

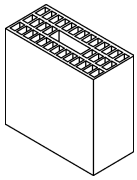
5.2.1.2.5 Plane parallelism of bed faces (〈A1〉 P 〈A1〉 units)

When clay masonry units are intended to be used with thin layer mortar, the manufacturer shall declare the maximum deviation from plane parallelism of the bed faces.

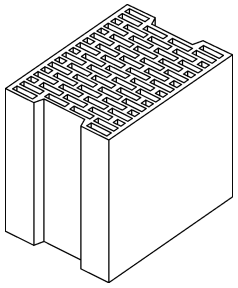
When regular-shaped clay masonry units are sampled from a consignment in accordance with Annex A and tested in accordance with EN 772-16, the deviation from plane parallelism of the bed faces shall not exceed the declared value.

5.2.2 Configuration ([A1] P [A1] units)

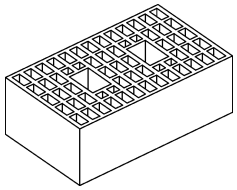
5.2.2.1 General ([A1] P [A1] units)



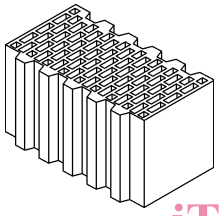
a) Vertically perforated unit



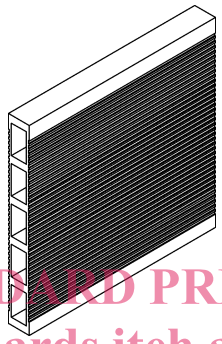
b) Vertically perforated unit with mortar pocket



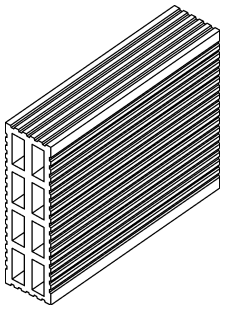
c) Vertically perforated unit with grip holes



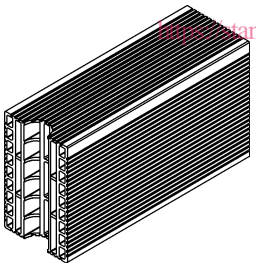
d) Vertically perforated unit with tongue and groove system



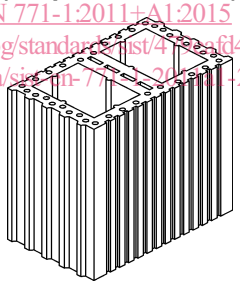
e) Horizontally perforated unit (for partition walls)



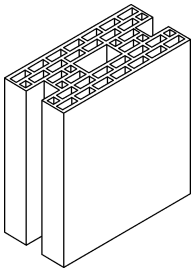
f) Horizontally perforated unit with rendering keyways



g) Horizontally perforated unit with mortar pocket



h) Unit for concrete or mortar infill



i) Unit for masonry panels

Figure 2 — Examples of [A1] P [A1] units

When relevant to the uses, for which clay masonry ([A1] P [A1]) units are placed 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;