



SLOVENSKI STANDARD
SIST EN 15435:2008

01-september-2008

Montažni betonski izdelki - Normalni in lahki betonski bloki - Značilnosti in obnašanje izdelkov

Precast concrete products - Normal weight and lightweight concrete shuttering blocks - Product properties and performance

Betonfertigteile - Schalungssteine aus Normal- und Leichtbeton - Produkteigenschaften und Leistungsmerkmale

Produits préfabriqués en béton - Blocs de coffrage en béton de granulats courants et légers - Exigences et méthode d'essai

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EUROPEAN STANDARD

EN 15435

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EUROPÄISCHE NORM

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ICS 91.100.30

English Version

Precast concrete products - Normal weight and lightweight concrete shuttering blocks - Product properties and performance

Produits préfabriqués en béton - Blocs de coffrage en béton de granulats courants et légers - Propriétés et performances des produits

Betonfertigteile - Schalungssteine aus Normal- und Leichtbeton - Produkteigenschaften und Leistungsmerkmale

This European Standard was approved by CEN on 18 March 2008.

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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 CEN Management Centre has the same status as the official versions.

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

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Foreword

This document (EN 15435:2008) has been prepared by Technical Committee CEN/TC 229 “Precast concrete products”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by October 2008, and conflicting national standards shall be withdrawn at the latest by January 2010.

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 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 Construction Products Directive (89/106/EC).

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

It also takes into account the “Common rules for precast concrete products” in EN 13369.

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, 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.

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1 Scope

This European Standard specifies the properties, performance and test methods of factory made, non-load bearing hollow concrete shuttering blocks made from normal weight or lightweight aggregates or a combination of both. Shuttering blocks may include vertical or horizontal interlocking features and factory installed supplementary insulation. Shuttering blocks are intended to be used to form walls and partitions when filled with concrete or mortar. Concrete shuttering blocks rely on a concrete or mortar infill for their structural performance and are not intended to be used unfilled.

This standard does not cover masonry units covered in EN 771-3.

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 772-11, *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 772-14, *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 1745, *Masonry and masonry products — Methods for determining design thermal values*

EN 12390-5:2000, *Testing hardened concrete — Part 5: Flexural strength of test specimens*

EN 12664, *Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products of medium and low thermal resistance*

EN 13369, *Common rules for precast concrete products*

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

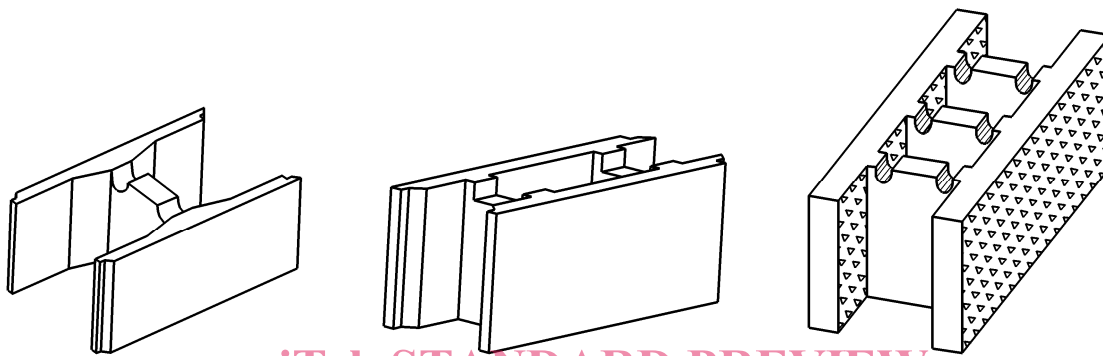
3.1 Terms and definitions

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

3.1.1

shuttering block

hollow block, sometimes incorporating lateral interlocking, intended as permanent formwork for concrete or mortar infill, for laying dry or with mortar



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Figure 1 — Example of a shuttering block

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3.1.2

shuttering block with supplementary thermal insulation

shuttering block incorporating thermal insulation to enhance thermal resistance

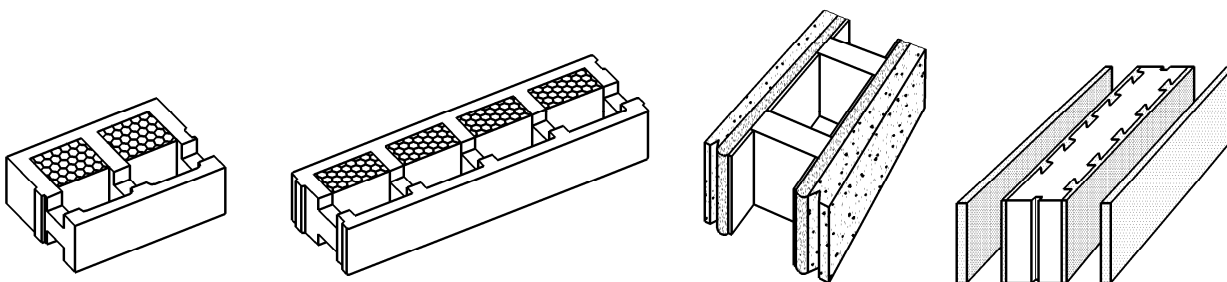


Figure 2 — Examples of shuttering blocks with supplementary thermal insulation

3.1.3

design (nominal) dimension

dimension targeted in the project documentation

3.1.4

actual dimension (of the product)

dimension found by measurement (on the finished product)

3.1.5**specialty shaped shuttering block**

shuttering block having a shape, such as a corner block, which allows it to fulfil a particular function

3.1.6**interlocking features (horizontal and/or vertical)**

shaped matched projections and indentations on shuttering blocks (e.g. tongue and groove systems)

3.1.7**hollow core**

shaped void for incorporation of concrete or mortar infill and any supplementary thermal insulation

3.1.8**shell**

solid material between the hollow core and the faces of a shuttering block

3.1.9**web**

solid material linking the shells of the shuttering block

3.1.10**web recess**

formed notch in a web

3.2 Symbols

l	length of the shuttering block in mm
t_b	width of the shuttering block in mm
h	height of the shuttering block in mm
t_{s1}	thickness of the outer shell in mm
t_{s2}	thickness of the inner shell in mm
t_{wl}	(w_1, w_2, \dots) thickness of web in mm
t_c	width of the hollow core (concrete infill) in mm
W_R	width of web recess
t_i	thickness of the insulating material in mm
h_R	Total height of the web in mm ($h_R = h_{R1} + h_{R2}$)
A_R	Total area of the web recess in mm ²
l_d	diagonal of the face
h_w	recessed height of web ($h_w = h - h_{R1} - h_{R2}$)
a_1	length of hollow core
a_2	length of cantilevered shell

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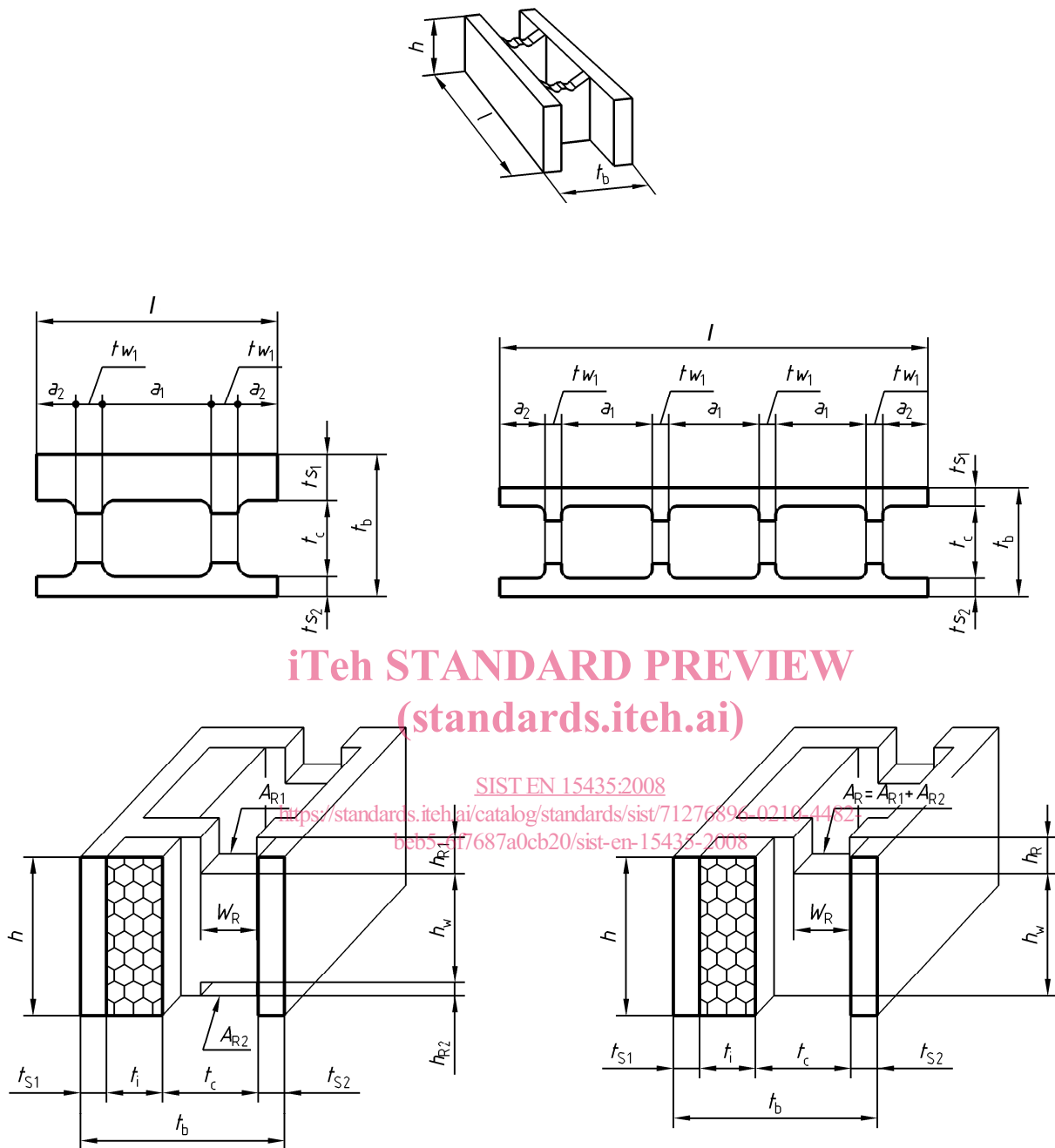


Figure 3 — Geometric specification symbols

4 Requirements

4.1 General

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

NOTE The standard test methods are not always applicable to specially shaped shuttering blocks as defined in 3.1.5.

4.2 Raw materials and concrete

Materials for shuttering block concrete shall comply with EN 13369. Any supplementary thermal insulation material shall comply with an appropriate European standard.

4.3 Dangerous substances

Shuttering blocks shall not release any dangerous substances in excess of the maximum permitted levels specified or permitted in the national regulations valid in the place of use.

4.4 Geometric properties

4.4.1 Dimensions

The dimensions of the shuttering blocks shall be declared in millimetres for length, width and height, in that order (see Figure 3). The dimensions of voids and web recesses shall be declared in millimetres. They shall be given in terms of work size and be shown on diagrams. Tolerances on declared work sizes of individual regular shaped shuttering blocks shall conform to Table 1. Closer deviations may be declared by the manufacturer for one or more dimensions.

The thickness of shell(s) and web(s) shall be declared.

Table 1 — Permissible deviations in millimetres

Length (l)	Width (b)	Height (h)	Dimensions of voids and web recesses
+5	+5	+3	+10
-5	-5	-5	-4

4.4.2 Web recess area

When web recesses are included the minimum web recess area shall be declared. The web recess area shall be determined in accordance with 5.1.4.

4.4.3 Flatness

4.4.3.1 Flatness of external faces of facing shuttering blocks

When the surface of facing shuttering blocks is declared as plane, it 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 face. The flatness of external faces of facing shuttering blocks shall be determined in accordance with 5.1.5.

4.4.3.2 Flatness of bed faces

When the shuttering blocks are dry-stacked the flatness of bed faces shall be determined in accordance with 5.1.6. The deviation from flatness shall not exceed 3 mm.

4.4.4 Squareness

When required, squareness between the side-faces and both bed faces for shuttering blocks to be dry-stacked shall not deviate by more than 5 mm when measured in accordance with 5.1.3.2. or 3 mm when measured in accordance with 5.1.3.3.

EN 15435:2008 (E)**4.4.5 Appearance of facing shuttering blocks**

When required, the appearance of facing shuttering blocks 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 shuttering blocks are used.

4.5 Density

The net dry density of the shuttering blocks shall be declared in kg/m^3 . The mean value of the test samples shall not differ from the declared value by more than $\pm 10\%$. The dry density shall be determined according to 5.2.

For factory production control purposes, density may be verified by weighing individual shuttering blocks.

4.6 Moisture movement

When required, the moisture movement of the shuttering blocks (shrinkage and expansion) shall be declared.

Moisture movement shall be determined according to EN 772-14.

4.7 Reaction to fire

For concrete shuttering blocks intended to be used in elements subject to fire requirements, the manufacturer shall declare the reaction to fire classification of the shuttering block.

Shuttering blocks containing a mass or volume fraction of a maximum of 1,0 % (whichever is the most onerous) of homogeneously distributed organic materials, are classified as Class A1 without the need to test.

Shuttering blocks containing a mass or volume fraction more than 1,0 % (whichever is the most onerous) of homogeneously distributed organic materials shall be classified in accordance with EN 13501-1 and the appropriate reaction to fire class declared.

Information on reaction to fire class of supplementary insulating material shall be given on the basis of European standards as declared by the supplier of the insulating material.

NOTE Attention is drawn to the Commission Decision 96/603/EC, as amended by Commission Decision 2000/605/EC, in which non-combustible shuttering blocks containing not more than a mass or volume fraction of 1,0 % (whichever is the more onerous) of homogeneously distributed organic materials are classified as reaction to fire Class A1 without testing.

4.8 Water vapour permeability

When required, the water vapour permeability shall be declared according to tabulated values in EN 1745 or determined according to EN ISO 12572.

4.9 Mechanical strength**4.9.1 General**

The mechanical strength of shuttering blocks shall be sufficient to allow handling and withstand the filling pressure on the shells.

For factory production control purposes mechanical strength may be verified by testing compressive strength in accordance with EN 772-1.

When relevant, the thermal insulation adhesion shall be determined according to 5.3 and declared.

NOTE Determination of thermal insulation adhesion can be relevant for blocks where thermal insulation binds together two block halves, see last block type in Figure 2.

4.9.2 Tensile strength of webs

The mean tensile strength shall be determined only when the web width is less than the shell width and/or the web height is less than 80 % of the shuttering block height.

The tensile strength in N/mm² of the webs $f_{t,fl}$ shall be determined on the smallest section of the webs according to 5.3 and shall not be less than the design value $f_{t,min}$.

Shuttering blocks shall be tested according to 5.3 and Annex A, the results evaluated according to Annex D.

4.9.3 Flexural strength of shells

The mean flexural strength in N/mm² of the shell $f_{f,m}$, shall not be less than $f_{f,min}$.

The flexural strength of the shells shall be determined on the thinnest shell according to 5.3.

Shuttering blocks shall be tested according to 5.3 and Annex B, results evaluated according to Annex D.

4.10 Acoustic properties

When required, the manufacturer shall supply information on the acoustic properties.

NOTE 1 The acoustic properties depend mainly on the density and configuration of the shuttering blocks and/or on the mass of the finished walls.

NOTE 2 Airborne sound insulation is a property of the finished walls.

4.11 Thermal properties

When required, the manufacturer shall supply information on the thermal properties.

The thermal conductivity shall be declared on the basis of tabulated values given in EN 1745 or determined in accordance with EN 12664.

NOTE The thermal properties depend mainly on the thermal conductivity of the shuttering blocks, the concrete or mortar infill, any supplementary insulation and the geometry of the shuttering blocks.

4.12 Water absorption by capillarity

When required, the maximum water absorption by capillarity shall be declared in g/m².s.

The test is carried out in accordance with EN 772-11 for a time in contact with water of (10,0 ± 0,2) min.

NOTE The result obtained according to EN 772-11 should be divided by 24,49 to express this value in g/m².s.

4.13 Durability

When required freeze-thaw resistance shall be declared by reference to the provisions valid in the intended place of use until an appropriate European standard is available.