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**Montažni betonski izdelki - Betonski bloki iz lesnih drobcov - Lastnosti in obnašanje izdelkov**

Precast concrete products - Wood-chip concrete shuttering blocks - Product properties and performance

Betonfertigteile - Holzspanbeton-Schalungssteine - Produkteigenschaften und Leistungsmerkmale

Produits préfabriqués en béton - Blocs de coffrage en béton utilisant des copeaux de bois comme granulat - Propriétés et performances des produits

**Ta slovenski standard je istoveten z: EN 15498:2008**

**ICS:**

91.100.30	Beton in betonski izdelki	Concrete and concrete products
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**SIST EN 15498:2008****en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 15498**

April 2008

ICS 91.100.30

English Version

**Precast concrete products - Wood-chip concrete shuttering  
blocks - Product properties and performance**

Produits préfabriqués en béton - Blocs de coffrage en  
béton utilisant des copeaux de bois comme granulat -  
Propriétés et performances des produits

Betonfertigteile - Holzspanbeton-Schalungssteine -  
Produkteigenschaften und Leistungsmerkmale

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## Foreword

This document (EN 15498:2008) 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of an identical text or by endorsement, at the latest by October 2008, and conflicting national standards shall be withdrawn at the latest by January 2010.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/EEC).

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

It also takes into account the EN 13369:2004 *Common rules for precast concrete products*.

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 wood-chip concrete shuttering blocks, which may include factory installed thermal insulation.

These blocks are intended to be used for external and internal walls and partitions when filled with concrete.

## 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 772-14, *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 1607, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*

EN 1793-1, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 1 : Intrinsic characteristics of sound absorption*

EN 1793-2, *Road traffic noise reducing devices — Test method for determining the acoustic performance — Part 2 : Intrinsic characteristics of airborne sound insulation*

EN 1934, *Thermal performance of buildings — Determination of thermal resistance by hot box method using heat flow meter — Masonry*

EN 12524, *Building materials and products — Hygrothermal properties — Tabulated design values*

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

EN 13162, *Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification*

EN 13163, *Thermal insulation products for buildings - Factory made products of expanded polystyrene (EPS) - Specification*

EN 13164, *Thermal insulation products for buildings - Factory made products of extruded polystyrene foam (XPS) - Specification*

EN 13165, *Thermal insulation products for buildings - Factory made rigid polyurethane foam (PUR) products - Specification*

EN 13166, *Thermal insulation products for buildings - Factory made products of phenolic foam (PF) - Specification*



EN 13167, *Thermal insulation products for buildings - Factory made cellular glass (CG) products - Specification*

EN 13168, *Thermal insulation products for buildings - Factory made wood wool (WW) products - Specification*

EN 13169, *Thermal insulation products for buildings - Factory made products of expanded perlite (EPB) - Specification*

EN 13170, *Thermal insulation products for buildings - Factory made products of expanded cork (ICB) - Specification*

EN 13171, *Thermal insulating products for buildings - Factory made wood fibre (WF) products - Specification*

EN 13238, *Reaction to fire tests for building products — Conditioning procedures and general rules for selection of substrates*

EN 13501-1, *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*

EN 14474, *Precast concrete products — Concrete with wood-chips as aggregate — Requirements and test methods*

EN ISO 140-3, *Acoustics - Measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995)*

EN ISO 354, *Acoustics - Measurement of sound absorption in a reverberation room (ISO 354:2003)*

EN ISO 6946, *Building components and building elements - Thermal resistance and thermal transmittance - Calculation method (ISO 6946:2007)*

EN ISO 10456, *Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values (ISO 10456:2007)*

EN ISO 12572, *Hygrothermal performance of building materials and products - Determination of water vapour transmission properties (ISO 12572:2001)*

### 3 Terms, definitions, symbols and abbreviations

#### 3.1 Terms and definitions

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

##### 3.1.1

##### **shuttering block**

hollow block, having outer shells connected by recessed webs, intended to be dry-stacked or laid with mortar and filled with concrete

##### 3.1.2

##### **wood-chip concrete shuttering block**

shuttering block made of wood-chip concrete according to EN 14474

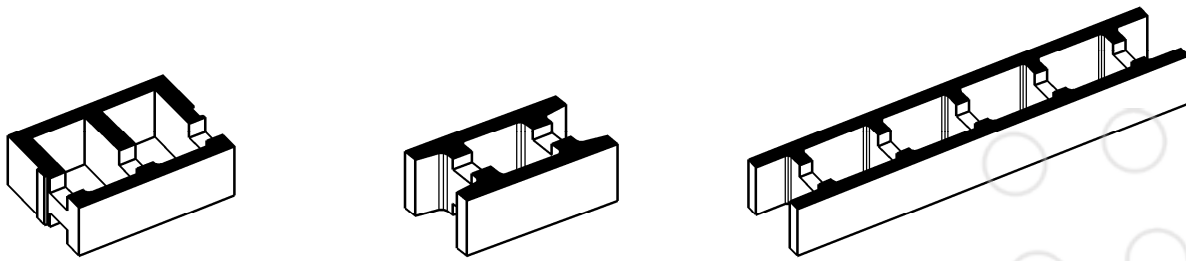


Figure 1 — Examples of shuttering blocks without additional thermal insulation

### 3.1.3

#### shuttering block with supplementary thermal insulation

shuttering block with factory installed thermal insulation to enhance thermal resistance

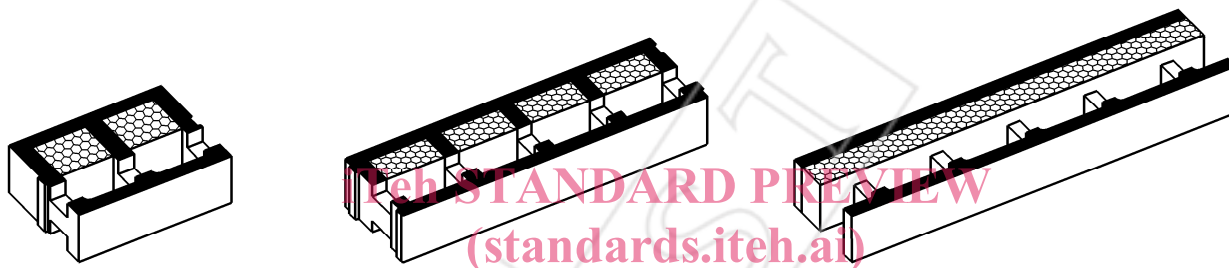


Figure 2 — Examples of shuttering blocks with supplementary thermal insulation

### 3.1.4

#### ancillary block

specialty shaped shuttering block for the execution of constructional details, such as corners, reveals, lintels, etc.

### 3.1.5

#### design (nominal) dimension

dimension targeted in the project documentation

### 3.1.6

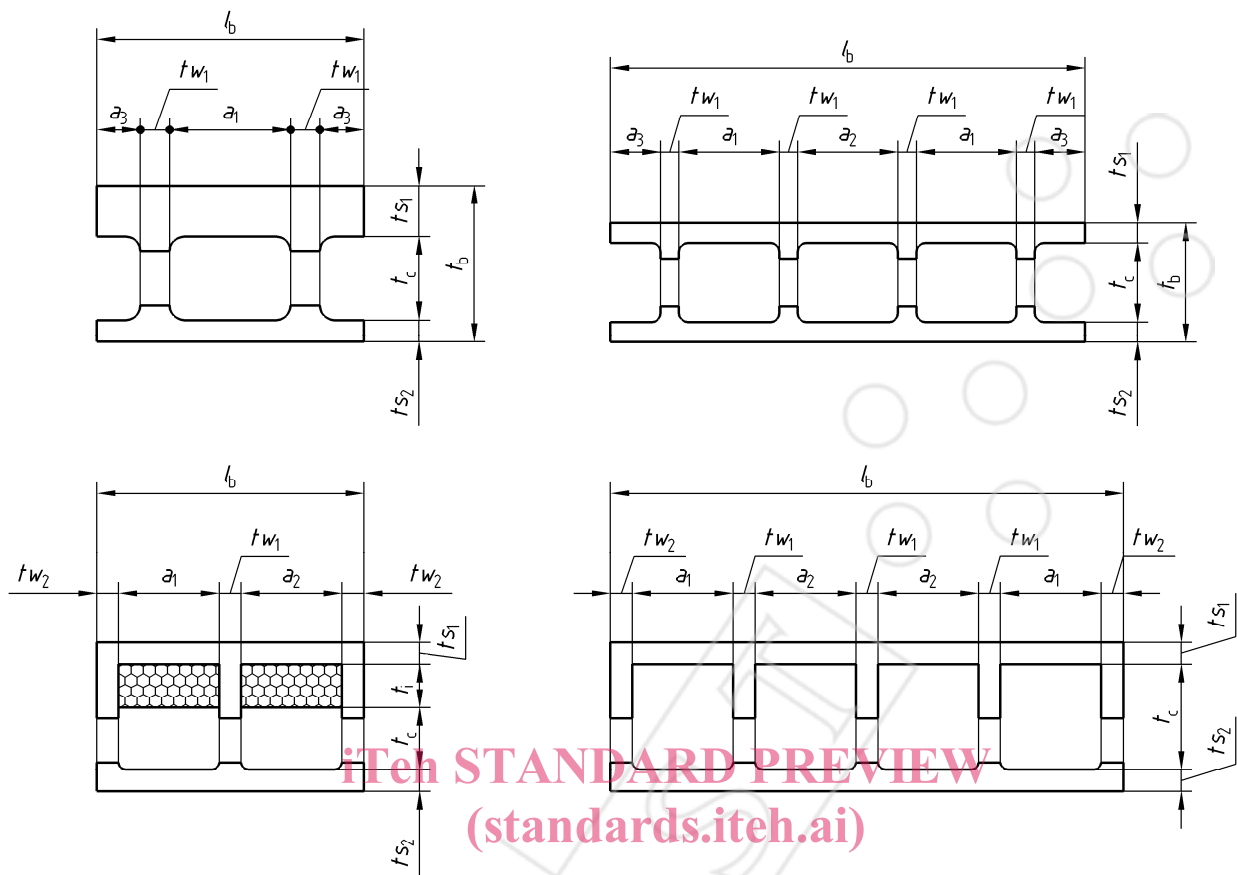
#### actual dimension (of the product)

dimension found by measurement (on the finished product)

## 3.2 Symbols and abbreviations

$l_b$	length of shuttering block, in mm
$t_b$	width (thickness) of shuttering block, in mm
$t_c$	thickness of concrete infill, in mm
$t_i$	thickness of insulation, in mm
$t_{wi}$ ( $w1$ , $w2$ , )	thickness of web, in mm
$t_s$	thickness of shell, in mm

$t_{S1}$	thickness of outer shell, in mm
$t_{S2}$	thickness of inner shell, in mm
$a_1, a_2$	length of hollow space, in mm
$a_3$	length of cantilever shell, in mm
$h_b$	height of shuttering block, in mm
$h_R$	height of web recess ( $h_R = h_{R1} + h_{R2}$ ), in mm
$h_w$	height of recessed web ( $h_w = h_b - h_R$ ), in mm
$w_R$	width of web recess, in mm
$s$	cross-sectional area of recessed webs ( $s = t_{wi} * h_w$ ), in mm <sup>2</sup>
$s_1$	cross-sectional area of recessed web with thickness $t_{w1}$ ( $s_1 = t_{w1} * h_w$ ), in mm <sup>2</sup>
$A_R$	total web recess area ( $A_R = A_{R1} + A_{R2}$ ), in mm <sup>2</sup>
$A_{R1}$	upper web recess area, in [mm <sup>2</sup> ]
$A_{R2}$	lower web recess area, in [mm <sup>2</sup> ]
$l$	supporting length of shell ( $l = a + 2 * t_{wl}/2$ ), in mm <sup>2</sup>
$p$	filling pressure, in N/mm <sup>2</sup>
$p_{max}$	maximum filling pressure of concrete infill, in N/mm <sup>2</sup>
$p_{msd}$	measured maximum filling pressure, in N/mm <sup>2</sup>
$P_t$	web tensile failure load, in N
$P_{t,min}$	minimum required web tensile failure load, in N
$P_{t,msd}$	measured web tensile failure load, in N
$f_{t,min}$	minimum required web tensile strength, in N/mm <sup>2</sup>
$f_{t,msd}$	individual value of the web tensile strength, in N/mm <sup>2</sup>
$f_{t,m}$	mean tensile strength of web, in N/mm <sup>2</sup>
$P_f$	shell flexural failure load, in N
$P_{f,msd}$	measured shell flexural failure load, in N
$f_{f,min}$	minimum required shell flexural strength, in N/mm <sup>2</sup>
$f_{f,msd}$	individual value of the shell flexural strength, in N/mm <sup>2</sup>
$f_{f,m}$	mean flexural strength of the shells, in N/mm <sup>2</sup>
$f_{tp}$	tensile strength of shells perpendicular to faces, in N/mm <sup>2</sup>
$\lambda$	thermal conductivity, in W/(m.K)
$c$	specific heat capacity, in kJ/(kg.K)



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Figure 3a) — Symbols for geometric characteristics

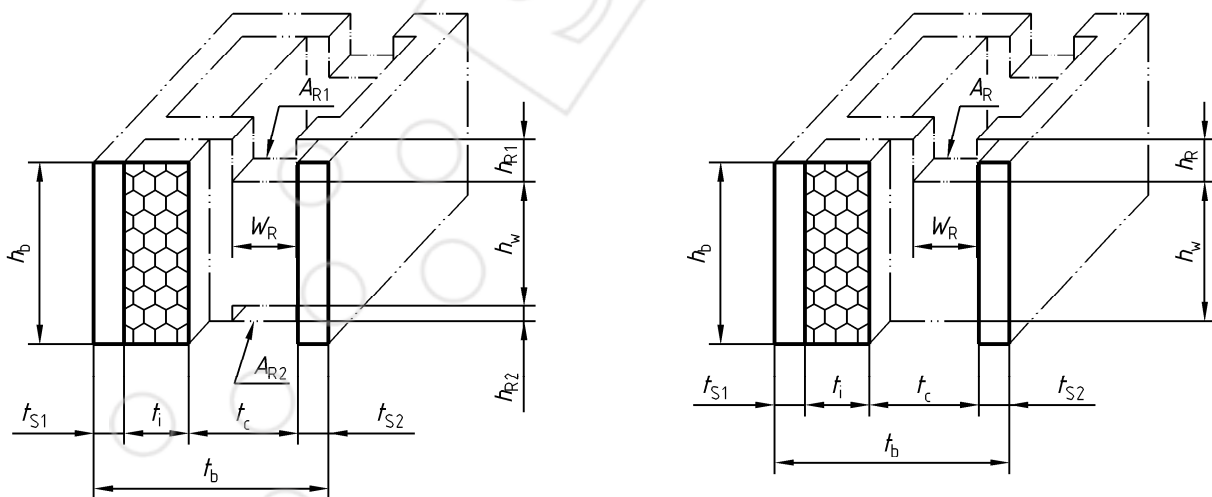


Figure 3b) — Symbols for geometric characteristics

## 4 Requirements

### 4.1 Material requirements

#### 4.1.1 Wood-chip concrete

Only wood-chip concrete conforming to EN 14474 shall be used for the manufacture of wood-chip concrete shuttering blocks.

#### 4.1.2 Supplementary thermal insulation materials

When supplementary thermal insulation materials are used, they shall comply with the relevant standard of the series EN 13162 to EN 13171.

### 4.2 Finished product requirements

#### 4.2.1 Geometric characteristics

##### 4.2.1.1 Dimensions

The work size of shuttering blocks shall be given in dimensioned drawings.

The external dimensions of the shuttering blocks shall be declared in mm in the order length, width and height.

The dimensions of voids and web-recesses shall be declared in mm.

The permissible deviations on declared work size of individual regularly shaped shuttering blocks shall conform to Table 1. Closer deviations may be declared.

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Table 1 — Permissible deviations

Permissible deviations				
Length	width	height	Dimensions of voids	Dimensions of web recesses
± 5 mm	± 5 mm	± 3 mm	+10 / - 3 mm	

Deviations for non-regularly shaped shuttering blocks shall be as given in Table 1 or as declared.

Dimensions shall be determined according to 5.2.1.2.

#### 4.2.1.2 Web recess area

If not otherwise declared, the web recess area  $A_R$  per web in a shuttering block in mm<sup>2</sup> shall be at least 0,2 times the core thickness  $t_c$  in millimetres multiplied by the height of the shuttering block  $h_b$  in millimetres (formula 1).

$$A_R = A_{R1} + A_{R2} \geq 0,2 \times t_c \times h_b \quad (1)$$

The web recess area for ancillary shuttering blocks shall conform to this requirement or shall be declared.

The web recess area shall be determined according to 5.2.1.3 .

#### 4.2.1.3 Flatness

The deviation from flatness shall not exceed 5 mm for the side faces and 3 mm for the bed faces.

Deviation from flatness shall be determined according to 5.2.1.4.

#### 4.2.1.4 Squareness

When required for shuttering blocks with bed faces, end faces and side faces designed to be at right angles the deviation from a right angle shall not exceed 4 mm over a length of 250 mm.

Deviation from squareness shall be determined according to 5.2.1.5.

#### 4.2.2 Density

The material oven dry density shall be declared. The mean material oven dry density shall deviate by not more than ± 10 % from the declared value.

The material dry density shall be determined according to 5.2.2.

#### 4.2.3 Moisture movement

If required, the moisture movement (shrinkage, expansion) of shuttering blocks to be used in exposed conditions shall be declared.

The moisture movement shall be determined according to 5.2.3 .

#### 4.2.4 Reaction to fire

Shuttering blocks shall meet the requirements of class B according to EN 13501-1.

Reaction to fire shall be determined according to 5.2.4 .

#### 4.2.5 Water vapour permeability

For shuttering blocks intended to be used in external walls water vapour permeability shall be given as design values for the wood-chip concrete and for any supplementary thermal insulation in the shuttering blocks.

Water vapour permeability shall be determined according to 5.2.5.

#### 4.2.6 Mechanical strength

##### 4.2.6.1 General

The mechanical strength of shuttering blocks shall be sufficient to allow handling and withstand a maximum filling pressure of  $p_{\max}$  according to Annex A.

##### 4.2.6.2 Tensile strength of web

The mean tensile strength of the web with the smallest cross-sectional area  $f_{t,m}$  shall not be less than the minimum tensile strength of web  $f_{t,\min}$  according to Annex A and Annex B.

$$f_{t,m} \geq f_{t,\min} \quad (2)$$

The tensile strength shall be determined according to 5.2.6.2.

##### 4.2.6.3 Flexural strength of shells

The mean flexural strength of shells with the smallest thickness  $f_{f,m}$  shall not be less than the minimum flexural strength of shells  $f_{f,\min}$  in according to Annex A and Annex C.

$$f_{f,m} \geq f_{f,\min} \quad (3)$$

The flexural strength of shells shall be determined according to 5.2.6.3.

##### 4.2.6.4 Tensile strength of shells perpendicular to faces

For shuttering blocks intended for use in external walls of buildings with a bonded external insulation system, the value of the tensile strength of shells perpendicular to faces  $f_{tp}$  shall not be less than 0,15 N/mm<sup>2</sup>.

$$f_{tp} \geq 0,15 \text{ N/mm}^2 \quad (4)$$

The tensile strength of shells perpendicular to faces shall be determined according to 5.2.6.4 .

#### 4.2.7 Acoustic properties

##### 4.2.7.1 General

When relevant to the intended uses, the manufacturer shall provide information on the acoustic properties of the shuttering blocks.

NOTE Acoustic properties are mainly dependent on the density, surface characteristics, geometry and structure of the shuttering blocks and/or the mass of the wall when the blocks are filled with concrete. Other factors (e.g. air-tightness of the wall and the shape of the block-construction) also have an influence.