



SLOVENSKI STANDARD

SIST EN 13369:2018

01-maj-2018

Nadomešča:
SIST EN 13369:2013

Splošna pravila za montažne betonske izdelke

Common rules for precast concrete products

Allgemeine Regeln für Betonfertigteile

Règles communes pour les produits préfabriqués en béton

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 13369:2018

<https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9aed875470/sist-en-13369-2018>

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products
-----------	---------------------------	--------------------------------

SIST EN 13369:2018

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 13369:2018

<https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018>

EUROPEAN STANDARD

EN 13369

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2018

ICS 91.100.30

Supersedes EN 13369:2013

English Version

Common rules for precast concrete products

Règles communes pour les produits préfabriqués en
béton

Allgemeine Regeln für Betonfertigteile

This European Standard was approved by CEN on 10 January 2018.

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.

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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

[SIST EN 13369:2018](https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018)

<https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018>



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents		Page
European foreword.....		6
Introduction		8
1	Scope	9
2	Normative references	9
3	Terms and definitions	10
4	Requirements	13
4.1	Material requirements	13
4.1.1	General	13
4.1.2	Constituent materials of concrete	13
4.1.3	Reinforcing steel	13
4.1.4	Prestressing steel	13
4.1.5	Inserts and connectors	14
4.2	Production requirements	14
4.2.1	Concrete production	14
4.2.2	Hardened concrete	16
4.2.3	Structural reinforcement	18
4.3	Finished product requirements	19
4.3.1	Geometrical properties	19
4.3.2	Surface characteristics	21
4.3.3	Mechanical resistance	21
4.3.4	Resistance and reaction to fire	22
4.3.5	Acoustic properties	23
4.3.6	Thermal properties	23
4.3.7	Durability	24
4.3.8	Other requirements	25
5	Test methods	25
5.1	Tests on concrete	25
5.1.1	Compressive strength	25
5.1.2	Water absorption	26
5.1.3	Dry density of concrete	26
5.2	Measuring of dimensions and surface characteristics	26
5.3	Weight of the products	27
6	Assessment and verification of constancy of performance	27
6.1	General	27
6.1.1	General	27
6.1.2	Demonstration of conformity	27
6.1.3	Assessment of conformity	27
6.1.4	Product families	28
6.2	Type testing	28
6.2.1	General	28
6.2.2	Testing and compliance criteria	29
6.3	Factory production control	29
6.3.1	General	29
6.3.2	Organization	29

6.3.3	Control system	29
6.3.4	Document control	29
6.3.5	Process control	30
6.3.6	Inspection and testing	30
6.3.7	Non-conforming products	31
6.3.8	Conformity criteria	31
6.3.9	Indirect or alternative test method	32
6.3.10	Initial inspection of factory and of FPC	32
6.3.11	Continuous surveillance of FPC	32
6.3.12	Procedure for modifications	33
7	Marking	33
8	Technical documentation	33
Annex A	(informative) Concrete cover as regard to corrosion	35
A.1	Minimum concrete cover for base conditions	35
A.2	Alternative conditions	36
Annex B	(informative) Concrete quality control	37
B.1	Statistical representative values	37
B.2	Conformity criteria for potential strength	37
B.3	Direct structural strength	37
B.4	Indirect structural strength	37
B.5	Direct assessment of possibly non-conforming units	38
Annex C	(informative) Reliability considerations	40
C.1	General	40
C.2	Reduction based on quality control and reduced tolerances	40
C.3	Reduction based on using reduced or measured geometrical parameters in design	40
C.4	Reduction based on assessment of concrete strength in finished structure	41
C.5	Reduction of γ_G based on control of self-weight	41
Annex D	(normative) Inspection schemes	42
D.1	General	42
D.2	Equipment inspection	42
D.3	Materials inspection	44
D.4	Process inspection	46
D.5	Finished product inspection	49
D.6	Switching rules	49
Annex E	(informative) Assessment of compliance	51
E.1	General	51
E.1.1	General remark	51
E.1.2	Compliance of factory quality system	51
E.1.3	Compliance of the product	51

E.2	Initial inspection	51
E.3	Continuous surveillance	51
E.4	Audit testing	52
Annex F (normative) Test of water absorption		53
F.1	Method	53
F.2	Sampling	53
F.3	Materials	56
F.4	Apparatus	56
F.5	Preparation	56
F.6	Procedure	56
F.7	Results	57
Annex G (informative) Shape correlation factor for cores		58
Annex H (informative) Measurement of dimensions		59
H.1	Length, height, width and thickness	59
H.2	Warp and straightness	60
H.3	Out of squareness	60
H.4	Surface characteristics	60
H.5	Angular deviation lateral bow, camber and sag	64
Annex I (informative) Prestressing losses		65
I.1	General	65
I.2	Calculation of losses (general method)	65
I.2.1	Losses before transfer of the prestress force	65
I.2.2	Loss at transfer of the prestress force	66
I.2.3	Losses after transfer of the prestressing force	66
I.2.4	Final prestress loss at infinite time	66
I.3	Simplified method	66
Annex J (informative) Technical documentation		68
J.1	General	68
J.2	Product documentation	68
J.3	Production documentation	68
J.4	Erection documentation	69
Annex K (informative) Properties of indented bars and wire		70
Annex L (informative) Resistance to fire: recommendations for the use of EN 1992-1-2		71
L.1	Use of tabulated data	71
L.2	Use of calculation methods	71
Annex M (informative) Survey of type testing		72

Annex N (informative) Use of reclaimed crushed and recycled coarse aggregates in concrete	74
N.1 General	74
N.2 Reclaimed crushed aggregates	74
N.3 Recycled coarse aggregates (aggregates from external source) assessed by the manufacturer	74
N.4 Other recycled coarse aggregates.....	74
Bibliography	75

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 13369:2018](#)

<https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018>

EN 13369:2018 (E)

European foreword

This document (EN 13369:2018) 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 2018, and conflicting national standards shall be withdrawn at the latest by April 2021.

This document supersedes EN 13369:2013.

The main technical changes that have been made in this new edition are the following ones:

- a) normative references have been updated taking into account the new version of EN 206;
- b) terms and definitions have been reviewed according to Construction Product Regulation, term and definition of “Product-type” are added;
- c) clause for reclaimed crushed aggregates and recycled coarse aggregates is reviewed;
- d) clause of Assessment and verification of constancy of performance is revised according to the wording of Construction Product Regulation;

EN 13369 is a common reference for the following group of specific product standards prepared by Technical Committee CEN/TC 229:

- STANDARD PREVIEW**
(standards.iteh.ai)
- EN 1168, *Precast concrete products — Hollow core slabs;*
SIST EN 13369:2018
 - EN 12737, *Precast concrete products — Floor slats for livestock;*
<https://standards.iteh.ai/catalog/standards/sist/8c40445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018>
 - EN 12794, *Precast concrete products — Foundation piles;*
 - EN 12839, *Precast concrete products — Elements for fences;*
 - EN 12843, *Precast concrete products — Masts and poles;*
 - EN 13198, *Precast concrete products — Street furniture and garden products;*
 - EN 13224, *Precast concrete products — Ribbed floor elements;*
 - EN 13225, *Precast concrete products — Linear structural elements;*
 - EN 13693, *Precast concrete products — Special roof elements;*
 - EN 13747, *Precast concrete products — Floor plates for floor systems;*
 - EN 13748-1, *Terrazzo tiles — Part 1: Terrazzo tiles for internal use;*
 - EN 13748-2, *Terrazzo tiles — Part 2: Terrazzo tiles for external use;*
 - EN 13978-1, *Precast concrete products — Precast concrete garages — Part 1: Requirements for reinforced garages monolithic or consisting of single sections with room dimensions;*
 - EN 14843, *Precast concrete products — Stairs;*

- EN 14844, *Precast concrete products — Box culverts*;
- EN 14991, *Precast concrete products — Foundation elements*;
- EN 14992, *Precast concrete products — Wall elements*;
- EN 15037-1, *Precast concrete products — Beam-and-block floor systems — Part 1: Beams*;
- EN 15037-2, *Precast concrete products — Beam-and-block floor systems — Part 2: Concrete blocks*;
- EN 15037-3, *Precast concrete products — Beam-and-block floor systems — Part 3: Clay blocks*;
- EN 15037-4, *Precast concrete products — Beam-and-block floor systems — Part 4: Expanded polystyrene blocks*;
- EN 15037-5, *Precast concrete products — Beam-and-block floor systems — Part 5: Lightweight blocks for simple formwork*;
- EN 15050, *Precast concrete products — Bridge elements*;
- EN 15258, *Precast concrete products — Retaining wall elements*;
- EN 15435, *Precast concrete products — Normal weight and lightweight concrete shuttering blocks — Product properties and performances*;
- EN 15498, *Precast concrete products — Wood-chip concrete shuttering blocks — Product properties and performances*.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is intended to outline the general common requirements applicable to a large variety of precast concrete products manufactured in a factory environment. It acts as a reference standard for other standards to enable a more consistent approach to standardization in the field of precast concrete products and to reduce the variations brought about by a large number of standards produced in parallel by different groups of experts. At the same time, it allows those experts the flexibility to include variations in specific product standards where they are required.

This standard has been produced as part of the total CEN programme for construction and refers to the relevant specifications of associated standards EN 206 for concrete and EN 1992 for the design of concrete structures. The installation of some precast concrete products is dealt with by EN 13670.

As it is not a harmonized standard, it may not be used on its own for the purpose of CE marking of precast concrete products.

The design of precast concrete products should be verified to ensure the fitness of their properties for the particular application, particular attention being paid to design co-ordination with other parts of the construction.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 13369:2018](https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018)

<https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018>

1 Scope

This document specifies the requirements, the basic performance criteria and the Assessment and Verification of Constancy of Performance (AVCP) for unreinforced, reinforced and prestressed precast concrete products made of compact light-, normal- and heavyweight concrete according to EN 206 with no appreciable amount of entrapped air other than entrained air. Concrete containing fibres for other than mechanical properties (steel, polymer or other fibres) is also covered. It does not cover prefabricated reinforced components of lightweight aggregate concrete with open structure.

It may also be used to specify products for which there is no standard. Not all of the requirements (Clause 4) of this standard are relevant to all precast concrete products.

If a specific product standard exists, it takes precedence over this document.

The precast concrete products dealt with in this standard are factory produced for building and civil engineering works. This document can also be applied to products manufactured in temporary plants on site if the production is protected against adverse weather conditions and controlled following Clause 6 provisions.

The analysis and design of precast concrete products is not within the scope of this document but it does offer, for non-seismic zones, information about:

- the choice of partial safety factors defined by the pertinent Eurocode;
- the definition of some requirements for prestressed concrete products.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 206:2013+A1:2016, *Concrete — Specification, performance, production and conformity*

EN 934-2, *Admixtures for concrete, mortar and grout — Part 2: Concrete admixtures — Definitions, requirements, conformity, marking and labelling*

EN 1008, *Mixing water for concrete — Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete*

EN 1097-6, *Tests for mechanical and physical properties of aggregates — Part 6: Determination of particle density and water absorption*

EN 1992-1-1:2004¹, *Eurocode 2: Design of concrete structures — Part 1-1: General rules and rules for buildings*

EN 1992-1-2:2004², *Eurocode 2: Design of concrete structures — Part 1-2: General rules — Structural fire design*

EN 10080:2005, *Steel for the reinforcement of concrete — Weldable reinforcing steel — General*

¹ As impacted by EN 1992-1-1:2004/AC:2010 and EN 1992-1-1:2004/A1:2014.

² As impacted by EN 1992-1-2:2004/AC:2008.

EN 13369:2018 (E)

prEN 10138-1, *Prestressing steels — Part 1: General requirements*

prEN 10138-2, *Prestressing steels — Part 2: Wire*

prEN 10138-3, *Prestressing steels — Part 3: Strand*

prEN 10138-4, *Prestressing steels — Part 4: Bar*

EN 12350-7, *Testing fresh concrete — Part 7: Air content - Pressure methods*

EN 12390-1, *Testing hardened concrete — Part 1: Shape, dimensions and other requirements for specimens and moulds*

EN 12390-2, *Testing hardened concrete — Part 2: Making and curing specimens for strength tests*

EN 12390-3, *Testing hardened concrete — Part 3: Compressive strength of test specimens*

EN 12390-7, *Testing hardened concrete — Part 7: Density of hardened concrete*

EN 12504-1, *Testing concrete in structures — Part 1: Cored specimens — Taking, examining and testing in compression*

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

EN ISO 717-1, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation (ISO 717-1)*

EN ISO 717-2, *Acoustics — Rating of sound insulation in buildings and of building elements — Part 2: Impact sound insulation (ISO 717-2)*

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

ASTM C173/C173M - 10b, *Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 General

3.1.1

precast concrete product

product which is made of concrete and is manufactured in accordance with this standard or a specific product standard in a place different from the final destination of use, protected from adverse weather conditions during production and which is the result of an industrial process under a factory production control system and with the possibility of sorting before delivery

Note 1 to entry: In relevant European Standards, the shorter term "Precast product" is often used.

3.1.2

(concrete) cover

distance between the surface of the reinforcement closest to the nearest concrete surface (including links and stirrups and surface reinforcement where relevant) and the nearest concrete surface

[SOURCE: EN 1992-1-1:2004]

3.1.3

concrete family

group of concrete compositions for which a reliable relationship between relevant properties is established and documented

[SOURCE: EN 206:2013+A1:2016]

3.1.4

tendon

prestressing unit (wire, strand or bar) subjected to pre- or post-tensioning

<https://standards.iteh.ai/catalog/standards/sist/8c4f1445-0301-4df7-a329-0b9acd875470/sist-en-13369-2018>

3.1.5

lightweight concrete

concrete with a closed structure and with an oven-dry density of 800 kg/m³ to 2 000 kg/m³

3.1.6

normal weight concrete

concrete with an oven-dry density of 2 000 kg/m³ to 2 600 kg/m³

3.1.7

heavyweight concrete

concrete with an oven-dry density of more than 2 600 kg/m³

3.1.8

product-type

set of representative performance levels or classes of construction product, in relation to its characteristics, produced using a given combination of raw materials or other elements in a specific production process

3.2 Dimensions

3.2.1

principal dimensions

length, width, depth or thickness

EN 13369:2018 (E)**3.2.2****nominal dimension**

dimension declared in the technical documentation and targeted at manufacture

3.3 Tolerances**3.3.1****tolerance**

sum of the absolute values of the upper and the lower permitted deviation

3.3.2**deviation**

difference between an actual measure and the corresponding nominal dimension

3.4 Durability**3.4.1****durability**

ability of a precast concrete product to satisfy, with anticipated maintenance, the design performance requirements during its design working life under the influence of the expected environmental actions

3.4.2**design working life**

assumed period for which a structure or part of it is to be used for its intended purpose with anticipated maintenance but without major repair being necessary

3.4.3**environmental conditions**

physical or chemical impacts to which the precast concrete product is exposed and which result in effects on the concrete or reinforcement or embedded metal that are not considered as loads in structural design

3.4.4**ambient conditions**

hygrothermic conditions in the factory which result in effects on the hardening process of the concrete

3.5 Mechanical properties**3.5.1****potential strength**

compressive concrete strength derived from tests on cubes or cylinders moulded and cured in laboratory conditions in accordance with EN 12390-2

3.5.2**structural strength**

compressive concrete strength derived from tests on specimens (drilled cores or cut prisms) taken from the precast concrete product (direct structural strength) or derived from tests on moulded specimens cured in the same ambient conditions as the product itself (indirect structural strength)

3.5.3**characteristic strength**

value of strength below which 5 % of the population of all possible strength determinations of the volume of concrete under consideration are expected to fall

4 Requirements

4.1 Material requirements

4.1.1 General

Only materials with established suitability shall be used.

For a particular material, the establishment of suitability may be based on a European Standard which refers specifically to the use of this material in concrete or in precast concrete products; in absence of a European Standard, it may also result, under the same conditions, from an ISO Standard.

Where this material is not covered by a European or ISO Standard, or if it deviates from the requirements of these standards, the establishment of suitability may be based on:

- the provisions valid in the place of use of the precast concrete product which refer specifically to the use of this material in concrete or in precast concrete products; or
- a European Technical Assessment specifically for the use of this material in concrete or precast concrete products.

4.1.2 Constituent materials of concrete

4.1.2.1 General

EN 206:2013+A1:2016, 5.1 shall apply.

4.1.2.2 Reclaimed crushed aggregates and recycled coarse aggregates

Reclaimed crushed aggregates and recycled coarse aggregates, mixed in concrete with other aggregates, shall not adversely alter the rate of setting and hardening of concrete, nor shall it be detrimental to the durability of the precast concrete product in the end use conditions.

The amount of reclaimed crushed aggregates obtained from precast concrete products manufactured in the same factory, can be used up to 10 % in weight of the total content of aggregates in the concrete mix with no further testing of the mechanical strength of the product or of hardened concrete properties other than testing of compressive concrete strength.

Where required and for specific applications, the amount of reclaimed crushed aggregates might be limited to 5 % in weight.

More detailed recommendations on the use of reclaimed crushed aggregates and recycled coarse aggregates are given in Annex N.

Alternative provisions are given in EN 206 and should be considered.

4.1.3 Reinforcing steel

Reinforcing steel (bars, coils and welded fabric) shall comply with EN 10080. Other types of reinforcing steel may be used according to provisions valid in the place of use of the product (e.g. EN 1992-1-1:2004, 3.2).

NOTE Recommendations on indented bars and wires are given in Annex K.

4.1.4 Prestressing steel

Prestressing steel (wire, bars and strand) shall comply with prEN 10138-1, prEN 10138-2, prEN 10138-3 and prEN 10138-4.