



SLOVENSKI STANDARD

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SIST EN 206-1:2003

SIST EN 206-1:2003/A1:2004

SIST EN 206-1:2003/A2:2005

SIST EN 206-9:2010

Beton - Specifikacija, lastnosti, proizvodnja in skladnost

Concrete - Specification, performance, production and conformity

Beton - Festlegung, Eigenschaften, Herstellung und Konformität

Béton - Spécification, performances, production et conformité

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Ta slovenski standard je istoveten z: EN 206:2013

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 206

December 2013

ICS 91.100.30

Supersedes EN 206-1:2000, EN 206-9:2010

English Version

Concrete - Specification, performance, production and conformity

Béton - Spécification, performances, production et conformité

Beton - Festlegung, Eigenschaften, Herstellung und Konformität

This European Standard was approved by CEN on 28 September 2013.

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.

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

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EN 206:2013 (E)**Foreword**

This document (EN 206:2013) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by June 2014 and conflicting national standards shall be withdrawn at the latest by June 2014.

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.

Based on a CEN/BT Decision (DECISION BT 42/2013) EN 12620:2013 was withdrawn. Therefore, this document has been aligned with the specifications given in EN 12620:2002+A1:2008. As soon as CEN/TC 154 publishes a new version of EN 12620, CEN/TC 104 intends to amend EN 206.

This document supersedes EN 206-1:2000 and EN 206-9:2010.

In particular, the following main items were subject to revision when preparing this European Standard:

- a) adding application rules for fibre concrete and concrete with recycled aggregates;
- b) revising k -value concept for fly ash and silica fume and adding new rules for ground granulated blast furnace slag;
- c) introduction of principles for the performance concepts for the use of additions, e.g. equivalent concrete performance concept and equivalent performance of combinations concept;
- d) revising and adding new concepts for the conformity assessment;
- e) including EN 206-9 “Additional rules for self-compacting concrete (SCC)”;
- f) including additional requirements for concrete for special geotechnical works (Annex D).

NOTE Annex D was jointly prepared by CEN/TC 104 and CEN/TC 288.

Figure 1 illustrates the relationships between EN 206 and standards for design and execution, standards for constituents and test standards.

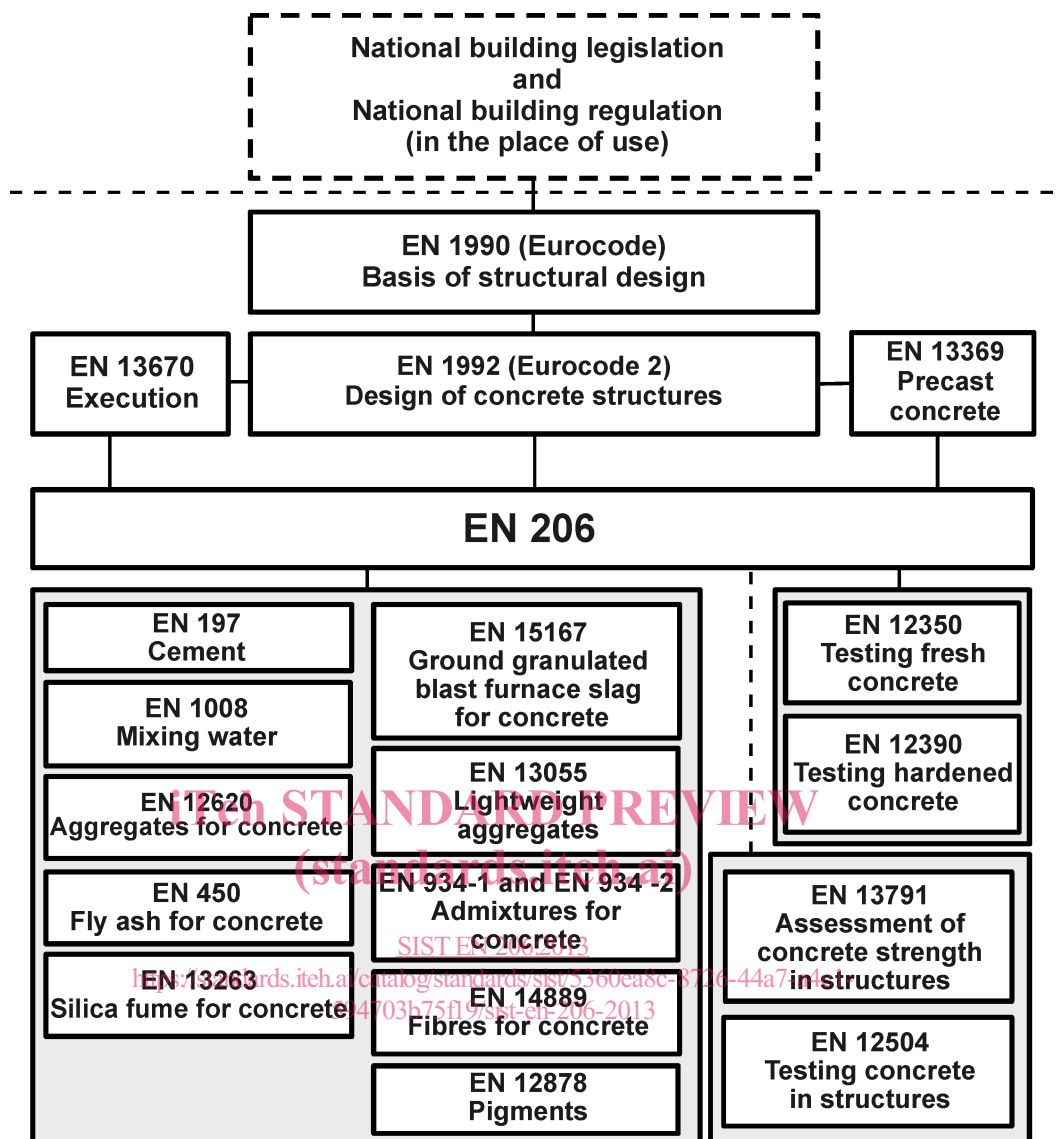


Figure 1 — Relationships between EN 206 and standards for design and execution, standards for constituents and test standards

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard will be applied under different climatic and geographical conditions, different levels of protection and under different, well established, regional traditions and experience. Classes for concrete properties have been introduced to cover these situations. Where such general solutions were not possible, the relevant clauses contain permission for the application of provisions valid in the place of use of the concrete.

This European Standard incorporates rules for the use of constituents that are covered by European Standards. Constituents not covered by European Standards may be used in accordance with provisions valid in the place of use of the concrete.

If the concrete is in conformity with the limiting values, the concrete in the structure is deemed to satisfy the durability requirements for the intended use in the specific environmental condition, provided:

- the appropriate exposure classes were selected;
- the concrete has the minimum cover to reinforcement in accordance with the relevant design standard required for the specific environmental condition, e.g. EN 1992-1-1;
- the concrete is properly placed, compacted and cured, e.g. in accordance with EN 13670 or other relevant standards;
- the appropriate maintenance is applied during the working life.

Performance based concepts as alternatives to the concept of limiting values are under development.

Concrete conforming to this European Standard may be assumed to satisfy the basic requirements for materials to be used in all three Execution Classes as defined in EN 13670.

This European Standard defines tasks for the specifier, producer and user. For example, the specifier is responsible for the specification of concrete, Clause 6, and the producer is responsible for conformity and production control, Clauses 8 and 9. The user is responsible for placing the concrete in the structure. In practice there may be several different parties specifying requirements at various stages of the design and construction process, e.g. the client, the designer, the contractor, the concreting sub-contractor. Each is responsible for passing the specified requirements, together with any additional requirements, to the next party in the chain until they reach the producer. In the terms of this European Standard, this final compilation is known as the "specification of concrete". Conversely, the specifier, producer and user may be the same party (e.g. a precast concrete manufacturer or a contractor doing design and build). In the case of ready-mixed concrete, the purchaser of the fresh concrete is the specifier who gives the specification of concrete to the producer.

This European Standard also covers the necessary exchange of information between the different parties. Contractual matters are not addressed. Where responsibilities are given for parties involved, these are technical responsibilities.

Notes and footnotes in tables of this standard are normative unless stated otherwise; other notes and footnotes are informative.

Further explanations and guidance on the application of this standard are given in other documents, such as CEN Technical Reports.

1 Scope

(1) This European Standard applies to concrete for structures cast in situ, precast structures, and structural precast products for buildings and civil engineering structures.

(2) The concrete under this European Standard can be:

- normal-weight, heavy-weight and light-weight;
- mixed on site, ready-mixed or produced in a plant for precast concrete products;
- compacted or self-compacting to retain no appreciable amount of entrapped air other than entrained air.

(3) This standard specifies requirements for:

- the constituents of concrete;
- the properties of fresh and hardened concrete and their verification;
- the limitations for concrete composition;
- the specification of concrete;
- the delivery of fresh concrete;
- the production control procedures;
- the conformity criteria and evaluation of conformity.

(4) Other European Standards for specific products e.g. precast products or for processes within the field of the scope of this standard may require or permit deviations.

(5) Additional or different requirements may be given for specific applications in other European Standards, for example:

- concrete to be used in roads and other trafficked areas (e.g. concrete pavements according to EN 13877-1);
- special technologies (e.g. sprayed concrete according to EN 14487).

(6) Supplementing requirements or different testing procedures may be specified for specific types of concrete and applications, for example:

- concrete for massive structures (e.g. dams);
- dry mixed concrete;
- concrete with a D_{\max} of 4 mm or less (mortar);
- self-compacting concretes (SCC) containing lightweight or heavy-weight aggregates or fibres;
- concrete with open structure (e. g. pervious concrete for drainage).

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(7) This standard does not apply to:

- aerated concrete;
- foamed concrete;
- concrete with density less than 800 kg/m³;
- refractory concrete.

(8) This standard does not cover health and safety requirements for the protection of workers during production and delivery of concrete.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 196-2, *Methods of testing cement — Part 2: Chemical analysis of cement*

EN 197-1, *Cement — Part 1: Composition, specifications and conformity criteria for common cements*

EN 450-1, *Fly ash for concrete — Part 1: Definition, specifications and conformity criteria*

EN 934-1:2008, *Admixtures for concrete, mortar and grout — Part 1: Common requirements*

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 1097-3, *Tests for mechanical and physical properties of aggregates — Part 3: Determination of loose bulk density and voids*

EN 1097-6:2013, *Tests for mechanical and physical properties of aggregates — Part 6: Determination of particle density and water absorption*

EN 1536, *Execution of special geotechnical work — Bored piles*

EN 1538, *Execution of special geotechnical work — Diaphragm walls*

EN 12350-1, *Testing fresh concrete — Part 1: Sampling*

EN 12350-2, *Testing fresh concrete — Part 2: Slump-test*

EN 12350-4, *Testing fresh concrete — Part 4: Degree of compactability*

EN 12350-5, *Testing fresh concrete — Part 5: Flow table test*

EN 12350-6, *Testing fresh concrete — Part 6: Density*

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

EN 12350-8, *Testing fresh concrete — Part 8: Self-compacting concrete — Slump-flow test*

EN 12350-9, *Testing fresh concrete — Part 9: Self-compacting concrete — V-funnel test*

- EN 12350-10, *Testing fresh concrete — Part 10: Self-compacting concrete — L box test*
- EN 12350-11, *Testing fresh concrete — Part 11: Self-compacting concrete — Sieve segregation test*
- EN 12350-12, *Testing fresh concrete — Part 12: Self-compacting concrete — J-ring test*
- 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 12390-6, *Testing hardened concrete — Part 6: Tensile splitting strength of test specimens*
- EN 12390-7, *Testing hardened concrete — Part 7: Density of hardened concrete*
- EN 12620:2002+A1:2008, *Aggregates for concrete*
- EN 12699, *Execution of special geotechnical work — Displacement piles*
- EN 12878, *Pigments for the colouring of building materials based on cement and/or lime — Specifications and methods of test*
- prEN 13055, *Lightweight aggregates for concrete, mortar, grout, bituminous mixtures, surface treatments and for unbound and bound applications*
- EN 13263-1, *Silica fume for concrete — Part 1: Definitions, requirements and conformity criteria*
- EN 13577, *Chemical attack on concrete — Determination of aggressive carbon dioxide content in water*
- EN 14199, *Execution of special geotechnical works — Micropiles*
- EN 14216, *Cement — Composition, specifications and conformity criteria for very low heat special cements*
- EN 14488-7, *Testing sprayed concrete — Part 7: Fibre content of fibre reinforced concrete*
- EN 14721, *Test method for metallic fibre concrete — Measuring the fibre content in fresh and hardened concrete*
- EN 14889-1:2006, *Fibres for concrete — Part 1: Steel fibres – Definitions, specifications and conformity*
- EN 14889-2:2006, *Fibres for concrete — Part 2: Polymer fibres – Definitions, specifications and conformity*
- EN 15167-1, *Ground granulated blast furnace slag for use in concrete, mortar and grout — Part 1: Definitions, specifications and conformity criteria*
- prEN 16502, *Test method for the determination of the degree of soil acidity according to Baumann-Gully*
- EN ISO 7980, *Water quality — Determination of calcium and magnesium — Atomic absorption spectrometric method (ISO 7980)*
- ISO 4316, *Surface active agents — Determination of pH of aqueous solutions — Potentiometric method*
- ISO 7150-1, *Water quality — Determination of ammonium — Part 1: Manual spectrometric method*

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ASTM C 173, *Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method*

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 General**3.1.1.1****concrete**

fr: béton

de: Beton

material formed by mixing cement, coarse and fine aggregate and water, with or without the incorporation of admixtures, additions or fibres, which develops its properties by hydration

3.1.1.2**concrete family**

fr: famille de béton

de: Betonfamilie

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

3.1.1.3**delivery**

fr: livraison

de: Lieferung

process of handing over the fresh concrete by the producer

3.1.1.4**designed concrete**

fr: béton à propriétés spécifiées

de: Beton nach Eigenschaften

concrete for which the required properties and additional characteristics if any are specified to the producer who is responsible for providing a concrete conforming to the required properties and additional characteristics

3.1.1.5**design working life**

fr: durée de vie de projet

de: Bemessungslebensdauer

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

3.1.1.6**document**

fr: document

de: Dokument

information and its supporting medium, which can be paper, magnetic, electronic or optical computer disc, photograph or reference sample or a combination thereof

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3.1.1.7**environmental actions**

fr: actions dues à l'environnement

de: Umwelteinflüsse

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

3.1.1.8**precast element**

fr: élément préfabriqué

de: Fertigteil

concrete element cast and cured in a place other than the final location of use (factory produced or site manufactured)

3.1.1.9**precast product**

fr: produit préfabriqué

de: Fertigteil

precast element manufactured in compliance with the relevant European product standard

3.1.1.10**prescribed concrete**

fr: béton à composition prescrite

de: Beton nach Zusammensetzung

concrete for which the composition of the concrete and the constituent materials to be used are specified to the producer who is responsible for providing a concrete with the specified composition

3.1.1.11**producer**

fr: producteur

de: Hersteller

person or body producing fresh concrete

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3.1.1.12**provisions valid in the place of use**

fr: dispositions en vigueur sur le lieu d'utilisation du béton

de: am Ort der Verwendung geltende Regeln

national provisions given in a National Foreword or National Annex to this European Standard, or in a complementary national standard to this European Standard applicable in the place of use of the concrete

3.1.1.13**ready-mixed concrete**

fr: béton prêt à l'emploi

de: Transportbeton

concrete delivered in a fresh state by a person or body who is not the user; in the sense of this standard it is also:

- concrete produced off site by the user;
- concrete produced on site, but not by the user

3.1.1.14**self-compacting concrete (SCC)**

fr: béton auto-plaçant

de: selbstverdichtender Beton

concrete that is able to flow and compact under its own weight, fill the formwork with its reinforcement, ducts, boxouts etc., whilst maintaining homogeneity

EN 206:2013 (E)**3.1.1.15****site-mixed concrete**

fr: béton de chantier

de: Baustellenbeton

concrete produced on the construction site by the user of the concrete for his own use

3.1.1.16**site (construction site)**

fr: chantier (chantier de construction)

de: Baustelle

area where the construction work is undertaken

3.1.1.17**specification of concrete**

fr: spécification du béton

de: Festlegung

final compilation of documented technical requirements given to the producer in terms of performance or composition

3.1.1.18**specifier**

fr: prescripteur

de: Verfasser der Festlegung

person or body establishing the specification for fresh and hardened concrete

3.1.1.19**standardized prescribed concrete**

fr: béton à composition prescrite dans une norme

de: Standardbeton

prescribed concrete for which the composition is given in a standard valid in the place of use of the concrete

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fr: utilisateur

de: Verwender

person or body using fresh concrete in the execution of a construction or an element

3.1.2 Constituents**3.1.2.1****addition**

fr: addition

de: Betonzusatzstoff

finely-divided-inorganic constituent used in concrete in order to improve certain properties or to achieve special properties

3.1.2.2**type I addition**

fr: addition de type I

de: Typ-I-Zusatzstoff

nearly inert addition

3.1.2.3**type II addition**

fr: addition de type II

de: Typ II-Zusatzstoff

pozzolanic or latent hydraulic addition

3.1.2.4**admixture**

fr: adjuvant

de: Betonzusatzmittel

constituent added during the mixing process in small quantities related to the mass of cement to modify the properties of fresh or hardened concrete

3.1.2.5**aggregate**

fr: granulat

de: Gesteinskörnung

natural, artificial, reclaimed or recycled granular mineral constituent suitable for use in concrete

3.1.2.6**all-in aggregate**

fr: grave

de: Gesteinskörnungsgemisch

aggregate consisting of a mixture of coarse and fine aggregates with D greater than 4 mm and $d = 0$

3.1.2.7**aggregate size**

fr: classe granulaire

de: Korngröße

designation of aggregate in terms of lower (d) and upper (D) sieve sizes expressed as d / D

3.1.2.8**cement**

fr: ciment

de: Zement

finely ground inorganic material which, when mixed with water, forms a paste that sets and hardens by means of hydration reactions and processes and which, after hardening, retains its strength and stability even under water

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[SOURCE: EN 197-1]

3.1.2.9**finer in concrete**

fr: fines du béton

de: Mehlkorn

sum of solid materials in fresh concrete with particle sizes less than or equal to 0,125 mm

3.1.2.10**heavy-weight aggregate**

fr: granulat lourd

de: schwere Gesteinskörnung

aggregate in the oven-dry condition having a particle density $\geq 3\ 000\ \text{kg/m}^3$ when determined according to EN 1097-6

3.1.2.11**lightweight aggregate**

fr: granulat léger

de: leichte Gesteinskörnung

aggregate of mineral origin in the oven-dry condition having a particle density $\leq 2\ 000\ \text{kg/m}^3$ when determined according to EN 1097-6 or a loose oven-dry bulk density $\leq 1\ 200\ \text{kg/m}^3$ when determined according to EN 1097-3