SLOVENSKI STANDARD
oSIST prEN 206:2012

01-junij-2012

Beton - 1. del: Specifikacija, lastnosti, proizvodnja in skladnost

Concrete - Specification, performance, production and conformity

Beton - Festlegung, Eigenschaften, Herstellung und Konformität

Béton - Spécification, performances, production et conformité

Ta slovenski standard je istoveten z: **prEN 206**

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products

oSIST prEN 206:2012 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 206

March 2012

ICS 91.100.30

Will supersede 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 draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 104.

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

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Foreword

This document (prEN 206:2012) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

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

In particular, the following 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 new 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;

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

h) including EN 206-1/A1 and EN 206-1/A2.

The Annexes A, B, C and D are normative. The Annexes E, F, G, H, J and K are informative.

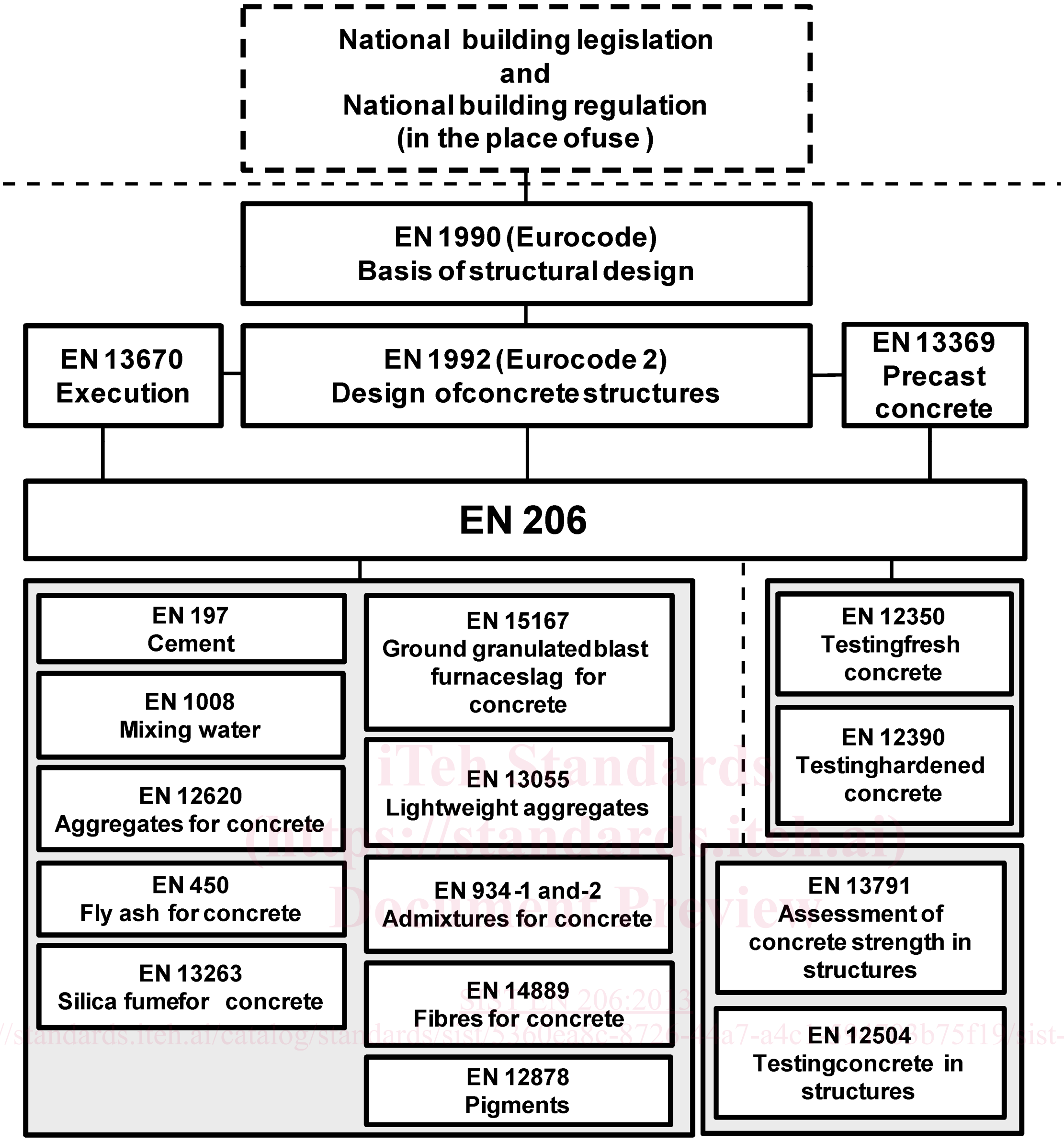

Figure 1 — Relationships between EN 206 and standards for design and execution, standards for constituents and test standards

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 national standards or 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 alternative to the concept of limiting values are under development.

— Concrete conforming to EN 206 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”. 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 and has to give the specification 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 and for precast products for buildings and other 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 or 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 an upper aggregate size of 4 mm or less;

— self-compacting concretes (SCC) containing lightweight or heavy-weight aggregates or fibres.

(7) This standard does not apply to:

— aerated concrete;

— foamed concrete;

— concrete with open structure (“no-fines” concrete);

— concrete with density less than 800 kg/m^3;

— 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 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 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 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method*

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

EN 1008:2002, *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, *Tests for mechanical and physical properties of aggregates — Part 6: Determination of particle density and water absorption*

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 12390-8, *Testing hardened concrete – Part 8: Depth of penetration of water under pressure*

prEN 12620:2011, *Aggregates for concrete*

EN 12878, *Pigments for the colouring of building materials based on cement and/or lime - Specifications and methods of test*

prEN 13055, *Lightweight aggregates*

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 14721, *Test method for metallic fibre concrete – Measuring the fibre content in fresh and hardened concrete*

EN 14488-7, *Testing sprayed concrete – Part 7: Fibre content of fibre reinforced concrete*

EN 14889-1, *Fibres for concrete — Part 1: Steel fibres – Definitions, specifications and conformity*

EN 14889-2, *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*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes; sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection*

ISO 3951:1994, *Sampling procedures and charts for inspection by variables by percent nonconforming*

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*

ISO 7150-2, *Water quality — Determination of ammonium — Part 2: Automated spectrometric method*

ISO 7980, *Water quality — Determination of calcium and magnesium — Atomic absorption spectrometric method*

DIN 4030-2, *Assessment of water, soil and gases for their aggressiveness to concrete - Part 2: Sampling and analysis of water and soil samples*

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
a 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
the 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 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 master sample or a combination thereof

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: elément 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

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
provisions given in a National Foreword or Annex to this standard, or referred to by the National Annex, 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. Ready- mixed concrete in the sense of this standard 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

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

3.1.1.20
user
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
cement
fr: ciment
de: Zement
a 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

3.1.2.8
coarse aggregate
fr: gravillon
de: grobe Gesteinskörnung
designation given to the larger aggregate sizes with *D* greater or equal than 4 mm and *d* greater than or equal to 1 mm

3.1.2.9
fine aggregate
fr: sable
de: feine Gesteinskörnung
designation given to the smaller aggregate sizes with *D* less than or equal to 4 mm and *d* = 0

3.1.2.10
heavy-weight aggregate
fr: granulat lourd
de: schwere Gesteinskörnung
aggregate having an oven-dry particle density ≥ 3 000 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 having an oven-dry particle density ≤ 2 000 kg/m^3 when determined according to EN 1097-6 or a loose oven-dry bulk density ≤ 1 200 kg/m^3 when determined according to EN 1097-3

3.1.2.12
normal-weight aggregate
fr: granulat courant
de: normale Gesteinskörnung
aggregate with an oven-dry particle density > 2 000 kg/m^3 and < 3 000 kg/m^3, when determined according to EN 1097-6

3.1.2.13
polymer fibres
fr: fibres polymères
de: Polymerfasern
straight or deformed pieces of extruded, orientated and cut material, which are suitable to be homogenously mixed into concrete