

ILNAS

Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 206:2013+A1:2016

Concrete - Specification, performance, production and conformity

Beton - Festlegung, Eigenschaften,
Herstellung und Konformität

Béton - Spécification, performances,
production et conformité

11/2016



National Foreword

This European Standard EN 206:2013+A1:2016 was adopted as Luxembourgish Standard ILNAS-EN 206:2013+A1:2016.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

THIS PUBLICATION IS COPYRIGHT PROTECTED

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

ILNAS-EN 206:2013+A1:2016
EUROPEAN STANDARD **EN 206:2013+A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2016

ICS 91.100.30

Supersedes EN 206:2013

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 and includes Amendment 1 approved by CEN on 27 July 2016.

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



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	6
Introduction	8
1 Scope	9
2 Normative references	10
3 Terms, definitions, symbols and abbreviations	12
3.1 Terms and definitions	12
3.1.1 General	12
3.1.2 Constituents	15
3.1.3 Fresh concrete	17
3.1.4 Hardened concrete	19
3.1.5 Conformity and production control	20
3.2 Symbols and abbreviations	21
4 Classification	23
4.1 Exposure classes related to environmental actions	23
4.2 Classes for properties of fresh concrete	26
4.2.1 Consistence classes	26
4.2.2 Classes for additional properties of SCC	28
4.3 Classes for properties of hardened concrete	29
4.3.1 Compressive strength classes	29
4.3.2 Density classes for lightweight concrete	31
5 Requirements for concrete and methods of verification	32
5.1 Basic requirements for constituents	32
5.1.1 General	32
5.1.2 Cement	32
5.1.3 Aggregates	32
5.1.4 Mixing water	33
5.1.5 Admixtures	33
5.1.6 Additions (including mineral fillers and pigments)	33
5.1.7 Fibres	33
5.2 Basic requirements for composition of concrete	33
5.2.1 General	33
5.2.2 Selection of cement	34
5.2.3 Selection of aggregates	34
5.2.4 Use of mixing water	35
5.2.5 Use of additions	35
5.2.6 Use of admixtures	37
5.2.7 Use of fibres	38
5.2.8 Chloride content	38
5.2.9 Concrete temperature	39
5.3 Requirements related to exposure classes	39
5.3.1 General	39
5.3.2 Limiting values for concrete composition	39
5.3.3 Performance-related methods	40
5.4 Requirements for fresh concrete	40
5.4.1 Consistence, viscosity, passing ability and resistance to segregation	40

5.4.2	Cement content and water/cement ratio.....	41
5.4.3	Air content.....	41
5.4.4	Fibre content.....	41
5.5	Requirements for hardened concrete.....	42
5.5.1	Strength.....	42
5.5.2	Density.....	42
5.5.3	Resistance to water penetration.....	43
5.5.4	Reaction to fire.....	43
6	Specification of concrete.....	43
6.1	General.....	43
6.2	Specification for designed concrete.....	44
6.2.1	General.....	44
6.2.2	Basic requirements.....	44
6.2.3	Additional requirements.....	45
6.3	Specification for prescribed concrete.....	45
6.3.1	General.....	45
6.3.2	Basic requirements.....	45
6.3.3	Additional requirements.....	46
6.4	Specification of standardized prescribed concrete.....	46
7	Delivery of fresh concrete.....	46
7.1	Information from the user of the concrete to the producer.....	46
7.2	Information from the producer of the concrete to the user.....	47
7.3	Delivery ticket for ready-mixed concrete.....	48
7.4	Delivery information for site-mixed concrete.....	49
7.5	Mix adjustments after the main mixing process and prior to discharge.....	49
8	Conformity control and conformity criteria.....	49
8.1	General.....	49
8.2	Conformity control for designed concrete.....	50
8.2.1	Conformity control for compressive strength.....	50
8.2.2	Conformity control for tensile splitting strength.....	55
8.2.3	Conformity control for properties other than strength.....	55
8.3	Conformity control of prescribed concrete including standardized prescribed concrete.....	60
8.4	Actions in the case of non-conformity of the product.....	60
9	Production control.....	61
9.1	General.....	61
9.2	Production control systems.....	61
9.3	Recorded data and other documents.....	62
9.4	Testing.....	64
9.5	Concrete composition and initial testing.....	64
9.6	Personnel, equipment and installation.....	64
9.6.1	Personnel.....	64
9.6.2	Equipment and installation.....	64
9.7	Batching of constituents.....	65
9.8	Mixing of concrete.....	66
9.9	Production control procedures.....	66
10	Evaluation of conformity.....	70
10.1	General.....	70
10.2	Assessment, surveillance and certification of production control.....	71
11	Designation for designed concrete.....	71

Annex A (normative) Initial test	72
A.1 General	72
A.2 Party responsible for initial tests	72
A.3 Frequency of initial tests	72
A.4 Test conditions	72
A.5 Criteria for adoption of initial tests	73
Annex B (normative) Identity testing	74
B.1 General	74
B.2 Sampling and testing plan	74
B.3 Identity criteria for compressive strength	74
B.3.1 Concrete under production control certification	74
B.3.2 Concrete not under production control certification	75
B.4 Identity criteria for consistence and air content	75
B.5 Identity criteria for fibre content and homogeneity of fresh concrete	75
Annex C (normative) Provisions for assessment, surveillance and certification of production control	76
C.1 General	76
C.2 Tasks for the inspection body	76
C.2.1 Initial assessment of the production control	76
C.2.2 Continuous surveillance of the production control	77
C.3 Tasks for the certification body	78
C.3.1 Certification of production control	78
C.3.2 Measures in case of non-conformity	78
Annex D (normative) Additional requirements for specification and conformity of concrete for special geotechnical works	80
D.1 General	80
D.2 Constituents	80
D.2.1 Cement	80
D.2.2 Aggregates	81
D.3 Concrete	81
D.3.1 General requirements for specification and acceptance of the mix design	81
D.3.2 Minimum fines content and minimum cement content	82
D.3.3 Water/cement ratio	82
D.3.4 Fresh concrete	83
Annex E (informative) Recommendation for the use of aggregates	84
E.1 General	84
E.2 Natural normal-weight and heavy-weight aggregates and air-cooled blast furnace slag	84
E.3 Recommendation for the use of coarse recycled aggregates	85
E.4 Recommendation for the use of lightweight aggregates	86
Annex F (informative) Recommendation for limiting values of concrete composition	88
Annex G (informative) Guidelines for self-compacting concrete requirements in the fresh state	90
G.1 General	90
G.2 Recommendations on classification of self-compacting concrete	91
G.2.1 Consistence	91
G.2.2 Viscosity	91
G.2.3 Passing ability	91
G.2.4 Segregation resistance	91
Annex H (informative) Rules of application for 8.2.1.3, Method C	92

H.1	Introduction	92
H.2	Control based on the cusum system	92
H.3	Control based on Shewhart charts with modified limits by variables	93
	Annex J (informative) Deviation to accommodate a notified Spanish Regulation	94
	Annex K (informative) Concrete families	95
K.1	General	95
K.2	Selection of the concrete family	95
K.3	Flow chart for the assessment of membership and conformity of a concrete family	96
	Annex L (informative) Further information regarding specific paragraphs	97
	Annex M (informative) Guidance on provisions valid in the place of use	99
	Bibliography	101

European foreword

This document (EN 206:2013+A1:2016) 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 May 2017 and conflicting national standards shall be withdrawn at the latest by May 2017.

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 (T 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 includes Amendment 1 approved by CEN on 27 July 2016.

This document supersedes A1 EN 206:2013 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

A1 In particular, the following main items had been subject to revision when preparing EN 206:2013: A1

- 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.

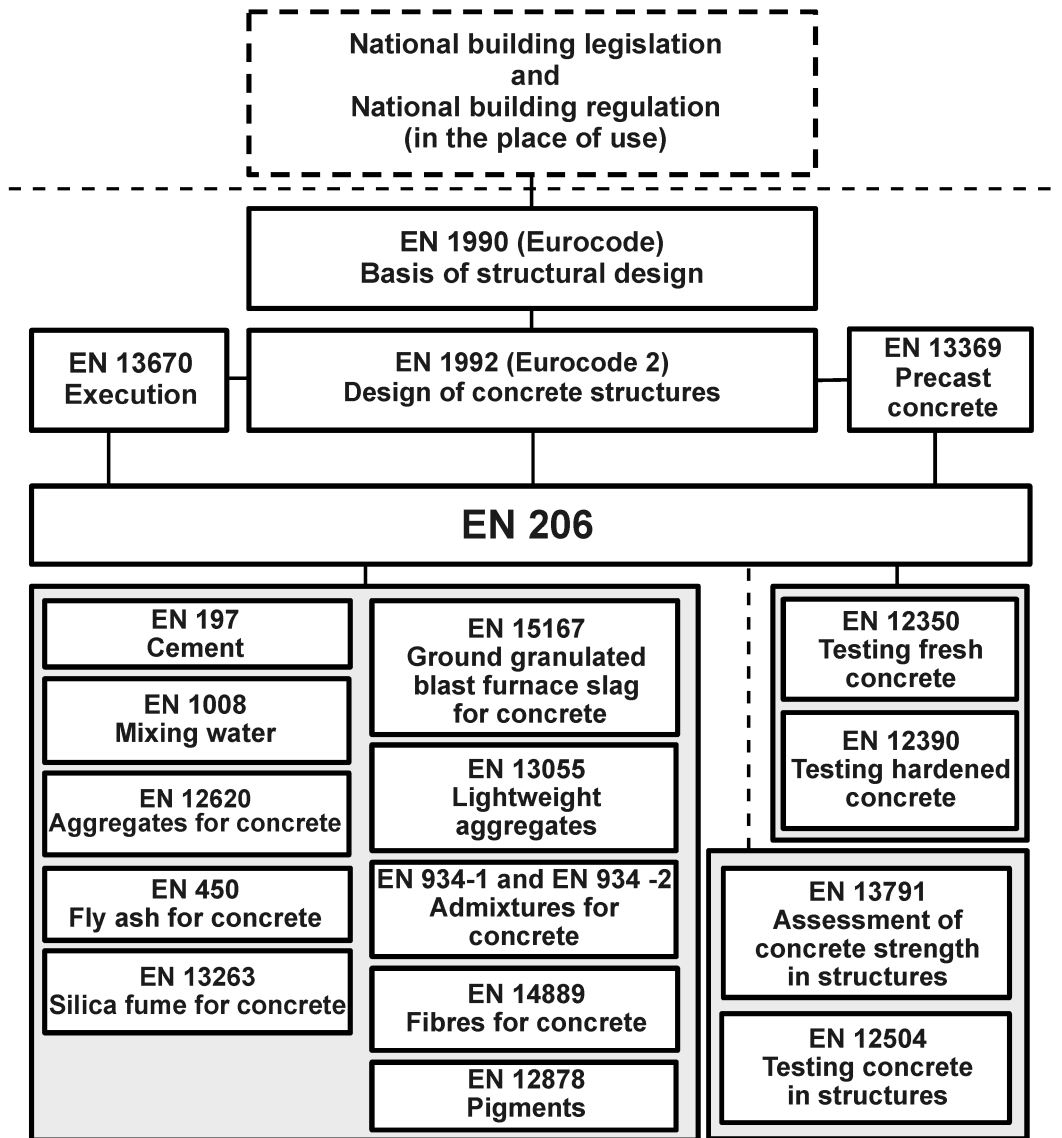


Figure 1 — Relationships between EN 206 and standards for design and execution, standards for constituents and test standards

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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.