SLOVENSKI STANDARD
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Pregled nacionalnih zahtev, ki se uporabljajo skupaj z EN 206-1:2000

Survey of national requirements used in conjunction with EN 206-1:2000

Überblick nationaler Anforderungen, die im Zusammenhang mit EN 206-1:2000 verwendet werden

État des prescriptions nationales utilisées avec l'EN 206-1:2000

Ta slovenski standard je istoveten z: **CEN/TR 15868:2009**

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État des prescriptions nationales utilisées avec l'EN 206-1:2000

Überblick nationaler Anforderungen, die im Zusammenhang mit EN 206-1:2000 verwendet werden

This Technical Report was approved by CEN on 3 February 2009. It has been drawn up by the Technical Committee CEN/TC 104.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

Foreword

This document (CEN/TR 15868:2009) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

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.

1 Scope

This CEN Report provides a summary of national requirements used with EN 206-1:2000. The aims of this CEN Report are to:

a) provide a picture of how EN 206-1 is being applied in practice;

b) identify areas where EN 206-1 is being interpreted in different ways;

c) identify areas where CEN Member Countries have found simplification to be necessary;

d) identify additional national requirements;

e) show areas where CEN Member Countries have found it necessary to override the requirements of EN 206-1.

EN 206-1 uses the phrase ‘national provisions’. However, recent CEN Guidance wishes to retain this term for regulatory requirements only. This survey uses the term ‘national requirements’ to include regulations, standards and other documents that form the basis of local practice.

As a summary of national requirements, the information in this CEN Report is incomplete and may have been subject to later revisons. It is insufficient and not intended to provide the basis for design and specification: for this the national requirements (see Table 1.1) should be studied.

Table 1.1 identifies CEN Member Countries who did not respond to the questionnaire. The other tables in this CEN Report only include information from CEN Member Countries who responded and CEN Member Countries who did not respond are not identified.

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CEN Member Countries	
Austria	AT
Belgium	BE
Cyprus	CY
Czech Republic	CZ
Denmark	DK
Estonia	EE
Finland	FI
France	FR
Germany	DE
Greece	GR
Hungary	HU
Iceland	IS
Ireland	IE
Italy	IT

CEN Member Countries	
Latvia	LV
Lithuania	LT
Luxembourg	LU
Malta	MT
Netherlands	NL
Norway	NO
Poland	PL
Portugal	PT
Slovakia (Slovak Republic)	SK
Slovenia	SI
Spain	ES
Sweden	SE
Switzerland	CH
United Kingdom	UK

Affiliates	
Albania	AL
Bulgaria	BG
Croatia (Hrvatska)	HR
Romania	RO
Turkey	TR

2 Location of national requirements

Table 1.1 gives the title of the documents that contain the national requirements, together with an English translation of the title. Any person wishing to design and specify concrete in another CEN Member Country should consult the documents cited in Table 1.1. Please note that the documents will be written in the national language(s) of the CEN Member Country. It should also be noted that the survey was conducted during 2005 to 2006 and the answers reflect practice at that time, which may not be the same as current practice.

Table 1.1 — Location of national requirements

CEN Member Countries[a]	Location of national requirements
Austria	ÖNORM B 4710-1: Beton — Teil 1: Festlegung, Herstellung, Verwendung und Konformitätsnachweis (Regeln zur Umsetzung der ÖNORM EN 206-1) (Concrete — Part 1: Specification, production, use and verification of conformity (Rules for the implementation of ÖNORM EN 206-1))
Belgium	NBN B 15-001: Supplément à la NBN EN 206-1 — Béton — Spécification, performances, production et conformité NBN B 15-001: Aanvulling op NBN EN 206-1 — Beton — Eisen, gedraging, vervaardiging en conformiteit (Supplement to NBN EN 206-1: Concrete — Specification, performance, production and conformity)
Cyprus	No response received
Czech Republic	CSN EN 206-1 Zmena Z2
Denmark	DS 2426: Beton — Materialer — Regler for anvendelse af EN 206-1 i Danmark (Concrete — Materials — Rules for the use of EN 206-1 in Denmark)
Estonia	No response received
Finland	Suomen rakentamismääräyskokoelma, B4 Betonirakenteet, Liite 3: Kansallinen liite standardiin SFS-EN 206-1 (National Building Code of Finland, B4 Concrete structures, Annex 3: national Annex to standard SFS-EN 206-1) Informative Guidance document: Betoninormit 2004, Suomen Betoniyhdistys (Concrete Code, Finnish Concrete Association)
France	National annex included in the NF EN 206-1 standard
Germany	DIN 1045-2: Tragwerke aus Beton, Stahlbeton und Spannbeton — Teil 2: Beton — Festlegung, Eigenschaften, Herstellung und Konformität — Anwendungsregeln zu DIN EN 206-1 (DIN 1045-2: Concrete, reinforced and prestressed concrete structures — Part 2: Concrete — Specification, properties, production and conformity — Application rules for DIN EN 206-1)
Greece	No response received
Hungary	No response received
Iceland	No response received
Ireland	National Annex; published with I.S. EN 206-1 as a single document.
Italy	UNI 11104: Calcestruzzo — Specificazione, prestazione produzione e conformità Istruzioni complementari per l'applicazione della EN 206-1 (Concrete — Specification, performance, production and conformity, Additional provisions for the application of EN 206-1)

Table 1.1 (*continued*)

CEN Member Countries[a]	Location of national requirements
Latvia	No response received
Lithuania	No response received
Luxembourg	DNA EN 206: Document National d'Application luxembourgeois de l'EN 206-1: Béton — Partie 1: Spécification, performances, production et conformité (DNA EN 206: Luxemburgish national application document of the EN 206-1: Concrete — Part 1: specification, performance, production and conformity)
Malta	There are no national provisions, but in the past, local industry has used recommendations in European, British or German standards
Netherlands	NEN 8005:2004: Nederlandse invulling van NEN-EN 206-1: Beton — Deel 1: Specificatie, eigenschappen, vervaardiging en conformiteit (Dutch supplement to NEN-EN 206-1: Concrete — Part 1: Specification, performance, production and conformity)
Norway	NS-EN 206-1 National Annex
Poland	No response received
Portugal	The Portuguese requirements are in the National Annex to NP EN 206-1 and to NP ENV 13670-1 and in the following National Civil Engineering Laboratory (LNEC) specifications, referenced in the NA of NP EN 206-1 LNEC E 461:2004: Metodologia para prevenir reacções expansivas internas (Methodology for avoiding internal expansive reactions) LNEC E 464:2005: Metodologia prescritiva para uma vida útil de 50 e 100 anos face às acções ambientais (Prescritive methodology for a 50 and 100 years design working life under the environmental exposures) LNEC E 465:2005: Metodologia para estimar as propriedades de desempenho do betão que permitam satisfazer a vida útil de projecto de estruturas de betão armado ou pré-esforçado sob as exposições ambientais XC e XS (Methodology for estimating the concrete performance properties allowing to comply with the design working life of the reinforced or prestressed concrete structures under the environmental exposures XC and XS)
Slovakia	STN EN 206-1: Zmena 1 Concrete — Part 1: Specification, performance, production and conformity supplements EN 206-1 with the national provisions STN 731210: Water-proof concrete and concrete types of the specific characteristics (Resistance to abrasion, Concrete for the massive constructions — Low hydrating warmth)
Slovenia	SIST 1026: Beton — 1.del: Specifikacija, lastnosti, proizvodnja in skladnost — Pravila za uporabo SIST EN 206-1 (SIST 1026: Concrete — Part 1: Specification, performance, production and conformity— Rules for the implementation of SIST EN 206-1)
Spain	Spain has not adopted EN 206-1
Sweden	SS 13 70 03: Betong – Användning av EN 206-1 I Sverige (Concrete — Application of EN 206-1 in Sweden) Vägledning för val av exponeringsklass enligt SS-EN 206-1, Betongrapport nr 11, Svenska Betongföreningen (Guidance for selection of exposure class according to SS-EN 206-1, Concrete report No 11, Swedish Concrete Association)

Table 1.1 (*continued*)

CEN Member Countries[a]	Location of national requirements
Switzerland	SN EN 206-1:2000: Beton — Teil 1: Festlegung, Eigenschaften, Herstellung und Konformität (mit Nationalem Vorwort und Nationalem Anhang) (SN-EN 206-1:2000: Concrete — Part 1: Specification, performance, production and conformity (with National Preface and National Annex)) SN EN 206-1:2000/A1:2004: Beton — Teil 1: Festlegung, Eigenschaften, Herstellung und Konformität (SN EN 206-1:2000/A2:2005: Concrete — Part 1: Specification, performance, production and conformity) Ergänzung zum Nationalen Anhang NB der Norm SN EN 206-1:2000: Teil 1: Verwendung von Zementen und Zusatzstoffen gemäss dem Prinzip der gleichwertigen Betonleistungsfähigkeit (in Arbeit) (Amendments to the National Annex of the SN EN 206-1: Part 1: Use of cements and mineral additions according to the equivalent performance concept of concrete properties (in preparation)) Ergänzung zum Nationalen Anhang der Norm SN EN 206-1:2000: Teil 1: Anwendung des k-Wert Konzeptes gemäss dem Prinzip der gleichwertigen Betonleistungsfähigkeit (in Arbeit); der Anhang wird *Nationaler Anhang NC* genannt (Application of the *k*-value concept according to the principle of the equivalent concrete performance)
United Kingdom	BS 8500: Concrete — Complementary British Standard to BS EN 206-1 — Part 1: Method of specifying and guidance for the specifier — Part 2: Specification for constituent materials and concrete

[a] None of the CEN affiliates chose to respond to this survey.

3 Exposure classes

In Table 2.1 exposure classes that have been grouped together are given. A significant number of CEN Member Countries have found the need to simplify the system. In its simplest form this reduces to interior, outside, severe and (chemically) aggressive. A significant number of CEN Member Countries have grouped classes (not always in the same way). For example, XC3 and XC4 are grouped together and often the XF1 is combined with XC4 and XF2 with XD3 or the concrete quality is the same. However, not all CEN Member Countries have to consider freeze-thaw action and so it may not be possible to group the carbonation-induced corrosion exposure classes (XC) and freeze-thaw exposure classes (XF) at a CEN level.

The reasons for grouping them together vary and include:

a) simplifying the system to meet local needs;

b) one exposure class cannot exist without the other exposure class in the local environment;

c) not easy for engineers to select one exposure from another;

d) the resulting concrete specification is the same.

Some CEN Member Countries have not grouped the exposure classes, but have the same quality of concrete for several exposure classes. If they are following EC2, this may lead to different minimum covers to reinforcement, but the same concrete quality.

As the examples in EN 206-1:2000, Table 1 are informative, Table 2.2 shows the extent to which the informative examples have been adopted in CEN Member Countries and gives the additional national examples of these exposure classes. There is a clear message in the responses showing that the informative examples for the XC1 and XC2 exposures should clearly identify that the water is non-aggressive.

The responses to Table 2.3 show that EN 206-1, Table 2 is applied to the majority of situations in CEN Member Countries including mobile groundwater. As such the limitation in Table 2 to static groundwater should be reviewed.

The principle of classification by deterioration process has been widely accepted. However, there seems to be a need to review the sub-divisions of the exposure classes as part of the review of durability to see if simplification is possible. Any changes to exposure classes should be co-ordinated with changes to the design codes.

The fib model code on service life design may lead to a better way of sub-dividing the exposure classes, but it is premature to take this path until the models have been thoroughly checked for robustness, reality, sensitivity, reliability and economy.

NOTE 1 It may be appropriate to review EN 206-1, annexes E and J.

NOTE 2 In future reviews of EN 206-1, it may be possible to use the fib model code to define the exposures in terms of relative humidity, temperature and days of rainfall, the performance requirements in terms of carbonation resistance and 'deemed to satisfy' limiting values, but in the view of the ad hoc group this is not achievable for the 2010 revision of EN 206-1.

If it is decided to keep the exposure class as a designation for a concrete, an alternative approach to exposure sub-classes would be to create sets of concretes for each main exposure class. CEN Member Countries would then be free to select the appropriate designations for their 'indoor' and 'outdoor' exposures.

Table 2.4 assesses the extent to which CEN Member Countries select the same exposure classes for the same elements. There is a clear difference in view over whether indoor reinforced concrete should be classed as X0 or XC1. This is sometimes reinforced by defining the relative humidity for the X0 exposure at low values that are unlikely to exist in normal buildings. The need to allow the designer some flexibility to select the appropriate class is also a common feature of this table. The inclusion of a freeze-thaw exposure class reflects local conditions.

Table 2.1 — Exposure classes that have been grouped together

CEN Member Countries	Grouped exposure classes
Austria	(XC1) = XC1 (A) (XC2, XC3, XC4) = XC2 (A)
Belgium	In Belgium exposure classes are recommended in an indirect way. They are linked to "environmental classes". "Environmental classes" are defined as environments which are very relevant to the Belgian concrete practice. They are indicated by the letter E (for Environment), followed by a letter (I for Interior, E for Exterior, S for Seawater, A for Aggressive) and a numeral for a more detailed description. For each environmental class the relevant exposure classes are identified for unreinforced and reinforced concrete.
Czech Republic	-
Denmark	(X0, XC1) = Interior (XC2, XC3, XC4, XF1, XA1) = Exterior without risk of water saturation (XD1, XS1, XS2, XF2) = Exterior with risk of water saturation and additional chlorides/alkalis to the surface (XD2, XD3, XS3, XF4, XA3) = Severe exterior with risk of accumulation of chlorides/alkalis
Finland	None

Table 2.1 (*continued*)

CEN Member Countries	Grouped exposure classes
France (for in-situ concrete)	(XC1, XC2) (XC3 XC4, XD1, XF1) (XS1, XS2)
Germany	(XD1, XS1); (XD2, XS2); (XD3, XS3) – grouped with respect to limiting values of concrete composition
Ireland	None
Italy	(XC1, XC2), (XS2, XS3), (XF2, XF3) in table 'Limiting values for composition and properties of concrete' (UNI 11104)
Luxembourg	No grouping for the specification! Following exposure classes shows equal values for the limits of composition: (XC1, XC2) (XC3, XC4) (XD1, XD2) (XF2, XF3) The exposure classes must be considered and documented separately for the specification
Netherlands	None
Norway	This depends on the matter under consideration. Groups might be different with respect to different matters such as, concrete composition, concrete cover, crack width requirements etc. With respect to concrete composition the following can be considered a grouping: (X0) (XC1,XC2, XC3, XC4, XF1) (XD1, XS1, XA1, XA2, XA4*) *XA4 is a special class for manure in agricultural buildings (XF2, XF3, XF4) (XD2, XD3, XS2, XS3, XA3) (XSA*) *XSA is a special class for particularly aggressive environments, other environments than those above
Portugal	(XS, XD); (XC4, XF1)
Slovakia	None so far, but we suggest (XC3, XC4) and (XD1, XD2) to be merged together
Slovenia	None
Sweden	No classes have been grouped
Switzerland	None
United Kingdom and Northern Ireland	(XC3, XC4) In 2006 revision of BS 8500-1, the recommendations for resisting the XD and XS exposures are adequate for resisting the associated XC exposure

Table 2.2 — Examples of exposure classes

Class designation	Examples where exposure classes may occur		
X0	**Examples from EN 206-1, Table 1**	**Adopted locally**	
		Yes	**No**
	Concrete inside buildings with very low air humidity	CH CZ[a] BE FI FR[b] IE IT LU NL NO PT UK[c] SI SE SK	AT DE DK
	Other local examples		
	Humidity below 35 %	AT	
	A very dry environment is not (or rarely) found in Belgium	BE	
	Unreinforced concrete basements in environment without frost Unreinforced concrete inside buildings	CZ	
	Concrete inside buildings with low air humidity Foundations below ground for low and normal safety classes		
	Information guidance: dry, heated indoor spaces	FI	
	Foundations without reinforcement or without embedded metal and not subjected to freeze/thaw attack; interior components without reinforcement or without embedded metal	DE	
	House strip foundations, unreinfoced or nominally reinforced; in non-aggressive soils	IE	
	Unreinforced concrete inside buildings. Unreinforced concrete either placed below grade or submerged in non-aggressive water. Unreinforced concrete undergoing cycles of drying and wetting but not subjected to abrasion, frost or chemical attacks	IT	
	Unreinforced concrete. Concrete permanently submerged in non-aggressive water	NL SE	
	Certain soil-covered foundations (non-aggressive soil/water) Unreinforced concrete surfaces inside structures. Unreinforced concrete completely buried in non-aggressive soil. Unreinforced concrete permanently submerged in non-aggressive water Unreinforced concrete in cyclic wet and dry conditions not subject to abrasion, freezing or chemical attack	UK PT	
	Reinforced concrete in structures with very low air humidity	PT	
	Permanent relative air humidity of less than 30 %. Concrete of the foundations without reinforcement and without freeze/thaw	SK	
XC1	**Examples from EN 206-1, Table 1**	**Adopted locally**	
		Yes	**No**
	Concrete inside buildings with low air humidity	CH CZ[d] BE DK FR IE IT LU NL SI NO PT SE SK UK	AT DE
	Concrete permanently submerged in (non-aggressive) water	BE DE SI PT	DK
	Other local examples		
	Parts of structures inside buildings with low air humidity (inc kitchens, bathrooms & laundries) in residential buildings Unsplashy bridges elements in contact with air	CZ[d]	
	Foundations below ground for low and normal safety classes	DK	

Table 2.2 (*continued*)

Class designation	Examples where exposure classes may occur	
	Bathrooms, stairways, structures below the water level. Inner surface of a layered wall surface. Underwater parts of bridges	FI
	Components in rooms with normal air humidity (inc kitchens, bathrooms, laundries in residential buildings); concrete permanently submerged in water	DE
	Ordinary reinforced concrete or prestressed concrete with surfaces inside structures, excepting parts exposed to condensation or submerged in water	IT
	Permanent relative air humidity between 30 % to 60 %	SK
XC2	**Examples from EN 206-1, Table 1**	**Adopted locally**
		Yes / **No**
	Concrete surfaces subject to long-term (non-aggressive) water contact	CH BE FR DE IT LU NL NO UK SI SE PT AT[e] SK
	Many foundations	BE FI SI DE IE / PT
	Other local examples	
	Parts of water tanks	CZ
	Foundations partly above ground Foundations below ground for high safety class External walls, columns and facades External beams with sheltered top surface Structural parts in contact with slightly aggressive chemical water	DK
	Bridge foundations, transition slabs	FI
	Parts of water tanks; foundation members	DE
	Portions of structures devised for containing liquids, foundations. Ordinary reinforced or prestressed concrete mainly submerged in water or below non-aggressive grade	IT
	Reinforced and prestressed concrete completely buried in non-aggressive soil	UK
	Reinforced concrete into non-aggressive soil	PT
	Permanent relative air humidity of over 85 %. Parts of the water tanks, inside areas like canteens, bathrooms, laundries, areas of the sheltered pools and stables	SK

Table 2.2 (*continued*)

Class designation	Examples where exposure classes may occur		
XC3	**Examples from EN 206-1, Table 1**	**Adopted locally**	
		Yes	**No**
	Concrete inside buildings with moderate or high air humidity	CH CZ[f] BE FR DE IT LU NL NO UK SI SE SK	DK PT
	External concrete sheltered from rain	BE DE IE UK SI IT	PT
	Other local example		
	Parts of structures in contact with outside air e.g. halls, interiors with high air humidity (kitchens of community feeding, bath, laundries, swimming-pools, stables	CZ DE PT	
	Foundations partly above ground Foundations below ground for high safety class External walls, columns and facades External beams with sheltered top surface Structural parts in contact with slightly aggressive chemical water	DK	
	Facades and other vertical outdoor surfaces sheltered from rain. Car park slabs swimming baths, saunas, industrial kitchens, many industrial buildings. Bridge superstructures sheltered from rain such as lower surfaces of decking slabs and beams, beams, columns, retaining walls and abutments and intermediate supports	FI PT	
	Either ordinary reinforced or prestressed concrete placed outdoors with external surfaces protected from rain or placed inside buildings with moderate to high air humidity	IT	
	Permanent relative air humidity between 60 % to 85 %. Parts of buildings that are in permanent or temporary contact with the outside air, e.g. open space halls	SK	
	None given as grouped with XC4	UK	
XC4	**Examples from EN 206-1, Table 1**	**Adopted locally**	
		Yes	**No**
	Concrete surfaces subject to water contact, not within exposure class XC2	CH BE FI FR IE IT LU NL NO PT UK SI SE SK	DE DK
	Other local examples		
	Outside buildings parts from concrete exposed to rain	CZ DE	
	Foundations partly above ground Foundations below ground for high safety class External walls, columns and facades External beams with sheltered top surface Structural parts in contact with slightly aggressive chemical water	DK	
	Balcony slabs, facades exposed to rain, footings. Bridge structures exposed to rain such as edge beams, lateral sides of abutments, retaining walls, columns	FI	
	Either ordinary reinforced or prestressed concrete place outdoors with surfaces undergoing alternatively dry and wet cycles. Architectural concrete in urban settings. Surfaces in contact with water not included in the XC2 class	IT	
	Reinforced concrete under dry-wet cycles	PT	
	Reinforced and prestressed concrete surfaces exposed to alternate wetting and drying	UK	