Ineqarnermut, Attaveqaasersuutinut Isorliunerusunullu Naalakkersuisoqarfik
Ministry of Housing, Infrastructure and Outlying Districts

EN 206 GL NA:2025

National Annex to
EN 206: Concrete – Specification, performance, production and conformity

---

Foreword

This Greenlandic National Annex (GL NA) replaces EN 206 GL NA:2024.

This Annex is based on DS/EN 206 DK NA:2023.

The annex carries forward a number of provisions from "Forskrifter for betonkonstruktioner" (Regulations for Concrete Structures), Greenland Home Rule, Building and Construction Authority, 1996.

Scope

This Annex is adapted to national, geographical and climatic conditions as well as national legislation and specifies how EN 206:2013, including amendments, is to be applied in Greenland.

The Annex provides Greenlandic national choices and complementary information. For any complementary information, it is specified whether it is normative or informative. Normative information comprises requirements to be followed.

The numbering in the Annex refers to the numbering in EN 206:2013 and DS/EN 206 DK NA:2023.

Overview of Greenlandic national choices and complementary information

EN 206 and DS/EN 206 DK NA is applicable with the following national choices and complementary information:

Clause	Subject	Change
DK NA	References in DK NA	National choice
1	Scope, concrete elements	Complementary information, Normative
4.1	Exposure classes related to environmental actions	National choice
5.1	Basic requirements for constituents	National choice
5.1.3	Aggregates	National choice
5.1.4	Mixing water	National choice
5.2.2	Selection of cement	National choice
5.2.3	Alkali reactivity of aggregates	Complementary information, Informative
5.2.3.1	Selection of aggregates: General	National choice
5.2.3.3	Reclaimed aggregate	National choice
5.2.3.4	Recycled aggregates	National choice
5.2.3.5	Resistance to alkali-silica reaction	National choice
5.2.5	Use of additions	National choice
5.2.6	Use of admixtures	National choice
5.2.9	Concrete temperature	National choice
5.3.2	Limiting values for concrete composition	National choice
5.4.3	Air content	National choice
5.5	Requirements for hardened concrete	National choice
6.1	Specification of concrete: General	National choice
6.2.1	Specification for designed concrete: General	National choice
6.2.2	Basic requirements	National choice
6.2.3	Additional requirements	National choice
6.3.1	Specification for prescribed concrete: General	National choice
6.3.2	Basic requirements	National choice
8.2.1.3	Conformity criteria for compressive strength	National choice
8.2.1.3.2	Criteria for mean results	National choice
8.2.3.1	Conformity control for properties other than strength: General	National choice
8.3	Conformity control of prescribed concrete including standardized prescribed concrete	National choice
9.1	Production control: General	National choice
9.2	Production control systems	National choice
9.4	Testing	National choice
9.5	Concrete composition and initial testing	National choice
9.6.1	Personnel	National choice
10.2	Assessment, surveillance and certification of production control	National choice

11	Designation for designed concrete	National choice
Annex C	Provisions for assessment, surveillance and certification of production control	National choice
Annex D	Additional requirements for specification and conformity of concrete for special geotechnical works	National choice
Annex E	Requirements for aggregates	National choice
Annex F	Recommendation for limiting values of concrete composition	National choice
Annex M	Guidance on provisions valid in the place of use	National choice
Annex U	Requirements for the knowledge, training and experience of personnel	National choice
Annex X	Alternative method for assessing the conformity for compressive strength	National choice

National choices

References in DK NA

References in DS/EN 206 DK NA to other Danish National Annexes are replaced by references to corresponding Greenlandic National Annexes. Where these do not exist, the Danish National Annexes apply.

4 Classification

4.1 Exposure classes related to environmental actions

DS/EN 206 DK NA, Subsection 4.1, including Table DK NA-1, is deleted and replaced by:

(1)
The informative examples in Table 1 of EN 206 are replaced by those given in Table GL NA-1, which provide informative examples of the exposure classes to which the individual structural members and their surfaces shall be assigned under Greenlandic environmental and climatic actions.

NOTE 1 – The exposure classes cover the environmental and climate actions that are common in Greenland. If structural members are exposed to particularly aggressive environmental and climatic actions, this may lead to a need for the specification of additional requirements.

NOTE 2 – In the informative examples given in Table GL NA-1, a structural member may be covered by several exposure classes. For example, a foundation pile in fresh water will be subject to exposure class XC2, whereas a foundation pile in seawater will be subject to both exposure classes XC2 and XS2.

Table GL NA-1 Exposure classes

Class designation	Description of the environment, cf. EN 206	Informative examples of exposure classes related to climatic and environmental actions
1 No risk of corrosion or attack		
X0	For concrete without reinforcement or embedded metal: All exposures except where there is freeze/thaw, abrasion or chemical attack. For concrete with reinforcement or embedded metal: Very dry	Concrete inside buildings with very low humidity, e.g. structures in heated rooms.
2 Corrosion induced by carbonation		
Where concrete containing reinforcement or other embedded metal is exposed to air and moisture, the exposure shall be classified as follows:		
XC1	Dry or permanently wet	Concrete inside buildings with low air humidity, e.g: – structures in rooms that are unheated – floor slabs on insulation. Or concrete permanently submerged in soil without flowing water, e.g. – buried foundations where the load bearing capacity is verified without the use of reinforcement.
XC2	Wet, rarely dry	Concrete subject to long-term water contact, e.g.: – foundation piles;

Class designation	Description of the environment, cf. EN 206	Informative examples of exposure classes related to climatic and environmental actions
		– lift shafts; – installation ducts; – service corridors; – structures in fresh water (e.g. water tanks); – buried foundations where the load bearing capacity is verified with the use of reinforcement; – base plates.
XC3	Moderate humidity	Concrete inside buildings with moderate or high humidity, e.g.: – installation ducts; – service corridors. Or external concrete sheltered from rain, e.g. – beams with structurally protected surfaces at the top side.
XC4	Cyclic wet and dry	Concrete subject to water contact, but not within exposure class XC2, e.g. – external walls, facades, columns, staircases, slabs and beams; – balcony parapets, balcony slabs, access balconies and balcony corbels; – foundations partly above ground; – retaining walls; – external basement walls partly above ground; – concrete exposed to industrial waters; – car washes; – parking floors; – bridge piers and edge beams on bridges; – marine structures near the water line.
3 Corrosion induced by chlorides other than from sea water		
Where concrete containing reinforcement or other embedded metal is subject to contact with water containing chlorides, including de-icing salts, from sources other than from sea water, the exposure shall be classified as follows:		
XD1	Moderate humidity	Concrete exposed to airborne chlorides from de-icing salts, limited de-icing salts, or adjacent to de-icing areas, e.g.: – balcony slabs of restricted access; – retaining walls; – external staircases; – external basement walls partly above ground; – vertical parts of car parks; – columns, end supports, retaining walls, foundations, etc., for bridges and tunnels not assigned to XD3; – moisture insulated bridge decks.
XD2	Wet, rarely dry	Concrete subject to long-term water and chloride contact, e.g.: – swimming pools; – concrete exposed to industrial waters containing chlorides. NOTE – For swimming pools, see DS 477:2013, 6.2.2 and 2.7.

Class designation	Description of the environment, cf. EN 206	Informative examples of exposure classes related to climatic and environmental actions
XD3	Cyclic wet and dry	Concrete exposed to water spray containing chlorides or exposed to de-icing salts, e.g.: – access balconies and balcony corbels; – external staircases; – parking floors; – edge beams on bridges; – bridge piers. NOTE – See DS/EN 1992-2 DK NA for specific rules regarding bridges and tunnels.
4 Corrosion induced by chlorides from sea water		
Where concrete containing reinforcement or other embedded metal is subject to contact with chlorides from sea water or airborne salt originating from sea water, the exposure shall be classified as follows:		
XS1	Exposed to airborne salt but not in direct contact with sea water	Concrete exposed to airborne salt from sea water, e.g.: – structures in harbour and coastal areas. NOTE – If the condition is not investigated, "coastal areas" can normally be considered as locations with less than 1 000 m to the coastline.
XS2	Permanently submerged	Concrete exposed to permanent contact with seawater, e.g.: – submerged marine structures; – buried structures in harbour or coastal areas with groundwater with chloride content corresponding to the adjacent sea water.
XS3	Tidal, splash and spray zones	Concrete exposed to water spray from seawater, e.g.: – marine structures near the water line.
5 Freeze/thaw attack with or without de-icing agents		
Where concrete is exposed to significant attack by freeze/thaw cycles while wet, the exposure shall be classified as follows:		
XF1	Moderate water saturation, without de-icing agent	Vertical concrete surfaces exposed to rain and freeze, e.g.: – foundations partly above ground; – retaining walls; – external basement walls partly above ground; – external walls and facades; – external columns; – external beams with structural protection; – balcony parapets.
XF2	Moderate water saturation, with de-icing agent	Vertical concrete surfaces exposed to freezing and airborne de-icing agents, e.g.: – retaining walls; – external staircases with limited traffic; – external basement walls partly above ground; – structures in harbour and coastal areas.
XF3	High water saturation, without de-icing agent	Horizontal concrete surfaces exposed to rain and freeze, e.g.: – balcony slabs of restricted access; – external slabs; – external beams; – light shafts;

Class designation	Description of the environment, cf. EN 206	Informative examples of exposure classes related to climatic and environmental actions
		– ducts, outdoor basins and pits.
XF4	High water saturation, with de-icing agent or seawater	Concrete exposed to water, freeze, and chlorides, e.g.: – access balconies and balcony corbels; – parking floors; – bridge piers; – edge beams on bridges; – marine structures in the splash zone; e.g. ramps NOTE – Freeze/thaw attack on parking floors may vary depending on the design of the car park.
6 Chemical attack		
Where concrete is exposed to chemical attack from natural soils and groundwater, the exposure shall be classified as follows:		
XA1	Slightly aggressive chemical environment	Concrete exposed to natural soil and groundwater according to Table 2 of EN 206, XA1, e.g.: – ducts and pits; – foundation piles; – tunnels; – external basement walls.
XA2	Moderately aggressive chemical environment	Concrete exposed to natural soil and groundwater according to Table 2 of EN 206, XA2, e.g. examples as shown in XA1 NOTE – Concrete in sea water should comply with XA2 as sea water contains $SO4^{2-}$
XA3	Highly aggressive chemical environment	Concrete exposed to natural soil and groundwater according to Table 2 of EN 206, XA3, e.g. examples as shown in XA1

5.1 Basic requirements for constituents

DS/EN 206 DK NA, Subsection 5.1 is deleted and replaced by:

The constituents cement, additions and admixtures shall be CE marked.

5.1.3 Aggregates

DS/EN 206 DK NA, Subsection 5.1.3 is deleted and replaced by:

Sand

Sand is understood to mean aggregate with particles smaller than 4 mm.

Sand dredged or excavated from the sea without sieving may be used as sand aggregate for concrete, provided that the sand does not contain more than 15 % stones by volume.

NOTE – Sand dredged or excavated from the sea is often referred to as sand dredging. Dredged sand should be light grey and consist predominantly of quartz and granite. Dredged sand should not be dark with significant amounts of basalt and mica.

Stone

Stone is understood to mean aggregate with particles larger than 4 mm.

Stone materials shall consist of frost-resistant rock types to avoid the risk of frost-induced cracking.

NOTE – If no experience exists regarding the frost resistance of the stone material, the frost resistance may be verified using the test methods and acceptance criteria specified in DS/EN 206 DK NA, Table DK NA-3.3.

Stone dredged or excavated from the sea without sieving may be used as stone aggregate for concrete, provided that the stone material does not contain more than 10 % sand by volume.

Crushed rock (aggregate) shall contain no more than 4 % fines (rock dust).

The maximum aggregate size shall not exceed 32 mm for reinforced concrete and reinforced, plaster-free walls. For concrete in slender structural members and in members with closely spaced reinforcement, the maximum aggregate size shall be smaller, but not less than 8 mm.

For unreinforced indoor concrete (Concrete 1:3:5) (e.g. mass concrete in foundations), aggregate with a maximum size of 64 mm may be used.

For outdoor salt/frost-exposed concrete (Concrete 1:2:2), the aggregate shall be crushed rock.

NOTE – For a definition of concrete types, see 6.2.1.

5.1.4 Mixing water

Mixing water may be taken from freshwater lakes and from streams with a strong flow towards the sea, provided that the water does not taste salty.

5.2 Basic requirements for composition of concrete

5.2.2 Selection of cement

(1)
Without special documentation, the cement types listed in Table DK NA-2 are permitted. However, Portland-limestone cement and Portland composite cement shall not be used for concrete in permanent contact with seawater; exposure classes XS2 and XS3.

NOTE – If other cement types are to be used, the provisions in DS/EN 206 DK NA, Table DK NA-2 may be used as a basis.

For prescribed concretes permitted to be batched by volume in accordance with Subsection 6.3.1, only CEM I with a minimum strength class of 42,5 may be used.

5.2.3.1 General

DS/EN 206 DK NA, Subsection 5.2.3.1 is deleted and replaced by:

(1)
Aggregates shall consist of sand and stone with properties and characteristics that ensure the concrete achieves the desired properties and the required durability in the structures in which the concrete is to be used.

Aggregates shall be separated into sand and stone. Grading determination of sand and stone is not required.

Aggregate materials shall be free from impurities in quantities that would damage the concrete or the reinforcement.

5.2.3.3 Reclaimed aggregate

DS/EN 206 DK NA, Subsection 5.2.3.3 is deleted.

5.2.3.4 Recycled aggregates

DS/EN 206 DK NA, Subsection 5.2.3.4 is deleted.

5.2.3.5 Resistance to alkali-silica reaction

DS/EN 206 DK NA, Subsection 5.2.3.4 is deleted and replaced by:

(1)
It shall be documented that the aggregate materials consist of alkali-inactive rock types that do not result in damage from alkali-silica reactions. Aggregate materials that can be documented through experience to have been used in concrete for at least 20 years without observed damage from alkali-silica reactions may be regarded as alkali-inactive without any further documentation.

Where such documentation from experience is not available, testing of the aggregate materials shall be carried out to demonstrate their suitability as concrete aggregates without the risk of damage from alkali-silica reactions.

Testing of the alkali-silica reactivity of the aggregate shall be carried out in accordance with DS/EN 206 DK NA, Annex E, Table DK NA-E.2. This means that for aggregates of granite and granite-like materials, testing shall be carried out according to ASTM C 1260 with the acceptance requirements specified in Table DK NA-E.2.

If this testing does not demonstrate compliance with the requirements (see Table DK NA-E.2), another aggregate material shall be used, or supplementary testing of the material may be carried out using concrete prisms in accordance with ASTM C 1293, with an acceptance criterion of 0,04 % after 52 weeks.

NOTE – When selecting a site for aggregate production, reference may be made to the complementary information in this document, informative, regarding the alkali-silica reactivity of aggregates.

5.2.5 Use of additions

Additions (e.g. fly ash, microsilica, limestone filler, etc.) are generally not used in Greenland.

If additions are to be used in exceptional cases, this shall only be done in designed concrete produced at a ready-mixed concrete plant.

In this case, all rules regarding the use of additions in EN 206 and DS/EN 206 DK NA shall be complied with, including Subsection 5.2.5.1 and 5.2.5.2 with their corresponding subsections.

5.2.6 Use of admixtures

DS/EN 206 DK NA, Subsection 5.2.6 is deleted and replaced by:

The water content of the admixtures shall always be included when calculating the water/cement ratio.

Concrete shall be dosed with a plasticising admixture that results in a reduction in water content and/or improved workability.

Concrete that is to be frost-resistant (exposure classes XF1, XF2, XF3, and XF4) shall be dosed with an air-entraining admixture.

NOTE – A combined admixture that both plasticises and entrains air may be used where appropriate.

As an alternative to documenting the air content requirements in fresh and hardened concrete, the method in 5.3.3 may be used.

5.2.9 Concrete temperature

See EN 13670 GL NA, Subsection 8.5, Curing and protection.

5.3.2 Limiting values for concrete composition

DS/EN 206 DK NA, Subsection 5.3.2 is deleted and replaced by:

Requirements for concrete composition for each exposure class are listed in table GL NA-F.1 in Annex F.

5.4.3 Air content

The minimum air content depending on the exposure class is given in Table GL NA-F.1.

5.5 Requirements for hardened concrete

DS/EN 206 DK NA, Subsection 5.5 is deleted.

6.1 General

DS/EN 206 DK NA, Subsection 6.1 is deleted and replaced by:

(2)
When preparing the project specification, it shall be assessed whether the concrete is exposed to special influences, such as aggressive environmental conditions, that will lead to the need for additional requirements.

(3)
NOTE 3 – Designed concrete – see 6.2 – corresponds to normal practice for production at a ready-mixed concrete plant.

(4)
NOTE 4 – Prescribed concrete – see 6.3 – corresponds to normal practice for production without a ready-mixed concrete plant.

6.2.1 General

(2)
The abbreviations for specifications given in Section 11 are not used.

(3)
Generally, the 4 concrete types listed below may be used:

- Outdoor, salt/freeze
- Outdoor, freeze
- Indoor
- Binding layer

The concrete types may be used in the exposure classes specified in Table 6.2.1 GL NA

Table 6.2.1 GL NA Use of concrete types in exposure classes

Concrete type		**Exposure classes** 3)
Designation	**Traditional designation**2)	
Outdoor, salt/freeze 1)	Concrete 1:2:2	XS1, XS2, XS3, XD1, XD2, XD3, XF2, XF3, XF4, XA2, and XA3 XC2, XC3, XC4, XF1, and XA1 X0 and XC1
Outdoor, freeze	Concrete 1:2:3	XC2, XC3, XC4, XF1, and XA1 X0 and XC1
Indoor	Concrete 1:3:5	X0 and XC1
Binding layer	Concrete 1:4:6	For binding layers only

NOTE – The traditional designations refer to volumetric composition, which is no longer used for designed concrete but is still used for prescribed concrete, see section 6.3.

1) The salt/freeze concrete type is also known as "tidal concrete".

2) Traditional designation of concrete types in Greenland.

3) For concrete requiring a particularly long service life (more than 50 years), and for special structures, specific requirements should be set for the exposure classes XS3, XD2, XD3, XF4, and XA3; see also Table GL NA-F.1

Designed concrete is composed and batched by weight at a concrete plant.

Subsections 6.2.2 and 6.2.3 specify the requirements for the 4 concrete types designed by the concrete producer.

6.2.2 Basic requirements

(1)
The requirements for the 4 commonly used concrete types are given in Table 6.2.2 GL NA.

Table 6.2.2 GL NA Requirements for the commonly used concrete types

Concrete types	Cement content [kg/m³]	w/c ratio	Slump[1)] [mm]	Air content [vol.%]	Minimum characteristic cylinder compressive strength[2)] [MPa]	
Outdoor, salt/freeze	≥ *375*	≤ *0,45*	≤ 150	≥ *4,5*	≥ *30*	
Outdoor, freeze	≥ *300*	≤ *0,55*	≤ 150	≥ *4,5*	≥ *25*	
Indoor	≥ *200*	≤ *0,65*	≤ 150	≥ *4,5*	≥ *12*	
Binding layer	≥ 170	≤ 0,70	≤ 150	≥ 4,5	≥ 8	

NOTE 1 to Table: If segregation of the concrete occurs, a lower slump shall be used. The slump shall be adapted to the use of the concrete.

NOTE 2 to Table: Minimum characteristic strength that shall be verified during conformity control for compressive strength, see Subsection 8.2.1. If a higher strength is specified, this shall be verified. In some cases, a 14-day strength is specified. The ratio between the 28-day strength and the 14-day strength may be taken as 1,1 unless another value is documented.

NOTE 3 to Table: See Subsection 4.1

NOTE – Values in italics are taken from Tables GL NA-F.1 and 6.2.1 GL NA

In all concrete types, an air-entraining and a plasticising admixture complying with 5.1.5 and 5.2.6 shall be used.

All concrete types shall be in chloride content class Cl 0,20

6.2.3 Additional requirements

(1)
The user of the concrete may require additional requirements to be met.

NOTE – The provisions in EN 206 and DS/EN 206 DK NA in Subsection 6.2.3 may be used as a basis for such supplementary requirements. This applies, for example, to the requirements for moisture tight and watertight concrete specified in DS/EN 206 DK NA, Subsection 6.2.3.

6.3 Specification of prescribed concrete

6.3.1 General

(1)
Prescribed concrete may be used in accordance with the requirements given in 6.3.2 and 6.3.3.

Prescribed concrete is composed and batched by volume.

6.3.2 Basic requirements

(1)
The following types of concrete, batched by volume, may be used:

- Concrete 1:2:2
- Concrete 1:2:3
- Concrete 1:3:5
- Concrete 1:4:6

The designation is to be understood as, for example, Concrete 1:3:5 consists of a mixture of 1 volume part cement, 3 volume parts sand (smaller than 4 mm) and 5 volume parts stone (larger than 4 mm).

Any admixtures and water are then added until the concrete has an appropriate consistency.

The following applies to these prescriptive concretes:

a) The concretes shall comply with EN 206 GL NA
b) CEM I of at least strength class 42,5 shall be used as cement
c) The approximate cement content is shown in Table 6.3 GL NA
d) The approximate w/c ratio is shown in Table 6.3 GL NA
e) The aggregates (stones and sand) specified in 5.2.3 shall be used

Table 6.3 GL NA Approximate properties and exposure classes for prescribed concretes batched by volume.

Concrete types	Cement content [kg/m³]	w/c ratio	Slump[1)] max/min [mm]	Air content [vol.%]	Characteristic cylinder compressive strength[2)] [MPa]	Exposure classes[3)]
Outdoor, salt/freeze [1)]	375	0,45	150/100	4-6	20	XD1, XS1, XS2, XF2, and XF3
Outdoor, freeze	300	0,50	150/100[1)]	3-5	16	XC2, XC3, XC4, and XF1
Indoor	200	0,65	150/100	4-6	8	X0 and XC1

Binding layer	170	1	150/100	4-6	-	For binding layers only

NOTE 1 to Table: If segregation of the concrete occurs, a lower slump shall be used. Concrete for floors and pavements may be produced with a lower slump for levelling and geometry purposes.

NOTE 2 to Table: Characteristic cylinder compressive strength that may be used without further documentation. If a higher strength is to be verified, conformity control for compressive strength shall be carried out as for designed concrete, see Subsection 8.2.1.

NOTE 3 to Table: See Subsection 4.1

In all concrete types, an air-entraining and a plasticising admixture complying with 5.1.5 and 5.2.6 shall be used.

8.2.1.3 Conformity criteria for compressive strength

DS/EN 206 DK NA, Subsection 8.2.1.3 is deleted.

NOTE – This also means that Annex X is deleted.

8.2.1.3.2 Criteria for mean results

For the verification of the strengths of prescribed concrete, Method A shall be used.

8.2.3.1 General

DS/EN 206 DK NA, Subsection 8.2.3.1 is deleted and replaced by:

Frost resistance control of the concrete in accordance with Subsection 5.3.3 shall be carried out at least once every 12 months.

8.3 Conformity control of prescribed concrete including standardized prescribed concrete

A record shall be kept of the mixing of the prescribed concrete.

This record shall include all mixtures, numbered consecutively.

The achieved consistency – measured or assessed visually – shall be recorded for each batch, and any deviations shall be noted.

The record shall also include measurements of e.g. consistency and air content and any sampling for strength control.

9.1 General

DS/EN 206 DK NA, Subsection 9.1 is deleted.

9.2 Production control systems

DS/EN 206 DK NA, Subsection 9.2 is deleted.

9.4 Testing

DS/EN 206 DK NA, Subsection 9.4 is deleted.

9.5 Concrete composition and initial testing

DS/EN 206 DK NA, Subsection 9.5 is deleted and replaced by:

For designed concretes for exposure classes XF2, XF3, and XF4, where frost resistance is verified by frost testing in accordance with 5.3.3, the frost resistance shall be documented by initial testing.

9.6.1 Personnel

DS/EN 206 DK NA, Subsection 9.6.1 is deleted.

NOTE – This also means that Annex U is deleted.

10.2 Assessment, surveillance and certification of production control

DS/EN 206 DK NA, Subsection 10.2 is deleted and replaced by:

Assessment, surveillance and certification of production control are not required.

NOTE – Project-specific production control may be required when utilising higher compressive strengths than those specified in EN 1992-1-1 GL NA.

11 Designation for designed concrete

The designation given in EN 206 Section 11 is not used.

Annex C Provisions for assessment, surveillance and certification of production control

Deleted.

Annex D Additional requirements for specification and conformity of concrete for special geotechnical works

Deleted.

Annex E Requirements for aggregates

Deleted in its entirety, but reference is made to specific parts in the annex.

Annex F Limiting values for concrete composition

Tables F.1 and DK NA F.1 are deleted and replaced by Table GL NA F.1.

Tabel GL NA-F.1 Limiting values for concrete composition

Requirements	**Exposure classes**																	
	No risk of corrosion	Corrosion induced by carbonation				Corrosion induced by chlorides: Seawater			Corrosion induced by chlorides: Chlorides other than from sea water			Freeze/thaw attack				Aggressive chemical environments		
	X0	**XC 1**	**XC 2**	**XC 3**	**XC 4**	**XS 1**	**XS 2**	**XS3[1)]**	**XD 1**	**XD 2**	**XD 3**	**XF 1**	**XF 2**	**XF 3**	**XF 4**	**XA 1**	**XA2[1)]**	**XA3[1)]**
Max w/c ratio[2)]	0,65	0,65	0,55	0,55	0,55	0,45	0,45	0,45	0,45	0,45	0,45	0,55	0,45	0,45	0,45	0,55	0,45	0,45
Min. characteristic cylinder strength [MPa]	12	12	25	25	25	30	30	30	30	30	30	25	30	30	30	30	30	30
Min. cement content [kg/m^3]	200	200	300	300	300	375	375	375	375	375	375	300	375	375	375	300	375	375
Min. air content [%]													4,5	4,5	4,5			
Other req.	Aggregates shall conform to the requirements specified in 5.1.3																	

NOTE 1 to Table: For concrete requiring a particularly long service life (more than 50 years), and for structures in consequence class 3 in accordance with EN 1990 GL NA that are in contact with seawater and sulphate-bearing soil, such as bridges and tunnels, a sulphate-resistant cement shall be used.

NOTE 2 to Table: For concrete requiring a particularly long service life (more than 50 years), and for structures in consequence class 3 in accordance with EN 1990 GL NA, such as bridges and tunnels, in exposure classes XS3, XD3, XF4 and XA3, it should be considered to limit the maximum w/c ratio to ≤ 0,40.

Annex M Guidance on provisions valid in the place of use

Deleted.

Annex U Requirements for the knowledge, training and experience of personnel

Deleted.

Annex X Alternative method for assessing the conformity for compressive strength

Deleted.

Complementary information
Normative

1. Scope
Concrete elements
Concrete in concrete elements manufactured in Greenland shall comply with the provisions of EN 206 GL NA.

Concrete in concrete elements manufactured in other countries shall comply with the provisions of DS/EN 206 DK/NA.

Complementary information
Informative

5.2.3 Alkali reactivity of aggregates

In *Forskrifter for betonkonstruktioner (Regulations for Concrete Structures)*, Greenland Home Rule, Building and Construction Authority, September 1996, Section 1.4.6 "Concrete Damage" sets out the following regarding harmful alkali reactions in Norway, and describes that conditions in many parts of Greenland have been compared with those in Norway.

This information is used as part of any investigations of the alkali reactivity of aggregate materials.

Alkali-silica reaction in Norway
In Norway, it has been observed over the past approximately 5 years that alkali-silica reaction may be a contributing cause of cracking in concrete structures such as power plants, dams, bridges, mast foundations, harbour structures and building structures. Some of the rock types that can cause alkali-silica reaction in concrete in Norway are also found in Greenland.

Bedrock
The majority of the ice-free part of Greenland, and in particular the areas with concentrations of towns along the west coast, consists of bedrock dominated by gneiss with occurrences of granite and amphibolite. Alkali reaction has not been observed here.

West Greenland
Possible alkali-reactive rock types in the bedrock of West Greenland include sedimentary occurrences of quartzite, e.g. at Ivittuut. In addition, fault zones with mylonitic gneisses exist, e.g. at Kangerlussuaq.

South Greenland
In South Greenland, east of Narsaq, sandstone and lavas also constitute potentially alkali-reactive rocks.

East Greenland
In East Greenland, north of Ittoqqortoomiit, Caledonian rocks occur, similar to the Caledonian rocks in Norway. Among these, sandstone, phyllite and quartzite have been found to be alkali-reactive in Norway.

North Greenland
In North Greenland, the same rock types present a potential risk within the North Greenland fold belt. In both East and North Greenland, however, the use of concrete is still considered to be minimal

West and East Greenland
The tertiary basalts at Disko in West Greenland, as well as those south of Ittoqqortoormiit in East Greenland, may contain alkali-reactive minerals such as chalcedony and opal, which, together with volcanic glass, are alkali-reactive constituents of basalts.

Testing new types of aggregates

On this basis, it is relevant to carry out testing for potential alkali reactivity of new aggregate types. However, this is not considered necessary where the aggregate has previously been used with good experience over an appropriate period.