DS/EN 1994-1-1 DK NA:2013

National Annex to

Eurocode 4: Design of composite steel and concrete structures - Part 1-1: General rules and rules for buildings

Foreword

This national annex (NA) is a revision of DS/EN 1994-1-1 DK NA:2007 and replaces the latter on 2013-05-22. For a transition period until 2013-09-01, this National Annex as well as the previous National Annex will be applicable. In addition to minor editorial changes, the factor γ_0 has been introduced in clause 2.4.1.2(5)P and other clauses.

Previous versions, addenda and an overview of all National Annexes can be found at www.eurocodes.dk

This NA lays down the conditions for the implementation in Denmark of EN 1994-1-1 for construction works in conformity with the Danish Building Act or the building legislation. Other parties can put this NA into effect by referring thereto.

This NA includes:

- an overview of possible national choices and clauses containing complementary information;
- national choices;
- complementary (non-contradictory) information which may assist the user of the Eurocode.

The numbering refers to the clauses of the Eurocode where national choices have been made and/or complementary information is given. To the extent possible, headings are identical to the headings of the clauses in the Eurocode followed by a clarification, as appropriate.

Overview of possible national choices and clauses containing complementary information

The list below identifies the clauses where national choices are possible and the applicable/not applicable informative annexes. Furthermore, clauses giving complementary information are identified. Complementary information is given at the end of this document.

Clause	Subject	National choice	Complementary information
2.4.1.1(1)	Design values of actions	Unchanged	
2.4.1.2(5)P	Design values of material or product properties	National choice	
2.4.1.2(6)P	Design values of material or product properties	National choice	
2.4.1.2(7)P	Design values of material or product properties	National choice	
3.1(4)	Concrete		Complementary information
3.5(2)	Profiled steel sheeting for composite slabs in buildings	Unchanged	
6.4.3(1) h)	Lateral-torsional buckling of composite beams - Simplified verification for buildings without direct calculation		Complementary information
6.6.3.1(1)	Shear connection - Headed stud connectors in solid slabs and concrete encasement - Design resistance	National choice	
6.6.3.1(3)	Shear connection - Headed stud connectors in solid slabs and concrete encasement - Design resistance		Complementary information
6.6.4.1(3)	Shear connection - Design resistance of headed studs used with profiled steel sheeting in buildings - Sheeting with ribs parallel to the supporting beams		Complementary information
6.8.2(1)	Partial factors for fatigue assessment for buildings		Complementary information
6.8.2(2)	Partial factors for fatigue assessment for buildings	National choice	
9.1.1(2)P	Composite slabs with profiled steel sheeting for buildings - Scope	Unchanged	

Clause	Subject	National choice	Complementary information
9.6(2)	Verification of profiled steel sheeting as shuttering for serviceability limit states	Unchanged	
9.7.3(4) NOTE 1	Verification of composite slabs for ultimate limit states - Longitudinal shear for slabs without end anchorage	National choice	
9.7.3(8) NOTE 1	Verification of composite slabs for ultimate limit states - Longitudinal shear for slabs without end anchorage	National choice	
9.7.3(9)	Verification of composite slabs for ultimate limit states - Longitudinal shear for slabs without end anchorage	Unchanged	
B.2.5(1)	Tests on shear connectors – Test evaluation	National choice	
B.3.6(5)	Testing of composite floor slabs - Determination of the design values for $\tau_{u,Rd}$	National choice	

NOTE Unchanged: Recommendations in the Eurocode are followed.

National choices

2.4.1.2(5)P Design values of material or product properties

The following value is applied, including the factor (γ_0) for the partial factors for strength parameters and resistances, cf. National Annex to EN 1990, Table A1.2(B+C):

$\gamma_V = 1{,}35 \cdot \gamma_0 \cdot \gamma_3$

The factor γ_0 takes account of the combination of actions, cf. National Annex to EN 1990, Table A1.2(B+C).

Limit state	**STR/GEO**				**STR**
Combination of actions	1	2	3	4	5
γ_0	1,0	1,0	K_{FI}	K_{FI}	$1{,}2 \cdot K_{FI}$

The factor γ_3 takes account of the level of checking of the product and is defined in EN 1990 and stated in the National Annex to EN 1990, Annex F. The reduced level of checking is not used.

For the value of γ_V, the following types of failure according to the National Annex to EN 1990, Annex F, are applied:

γ_V: Warning of failure with residual resistance

For accidental and seismic design situations the following value is used:

$\gamma_V = 1{,}0$

2.4.1.2(6)P Design values of material or product properties

The following value shall be used: $\gamma_{VS}=1{,}35 \cdot \gamma_0 \cdot \gamma_3$

The factor γ_3 takes account of the level of checking of the product. The reduced level of checking is not used.

Extended level of checking: $\gamma_3 = 0{,}95$
Normal level of checking: $\gamma_3 = 1{,}00$

The partial factors are determined in accordance with the National Annex to EN 1990, Annex F, where $\gamma_M = \gamma_1 \gamma_2 \gamma_3 \gamma_4$.

γ_1 takes into account the type of failure
γ_2 takes into account the uncertainty related to the design model
γ_3 takes into account the scope of checking
γ_4 takes into account the variation of the strength parameter or resistance.

When determining γ_1, the following types of failure have been assumed:

γ_{VS}: Warning of failure with residual resistance

For accidental and seismic design situations the following value is used:

$\gamma_V = 1,0$

2.4.1.2(7)P Design values of material or product properties

The following value shall be used: $\gamma_{Mf,s}=1,1\cdot\gamma_0\cdot\gamma_3$

The factor γ_3 takes account of the level of checking of the product. The reduced level of checking is not used.

Extended level of checking:	$\gamma_3 = 0,95$
Normal level of checking:	$\gamma_3 = 1,00$

The partial factors are determined in accordance with the National Annex to EN 1990, Annex F, where $\gamma_M = \gamma_1 \gamma_2 \gamma_3 \gamma_4$.

γ_1	takes into account the type of failure
γ_2	takes into account the uncertainty related to the design model
γ_3	takes into account the scope of checking
γ_4	takes into account the variation of the strength parameter or resistance.

When determining γ_1, the following types of failure have been assumed:

$\gamma_{Mf,s}$:	Warning of failure with residual resistance

For accidental and seismic design situations the following value is used:

$\gamma_{Mf,s} = 1,0$

6.6.3.1(1) Shear connection - Headed stud connectors in solid slabs and concrete encasement - Design resistance

The following value is used: $\gamma_V=1,35\cdot\gamma_0\cdot\gamma_3$

6.8.2(2) Partial factors for fatigue assessment for buildings

Partial factors γ_{Ff} for fatigue actions are given in the National Annex to EN 1990.

9.7.3(4) NOTE 1 Verification of composite slabs for ultimate limit states - Longitudinal shear for slabs without end anchorage

The following value is used: $\gamma_{VS}=1,35\cdot\gamma_0\cdot\gamma$

9.7.3(8) NOTE 1 Verification of composite slabs for ultimate limit states - Longitudinal shear for slabs without end anchorage

The following value is used $\gamma_{VS}=1,35\cdot\gamma_0\cdot\gamma_3$

B.2.5(1) Tests on shear connectors – Test evaluation
The following value is used: $\gamma_V = 1{,}35 \cdot \gamma_0 \cdot \gamma_3$

B.3.6(5) Testing of composite floor slabs - Determination of the design values for $\tau_{u,Rd}$
The following value is used: $\gamma_{VS} = 1{,}35 \cdot \gamma_0 \cdot \gamma_3$

Complementary (non-contradictory) information

3.1(4) Concrete
The recommended values in Annex C should be used, unless a more precise analysis is performed.

6.4.3(1)h) Lateral-torsional buckling of composite beams - Simplified verification for buildings without direct calculation
The values given in Table 6.1 should be used.

6.6.3.1(3) Shear connection - Headed stud connectors in solid slabs and concrete encasement - Design resistance
For further information, reference is made to specialist literature.

6.6.4.1(3) Shear connection - Design resistance of headed studs used with profiled steel sheeting in buildings - Sheeting with ribs parallel to the supporting beams
For further information, reference is made to specialist literature.

6.8.2(1) Partial factors for fatigue assessment for buildings
Reference is made to the National Annex to EN 1990.