

## DS/EN 1993-1-8 DK NA:2019

### National Annex to **Eurocode 3: Design of steel structures – Part 1-8: Joints**

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#### Foreword

This National Annex (NA) is a revision of DS/EN 1993-1-8 DK NA:2013 and replaces the latter as from 2019-09-09. For a transition period until 2019-12-31, this National Annex as well as the previous National Annex will be applicable.

Text has been added under Clause 2.2(2) Basis of design, General requirements, in relation to level of checking.

Previous, valid versions of the NAs as well as addenda to these can be found at [www.eurocodes.dk](http://www.eurocodes.dk).

This NA lays down the conditions for the implementation in Denmark of EN 1993-1-8 for construction works in conformity with the Danish Building Regulations.

This NA applies to construction works covered by section 16(1) of the Danish Building Regulations as well as to construction works covered by sections 24 to 27 of the Danish Building Regulations.

This NA includes:

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

For structures covered by sections 24 to 27 of the Danish Building Regulations BR18, or not covered by the Danish Building Regulations, levels of checking may still be used for the calculation of structures in ultimate limit states. For structures covered by section 16(1) of the Danish Building Regulations, levels of checking cannot be applied.

## 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 <sup>1)</sup>	Complementary information <sup>2)</sup>
1.2.6	Normative references, Reference standards, Group 6: Rivets	No further information	
2.2(2)	Basis of design, General requirements	National choice	
3.1.1(3)	Connections made with bolts, rivets or pins, Bolts, nuts and washers, General	No further information	
3.4.2(1)	Connections made with bolts, rivets or pins, Categories of bolted connections, Tension connections		Complementary information
5.2.1(2)	Analysis, classification and modelling, Classification of joints, General	No further information	
6.2.7.2(9)	Structural joints connecting H or I sections, Design Resistance, Design moment resistance of beam-to-column joints and splices	No further information	
<p><sup>1)</sup> National choice: A national choice has been made. No further information: The Eurocode allows further information. No further information is given.</p> <p><sup>2)</sup> Complementary information: (Non-contradictory) complementary information on how to use the Eurocode</p>			

## National choices

### 2.2(2) Basis of design, General requirements

The below expressions for  $\gamma_{Mi}$  are used, including the factor ( $\gamma_0$ ) for the partial factors for strength parameters and resistances, cf. National Annex to EN 1990, Table A1.2(B+C):

$$\begin{aligned}\gamma_{M2} &= 1,35 \cdot \gamma_0 \cdot \gamma_3 \\ \gamma_{M3} &= 1,35 \cdot \gamma_0 \cdot \gamma_3 \\ \gamma_{M3,ser} &= 1,20 \cdot \gamma_0 \cdot \gamma_3 \\ \gamma_{M4} &= 1,10 \cdot \gamma_0 \cdot \gamma_3 \\ \gamma_{M5} &= 1,10 \cdot \gamma_0 \cdot \gamma_3 \\ \gamma_{M6,ser} &= 1,10 \cdot \gamma_0 \cdot \gamma_3 \\ \gamma_{M7} &= 1,20 \cdot \gamma_0 \cdot \gamma_3\end{aligned}$$

The factor  $\gamma_0$  takes into account the combination of actions, cf. National Annex to EN 1990, Table A1.2(B+C).

Limit state	STR/GEO				STR
	1	2	3	4	
Combination of actions					5
$\gamma_0$	1,0	1,0	$K_{FI}$	$K_{FI}$	$1,2 \cdot K_{FI}$

The factor  $\gamma_3$  takes account of the level of checking of the product. The reduced level of checking is not used.

$$\begin{aligned}\text{Extended level of checking:} & \quad \gamma_3 = 0,95 \\ \text{Normal level of checking:} & \quad \gamma_3 = 1,00\end{aligned}$$

For structures covered by section 16(1) of the Danish Building Regulations, the extended level of checking cannot be applied, and  $\gamma_3$  is taken as 1,00.

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

$$\begin{aligned}\gamma_1 & \text{ takes into account the type of failure;} \\ \gamma_2 & \text{ takes into account the uncertainty related to the design model;} \\ \gamma_3 & \text{ takes into account the extent of checking;} \\ \gamma_4 & \text{ takes into account the variation of the strength parameter or resistance.}\end{aligned}$$

When determining  $\gamma_1$ , the following types of failure have been assumed:

$$\begin{aligned}\gamma_{M4} & : \text{ Warning of failure with residual resistance} \\ \gamma_{M5} & : \text{ Warning of failure with residual resistance} \\ \gamma_{M6,ser} & : \text{ Warning of failure with residual resistance} \\ \gamma_{M3,ser} & : \text{ Warning of failure without residual resistance} \\ \gamma_{M7} & : \text{ Warning of failure without residual resistance} \\ \gamma_{M2} & : \text{ No warning of failure} \\ \gamma_{M3} & : \text{ No warning of failure}\end{aligned}$$

For accidental and seismic design situations the following values are used:

$$\gamma_{Mi} = 1,0 \quad \text{where } i = 2, 3, 3,\text{ser}, 4, 5, 6,\text{ser} \text{ or } 7$$

## **(Non-contradictory) complementary information**

### **3.4.2(1) Connections made with bolts, rivets or pins, Categories of bolted connections, Tension connections**

Preloading of bolts to consider other aspects than resistance and stiffness should be determined, as required, on the basis of an assessment of each individual case.