ANNEX 9

NATIONAL ANNEX

TO STANDARD

SFS-EN 1993-1-1 EUROCODE 3: DESIGN OF STEEL STRUCTURES. Part 1-1: General Rules and Rules for Buildings

Preface

This national annex is used together with Standard SFS - EN 1993-1-1:2005.

This national annex sets out:

a) The national parameters for the following clauses in Standard SFS-EN 1993-1-1 where national selection is permitted:

- 1.1.1(3)
- 2.3.1(1) Note 1
- 3.1.(2)
- 3.2.1(1)
- 3.2.2(1)
- 3.2.3(3)B
- 3.2.4(1) Note 3B
- 5.2.1(3)
- 5.2.2(8)
- 5.3.2(3)
- 5.3.2(11)
- 5.3.4(3)
- 6.1.(1) Note 1
- 6.1.(1) Note 2B
- 6.3.2.2(2)
- 6.3.2.3(1)
- 6.3.2.3(2)
- 6.3.2.4(1)B Note 2B
- 6.3.2.4(2)B Note B
- 6.3.3.(5) Note 2
- 6.3.4(1)
- 7.2.1(1)B
- 7.2.2(1)B
- 7.2.3(1)B Explanation

b) Guidance for the use of Annexes A, B, AB and BB.

1.1.1 Scope of Eurocode 3

1.1.1(3)

Explanation:

For execution in Standard EN 1993 reference is made to Standard EN 1090, which is not yet ready, when this explanation is written. For execution the valid part B7 of the Finnish collection of building regulations may be used till then Standard SFS-EN 1090-1 and Standard SFS-EN 1090-2 are ready. In that case tolerances according to Standard SFS 5867 and Standard SFS 5871 may also be used. However for straightness of compression member the value according to B7 should be used.

2.3.1 Actions and environmental influences

2.3.1(1), Note 1

The rules in Standard SFS-EN 1990 and Standard SFS- EN 1991 including their National Annexes should be used. For determining characteristic values of ice loads Standard ISO 12494 should be used.

3.1 General

3.1(2)

In addition to the materials given in the table 3.1 the following steel grades may also be used:

a) Steel grades S315MC, S355MC, S420MC and S460MC according to the Standard SFS-EN 10149-2.

b) Steel grades S260NC, S315NC, S355NC and S420NC according to the Standard SFS-EN 10149-3.

c) Steel grades with valid product approval which refers to the clause 3.1(2) of the National Annex to the Standard SFS-EN 1993-1-1 and states that the said steel grade is suitable for use in accordance to Standard SFS-EN 1993-1-1.

In the cases a) and b) the requirement for the fracture toughness should be determined according to the option 5 in the section 11 of the Standard SFS-EN 10149-1.

The properties of steels should fulfil the general requirements given in Standard SFS-EN 1993-1-1 and in its National Annex.

β_w- values to steel grades according to Standards SFS-EN 10149-2 and SFS-EN 10149-3 is given in the National Annex of Standard SFS-EN 1993-1-8.

For steel grades according to Standards SFS-EN 10149-2 and SFS-EN 10149-3 mechanical properties at elevated temparatures may be determined according to National Annex of Standard SFS-EN 1993-1-2.

For steels according to Standards SFS-EN 10149-2 and SFS-EN 10149-3 maximum permissible values of element thickness may be determined according to National Annex of Standard SFS-EN 1993-1-10.

3.2.1 Material properties

3.2.1(1)

Both alternatives may be used.

3.2.2 Ductility requirements

3.2.2(1)

Steels used should fulfil the requirements given in the Note, if not otherwise mentioned in some part of Standard SFS-EN 1993 or in other National Annexes of Standard SFS-EN 1993.

3.2.3 Fracture toughness

3.2.3(1)

The lowest service temperature should be determined according to Standard SFS-EN 1991-1-5 and its National Annex. The fracture toughness should be checked in all operating temperatures with relevant load case corresponding that temperature. The situation during erection stage should also be taken into account by using appropriate load combinations and temperatures during erection.

3.2.3(3)B

$\sigma_{Ed} = 0{,}25\ f_y(t)$ should be used for building component under compression.

Clause 2.1(2) of Standard SFS-EN 1993-1-10 states that fracture toughness need not be specified for elements only in compression. However the recommendation given in the Note B above should be used.

3.2.4 Through-thickness properties

3.2.4(1), Note 3B

The table 3.2 should be applied for building structures.

5.2.1 Effects of deformed geometry of the structure

5.2.1(3)

Other values for α_{cr} is not given.

5.2.2 Structural stability of frames

5.2.2(8)

Buckling lengths should be determined according to the rules of structural mechanics.

When this method is used the second order effects should be taken into account in the design of cross-section resistance of members and in the design of joints, connections and splices.

5.3.2 Imperfections for global analysis of frames

5.3.2(3)

The values according to Table 5.1 should be used.

5.3.2(11), Note 2

The method is not used.

5.3.4 Member imperfections

5.3.4(3)

The value k = 0,5 should be used.

6.1 General

6.1(1), Note 1

Partial factors for structures not covered by Standard SFS-EN 1993 are not given.

6.1(1), Note 2B

The recommended values should be used.

6.3.2.2 Lateral torsional buckling curves – General case

6.3.2.2(2)

The values given in the table 6.3 should be used.

6.3.2.3 Lateral torsional buckling curves for rolled sections or equivalent welded sections

6.3.2.3(1)

a) For rolled double symmetric I-sections and H-sections and hot-finished and cold-formed hollow sections with constant cross section the following values should be used:

$\overline{\lambda}_{LT,0} = 0,4$

$\beta = 0,75$.

b) For welded double symmetric I-sections with constant cross section the following values should be used:

$\overline{\lambda}_{LT,0} = 0,2$

$\beta = 1,0$.

In both cases lateral torsional buckling curve is selected from table 6.5(FI).

Table 6.5 (FI) Selection of lateral torsional buckling curve for cross sections using equation (6.57)

Cross-section (constant cross section)	**Limits**	**Buckling curve**
Rolled double symmetri I- and H-sections and hot fnished hollow sections	$h/b \leq 2$ $2 < h/b < 3,1$	b c
Welded double symmetric I-section and H- sections and cold-formed hollow sections	$h/b \leq 2$ $2 < h/b < 3,1$	c d

In all other cases the rules given in 6.3.2.2 should be applied.

6.3.2.3(2)

The value f = 1,0 should be used.

6.3.2.4 Simplified assessment methods for beams with restraints in buildings

6.3.2.4(1)B, Note 2B

A limit value $\overline{\lambda}_{c0} = \overline{\lambda}_{LT,0} + 0,1$ should be used.

6.3.2.4(2)B, Note B

The value $k_{f\ell} = 1{,}10$ should be used.

6.3.3 Uniform members in bending and axial compression

6.3.3(5), Note 2

The alternative method 2 should be used, if applicable. The alternative method 1 may be used.

6.3.4 General method for lateral and lateral torsional buckling of structural components

6.3.4(1)

This method may be used, when other methods given in Standard SFS-EN 1993-1-1 are not applicable. In these cases the applicability of the general method should be verified case by case.

7.2.1 Vertical deflections

7.2.1(1)B

The final vertical (w_{max}, see Standard SFS-EN 1990) and horizontal deflections due to characteristic load combinations calculated with a static load should not exceed the values in Table 7.1(FI) if some harm is caused by it unless due to type of structure, use or the nature of activity other values are determined to be more suitable. Precamper (w_c, see Standard SFS-EN 1990) may be used for compensation of the deflection of the permanent load unless harm is not caused by it.

Table 7.1 (FI) Serviceability limit states for deflections

Structure	Serviceability limit state for deflection
Main girders: -roofs -floors Cantilevers	 L/300 L/400 L/150
Roof purlins	L/200
Wall purlins	L/150
Sheetings: -in roofs, with no risk for accumulation of water or other risk for failure of the roof -in roofs, with risk for accumulation of water or other risk for failure of the roof -when L ≤ 4,5 m -when 4,5 m < L ≤ 6,0 m -when L > 6,0 m -in floors -in walls -cantilevers	 L/100 L/150 30 mm L/200 L/300 L/100 L/100
Horizontal deflection of the structure -1- and 2-storey high buildings -other buildings	 H/150 H/400
L is span H is the height of the building at the point to be checked	
Buildings supporting crane gantry girders, see Standard SFS-EN 1993-6 and its National Annex.	

7.2.2 Horizontal deflections

7.2.2(1)B

See table 7.1 of clause 7.2.1.

7.2.3 Dynamic effects

7.2.3(1)B

Explanation:

Information for Guidance is given in the Code of Practice No. 17/2005: ***The Vibration of Floors induced by Walking,*** *published by Finnish Constructional Steelwork Association.*

Annex A

Method 1: Interaction factors k_{ij} for interaction formula in 6.3.3(4)

Annex A may be used.

Annex B

Method 2: Interaction factors k_{ij} for interaction formula in 6.3.3(4)

Annex B may be used.

Annex AB

Additional design provisions

Annex AB may be used.

Annex BB

Buckling of componets of building structures

Annex BB may be used.

BB.1.3 Hollow sections as members

BB.1.3(3)B

The buckling length L_{cr} of a hollow section brace member without cropping or flattening, welded around its perimeter to hollow section chords, may be generally taken as 0,75L for both in-plane and out-of-plane buckling. Lower buckling lengths may be used based on testing or calculations.