ANNEX 14

NATIONAL ANNEX

TO STANDARD

SFS-EN 1994-1-1 EUROCODE 4: DESIGN OF COMPOSITE STEEL AND CONCRETE STRUCTURES

Part 1-1: General rules and rules for buildings

Preface

This National Annex is used together with Standard SFS-EN 1994-1-1: 2004.

This National Annex sets out:

a) Nationally determined parameters for the clauses of Standard SFS-EN 1994-1-1, where national choice is permitted.

National choice is permitted in the following clauses of Standard SFS-EN 1994-1-1:

- 2.4.1.1(1)	- 6.4.3(1)(h)	- 9.1.1(2)	- B.2.5(1)
- 2.4.1.2(5)P	- 6.6.3.1(1)	- 9.6(2)	- B.3.6(5)
- 2.4.1.2(6)P	- 6.6.3.1(3)	- 9.7.3(4)	
- 2.4.1.2(7)P	- 6.6.4.1(3)	- 9.7.3(8)	
- 3.1(4)	- 6.8.2(1)	- 9.7.3(9)	
- 3.5(2)	- 6.8.2(2)		

b) Guidance for the use of the Informative Annexes A, B and C.

c) Guidance on the evaluation and limitation of deflections in composite structures of buildings.

2.4.1.1 Design values of actions

2.4.1.1(1)

For pre-stress by controlled imposed deformations, e.g. by jacking at supports, the partial safety factor for ultimate limit state is $\gamma_P = 1$ for both favourable and unfavourable effects.

2.4.1.2 Design values of material and product properties

2.4.1.2(5)P

For shear connection, the partial safety factor $\gamma_V = 1,25$.

2.4.1.2(6)P

For longitudinal shear in composite slabs for buildings, the partial safety factor $\gamma_{VS} = 1,25$

2.4.1.2(7)P

For fatigue verification of headed studs in buildings the value of γ_{Mf} is that used in the relevant parts of SFS-EN 1993 and $\gamma_{Mf,s} = 1,0$.

3.1 Concrete

3.1(4)

The shrinkage strains used for composite structures in buildings are those given in Annex C.

3.5(2)

The minimum value for the nominal thickness t of steel sheets is $0,70$ mm.

6.4.3 Simplified verification for buildings without direct calculation

6.4.3(1)(h)

Table 6.1 of SFS-EN 1994-1-1 for IPE and HE profiles may also be used for equivalent welded sections where the geometry complies with rules $I_{f,z,w}/I_{f,z,hr} \geq 0,9$ and $0,95 \leq h_w/h_{hr} \leq 1,05$. $I_{f,z,w}$ is the second moment of area of the flange in a welded section in the transverse direction and $I_{f,z,hr}$ is the respective second moment of area in a rolled IPE or HE section. Respectively, h_w is the depth of a welded section and h_{hr} is the depth of a rolled IPE or HE section. $I_{f,z} = b^3 t_f/12$, when notation of Fig. 1.1 in SFS-EN 1993-1-1 is used.

6.6.3.1 Design resistance

6.6.3.1(1)

The value of partial safety factor γ_V is $1,25$.

6.6.3.1(3)

Where studs are arranged in a way such that splitting forces occur in the direction of the slab thickness, the design resistance of the studs is determined on the basis of shear tests in accordance with section B.2 of Annex B in SFS-EN 1994-1-1.

6.6.4.1 Sheeting with ribs parallel to the supporting beams

6.6.4.1(3)

No special guidance is given.

6.8.2 Partial factors for fatigue assessment for buildings

6.8.2(1)

The value of the partial factor for fatigue strength is $\gamma_{Mf,s} = 1,0$.

6.8.2(2)

The partial factor for fatigue loading is γ_{Ff}. No special values for different kinds of fatigue loading are given.

9.1.1 Scope

9.1.1(2)P

The upper limit for the ratio defining the narrowly spaced webs, b_r/b_s, is $0,6$. Figure 1-FI gives additional clarification on the definition.

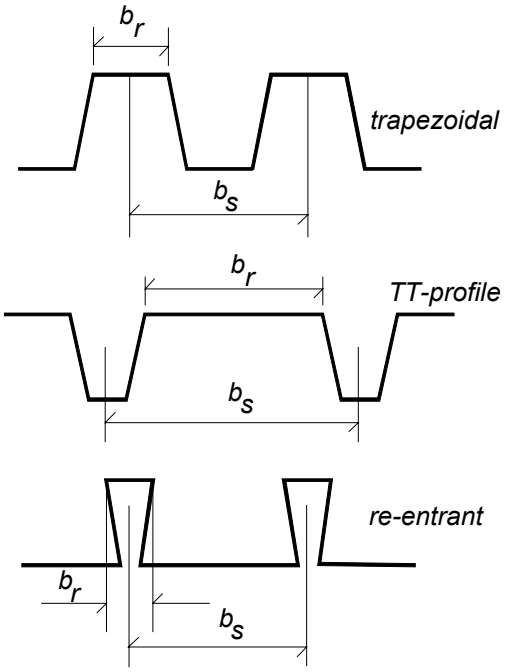

Figure 1-FI

The narrow spacing of the webs is defined in terms of:

b_r = width of ribs, b_s = spacing of the webs.

When the vertical parts of the webs are corrugated, the maximum web width is used as web width b_r.

It is most likely that the profiles of the type shown in the middle (TT-profiles) are not included in the scope.

9.6 Verification of profiled steel sheeting as shuttering for serviceability limit states

9.6(2)

The deflection δ_s of the sheeting under its own weight plus the weight of wet concrete, excluding the construction load should not exceed $\delta_{s,max} = L/180$. L is the effective span between supports, props being supports in this context.

9.7.3 Longitudinal shear for slabs without end anchorage

9.7.3(4)

The value for the partial safety factor γ_{VS} in equation (9.7) is *1,25*.

9.7.3(8)

In expression $\tau_{u,Rd} = \tau_{u,Rk}/\gamma_{VS}$, the value of the partial safety factor γ_{VS} is *1,25*.

9.7.3(9)

In expression (9.8) N_c may be increased by μR_{Ed} provided that $\tau_{u,Rd}$ is determined taking into account the additional longitudinal shear resistance caused by the support reaction. The value of the nominal factor μ is *0,5*, provided that it is clearly stated in the product specification of the sheeting that the additional effect of the support reaction has been taken into account in the appropriate tests for $\tau_{u,Rd}$. Otherwise, $\mu = 0$ is applied.

Annex A
Stiffness of joint components in buildings

Informative Annex A may be used.

Annex B
Standard tests

Informative Annex B may be used taking into account the values of nationally determined parameters given below.

B.2.5(1)

In expression (B.1) the value of the partial safety factor γ_V is *1,25*.

B.3.6(5)

The design strength $\tau_{u,Rd}$ is the characteristic strength $\tau_{u,Rk}$ divided by the partial safety factor $\gamma_{VS} = 1,25$.

Annex C
Shrinkage of concrete for composite structures for buildings

Informative Annex C may be used.

Guidance on evaluation and limitation of deflections in composite structures in buildings

The deflections are evaluated in accordance with section 7.3.1 of SFS-EN 1994-1-1 and they should be below the limits set out in Table 1-FI of this National Annex. The Table sets out the recommended maximum values for final deflections and horizontal displacements in the composite structures due to characteristic combination of static loads, unless other limits due to type of the structure, its intended use or known behaviour are better applicable.

Table 1-FI The maximum values of deflections and horizontal displacements of composite structures in serviceability limit state

$w_{max} = w_1 + w_2 + w_3 - w_c$ The deflections are calculated using characteristic load combination conforming to expressions (6.14) and quasi-permanent combination conforming to expressions (6.16) of SFS-EN 1990		
Recommended limits for	w_{max}	$w_2 + w_3$
Roofs	*L/200*	*L/250*
Floors in general	*L/250*	*L/300*
Floors supporting columns	*L/400*	*L/500*
Deflection of structures that carry partitions of brittle nature, after installation of walls	*L/400*	*L/500*
Horizontal displacement of a structure - Buildings of no more than two storeys - Other buildings	 *H/150* *H/400*	

L = span length,
H = height of the building in the section considered,
w_c = precamber of the steel member,
w_1 = short-term deflection due to permanent loads (expressions (6.14) in SFS-EN 1990),
w_2 = long-term effects on the deflection due to permanent loads (expressions (6.16) in SFS-EN 1990),
w_3 = deflection due to variable loads (expressions (6.16) in SFS EN 1990).