ANNEX 17

NATIONAL ANNEX

TO STANDARD

SFS-EN 1995 EUROCODE 5: DESIGN OF TIMBER STRUCTURES

Part 1-2: General. Structural fire design

Foreword

This National Annex is issued to be used together with Standard SFS-EN 1995-1-2:2004.

This National Annex sets out:

a) Nationally determined parameters for the following clauses of EN 1995-1-2:2004 where national choice is permitted.

- 2.1.3(2)
- 2.3(1)P
- 2.3(2)P
- 2.4.2(3)
- 4.2.1(1)

b) Guidance on use of the Informative Annexes A, B, C, D, E and F.

2.1.3 Parametric fire exposure

2.1.3(2)

No values are given for the average temperature rise and the maximum temperature rise during the decay phase.

Explanation:

The requirement for the separating function is based only on standard fire exposure and the temperature limits set by it.

The fire safety requirement is deemed to be satisfied also if the building is designed and executed based on design fire scenarios, which cover situations likely to occur in the said building. The satisfaction of the requirement is attested case-by-case taking into consideration the properties and use of the building (The National Building Code of Finland E1:1.3.2).

2.3. Design values of material properties and resistances

2.3(1)P and 2.3(2)P

Partial safety factor for material properties in fire is $\gamma_{M,fi}$ = 1,0.

2.4.2 Member analysis

2.4.2(3)

The value η_{fi} = 0,6 is used for the reduction factor except for imposed loads according to category E given in standard EN 1991-1-1 where the value is η_{fi} = 0,7.

4.2.1 General

4.2.1(1)

The section properties should be determined by the rules given in 4.2.2.

Annex A
Parametric fire exposure

Informative Annex A may be used in Finland.

Annex B
Advanced calculation methods

Informative Annex B may be used in Finland.

Annex C
Load-bearing floor joists and wall studs in assemblies whose cavities are completely filled with insulation

Informative Annex C is used in Finland as follows:

C1 (1), *amendment*

The method may be used although the cavities are would not be completely filled with insulation if the thickness of insulation is at least 100 mm and the density at least 30 kg/m^3. The insulation shall be at the level of the narrow side of the member exposed to fire so that it protects the wide sides of the member from charring.

C2.1 (3), *amendment*

Value $k_s = 1.0$, when $b \geq 90$ mm, is added to Table C1. For intermediate values of b, linear interpolation is applied.

C2.1 (4)

correction
Equations (C.3) and (C.4) should be the other way round i.e. equation (C.3) is related to joint configurations 1 and 3 and equation (C.4) to joint configurations 2 and 4.

amendment
The insulation factor values k_2 in table 1 shall be used for floors and the values k_2 in table 2 for walls. The values are not dependant on joint configurations.

Table 1 Time of start of charring t_{ch} and failure time of claddings t_f as well as factors k_2 and k_3 for floor structures.

Cladding	t_{ch}	k_2	t_f	k_3 1) / k_3 2)
	min		min	
A 3)	10	-	10	3.0 / 4.0
2 x A 3)	30	-	30	3.0 / 4.0
A + F 3,4)	40	0.85	45	3.8 / 5.0
F 4)	15	0.85	30	3.8 / 5.0
2 x F 4)	60	0.85	> 60	-
Pl + F 4,5)	40	0.85	45	4.0
Pl + A 3,5)	30	-	30	3.0

1) If the insulation is supported in such a manner that there is no charring on the wide sides of joists
2) If the insulation is supported with steel channels or timber battens or chicken wire (the wide sides are not completely uncharred)
3) A-board 13 mm thick gypsum board
4) F-board 15 mm thick gypsum board manufactured especially for fire
5) Pl-board 12 mm thick plywood or some other wood-based panel. If thickness d of plywood or wood-based panel board is greater than 12 mm the values t_{ch} and t_f in the table are increased by Δt, when $\Delta t = (d - 12) / \beta_0$.

Taulukko 2 Time of start of charring t_{ch} and failure time of claddings t_f as well as factors k_2 and k_3 for wall structures.

Cladding	t_{ch}	k_2	t_f	k_3
	min		min	
A [1)]	15	-	15	1.5
2 x A [1)]	40	-	40	1.0
A + F [1,2)]	55	0.85	>60	-
F [2)]	20	0.85	50	3.8
2 x F [2)]	65	0.85	> 60	-
Pl + F [2,3)]	55	0.85	>60	-
Pl + A [1,3)]	40	-	40	1.0

1) A-board 13 mm thick gypsum board
2) F-board 15 mm thick gypsum board manufactured especially for fire
3) Pl-board 12 mm thick plywood or some other wood-based panel. If thickness d of plywood or wood-based panel is greater than 12 mm the values t_{ch} and t_f in the table are increased by Δt, when $\Delta t = (d - 12) / \beta_0$.

C2.1(5)

amendment
The factors k_3 in table 1 are used for floors and the factors k_3 in table 2 for walls. The values given for floor structures depend on how the insulation is supported.

C2.1(6)

amendment
If cavity insulation is made of glass wool, fire design of wall and floor structures is performed according to method given in Annex D (Charring of members in wall and floor assemblies with void cavities).

C2.2(2)

correction
Where the fire protective claddings are made of gypsum plasterboard of type A, H or F the time of start of charring on the narrow fire-exposed side of the timber member should be determined according to 3.4.3.3(2), expressions (3.11) or (3.12) **or 3.4.3.3(3) or 3.4.3.3(4).**

amendment
Where the fire protective claddings are made of gypsum plasterboard of type A, R or F or of the combination of these boards and wood-based panels (gypsum plasterboard outermost), the time of start of charring t_{ch} in table 1 shall be used for floors and the time of start of charring t_{ch} in table 2 for walls.

C2.3(4)

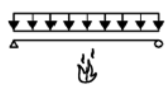
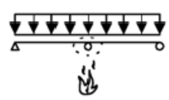
amendment
Where the fire protective claddings are made of gypsum plasterboard of type A, R or F or of the combination of these boards and wood-based panels (gypsum plasterboard outermost) the failure time of claddings t_f in table 1 shall be used for floors and the failure time t_f in table 2 for walls.

C2.3(5)

amendment
The value k_j = 1.0 is used for all joint types. k_2 is insulation factor according to Tables 1 or 2.

C3 (1)

amendment
Following values are added to table C2:

		Case	***h*** *mm*	a_0	a_1
1	*Bending strength with exposed side in tension*		*300*	*0,84*	*0,51*
			400	*0.94*	*0.51*
			500	*1.00*	*0.51*
2	*Bending strength with exposed side in compression*		*300*	*0,73*	*0,47*
			400	*0.81*	*0.47*
			500	*0.89*	*0.47*

For intermediate values of *h* in tables C2 and C4, linear interpolation is applied.

Annex D
Charring of members in wall and floor assemblies with void cavities

Informative Annex D is used in Finland as follows:

D2 (1)

amendment
For fire protective claddings made of gypsum plasterboard or of the combination of wood-based panel and gypsum plasterboard the insulation factor values k_2 in table 1 are used for floors and the values in table 3 for walls.

D3 (2)

correction
For fire protective claddings made of gypsum plasterboard the time until start of charring t_{ch} of timber members should be determined according to the following:

-on the narrow side of the timber exposed to the fire, see figure D1, according to expression (3.11) or (3.12) **or according to clause 3.4.3.3(3) or (4)**

amendment
For fire protective claddings made of gypsum plasterboard or of the combination of wood-based panel and gypsum plasterboard the time until start of charring t_{ch} of timber members the values in table 1 are used for floors and the values in table 3 for walls. The same time of start of charring is used for narrow and wide sides of a member.

D4 (2)

amendment
For fire protective claddings made of gypsum plasterboard or of the combination of wood-based panel and gypsum plasterboard the values of failure time t_f are taken from table 1 for floors and from table 3 for walls.

Table 3 Time of start of charring t_{ch} and failure time of claddings t_f as well as factors k_2 and k_3 for wall structures.

Cladding	t_{ch}	k_2	t_f	k_3
	min		min	
A [1]	15	-	15	2.0
2 x A [1)]	40	-	40	2.0
A + F [1,2)]	55	0.85	77	2.0
Pl + F [2,3)]	55	0.85	77	2.0
Pl + A [1,3)]	40	-	40	2.0

1) A-board 13 mm thick gypsum board
2) F-board 15 mm thick gypsum board manufactured especially for fire
3) Pl-board 12 mm thick plywood or some other wood-based panel. If thickness d of plywood or wood-based panel is greater than 12 mm the values t_{ch} and t_f in the table are increased by Δt, when $\Delta t = (d - 12) / \beta_0$.

addition
Reduced cross-section method, clause 4.2.2, is used for determining of mechanical resistance. Factor k_0 is determined according to clause 4.2.2(3).

Annex E
Analysis of the separating function of wall and floor assemblies

Informative Annex E is used in Finland as follows:

Calculation method is used only for the analysis of wall structures.

E1 (3)

addition
The rules are applied for loadbearing timber studs, claddings made of wood-based panels according to standard EN 13986 and claddings made of gypsum plasterboards of type A, F or H according to standard EN 520. Integrity of structures made of other materials shall be determined experimentally.

Design values of type A can be used for gypsum plasterboard of type R.

E1 (3) NOTE, correction

NOTE The test method of walls is presented in standards EN 1364-1 (non-loadbearing) and EN 1365-1 (loadbearing) and the test method of floors in standard EN 1365-2.

Annex F
Guidance for users of this Eurocode Part

Informative Annex F is used in Finland as follows:

Reduced cross-section method is chosen as design procedure for mechanical resistance in the flow chart F1.