

Section 7 – Durability

Subsection E17 - Laminated or Multi-laminated Glass Assemblies for Structural Use

Clause E17.1

Glass requiring an FRR commonly uses a clear intumescent interlayer “gel” in a laminated or multi-laminated glass assembly. Such laminated glass should be tested in accordance with BS EN ISO 12543, *Glass in building – Laminated glass and laminated safety glass*.

Reference – List of Tables

1. The FRR of the standard of construction and building materials are set out in the following Tables for reference.

2. In this List :
 - “gypsum plaster” means gypsum building plaster complying with BS EN 13279;
 - “gypsum plaster board” means gypsum plaster board complying with BS EN 520.

3. The List contains:
 - Table E2 on Walls Constructed Wholly of Non-combustible Materials
 - Table E3 on Walls not Constructed Wholly of Non-combustible Materials
 - Table E4 on Floors and Landings
 - Table E5 on Steel Columns and Beams
 - Table E6 on Reinforced Concrete Columns and Beams
 - Table E7 on Stairs

TABLE E2

WALLS CONSTRUCTED WHOLLY OF NON-COMBUSTIBLE MATERIALS

Construction and Materials	Minimum thickness in mm (excluding plaster) for FRR of		
	240 mins	120 mins	60 mins
SOLID CONSTRUCTION			
Solid bricks of clay, concrete or sand lime without plaster	225	225*	100
Reinforced concrete -			
(a) containing not less than 1 per cent of vertical reinforcement	180	100	75
Concrete cover to main reinforcement	25	25	15
(b) containing less than 1 per cent of vertical reinforcement	240	160	120
Concrete cover to main reinforcement	25	25	25
HOLLOW BLOCK CONSTRUCTION			
Clay blocks (outer web not less than 13mm thick) of 2 cells not less than 50 per cent solid finished with 13mm gypsum plaster on each side		100	100
Concrete blocks of one cell in wall thickness not less than 50 per cent solid finished with 13mm gypsum plaster on each side			190

* Where finished with 13mm gypsum plaster on each side, the thickness may be reduced to 100mm.

TABLE E3

WALLS NOT CONSTRUCTED WHOLLY
OF NON-COMBUSTIBLE MATERIALS

Construction and Materials	Minimum thickness of finish in mm on each face for FRR of	
	120 mins	60 mins
SOLID CONSTRUCTION		
Wood wool slabs – complying with BS EN 13168 -		
(a) 50mm minimum thickness with gypsum plaster finish		13
(b) 75mm minimum thickness with gypsum plaster finish	13	6
Gypsum plaster board in cores not less than 19mm thick in section not more than 1.2m wide supported top, bottom and sides in steel channels or a timber framework, with gypsum plaster finish		10
HOLLOW CONSTRUCTION		
Steel or timber framing with facings on each side of -		
(a) Portland cement plaster, Portland cement-lime plaster or gypsum plaster on metal lathing		19
(b) 2 layers of 10mm thick gypsum plaster board with gypsum plaster finish		Nil
(c) 13mm thick gypsum plaster board with gypsum plaster finish		6
(d) 19mm thick gypsum plaster board with gypsum plaster finish		Nil

TABLE E4
FLOORS AND LANDINGS

Construction and Materials	Minimum thickness in mm for FRR of		
	240 mins	120 mins	60 mins
SOLID REINFORCED CONCRETE CONSTRUCTION			
Thickness of concrete	170	125	100
Concrete cover to all reinforcement -			
simply supported	55*	35	20
continuous	45*	25	20
SOLID PRESTRESSED CONCRETE CONSTRUCTION			
Depth including screed	170	125	100
Concrete cover to all reinforcement -			
simply supported	65*	40	25
continuous	55*	35	20

* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5kg/m² with 2mm diameter wire at not more than 100mm centres or a continuous arrangement of links at not more than 200mm centres should be incorporated in the concrete cover at a distance not exceeding 20mm from the face.

TABLE E5

STEEL COLUMNS AND BEAMS

Construction and Materials	Minimum thickness of protection in mm for FRR of		
	240 mins	120 mins	60 mins
SOLID PROTECTION			
Columns and hangers (mass per metre not less than 45kg)			
(a) Concrete not inferior to Grade 20 and reinforced in accordance with the Code of Practice for the Structural Use of Steel	75	50	50
(b) Solid bricks of clay, concrete or sand lime	75	50	50
Beams (mass per metre not less than 30 kg)			
Concrete not inferior to Grade 20 and reinforced in accordance with the Code of Practice for the Structural Use of Steel	75	50	50
HOLLOW PROTECTION			
Columns and hangers (mass per metre not less than 45kg)			
(a) Solid bricks of clay, concrete or sand lime reinforced in every horizontal joint with steel binding wire not less than 2.5mm in thickness or steel mesh weighing not less than 0.5kg/m ² .	115	50	50
(b) Portland cement plaster, Portland cement-lime plaster or gypsum plaster on metal lathing.			19
(c) Gypsum plaster on 10mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch			13
(d) Gypsum plaster on 19mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch		13	7
Beams (mass per metre not less than 30kg)			
(a) Portland cement plaster or Portland cement-lime plaster on metal lathing			19
(b) Gypsum plaster on metal lathing		22	16
(c) Gypsum plaster on 10mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch			13
(d) Gypsum plaster on 19mm gypsum plaster board with 1.6mm diameter wire binding at 100mm pitch		13	7

In this Table –

“hollow protection” means there is a void between the protective material and the web of the steel section, such hollow protection to columns should be effectively sealed at each floor level.

“solid protection” means casing which is bedded close to the steel without any intervening cavities and with all joints in that casing made full and solid.

TABLE E6

REINFORCED CONCRETE COLUMNS AND BEAMS

Construction and Materials	Minimum overall size of column in mm for FRR of		
	240 mins	120 mins	60 mins
REINFORCED CONCRETE COLUMNS AND HANGERS			
(a) Fully exposed columns and hangers	450	300	200
Concrete cover to main reinforcement	35	35	25
(b) 50 per cent exposed of columns and hangers	350	200	160
Concrete cover to main reinforcement	35	25	25
(c) One face exposed of columns and hangers	240	160	120
Concrete cover to main reinforcement	25	25	25
REINFORCED CONCRETE BEAMS			
Width of beam	280	200	200
Concrete cover to main reinforcement -			
simply supported	80*	50*	30
continuous	60*	40	30
PRESTRESSED CONCRETE BEAMS			
Width of beam	280	200	200
Concrete cover to tendons -			
simply supported	90*	70*	30

* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5kg/m² with 2mm diameter wire at not more than 100mm centres or a continuous arrangement of links at not more than 200mm centres should be incorporated in the concrete cover at a distance not exceeding 20mm from the face.

TABLE E7

STAIRS

Construction and Materials	Minimum thickness in mm for FRR of		
	240 mins	120 mins	60 mins
Reinforced concrete construction -			
Thickness at waist of slab	170	125	95
Concrete cover to all reinforcement	55*	35	20

* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5kg/m² with 2mm diameter wire at not more than 100mm centres or a continuous arrangement of links at not more than 200mm centres should be incorporated in the concrete cover at a distance not exceeding 20mm from the face.