

FireCase

Frameless structural steel encasement system



This section includes updated information, added since it was first published in July 2009. Please see the WHITE BOOK update document for details.
Last updated 05/07/2010



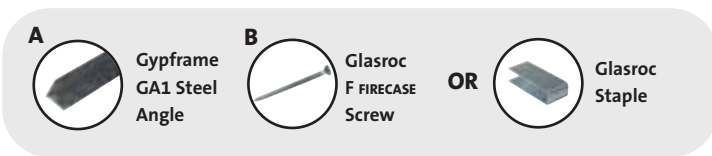
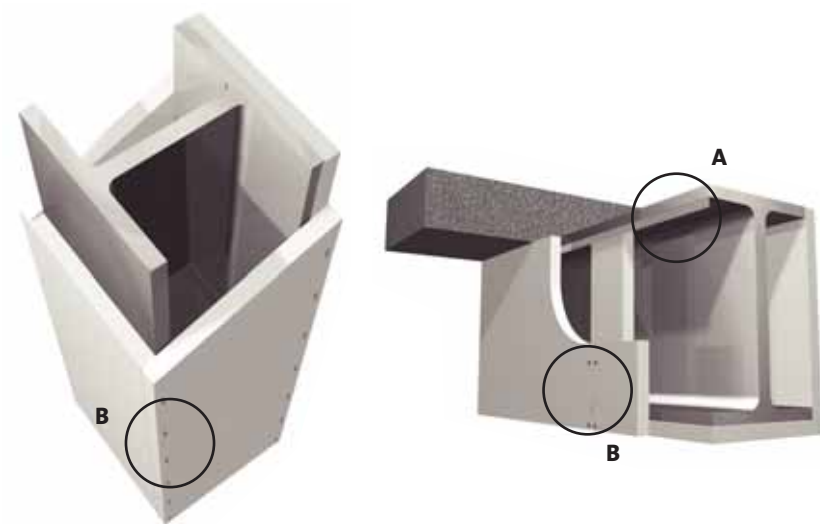
Manchester Civil Justice Centre

FireCase

30 - 180 mins

FireCase frameless encasement system provides a high quality cladding to structural steel, and offers up to 120 minutes fire protection (180 minutes can be achieved using Glasroc F FIRECASE in a framed solution - refer to GyPLYNER ENCASE for details). The system affords protection to universal steel columns and beams, together with many joist and castellated beam sections.

It can be used in any type of building where an encasement is required to structural steelwork. The Glasroc F FIRECASE lining provides a smooth, robust surface with no requirement to joint or apply a decorative treatment.



Key facts

- Non-combustible system
- Glasroc F FIRECASE cladding provides a smooth, impact resistant surface
- Option of staple-fixing for faster installation
- High levels of fire protection to structural steel
- Can be installed early in the building programme
- Simple and quick to install
- BBA Approved (93/2935)
- Listed in Association of Specialist Fire Protection Yellow Book and Loss Prevention Council Board Red Book

Applications

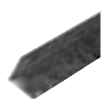
Encasement of structural steel.

Sector

- ✓ Office / commercial
- ✓ Retail
- ✓ Sport and leisure
- ✓ Education
- ✓ Healthcare
- ✓ Industrial
- ✓ Custodial
- ✓ High-rise multi-occupancy
- ✓ Auditoria

System components

Gypframe metal products



GA1 Steel Angle

Length
2900mm

Board products



Glasroc F FIRECASE

Thickness 15, 20, 25, 30mm
Width 600, 1200mm
Length 2000, 2400, 3000mm

Fixing and finishing products



Glasroc Staples

50mm long. Use with cordless Glasroc Impulse Staple Gun for board-to-board fixing (except 30mm board).

or



Glasroc F FIRECASE Screws - 40, 50, 58, 70mm

For board-to-board and board-to-metal fixing.



Gyproc Drywall Metal Angle Bead

For reinforcing external angles where maximum protection is required.

or



Gyproc No-Coat Ultraflex 325

High performance drywall corner reinforcement.



Gyproc Joint Cement

For decorative seamless jointing.



Thistle Board Finish or Thistle Multi-Finish

To provide a plaster skim finish.

or



Thistle Durafinish

To provide improved resistance to accidental damage.

Installation overview



Glasroc fixings

Glasroc F FIRECASE boards can be fixed with Glasroc Staples or Glasroc F FIRECASE Screws. Consult Table 1 to establish the minimum length of fixing.

Four-sided protection to steel columns

Cladding is commenced from the base of the column. See Construction details – 1. Boards are positioned and staple-fixed board-to-board using a Glasroc Impulse Staple Gun (or similar) or alternatively using Glasroc F FIRECASE Screws of appropriate length. Board joints on adjacent sides are staggered by a minimum 600mm. For double layer linings, board joints are staggered between layers by a minimum 300mm.

Three-sided protection to steel columns incorporating steel angles

Gypframe GA1 Steel Angle is fixed to the wall both sides of the column. Additional steel angles are incorporated where the column flange is at right angles to the wall structure. See Construction details – 2. Boards are positioned and screw-fixed to the steel angles. Board-to-board fixings are made by staples or using Glasroc F FIRECASE Screws. For double layer linings, board joints are staggered between layers.

Three-sided protection to steel beams incorporating steel angles

The procedure is as for columns except that for single layer encasements, fascia board joints are backed with Glasroc F FIRECASE. Strips of Glasroc F FIRECASE are cut to a minimum 60mm width and staple or screw-fixed behind fascia board-ends, so as to half-lap the joints. See Construction details – 5.

Three-sided protection to steel columns and beams incorporating Glasroc F FIRECASE soldiers to support single layer linings providing up to 90 minutes fire protection

Glasroc F FIRECASE soldiers are pre-cut to fit neatly into the steel section. See Construction details – 3 and 6. The soldiers are located into both sides of the section at 1200mm maximum centres as boarding progresses. At fascia board joints, two soldiers are fitted side by side so that each one finishes flush with the board-end. Cladding is fixed to each joint soldier and also any intermediate soldiers using three staples or Glasroc F FIRECASE Screws. Boarding is continued as previously, staggering board joints.

NB Boards are cut using a suitable mechanical saw. Board fixings throughout (including fixings to steel angles) are at 150mm centres. Steel angles are fixed at maximum 600mm centres.

NB Jointing and finishing of Glasroc F FIRECASE is not a requirement to meeting the specified fire protection period.

Table 1 - Specialist board fixings

Board thickness (mm)	Minimum fixing length Board-to-board fixing	Board-to-metal fixing
15	40mm Glasroc F FIRECASE Screws or 50mm Glasroc Staples	40mm Glasroc F FIRECASE Screws
20	50mm Glasroc F FIRECASE Screws or 50mm Glasroc Staples	40mm Glasroc F FIRECASE Screws
25	58mm Glasroc F FIRECASE Screws or 50mm Glasroc Staples	40mm Glasroc F FIRECASE Screws
30	70mm Glasroc F FIRECASE Screws	40mm Glasroc F FIRECASE Screws
15 + 20	40mm and 50mm Glasroc F FIRECASE Screws or 50mm Glasroc Staples	40mm and 50mm Glasroc F FIRECASE Screws

For full installation details, refer to the British Gypsum **SITE BOOK**, available to download from www.british-gypsum.com

Design

Planning - key factors

FireCase steel encasement is suitable for protecting structural steel sections with a section factor A/V (H_p/A) up to 260m^{-1} , calculated on the basis of box protection to three or four sides as required. It will protect universal column and beam sections described in *BS 4: Part 1*, and many joist and castellated beam sections.

Lining selection

The designer should follow the procedure below to determine the thickness of cladding required:

1. Ascertain whether protection is required on three or four sides of the section.
2. Find out what period of fire resistance is required.
3. Refer to the A/V (H_p/A) **Tables 2 - 4**. Locate the steel section to be protected, listed by its size and mass per metre, and read off the section factor A/V .
4. Refer to **Tables 5 - 8**. Locate the A/V value on the vertical scale on the appropriate table. Read across the chart to the column relating to the period of fire resistance required and read off the designated thickness of the relevant cladding required to form the encasement.
5. Select the type of board to be used.

For castellated sections and cellular beams please refer to the Association for Specialist Fire Protection publication, ASFP Yellow Book - 'Fire Protection for Structural Steel in buildings' for guidance, available to download from www.asfp.org.uk

For improved durability and impact resistance, the outer layer of Gyproc FireLine can be replaced with a layer of 15mm Gyproc DuraLine.

Partition fixing

Partitions and wall linings may be fixed directly to the Glasroc F FIRECASE cladding as long as:

1. The fire resistance requirement of the partition is 60 minutes or less.
2. There are no special requirements for pressure resistance, e.g. around lift shafts.
3. There are no special loading requirements, i.e. Heavy Duty or Severe Duty as defined in recognised partition performance specifications (e.g. *BS 5234*). See **Construction details – 9**.

Where these criteria are not met, the partition framing must be suitably fixed to the structural steel section, through the Glasroc F FIRECASE cladding. Where the partition abuts the web of the structural steel, a suitable steel noggling must be provided. See **Construction details – 10**.

Additional support

Where steel section web dimensions exceed 600mm, additional support will be required for the cladding. Please contact the British Gypsum Drywall Academy for guidance.

Tiling

Lightweight tiles can be applied using conventional tile adhesives without pre-treatment of the Glasroc F FIRECASE.

Finishing

▶ Refer to **section 13 – Finishing systems and decorative effects**.

Glasroc F FIRECASE joints can be treated using Gyproc Joint Tape bedded in Gyproc Joint Cement. External angles / corners can be reinforced using Gyproc No-Coat Ultraflex 325 bedded in Gyproc Joint Cement.

If a plaster finish is required, joints should be reinforced and Thistle Board Finish, Thistle Durafinish or Thistle Multi-Finish applied.

▶ Refer to **section 13 – Finishing systems and decorative effects, Plaster skimming**.

Jointing and finishing is not a requirement of meeting the specified fire resistance. Board joints / abutments must be a flush fit.

Table 2 - Section factor A/V (Hp/A) of Universal Beams

Serial size mm	Mass / metre kg	3 sides m ²	4 sides m ²
914 x 419 ¹	388	45	55
	343	50	60
914 x 305 ¹	289	60	65
	253	65	75
	224	75	85
	201	80	95
838 x 292 ¹	226	70	80
	194	80	90
	176	90	100
762 x 267 ¹	197	70	85
	173	80	95
	147	95	110
686 x 254 ¹	170	75	90
	152	85	95
	140	90	105
	125	100	115
610 x 305 ¹	238	50	60
	179	70	80
	149	80	95
610 x 229 ¹	140	80	95
	125	90	105
	113	100	115
	101	110	130
533 x 210	122	85	95
	109	95	110
	101	100	115
	92	110	125
	82	120	140
457 x 191	98	90	105
	89	100	115
	82	105	125
	74	115	135
	67	130	150
457 x 152	82	105	120
	74	115	130
	67	125	145
	60	140	160
	52	160	180
406 x 178	74	105	125
	67	115	140
	60	130	155
	54	145	170
406 x 140	46	160	185
	39	190	220
356 x 171	67	105	125
	57	125	145
	51	135	165
	45	155	185
356 x 127	39	170	195
	33	195	225
305 x 165	54	115	140
	46	130	160
	40	150	180
305 x 127	48	125	145
	42	140	160
	37	155	180
305 x 102	33	175	200
	28	200	225
	25	225	260
254 x 146	43	120	150
	37	140	170
	31	160	200
254 x 102	28	170	200
	25	190	220
	22	215	250
203 x 133	30	145	180
	25	165	210
203 x 102	23	175	210
178 x 102	19	190	230
152 x 89	16	190	235
127 x 76	13	195	240

¹ These sections are above 600mm deep and will require additional support.

Table 3 - Section factor A/V (Hp/A) of Universal Columns

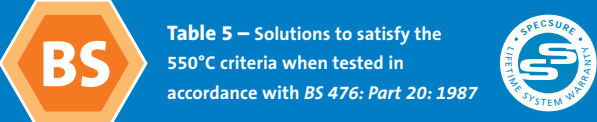
Serial size mm	Mass / metre kg	3 sides m ²	4 sides m ²
356 x 406	634	15	20
	551	20	25
	467	20	30
	393	25	35
	340	30	35
	287	30	45
	235	40	50
356 x 368	202	45	60
	177	50	65
	153	55	75
	129	65	90
305 x 305	283	30	40
	240	35	45
	198	40	50
	158	50	65
	137	55	70
	118	60	85
	97	75	100
254 x 254	167	40	50
	132	50	65
	107	60	75
	89	70	90
	73	80	110
203 x 203	86	60	80
	71	70	95
	60	80	110
	52	95	125
	46	105	140
152 x 152	37	100	135
	30	120	160
	23	155	205

Table 4 - Section factor A/V (Hp/A) of Universal Joists

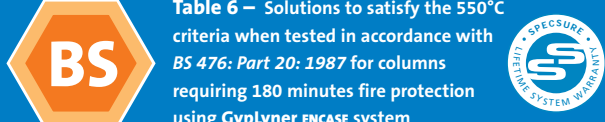
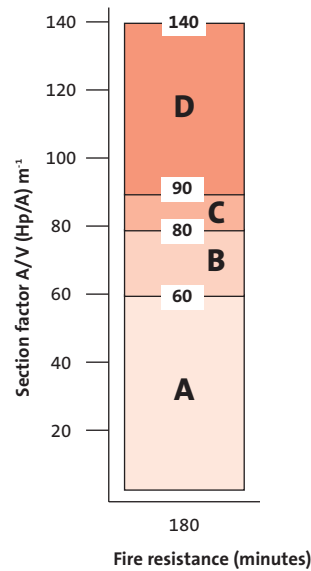
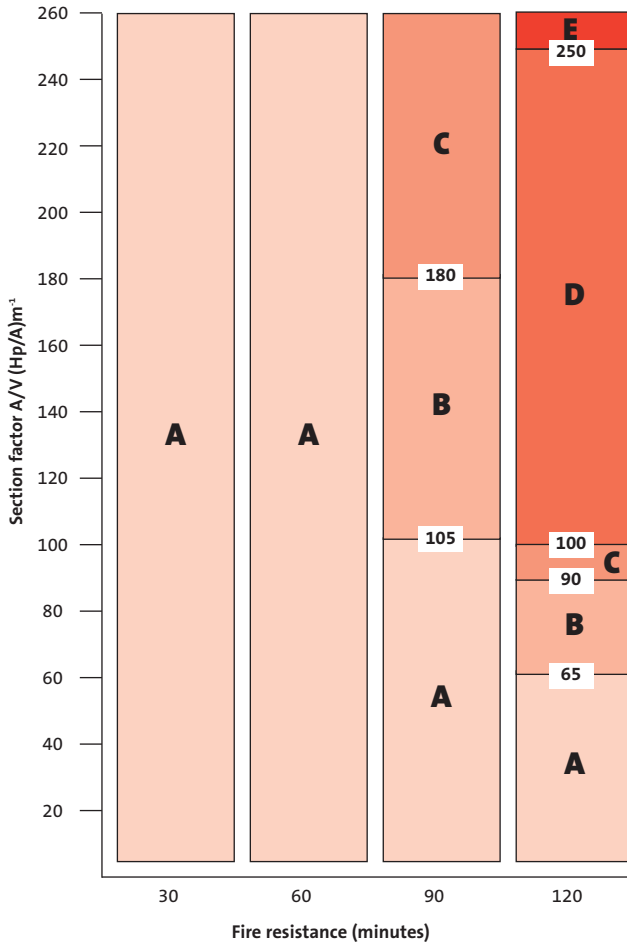
Serial size mm	Mass / metre kg	3 sides m ²	4 sides m ²
254 x 203	82	70	90
254 x 114	37	130	155
203 x 152	52	85	105
152 x 127	37	90	120
127 x 114	30	100	130
127 x 114	27	110	140
114 x 114	27	100	135
102 x 102	23	105	140
89 x 89	19	105	145
76 x 76	13	140	185

Performance (▶ Refer to section 3 - Basic principles of system design)

BS Table 5 – Solutions to satisfy the 550°C criteria when tested in accordance with BS 476: Part 20: 1987



BS Table 6 – Solutions to satisfy the 550°C criteria when tested in accordance with BS 476: Part 20: 1987 for columns requiring 180 minutes fire protection using Gyplyner encase system

System references D120001 (screwed system)
D120002 (stapled system)

System reference D120003

Key - Thickness of Glasroc F FIRECASE required

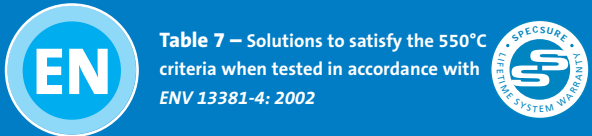
- A = 15mm
- B = 20mm
- C = 25mm
- D = 30mm
- E = 35mm (15mm + 20mm)

Key - Thickness of Glasroc F FIRECASE board required

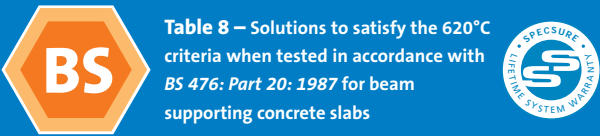
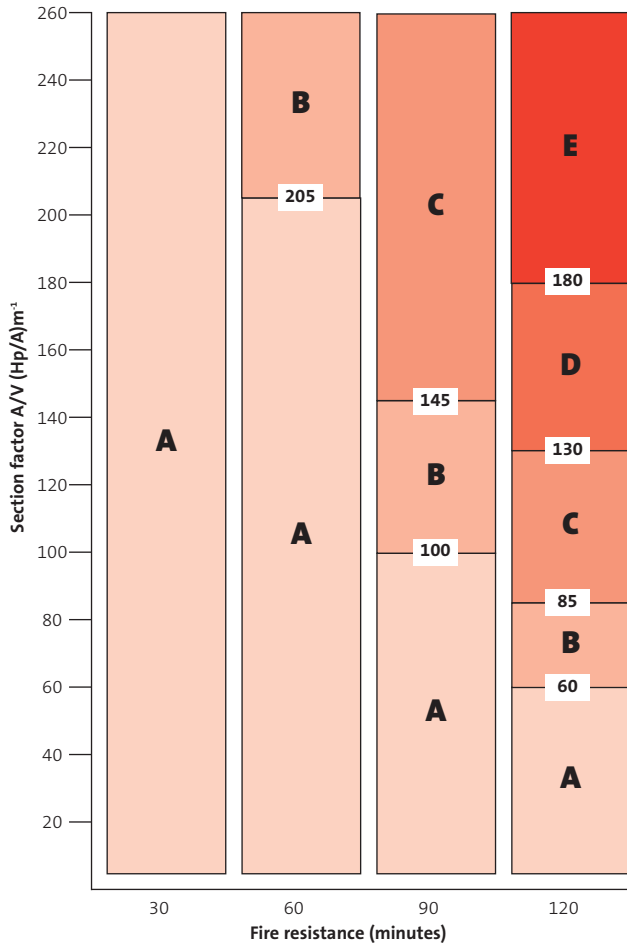
- A = 35mm (20mm + 15mm)
- B = 40mm (20mm + 20mm)
- C = 45mm (25mm + 20mm)
- D = 50mm (25mm + 25mm)

▶ Please refer to section 3 - Basic principles of system design for general guidance

EN Table 7 – Solutions to satisfy the 550°C criteria when tested in accordance with ENV 13381-4: 2002



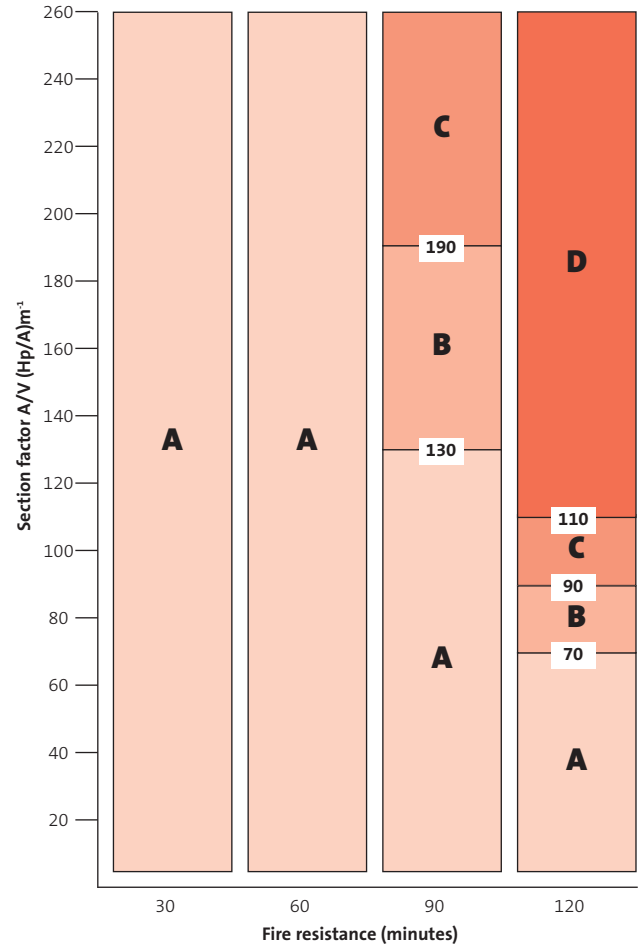
BS Table 8 – Solutions to satisfy the 620°C criteria when tested in accordance with BS 476: Part 20: 1987 for beam supporting concrete slabs

System references D120001 (screwed system)
D120002 (stapled system)

Key - Thickness of Glasroc F FIRECASE required

- A = 15mm
- B = 20mm
- C = 25mm
- D = 30mm
- E = 35mm (15mm + 20mm)



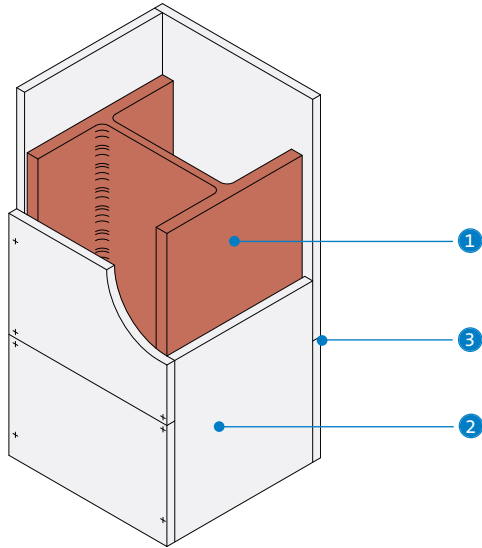
System references D120001 (screwed system)
D120002 (stapled system)

Key - Thickness of Glasroc F FIRECASE board required

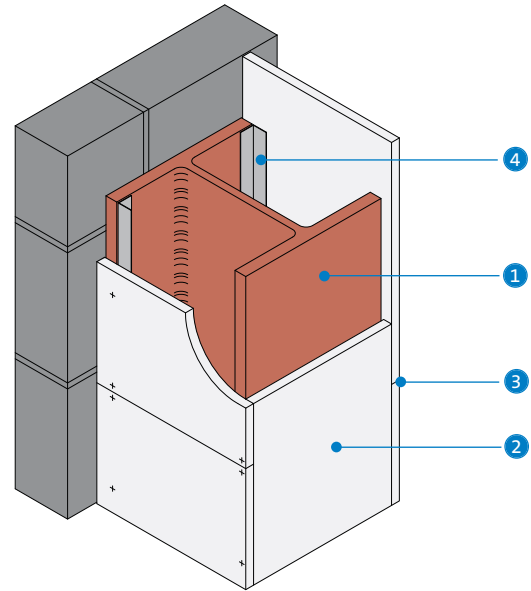
- A = 15mm
- B = 20mm
- C = 25mm
- D = 30mm

Construction details

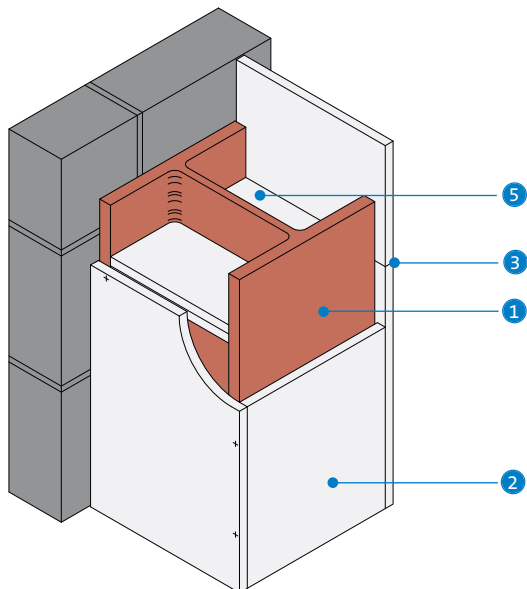
1 Four-sided column encasement for up to 120 minutes fire protection



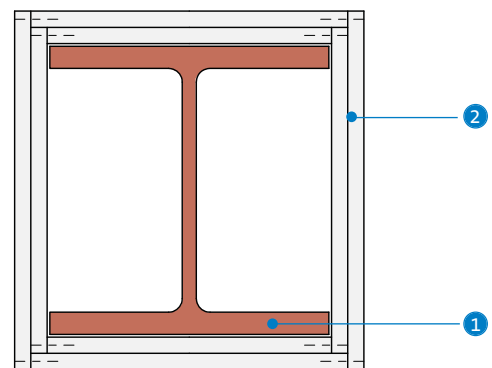
2 Three-sided column encasement incorporating steel angles for up to 120 minutes fire protection



3 Three-sided column encasement incorporating Glasroc F FIRECASE soldiers for up to 90 minutes fire protection



4 Four-sided column encasement for up to 120 minutes fire protection - double layer

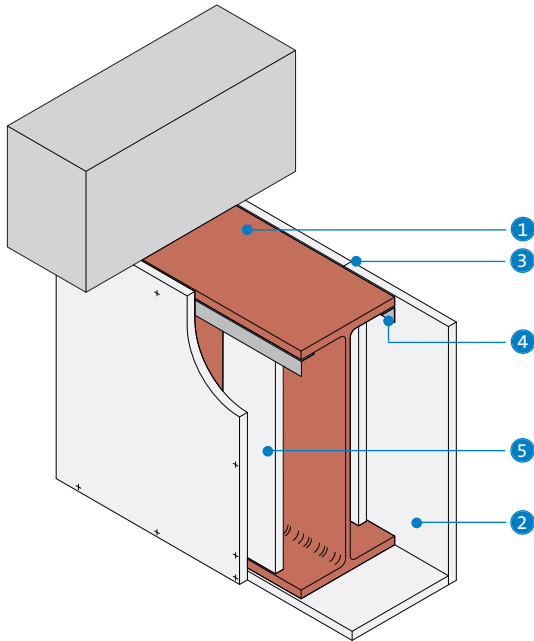


- 1 Structural steel
- 2 Glasroc F FIRECASE fixed together with Glasroc F FIRECASE Screws or Glasroc Staples at 150mm centres and fixed to Gypframe GA1 Steel Angle with Glasroc F FIRECASE Screws at 150mm centres
- 3 Board joints staggered by minimum 600mm between adjacent sides

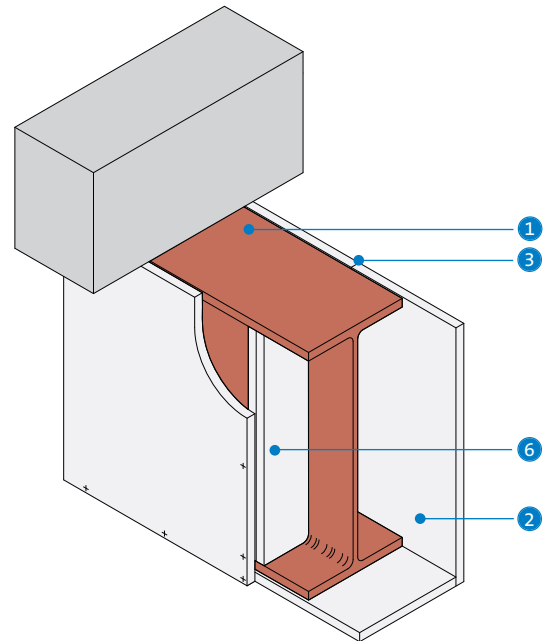
- 4 Gypframe GA1 Steel Angle suitably fixed to column flange at 600mm centres
- 5 Glasroc F FIRECASE soldiers at 1200mm centres (two together at board joints)

Construction details

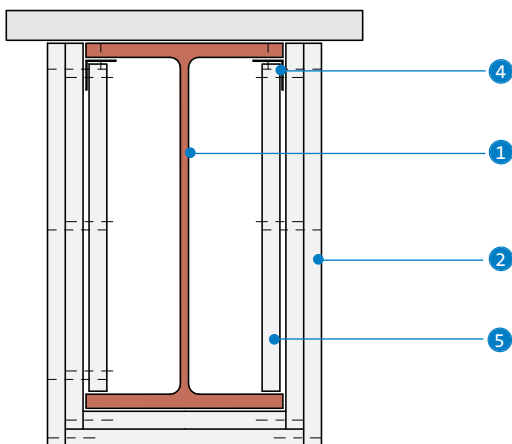
- 5** Three-sided beam encasement incorporating steel angles for up to 120 minutes fire protection



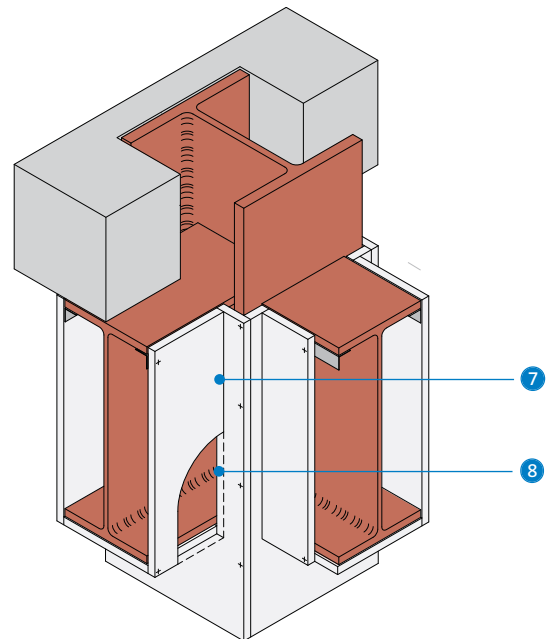
- 6** Three-sided beam encasement incorporating Glasroc F FIRECASE soldiers for up to 90 minutes fire protection



- 7** Three-sided beam encasement incorporating steel angles for up to 120 minutes fire protection - double layer



- 8** Column and beam encasement junction

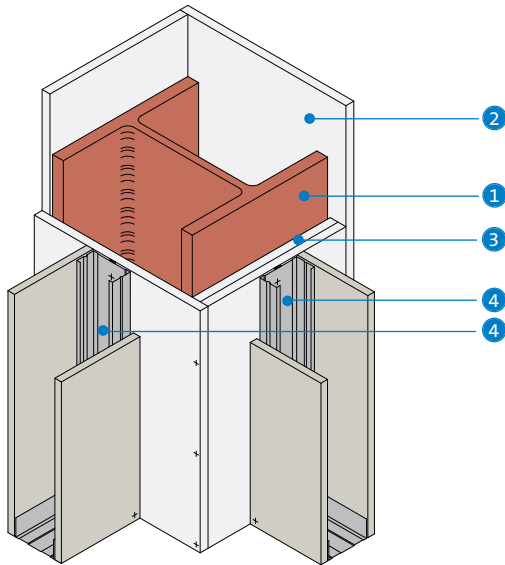


- 1 Structural steel
- 2 Glasroc F FIRECASE fixed together and to Gypframe GA1 Steel Angle with Glasroc F FIRECASE Screws at 150mm centres
- 3 Board joints staggered by minimum 600mm between adjacent sides
- 4 Gypframe GA1 Steel Angle suitably fixed to beam flange at 600mm centres
- 5 60mm wide Glasroc F FIRECASE backing strip
- 6 Glasroc F FIRECASE soldiers at 1200mm centres (two together at board joints)

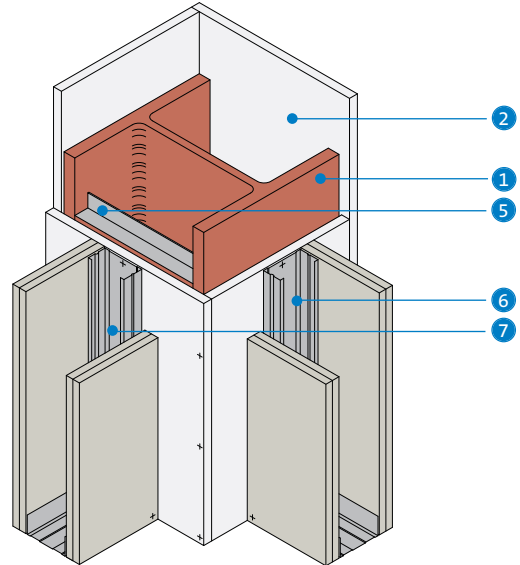
- 7 Beam encasement boards butted tight to column encasement
- 8 Column encasement boards cut around penetrations

Construction details

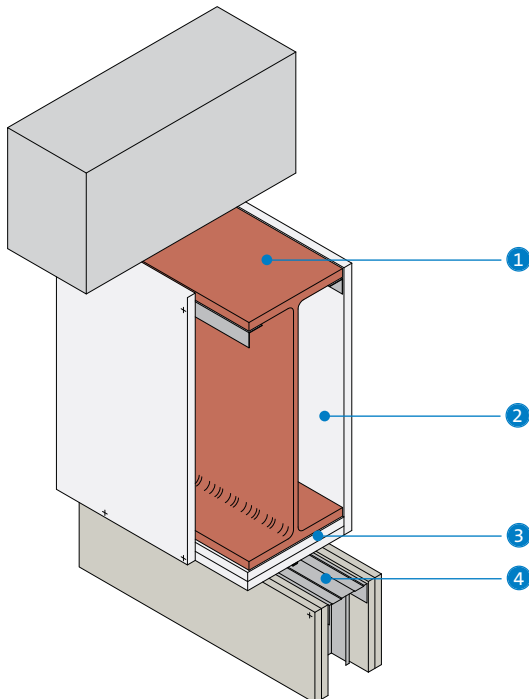
- 9** Column encasement and partition junction for partitions up to 60 minutes fire resistance and BS 5234 Light and Medium Duty



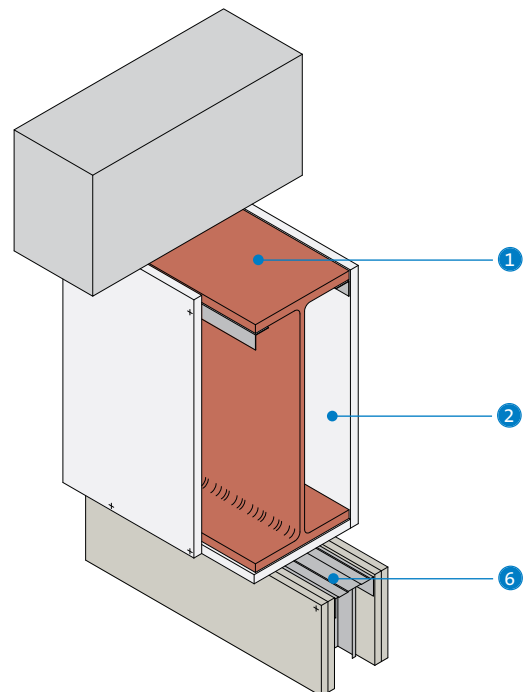
- 10** Column encasement and partition junction for partitions up to 120 minutes fire resistance and BS 5234 Heavy and Severe Duty



- 11** Beam encasement and partition junction for partitions up to 60 minutes fire resistance and BS 5234 Light and Medium Duty



- 12** Beam encasement and partition junction for partitions up to 120 minutes fire resistance and BS 5234 Heavy and Severe Duty

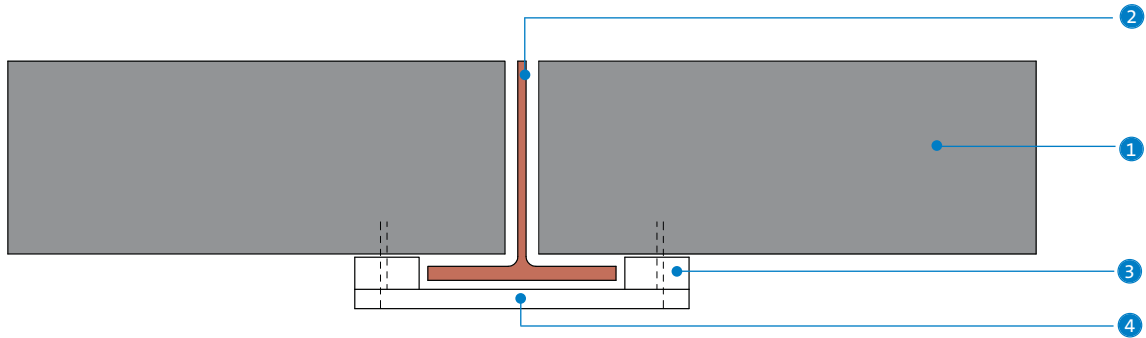


- 1 Structural steel
- 2 FireCase encasement
- 3 Additional layer of Glasroc F FIRECASE forming packer to receive partition fixing
- 4 Gypframe 'C' Stud / Channel bonded to Glasroc F FIRECASE with continuous bead of Gyproc Sealant (two beads for studs wider than 75mm) and fixed with Gyproc Drywall Screws at 600mm centres (in two lines staggered by 300mm for studs wider than 75mm). Allow 24 hours before boarding.
- 5 Suitable size Z-section (by others) fixed between column flanges at 600mm centres

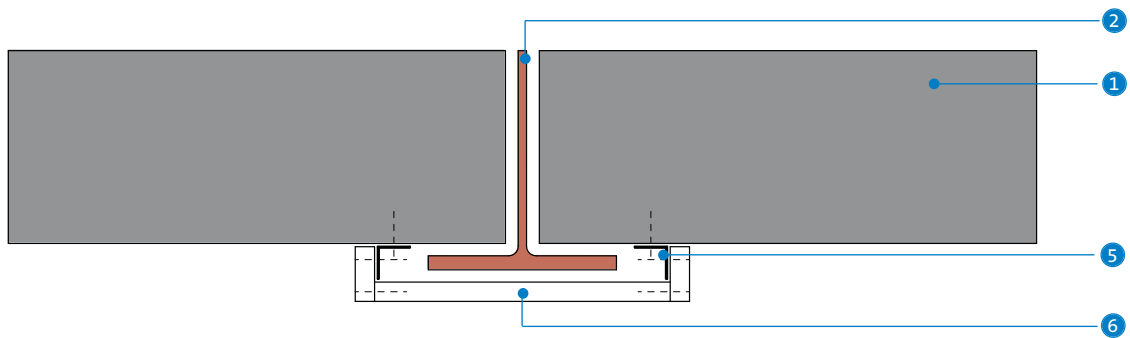
- 6 Gypframe 'C' Stud / Channel suitably fixed through Glasroc F FIRECASE to structural steel at 600mm centres (in two lines staggered by 300mm for studs wider than 75mm)
- 7 Gypframe 'C' Stud suitably fixed through Glasroc F FIRECASE to Z-sections (in two lines for studs wider than 75mm)

Construction details

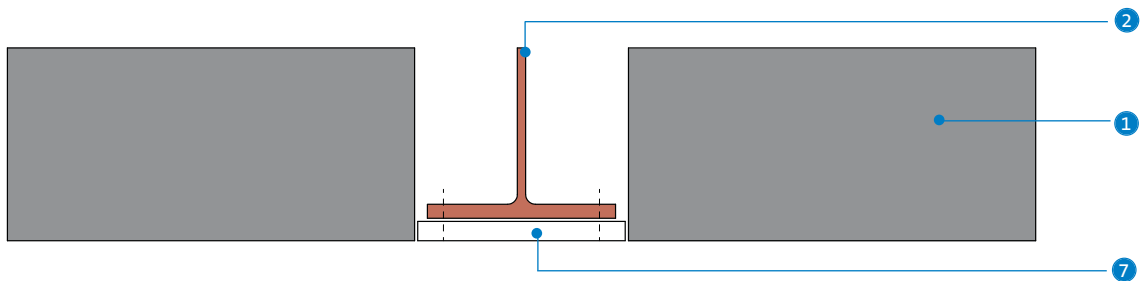
13 Column flange projection less than 30mm



14 Column flange projection less than 30mm using steel angles



15 Encasement flush with blockwork



- ① Blockwork
- ② Structural steel
- ③ Minimum 50mm wide strip of Glasroc FIRECASE suitably fixed to blockwork at 1200mm centres
- ④ Glasroc FIRECASE suitably fixed through packer to blockwork at 300mm centres

- ⑤ Gypframe GA1 Steel Angle suitably fixed to blockwork at 600mm centres
- ⑥ Glasroc FIRECASE fixed together and to Gypframe GA1 Steel Angles with Glasroc FIRECASE Screws at 150mm centres
- ⑦ Glasroc FIRECASE fixed to column with mechanical steel pin fixings at 300mm centres, in two lines staggered by 150mm