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Column and Beam Fire Protection

Column and beam protection systems consist of FireShield and ShaftLiner layers protecting structural timber, steel or concrete. This enables the structural members to maintain their load carrying capacity in the event of a fire.

This section details the most common methods to encase timber, steel or concrete columns and beams to achieve a structural fire resistance level.

The FRL (Fire Resistance Level) for structural protection systems do not require the Integrity and Insulation ratings. They are expressed with only first number for structural adequacy and two dashes, for example 90/-/-.

[For more information, refer to Section 2.3 Fire Resistance]

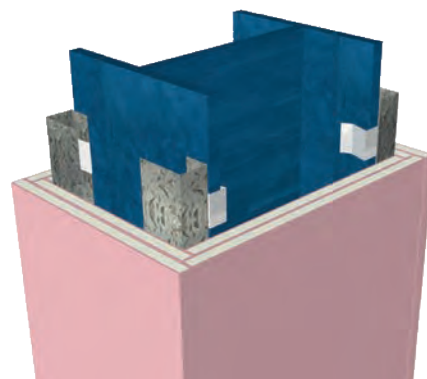
KSFP1-KSFP9

STRUCTURAL FRAME: Steel column or beam encased in either **FireShield** or **ShaftLiner**

PLASTERBOARD FRAME: [Option 1] Furring channel track with Encasement Clips at 600mm max centres friction fitted to structural frame flanges
[Option 2] Plasterboard directly fixed to structural steel

[13mm **FireShield** can be substituted with 13mm **TruRock**]

[16mm **FireShield** can be substituted with 16mm **TruRock**]



FRL	System	Plasterboard Lining	Plasterboard Thickness (mm)
30/-/- Fire Report FAR 2519	KSFP1	1 layer of 13mm FireShield	13
60/-/- Fire Report FAR 1613	KSFP2	1 layer of 16mm FireShield	16
60/-/- Fire Report FAR 3124	KSFP3	2 layers of 13mm FireShield	26
60/-/- Fire Report FAR 3124	KSFP4	1 layer of 25mm ShaftLiner	25
90/-/- Fire Report FAR 1613	KSFP5	2 layers of 16mm FireShield	32
120/-/- Fire Report FAR 1613	KSFP6	3 layers of 13mm FireShield	39
120/-/- Fire Report FAR 3124	KSFP7	1 layer of 13mm FireShield plus 1 layer of 25mm ShaftLiner	38
180/-/- Fire Report FAR 1613	KSFP8*	4 layers of 16mm FireShield	64
180/-/- Fire Report FAR 3124	KSFP9*	1 layer of 13mm FireShield plus 2 layers of 25mm ShaftLiner	63

* KSFP8 and KSFP9 can be installed as walls or bulkheads up to 1200mm wide with an FRL of 180/180/180. Fire Report FAR 4522.

KSFP10-KSFP16

STRUCTURAL FRAME: Timber column or beam (minimum dimension 92mm x 92mm) encased in either **FireShield** or **ShaftLiner**

[13mm **FireShield** can be substituted with 13mm **TruRock**]

[16mm **FireShield** can be substituted with 16mm **TruRock**]



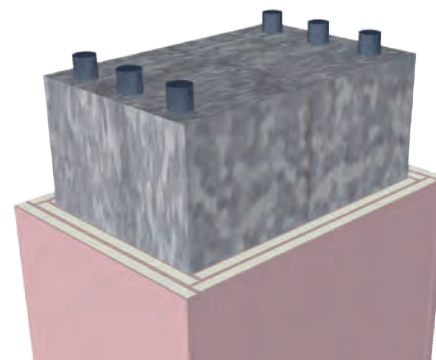
FRL	System	Plasterboard Lining	Plasterboard Thickness (mm)
30/-/- Fire Report FAR 1718	KSFP10	1 layer of 13mm FireShield	13
60/-/- Fire Report FAR 1718	KSFP11	2 layers of 13mm FireShield	26
60/-/- Fire Report FAR 3124	KSFP12	1 layer of 25mm ShaftLiner	25
90/-/- Fire Report FAR 1718	KSFP13	3 layers of 13mm FireShield	39
90/-/- Fire Report FAR 3124	KSFP14	1 layer of 13mm FireShield plus 1 layer of 25mm ShaftLiner	38
120/-/- Fire Report FAR 1718	KSFP15	3 layers of 16mm FireShield	48
180/-/- Fire Report FAR 1718	KSFP16	4 layers of 16mm FireShield	64

KSFP20-KSFP24

STRUCTURAL FRAME: Concrete column encased in **FireShield**
PLASTERBOARD FRAME: [Option 1] Plasterboard fixed to furring channels at 600mm max spacing
 [Option 2] Plasterboard fixed to concrete directly with tapcon countersunk head screws

[13mm **FireShield** can be substituted with 13mm **TruRock**]

[16mm **FireShield** can be substituted with 16mm **TruRock**]



FRL	System	Plasterboard Lining	Plasterboard Thickness (mm)
Concrete Structural Adequacy + 30/ - / - Fire Report FAR 3221	KSFP20	1 layer of 13mm FireShield	13
Concrete Structural Adequacy + 60/ - / - Fire Report FAR 3221	KSFP21	1 layer of 16mm FireShield	16
Concrete Structural Adequacy + 90/ - / - Fire Report FAR 3221	KSFP22	2 layers of 16mm FireShield	32
Concrete Structural Adequacy + 120/ - / - Fire Report FAR 3221	KSFP23	3 layers of 13mm FireShield	39
Concrete Structural Adequacy + 180/ - / - Fire Report FAR 3221	KSFP24	4 layers of 16mm FireShield	64

General Requirements

	Fire Rated
Only joint the face layer. As a minimum to achieve the FRL, only use paper tape and: <ul style="list-style-type: none"> > Two coats of MastaBase/MastaLongset, or > Three coats of MastaLite. 	✓
Use approved fire rated penetration details. Fire penetrations may require fire collars or other devices to maintain fire performance.	✓
Use fire sealant on all gaps and around perimeter, vermiculite plaster is not permitted.	✓
Check the BCA C1.8 for additional requirements for columns such as filling with concrete or surrounding column with steel casing up to 1.2m high.	✓

Framing

	Fire Rated
Install framing at maximum 450mm centres.	✓
Install furring channel track at each end of the column/beam and behind first layer butt joints.	✓

FURRING CHANNEL ANCHOR SPACING

Framing Member	Columns
13mm AccuCeil FC Recessed	900mm
18mm AccuCeil Furring Channel FC18	900mm
28mm AccuCeil Furring Channel FC28	900mm

Anchors for furring channel must also be fixed 100mm max from ends.

Plasterboard Layout

	Fire Rated
Stagger butt joints by 300mm minimum on adjoining sheets and between layers.	✓
Stagger recessed edges by 300mm minimum between layers.	✓



Minimise butt joints by using long sheets.

Plasterboard Fixing

	Fire Rated
Use the 'Screw Only Method'. Stud adhesive is not permitted.	✓
Drive screws to just below the sheet surface, taking care not to break the paper linerboard.	✓
Laminating screws can be used to fix butt joints in the second, third and fourth layers.	✓

SCREW TYPE AND MINIMUM SIZE FOR THE INSTALLATION OF PLASTERBOARD TO STEEL

Plasterboard Thickness	1st Layer	2nd Layer	3rd Layer	4th Layer
13mm	25mm screw	40mm screw	38mm – 10g laminating screws	–
16mm	30mm screw	45mm screw	38mm – 10g laminating screws	38mm – 10g laminating screws
25mm	40mm screw	–	–	–
13mm + 25mm + 25mm	25mm screw	50mm screw	38mm – 10g laminating screws	–

For steel ≤ 0.75 mm BMT minimum 6g fine thread needle point screws.

For steel ≥ 0.75 mm BMT minimum 6g fine thread drill point screws.

* 38mm – 10g Laminating screws may be used as detailed in installation diagrams.

FASTENER TYPE AND MINIMUM SIZE FOR THE INSTALLATION OF PLASTERBOARD TO TIMBER

Plasterboard Thickness	1st Layer	2nd Layer	3rd Layer	4th Layer
13mm	30mm screw	41mm screw	38mm – 10g laminating screws	–
16mm	32mm screw	50mm screw	38mm – 10g laminating screws	38mm – 10g laminating screws
25mm	45mm screw	–	–	–
13mm + 25mm	30mm screw	60mm screw	–	–

Use minimum 6g needle point screws.

* 38mm – 10g Laminating screws may be used as detailed in installation diagrams.

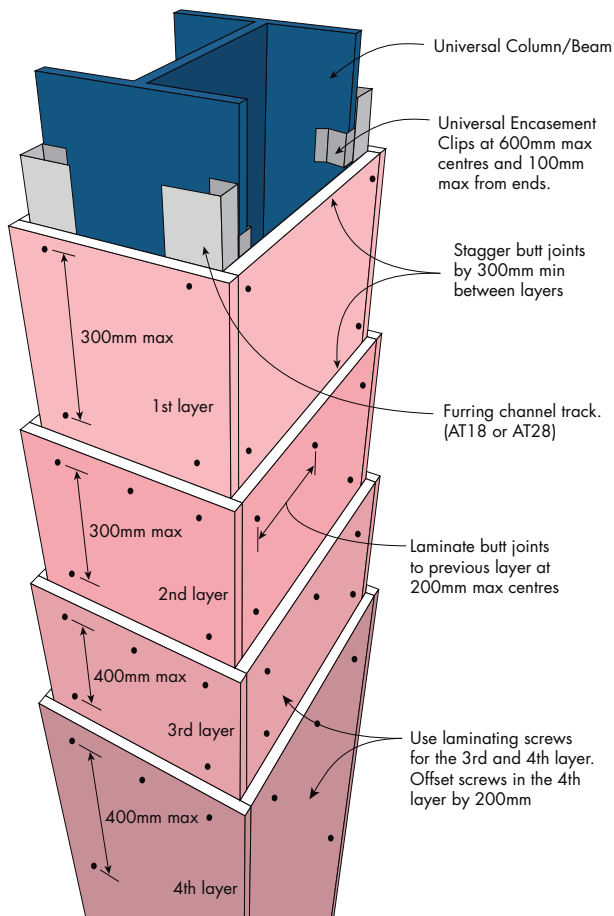
SCREW TYPE AND MINIMUM SIZE FOR THE INSTALLATION OF PLASTERBOARD TO CONCRETE

Plasterboard Thickness	1st Layer	2nd Layer	3rd Layer
13mm	32mm – 10g tapcon screw	45mm – 10g tapcon screw	38mm – 10g laminating screws
16mm	32mm – 10g tapcon screw	45mm – 10g tapcon screw	38mm – 10g laminating screws

For concrete use tapcon screws with countersunk head.

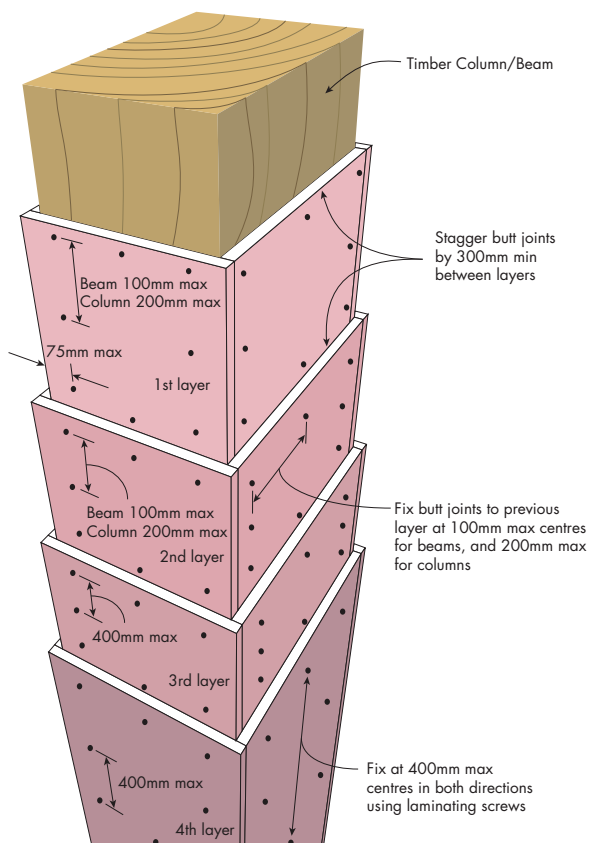


FIGURE 1 Steel Column/Beam



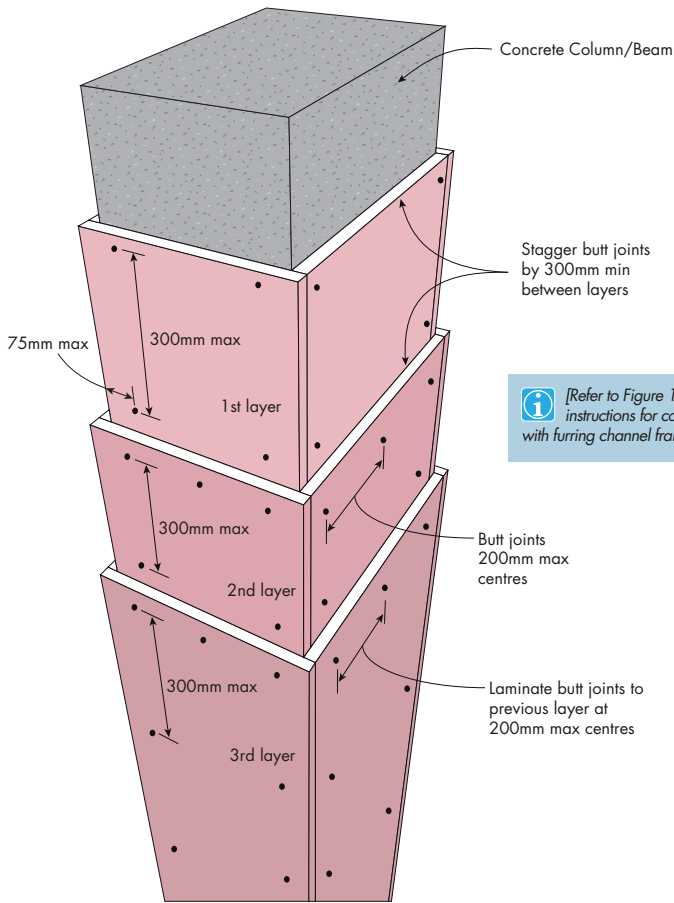
Fixing	Screw Only Method
Fasteners	All screws 50mm max from sheet edges
Edges along length	All layers: Fix at 300mm max centres. 3rd layer: Either screw to furring channel track or use laminating screws. 4th layer: Use 38mm -10g laminating screws.
Butt joints	Single Layer System: Install furring channel track behind sheet joints and fix at 200mm max centres. Multiple Layer Systems: Laminate to previous layer at 200mm max centres. Stagger butt joints by 300mm min between layers.


FIGURE 2 Timber Column/Beam



Fixing	Screw Only Method
Fasteners	All screws 75mm max from sheet edges.
Beam - Edges Along Length	All layers: Fix at 100mm max centres. Also fix at 450mm max centres in the centreline of the sheet for all layers. 3rd layer: Either screw to timber beam or use laminating screws. 4th layer: Use 38mm -10g laminating screws.
Column - Edges Along Length	All layers: Fix at 200mm max centres. 3rd layer: Either screw to timber column or use laminating screws. 4th layer: Use 38mm -10g laminating screws.
Butt Joints	Either screw to column/beam or laminate to previous layer at 200mm max centres. Stagger butt joints by 300mm min between layers.

FIGURE 3 Concrete Column



 [Refer to Figure 1 for installation instructions for concrete columns with furring channel framing]

Fixing	Screw Only Method
Fasteners	All screws 75mm max from sheet edges.
Edges along length	All layers: Fix at 300mm max centres. 3rd layer: Either screw to concrete or use 38mm -10g laminating screws.
Butt joints	Single Layer System: Fix at 200mm max centres. Multiple Layer Systems: Either screw to concrete or use 38mm -10g laminating screws at 200mm max centres to previous layer. Stagger butt joints by 300mm min between layers.

FIRE RATED

COLUMN AND BEAM FIRE PROTECTION – STEEL

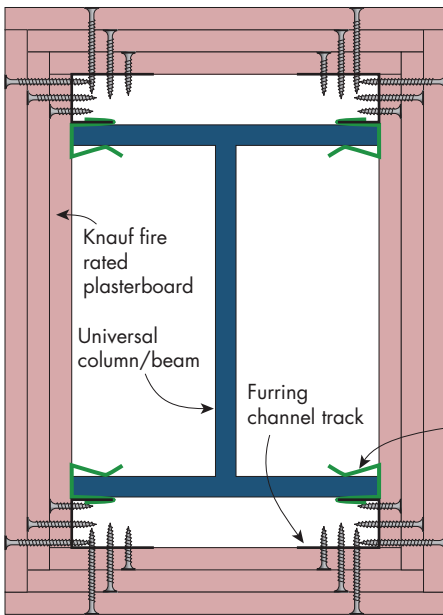


FIGURE 4 4 Sided Protection For I-Beam/Column
Plan or Section

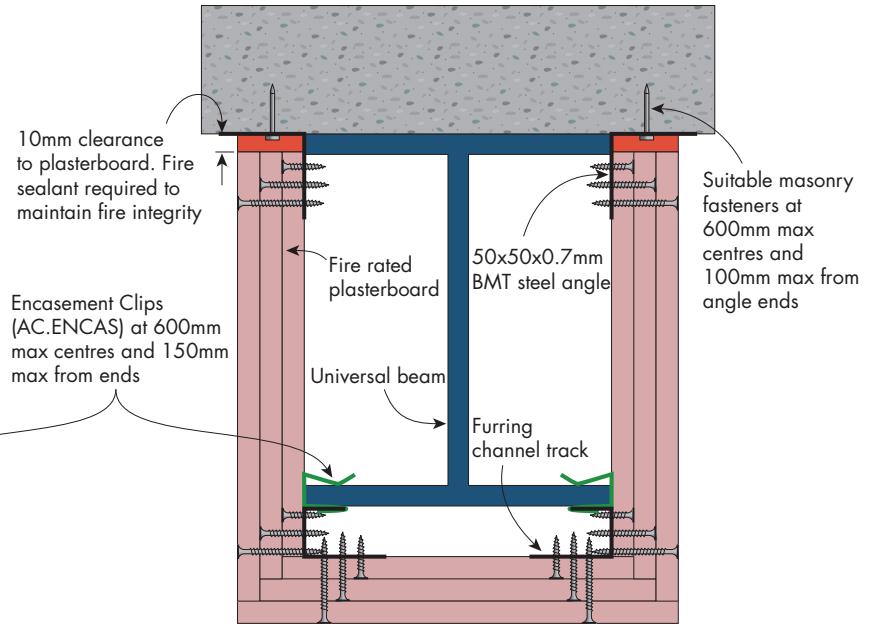


FIGURE 5 3 Sided Protection For I-Beam
Section

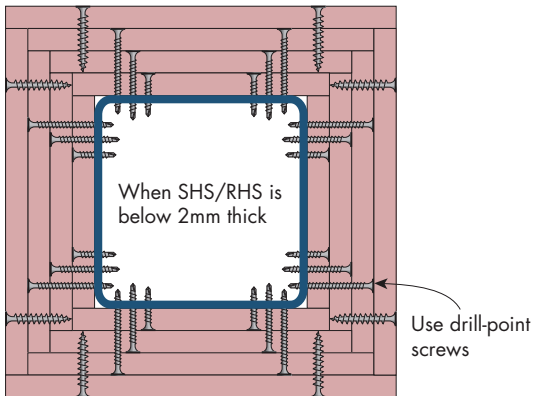


FIGURE 6 4 Sided Protection for SHS/RHS
Plan or Section

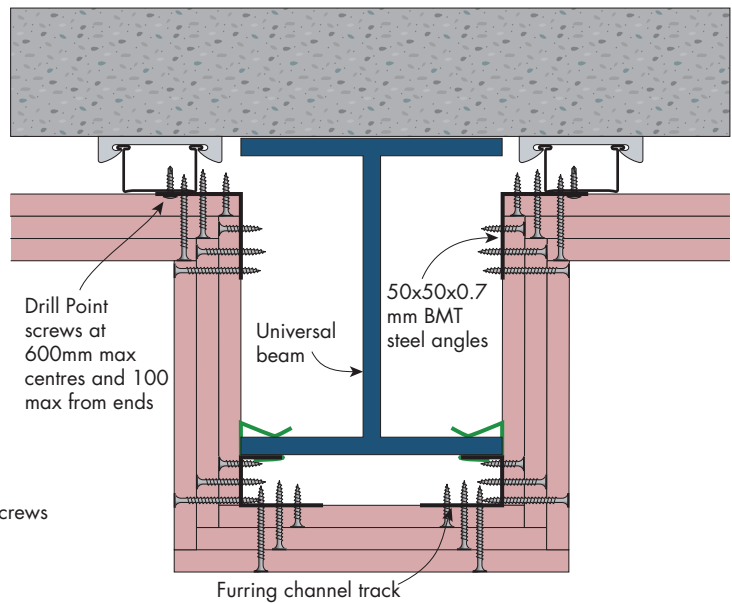


FIGURE 7 3 Sided Protection for I-Beam to Ceiling
Section

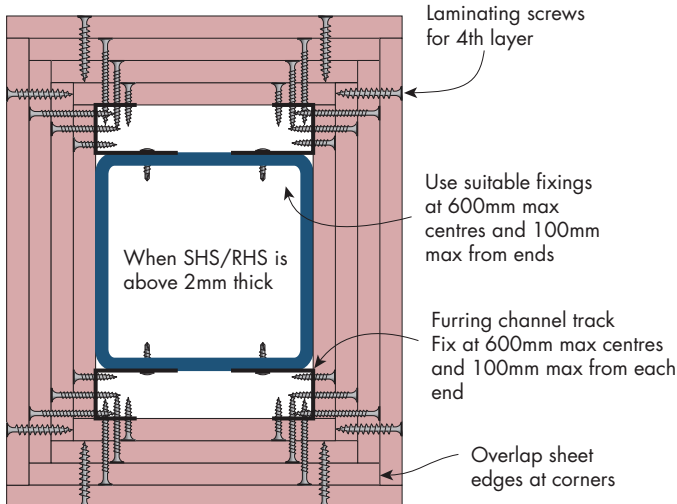


FIGURE 8 4 Sided Protection For SHS/RHS
Plan or Section

i For internal and external corners, fill gaps with either Knauf Bindex Fire and Acoustic sealant or Mastabase jointing compound. Fill any other gaps with Knauf Bindex sealant to maintain integrity.

FIRE RATED

COLUMN AND BEAM FIRE PROTECTION – TIMBER

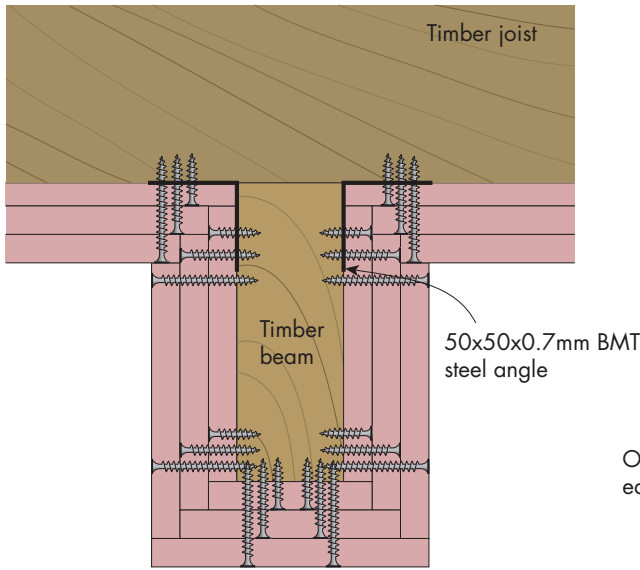


FIGURE 9 3 Sided Protection Timber Beam
Section

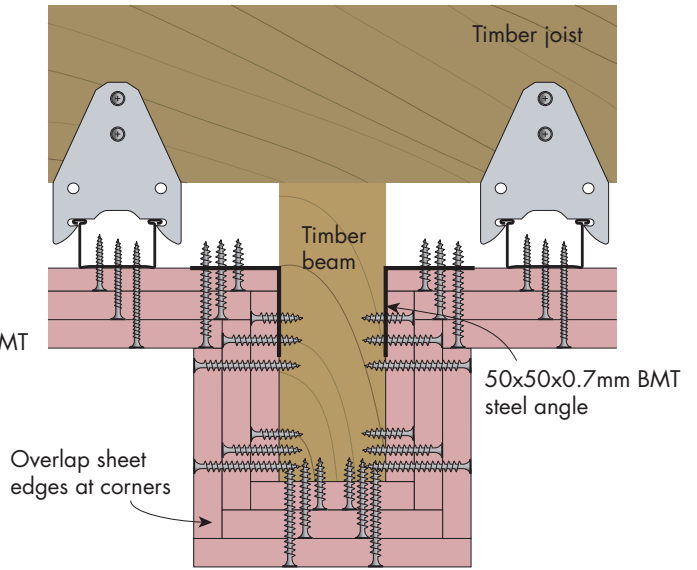


FIGURE 10 3 Sided Protection Timber Beam
Section

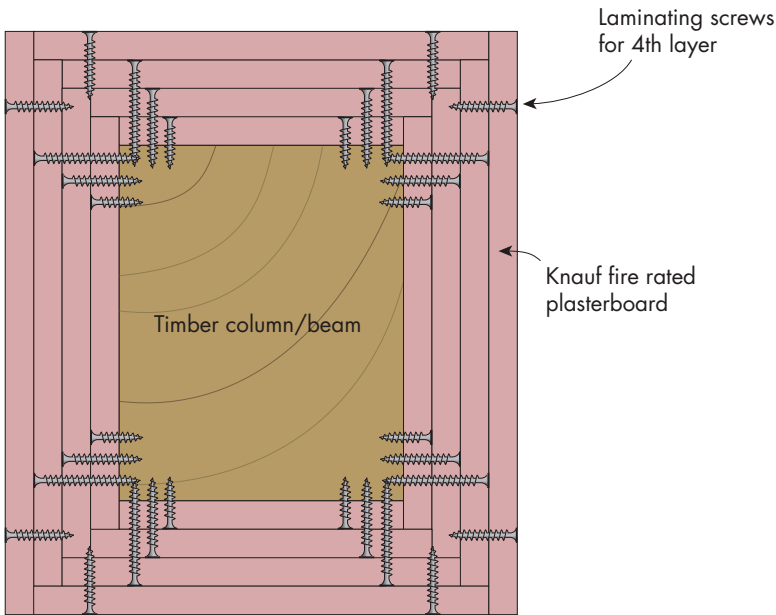


FIGURE 11 4 Sided Protection Timber Column/Beam
Plan or Section

FIRE RATED

COLUMN AND BEAM FIRE PROTECTION – CONCRETE

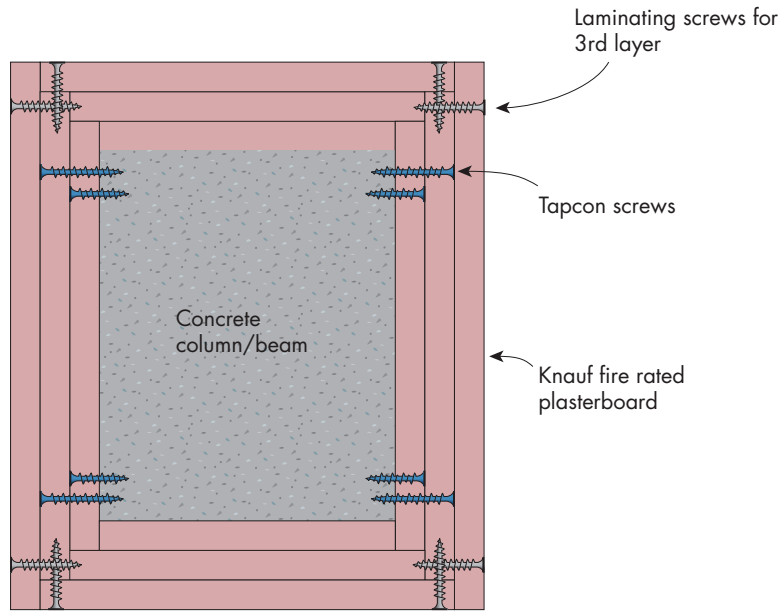


FIGURE 12 4 Sided Protection Concrete Column Plan

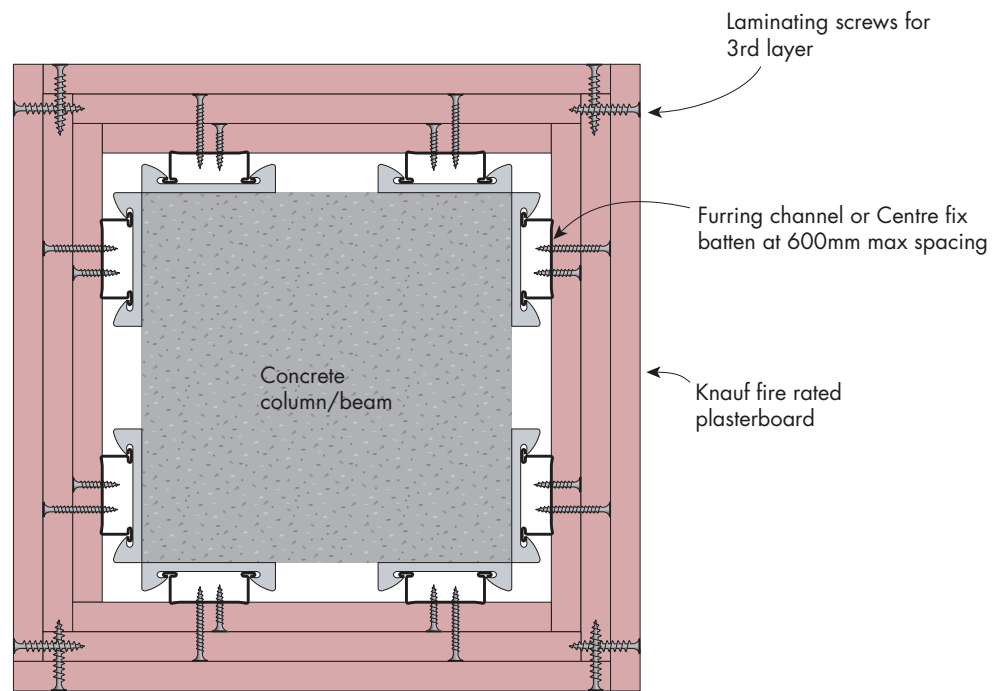


FIGURE 13 4 Sided Protection Concrete Column Plan