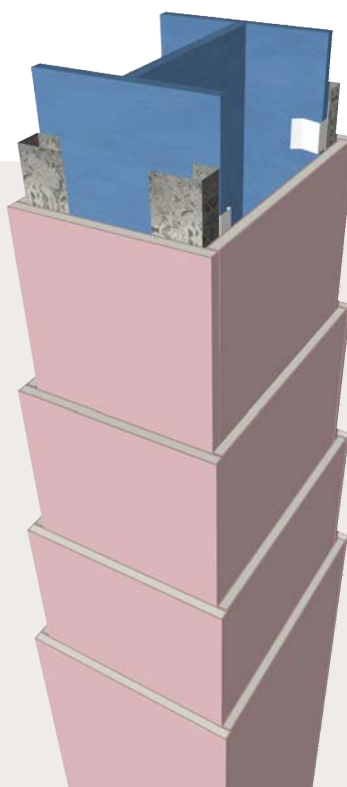


## COLUMN AND BEAM FIRE PROTECTION

<b>SYSTEMS</b>	<b>343</b>
<b>INSTALLATION</b>	<b>345</b>
General Requirements	345
Framing	345
Plasterboard Layout	345
Plasterboard Fixing	345
<b>CONSTRUCTION DETAILS</b>	<b>347</b>



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.

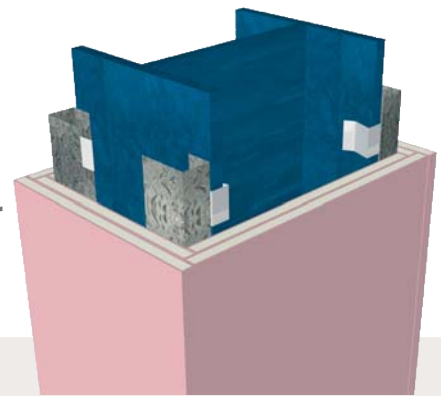
This section details the most common methods to encase timber, steel or concrete columns and beams to achieve a structural fire resistance level.

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 3.3 FIRE RESISTANCE].

**LSEP1-LSEP9**

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 MultiShield or 13mm ImpactShield]  
 [16mm FireShield can be substituted with 16mm MultiShield]

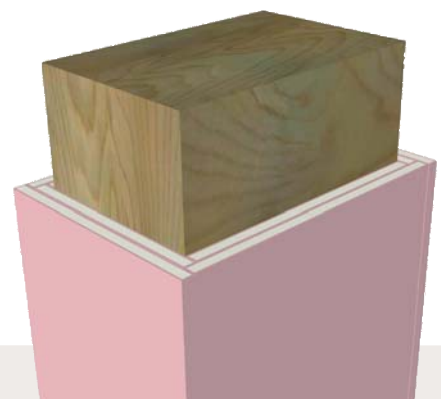


FRL	SYSTEM	PLASTERBOARD LINING	PLASTERBOARD THICKNESS (mm)
30/ - / - FAR 1613 FAR 2519	LSEP1	1 layer of 13mm <b>FireShield</b>	13
60/ - / - FAR 1613	LSEP2	1 layer of 16mm <b>FireShield</b>	16
60/ - / - FAR 3124	LSEP6	2 layers of 13mm <b>FireShield</b>	26
60/ - / - FAR 3124	LSEP7	1 layer of 25mm <b>ShaftLiner</b>	25
90/ - / - FAR 1613	LSEP3	2 layers of 16mm <b>FireShield</b>	32
120/ - / - FAR 1613	LSEP4	3 layers of 13mm <b>FireShield</b>	39
120/ - / - FAR 3124	LSEP8	1 layer of 13mm <b>FireShield</b> plus 1 layer of 25mm <b>ShaftLiner</b>	38
180/ - / - FAR 1613	LSEP5	4 layers of 16mm <b>FireShield</b>	64
180/ - / - FAR 3124	LSEP9	1 layer of 13mm <b>FireShield</b> plus 2 layers of 25mm <b>ShaftLiner</b>	63

**LTEP1-LTEP7**

STRUCTURAL FRAME: Timber column or beam (minimum dimension 100x100mm) encased in either **FireShield** or **ShaftLiner**

[13mm FireShield can be substituted with 13mm MultiShield or 13mm ImpactShield]  
 [16mm FireShield can be substituted with 16mm MultiShield]



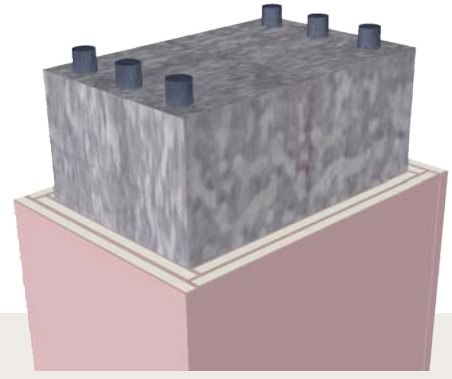
FRL	SYSTEM	PLASTERBOARD LINING	PLASTERBOARD THICKNESS (mm)
30/ - / - FAR 1613 FAR 2519	LTEP1	1 layer of 13mm <b>FireShield</b>	13
60/ - / - FAR 1613	LTEP2	2 layers of 13mm <b>FireShield</b>	26
60/ - / - FAR 3124	LTEP6	1 layer of 25mm <b>ShaftLiner</b>	25
90/ - / - FAR 3124	LTEP3	3 layers of 13mm <b>FireShield</b>	39
90/ - / - FAR 1613	LTEP7	1 layer of 13mm <b>FireShield</b> plus 1 layer of 25mm <b>ShaftLiner</b>	38
120/ - / - FAR 1613	LTEP4	3 layers of 16mm <b>FireShield</b>	48
120/ - / - FAR 3124	LTEP5	4 layers of 16mm <b>FireShield</b>	64

## LCEP1-LCEP5

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 MultiShield or 13mm ImpactShield]  
[16mm FireShield can be substituted with 16mm MultiShield]




FRL	SYSTEM	PLASTERBOARD LINING	PLASTERBOARD THICKNESS (mm)
Concrete Structural Adequacy + 30/ - / - FAR 3221	LCEP1	1 layer of 13mm <b>FireShield</b>	13
Concrete Structural Adequacy + 60/ - / - FAR 3221	LCEP2	1 layer of 16mm <b>FireShield</b>	16
Concrete Structural Adequacy + 90/ - / - FAR 3221	LCEP3	2 layers of 16mm <b>FireShield</b>	32
Concrete Structural Adequacy + 120/ - / - FAR 3221	LCEP4	3 layers of 13mm <b>FireShield</b>	39
Concrete Structural Adequacy + 180/ - / - FAR 3221	LCEP5	4 layers of 16mm <b>FireShield</b>	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"> <li>› Two coats of <b>MastaBase</b> / <b>MastaLongset</b>, or</li> <li>› Three coats of <b>MastaRapid</b> / <b>MastaLite</b>.</li> </ul> Never joint sheets with fire sealant [REFER TO SECTION 5].	✓
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 Recessed Furring Channel – Rondo No.333	900mm
16mm Furring Channel – Rondo No.308	900mm
28mm Furring Channel – Rondo No.129	1200mm


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

## PLASTERBOARD LAYOUT

	FIRE RATED 
Stagger butt joints by 600mm 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.	✓
Do not fix plasterboard to steel more than 2mm BMT.	✓
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 – 6g S screw	40mm – 6g S screw	50mm – 6g S screw *	-
16mm	30mm – 6g S screw	45mm – 6g S screw	60mm – 6g S screw *	40mm - 10g laminating screws
25mm	40mm – 6g S screw	-	-	-
13mm + 25mm + 25mm	25mm – 6g S screw	50mm – 6g S screw	40mm - 10g laminating screws	-

For steel up to 0.8mm BMT use Type 'S' fine thread needle point screws.  
 For steel 0.8mm to 2.0mm BMT use Type 'S' fine thread drill point screws.  
 \* 40mm - 10g Laminating screws may be used as detailed in installation diagrams.

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

PLASTERBOARD THICKNESS	1ST LAYER	2ND LAYER	3RD LAYER	4TH LAYER
13mm	30mm - 6g W screw	40mm - 6g W screw	60mm - 6g W screw *	-
16mm	30mm - 6g W screw	45mm - 6g W screw	65mm - 6g W screw *	40mm - 10g laminating screws
25mm	45mm – 6g W screw	-	-	-
13mm + 25mm	30mm - 6g W screw	60mm - 6g W screw	-	-

For timber use Type 'W' coarse thread needle point screws.  
 \* 40mm - 10g Laminating screws may be used as detailed in installation diagrams.

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

PLASTERBOARD THICKNESS	1ST LAYER	2ND LAYER	3RD LAYER	4TH LAYER
13mm	25mm - 6g W screw	40mm - 6g W screw	60mm - 6g W screw *	-
16mm	30mm - 6g W screw	45mm - 6g W screw	60mm - 6g W screw *	40mm - 10g laminating screws
25mm	40mm – 6g W screw	-	-	-
13mm + 25mm	30mm - 6g W screw	50mm - 6g W screw	-	-

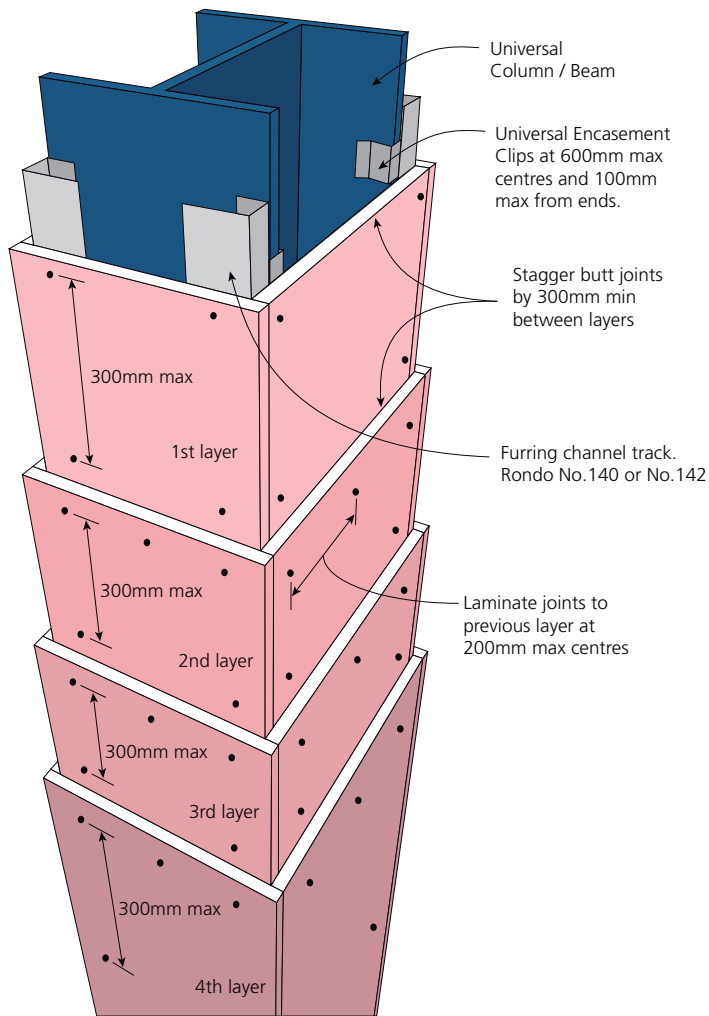
For timber use Type 'W' coarse thread needle point screws.  
 \* 40mm - 10g Laminating screws may be used as detailed in installation diagrams.

**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	40mm - 10g laminating screws
16mm	32mm – 10g tapcon screw	45mm – 10g tapcon screw	40mm - 10g laminating screws

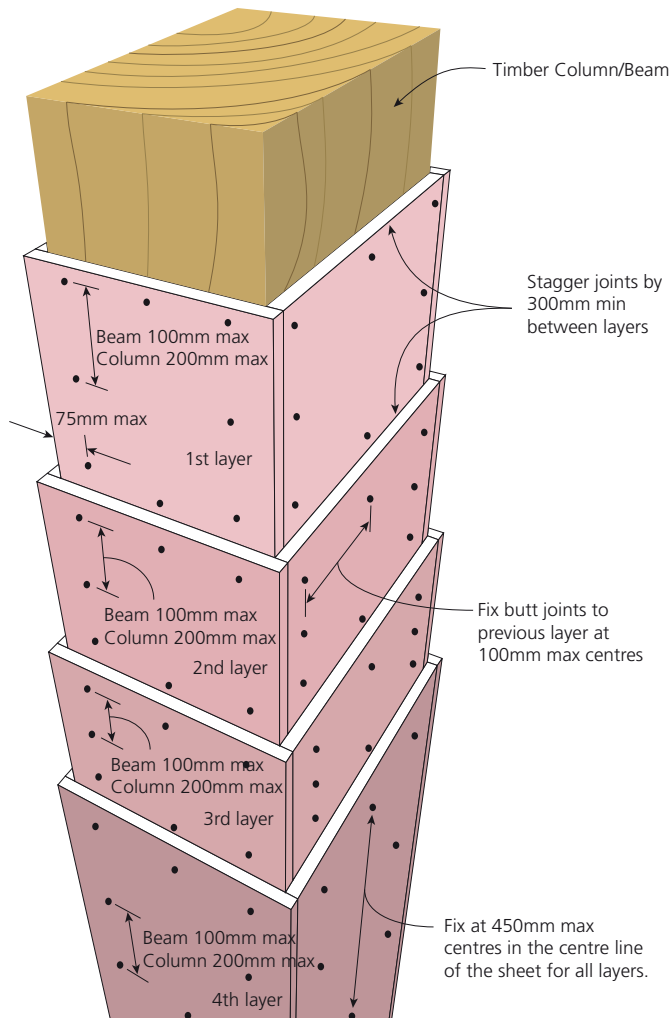
For concrete use tapcon screws with countersunk head.

FIGURE 1  
Steel Column/Beam



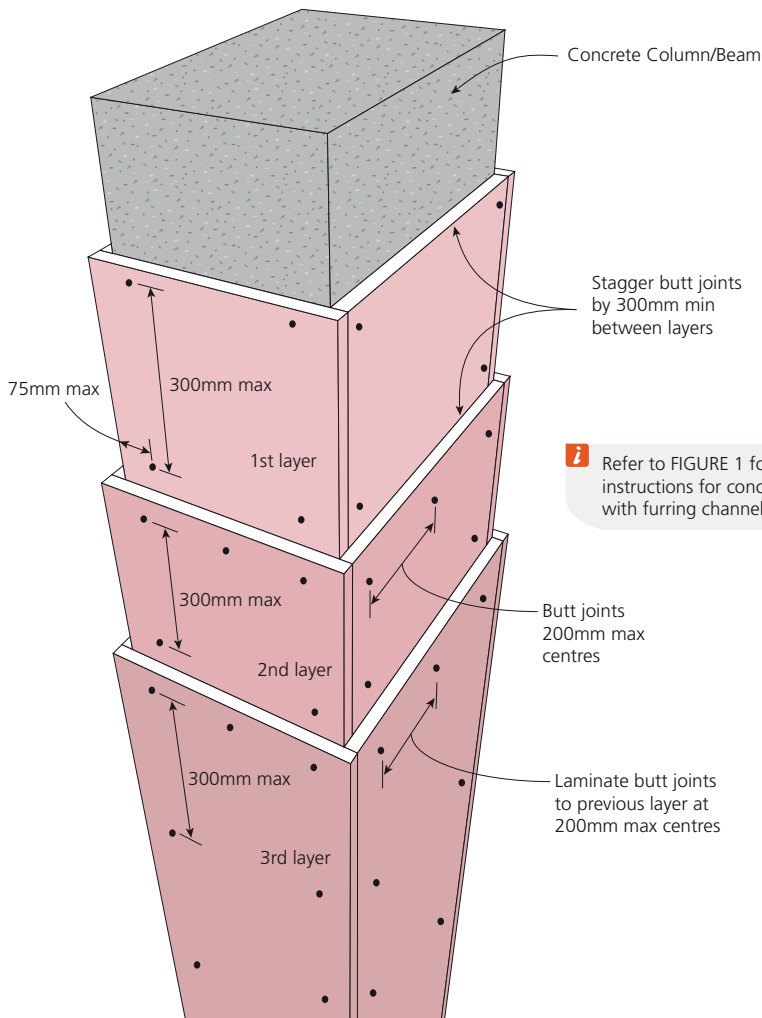
<b>Fixing</b>	SCREW ONLY METHOD
<b>Fasteners</b>	All screws 50mm max from sheet edges
<b>Edges along length</b>	All layers: Fix at 300mm max centres. 3rd layer: Either screw to furring channel track or use laminating screws. 4th layer: Use 40mm-10g laminating screws.
<b>Butt joints</b>	Single Layer System: 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**



<b>Fixing</b>	SCREW ONLY METHOD
<b>Fasteners</b>	All screws 75mm max from sheet edges.
<b>Beam - Edges along length</b>	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 40mm-10g laminating screws.
<b>Column - Edges along length</b>	All layers: Fix at 200mm max centres. 3rd layer: Either screw to timber column or use laminating screws. 4th layer: Use 40mm-10g laminating screws.
<b>Butt joints</b>	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**



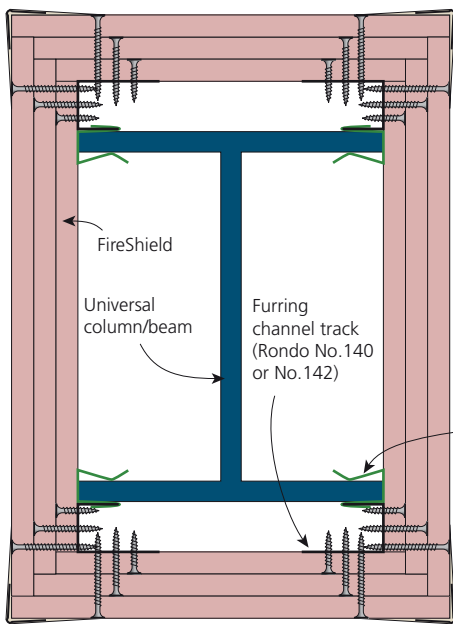
<b>Fixing</b>	SCREW ONLY METHOD
<b>Fasteners</b>	All screws 75mm max from sheet edges.
<b>Edges along length</b>	All layers: Fix at 300mm max centres. 3rd layer: Either screw to concrete or use 40mm-10g laminating screws.
<b>Butt joints</b>	Single Layer System: Fix at 200mm max centres. Multiple Layer Systems: Either screw to concrete or use 40mm-10g laminating screws at 200mm max centres to previous layer. Stagger butt joints by 300mm min between layers.

**i** Refer to FIGURE 1 for installation instructions for concrete columns with furring channel framing.

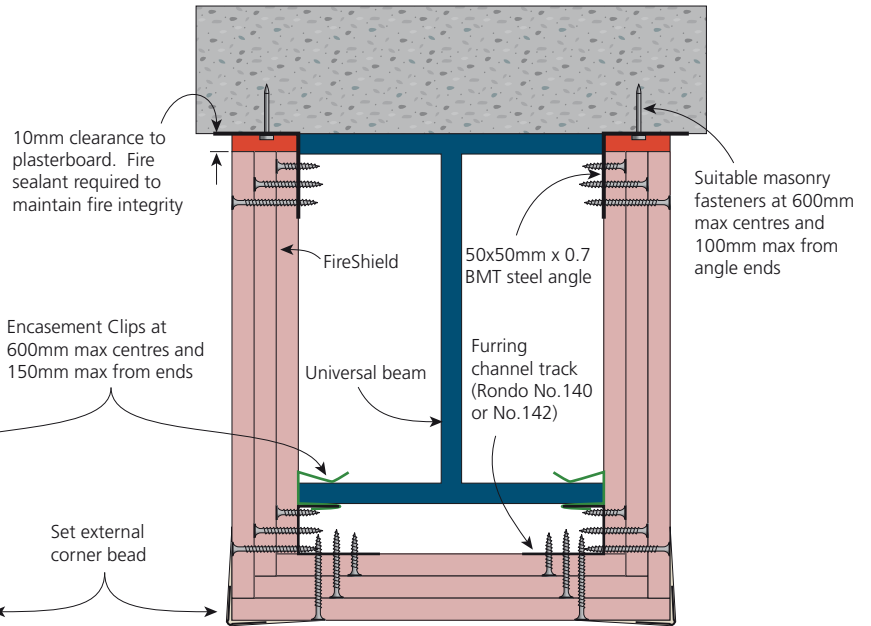


**FIRE RATED**

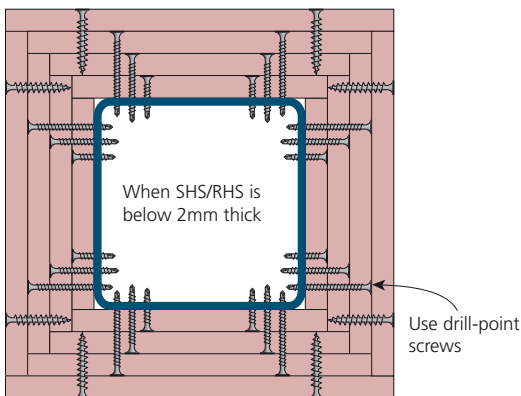
**COLUMN AND BEAM FIRE PROTECTION - STEEL**



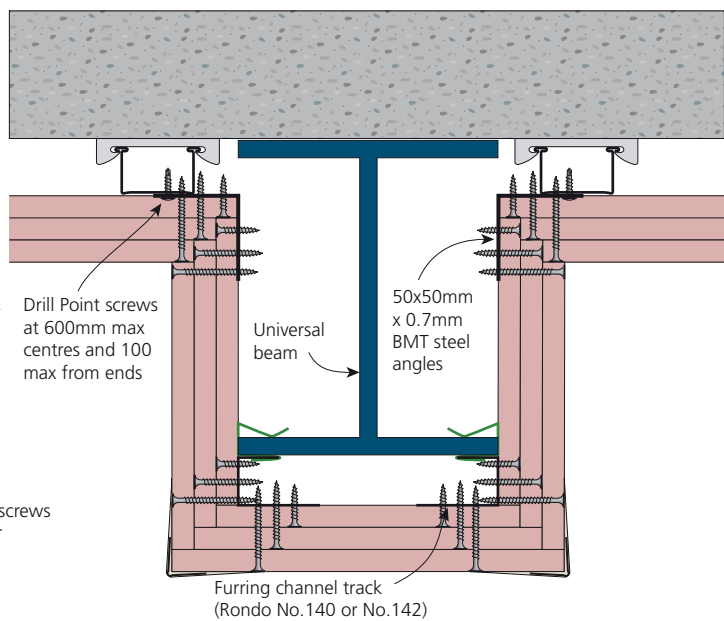
**FIGURE 4**  
**4 sided protection for I-beam/column**  
Elevation or plan view



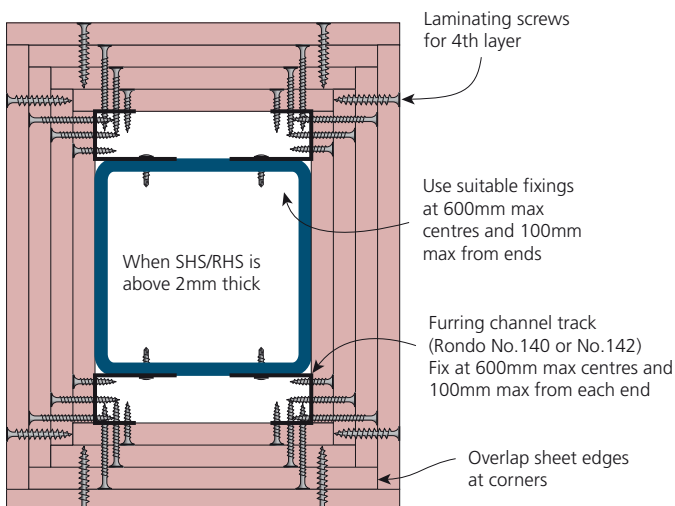
**FIGURE 5**  
**3 sided protection for I-beam**  
Elevation



**FIGURE 6**  
**4 sided protection for SHS/RHS**  
Elevation or plan view



**FIGURE 7**  
**3 sided protection for I-beam to ceiling**  
Elevation



**FIGURE 8**  
**4 sided protection for SHS/RHS**  
Elevation or plan view

**FIRE RATED**  
**COLUMN AND BEAM FIRE PROTECTION - TIMBER**

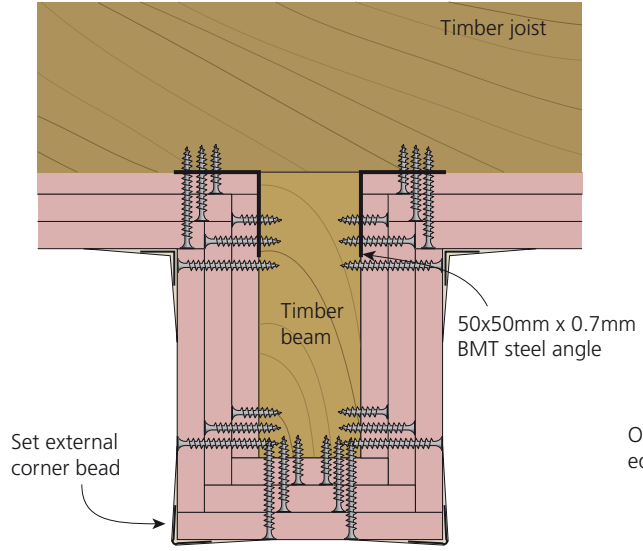


FIGURE 9  
**3 sided protection timber beam**  
 Elevation

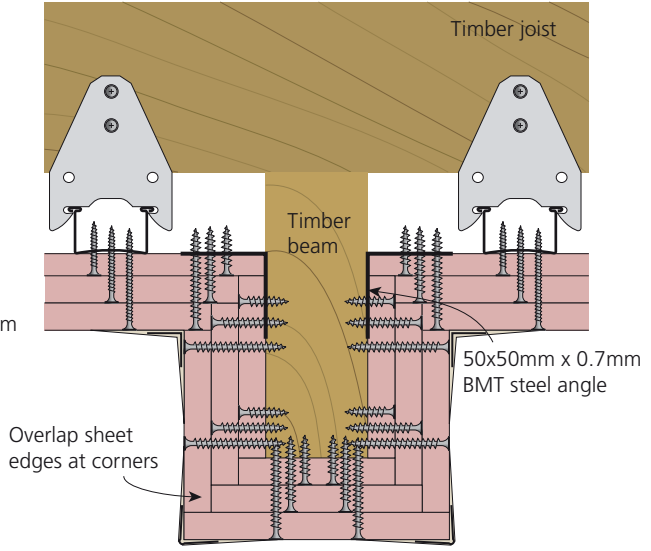


FIGURE 10  
**3 sided protection timber beam**  
 Elevation

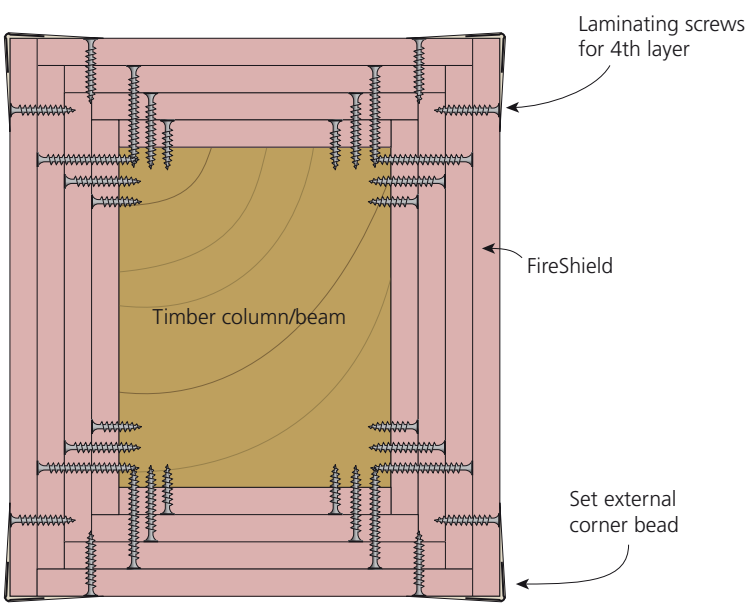


FIGURE 11  
**4 sided protection timber column/beam**  
 Elevation or plan view

**FIRE RATED**  
**COLUMN AND BEAM FIRE PROTECTION - CONCRETE**

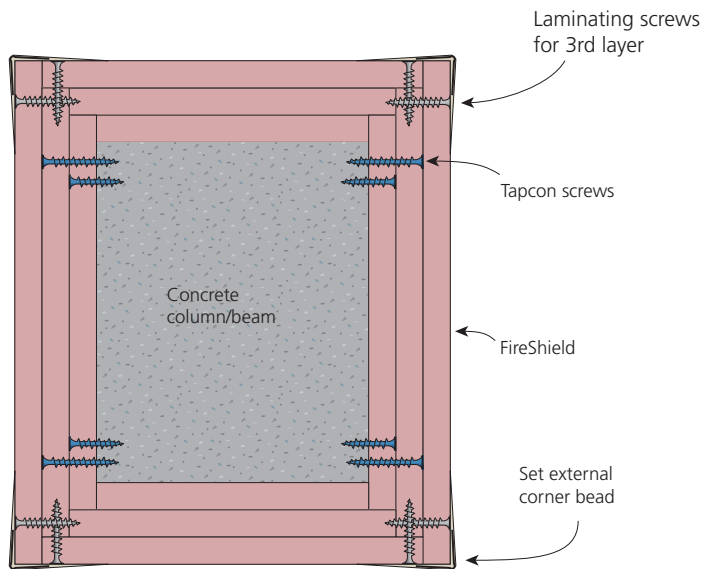


FIGURE 12  
**4 sided protection concrete column**  
 Elevation or plan view

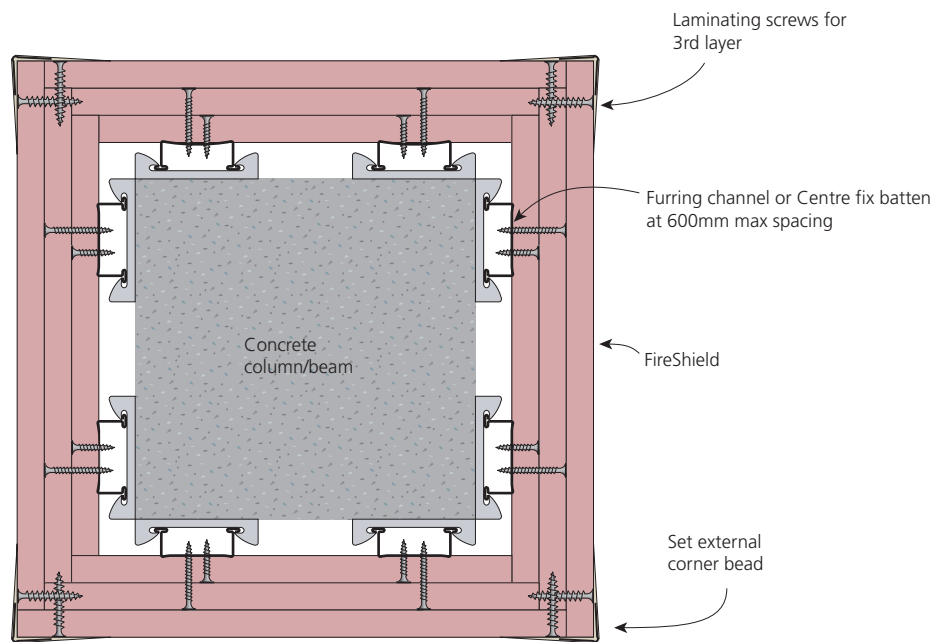


FIGURE 13  
**4 sided protection concrete column**  
 Elevation or plan view