

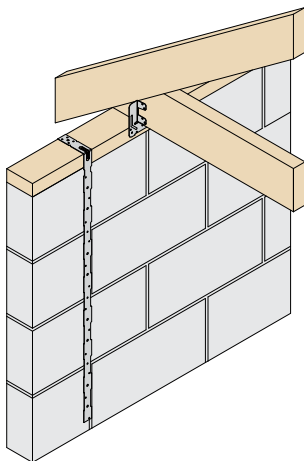
Lateral restraint of the walls can be provided by the roof, the restraint must be provided perpendicular to the roof trusses.

The information we provide has been compiled using the minimum requirement from Building Regulations 2010 approved document A, Scottish Building regulation domestic, NHBC standards and British Standard BS 5628-1;2005 Annex D.

These have been issued as guidance only, the overall responsibility lies with the Building Designer.

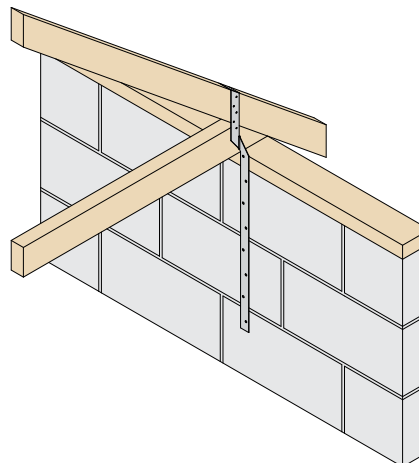
VERTICAL RESTRAINT

Bent Strap To Wall Plate



Fix VRS or LDGS to the wall plate with 2No 3.4 x 35mm square twist nails. Fixings into masonry to be specified by building designer.

Twisted Strap To Truss



RST strap to be nailed to truss with 3.4 x 35mm square twist nails. Nail quantity dependant on uplift value. Fixings into masonry to be specified by building designer.

HORIZONTAL RESTRAINT (MASONRY & TIMBER GABLES)

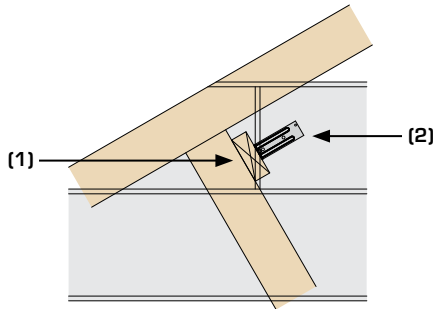
Detail	Region	Floor Level		
		Up to and including 2 storeys	3 storeys	4 storeys
Perpendicular	England & Wales	PFS or HDGS or RST* required at 2m max centres		PFS or HDGS or RST* required at 1.25m max centres
	Scotland	PFS or HDGS or RST* required at 2m max centres		PFS or HDGS or RST* required at 1.25m max centres

*For timber gables

- Straps to be installed at not more than 2m centres (or 1.25m where appropriate) along gable end.
- Strap to be of sufficient length to be fixed to a minimum of 3no. Trusses.
- Longitudinal bracing to be fixed to each truss with 2no. 3.35 x 65mm round wire nails (in all details 3.1 x 90mm long mechanically driven nails may be substituted for 3.35 x 65mm long wire nails).
- Where the position of the strap does not coincide with an existing longitudinal truss brace, then the strap may be fixed to an additional 25 x 100mm longitudinal binder (as shown in detail X). The binder to be fixed over a minimum of four trusses and fixed to each truss with 2no. 3.35 x 65mm round wire nails.
- Fix straps to longitudinal bracing with 8no. 3.4 x 35mm square twist nails, evenly spaced along the length of the strap (for NHBC warranted buildings, in accordance with NHBC Standards 2017 section 7.2.8, 8no. 25 x 4mm steel screws shall be used instead of square twist nails).

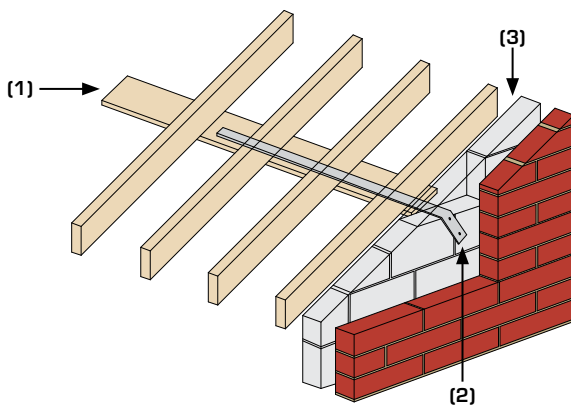
HORIZONTAL RESTRAINT (MASONRY GABLES)

Fixing to Longitudinal Truss Bracing (Fixed to Truss Web)



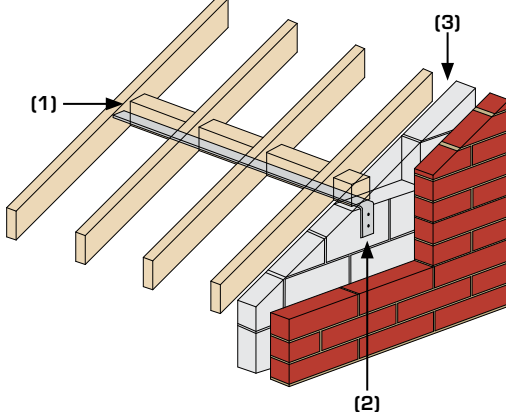
- Install PFS or HDGS on the 25 x 100mm longitudinal truss bracing (1).
- Ensure the position of the longitudinal bracing and strap coincide with the blocks vertical joint.
- The 90deg bend of the strap is to be held tight against the cavity face of the inner leaf of blockwork (2), preferably located on the full block. Notch the blocks to accommodate the angle of the strap and ensure notch is fully mortared.

Fixing to Longitudinal Truss Bracing / Additional Longitudinal Binder (Fixed to Truss Web)



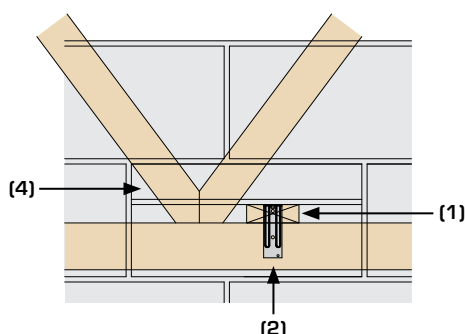
- Install PFS or HDGS on the 25 x 100mm longitudinal truss bracing (1).
- Ensure the position of the longitudinal bracing and strap coincide with a horizontal blockwork joint.
- The 90deg bend of the strap is to be held tight against the cavity face of the inner leaf of blockwork (2), preferably located on a substantial piece of blockwork, i.e. over the centre of a full block, with a single cut block over the strap (3). Notch the blocks to accommodate the angle of the strap and ensure notch is fully mortared.

Fixing to Solid Noggins (Between Trusses)



- Ensure the position of the straps coincides with the horizontal blockwork joint.
- Install PFS or HDGS to underside of solid noggins (1). Noggins to be fixed horizontally to avoid twisting of the restraint straps.
- The 90deg bend of the strap is to be held tight against the cavity face of the inner leaf of blockwork (2), preferably located on a substantial piece of blockwork, i.e. over the centre of a full block, with a single cut block over the strap (3). Notch the blocks to accommodate the angle of the strap and ensure notch is fully mortared.
- Fix straps to noggins/trusses with 8no. 3.4 x 35mm square twist nails, evenly spaced along the length of the strap (for NHBC warrantied buildings, in accordance with NHBC Standards 2017 section 7.2.8, 4no. 50 x 4mm steel screws or 4no. 75 x 4mm round wire nails, with one fixing into the third rafter, shall be used instead of square twist nails).

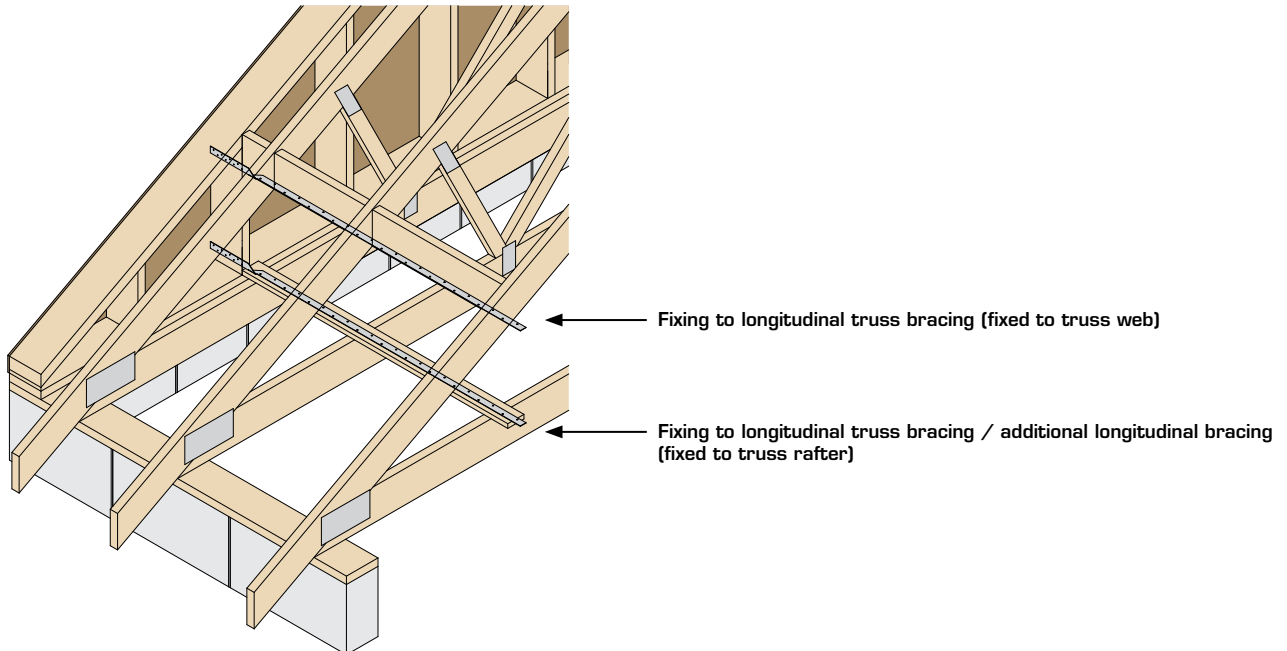
Fixing to Longitudinal Truss Bracing / Additional Longitudinal Binder (Fixed to Truss Ceiling)



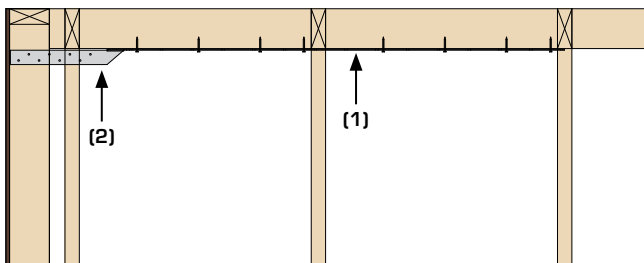
- Install PFS or HDGS on the 25 x 100mm longitudinal truss bracing (1). Bracing to be fixed to each truss with 2no. 3.35 x 65mm round wire nails.
- Ensure the position of the longitudinal bracing and strap coincide with a horizontal blockwork joint, where this is not possible inserted a cut block to suit strap location (4).
- The 90deg bend of the strap is to be held tight against the cavity face of the inner leaf of blockwork (2), preferably located on a substantial piece of blockwork, i.e. over the centre of a full block.

HORIZONTAL RESTRAINT (TIMBER GABLES)

- Gable panel to be restrained vertical using VRS or LDGS holding down straps at suitable centres.
- External masonry to be connected to gable panel using suitable FT timber frame wall ties.
- Solid blocking required between truss and wall.

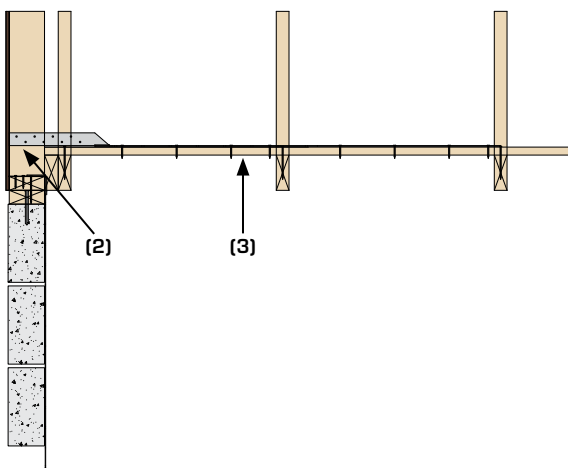


Fixing to Longitudinal Truss Bracing (Fixed to Truss Web)



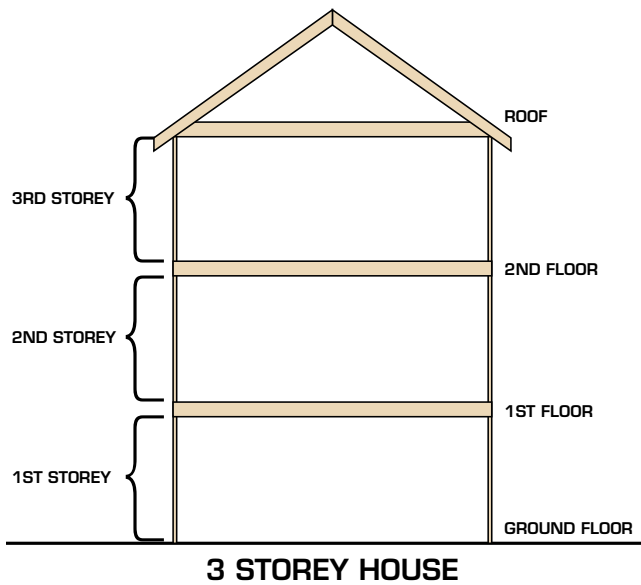
- Install RST-3 to underside of solid noggins (1). Noggins to be fixed horizontally to avoid twisting of the restraint straps.
- Strap to be fixed to face of vertical stud (within gable panel) with 3no. 3.4 x 35mm square twist nails (2).
- Fix straps to noggins/trusses with 8no. 3.4 x 35mm square twist nails, evenly spaced along the length of the strap (for NHBC warrantied buildings, in accordance with NHBC Standards 2017 section 7.2.8, 4no. 50 x 4mm steel screws or 4no. 75 x 4mm round wire nails, with one fixing into the third rafter, shall be used instead of square twist nails).

Fixing to Longitudinal Truss Bracing / Additional Longitudinal Binder (Fixed to Truss Rafter)



- Install RST-3 on the 25 x 100mm longitudinal truss bracing (3).
- Ensure the position of the longitudinal bracing and strap coincide with vertical timber studs (within gable panel).
- Strap to be fixed to face of vertical stud (within gable panel) with 3no. 3.4 x 35mm square twist nails (2).
- Fix straps to longitudinal bracing with 8no. 3.4 x 35mm square twist nails, evenly spaced along the length of the strap (for NHBC warrantied buildings, in accordance with NHBC Standards 2017 section 7.2.8, 8no. 25 x 4mm steel screws shall be used instead of square twist nails).

Restraint Straps (Domestic Floors)



Lateral restraint of the walls can be provided by the floor; the restraint must be provided parallel and perpendicular to the floor joists.

The type of restraint straps required and the centres at which they are placed depend on the joist end detail and region in which the house is built.

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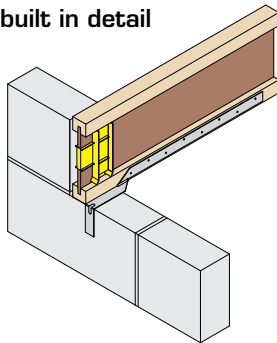
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For 3rd floor and above please refer to the building standards or building designer for guidance.

All straps require a full storey of block work above to achieve the full 8kN declared load capacity.

PARALLEL RESTRAINT

PSB strap with built in detail

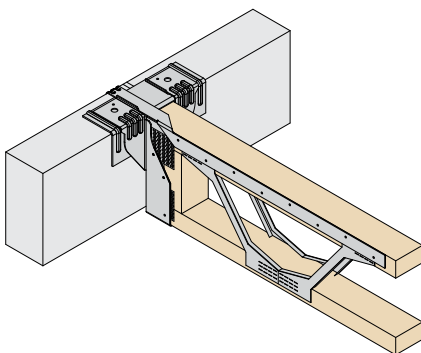


- The strap should be nailed with a minimum of 8No 3.4 x 35mm Square Twist Nails into the joist top flange/chord

Detail	Region	Floor Level		
		Ground Floor	1st Floor	2nd Floor
Built in	England & Wales	Where joists have a minimum bearing of 90mm no additional restraint is required (additional PSB straps required each side of opening where openings exceed 600mm)		PSB straps required at 2m max centres
	Scotland			

Please refer to page 137 for further information on PSB straps

PST strap with non-restraint hanger

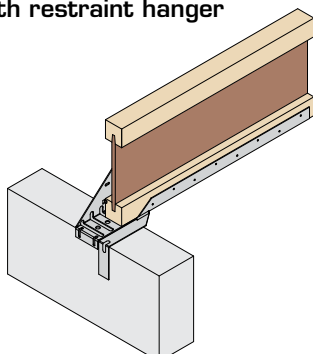


- The strap should be nailed with a minimum of 8No 3.4 x 35mm Square Twist Nails into the joist top flange/chord

Detail	Region	Floor Level		
		Ground Floor	1st Floor	2nd Floor
Non-Restraint Hangers (JHI/JHIR/RB-JHI/RB-JHIR)	England & Wales	PST or PSC required at 2m max centres		
	Scotland	PST or PSC required at 2m max centres	PST or PSC required at 1.25m max centres	

Please refer to page 137 for further information on PST/PSC straps

PSB strap with restraint hanger



- The strap should be nailed with a minimum of 8No 3.4 x 35mm Square Twist Nails into the joist top flange/chord

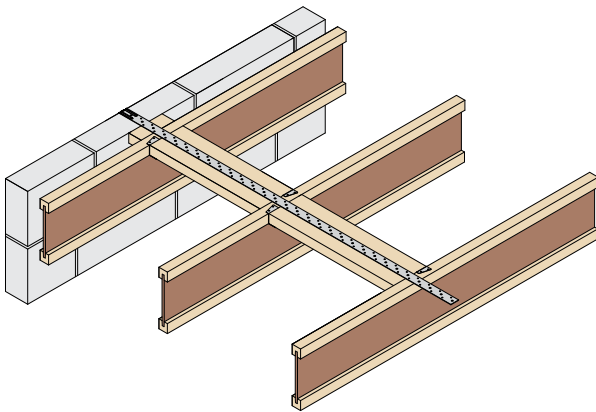
Detail	Region	Floor Level		
		Ground Floor	1st Floor	2nd Floor
Restraint Hangers (RA/HRAD/RADS)	England & Wales	No additional restraint is required (additional PSB straps required each side of opening where openings exceed 600mm)		PSB required at 2m max centres
	Scotland	PSB required at 1.25m max centres		

Please refer to page 137 for further information on PSB straps

PERPENDICULAR RESTRAINT

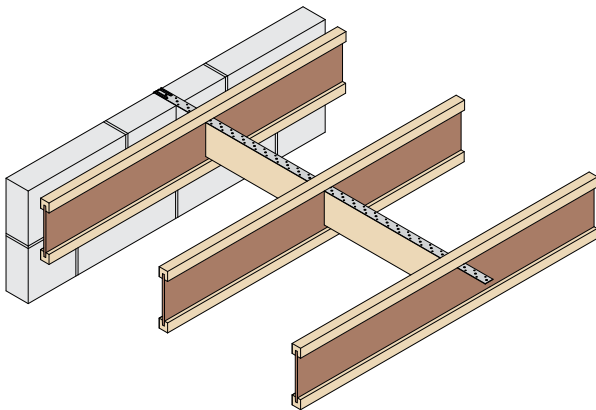
Detail	Region	Floor Level		
		Ground Floor	1st Floor	2nd Floor
Perpendicular	England & Wales	PFS or HDGS required at 2m max centres		
	Scotland	PFS or HDGS required at 2m max centres	PFS or HDGS required at 1.25m max centres	

PFS surface fixed to I-Joist



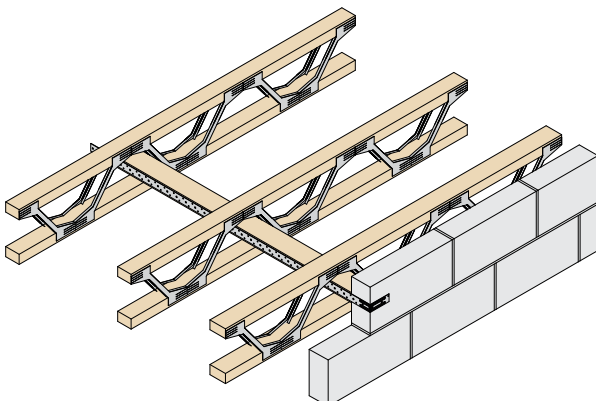
- Noggins to be installed between the I-Joists with 2No UZ Clips staggered either side (Noggins to be minimum half the depth of the joists x depth of flange)
- Once nailed into position a skew nail is placed in the opposite corner to secure connection
- After fitting all noggins the PFS strap can then be located tight to the block work and centred on the noggins
- The strap should be nailed with a minimum of 8No 3.4 x 35mm square twist nails evenly spaced and into at least every joist
- Strap must extend over a minimum 3No joists

PFS through web of I-Joist



- Cut a small slot in the I-Joist web, just under the top flange
- Slide the PFS through the slots and position tight against the block work
- To provide a fixing for the PFS, noggins must be installed between the I-Joists (Noggins to be at least half the I-Joist depth, to a maximum of 150mm x minimum 38mm wide)
- Each noggin should be nailed in place through the I-Joist web
- The strap should be nailed with a minimum of 8No 3.4 x 35mm square twist nails evenly spaced into the noggins
- Strap must extend over a minimum 3No joists

PFS through web of Open Web Joist



- Strongback to be installed as per manufacturer's guidelines
- Position PFS tight to block work and centred on block
- The strap should be nailed with a minimum of 8No 3.4 x 35mm square twist nails evenly spaced into the noggins
- Strap must extend over a minimum 3No joists

Vertical Restraint Strap



The VRS is an engineered strap that has been designed to provide a convenient and secure method of fixing wall plates to timber and masonry walls.

Features & Benefits

- Designed to provide optimum performance
- Thinner profile than a standard tie-down strap with strengthening ribs, achieving the same performance as a traditional 30 x 2.5mm strap

Material Specification

- 30 x 1.2mm Galvanised mild steel - Z600

Approvals

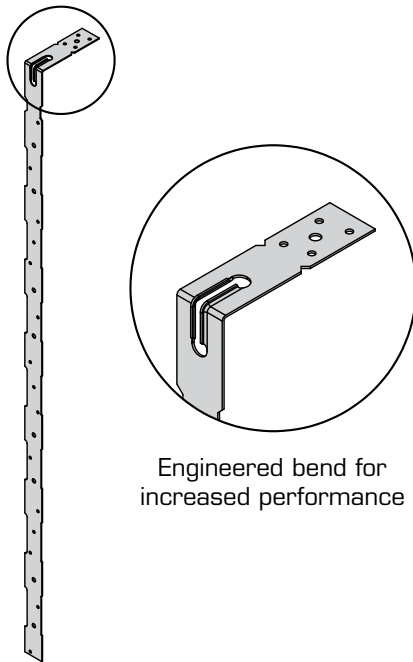
- CE marked and tested in accordance with EN846-4
- Meets NHBC Technical requirements

Fixings

Dependant on application.

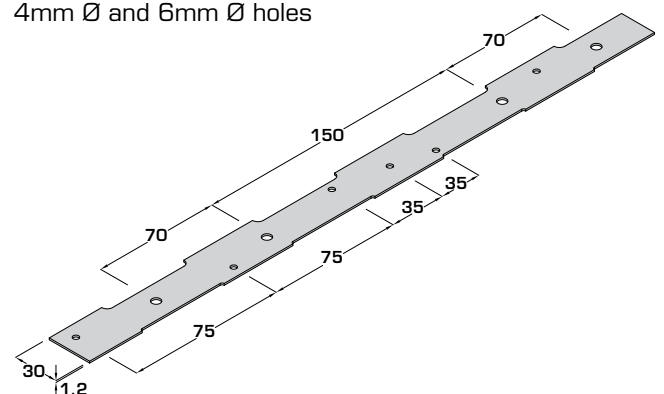
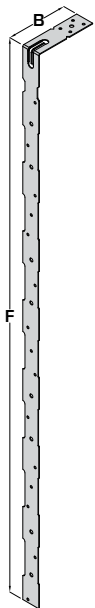
Dimensions (mm)

4mm Ø and 6mm Ø holes



Engineered bend for increased performance

Available Sizes



Product Code	F (mm)	B (mm)
VRS-900-100	900	100

Load Data

Performance	Fixings (3.4 x 35mm)			Characteristic Tensile Capacity (kN)
	Wall Plate (3.4 x 35mm)	Timber Stud (3.4 x 35mm)	Wall (#8/6mm Nylong Plugs)	
Fixed to 3.5N/mm ² block work & nailed to min C16 grade timber wall plate*	2	n/a	6*	4.80
Nailed to timber stud & wall plate (min C16 grade)	2	8	n/a	4.80

*Fixings to be specified by building designer