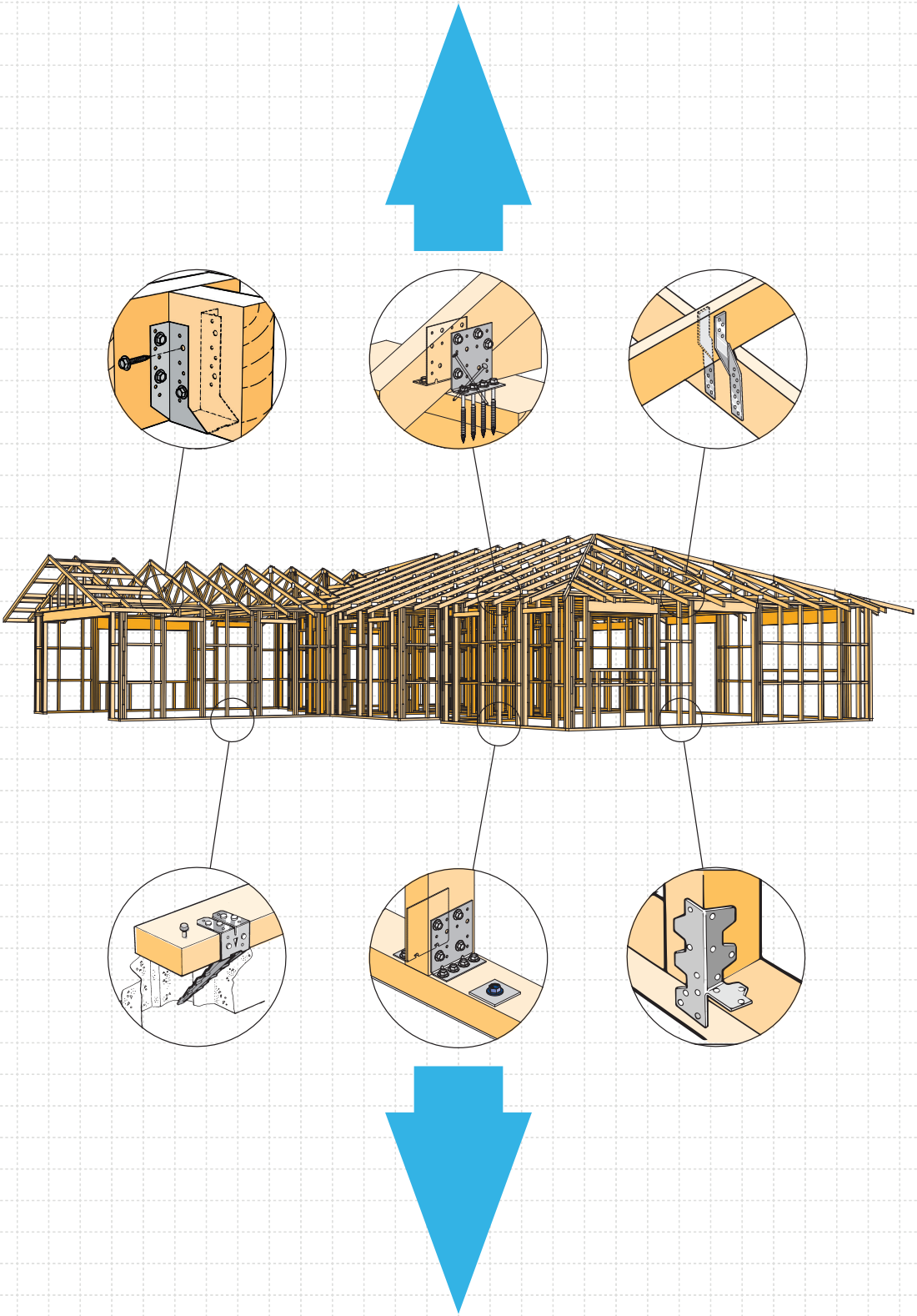
LUMBERLOK

TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA



MiTek®
LUMBERLOK®
Timber Connectors

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TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

Characteristic Loads

Characteristic loads that are shown are used to derive a connector capacity. The connector capacity is the figure used to directly compare against the loads/actions in AS/NZS 1170 and NZS 3604. The characteristic strength as defined in NZS 3603 is an estimate of the lower 5th percentile value determined with 75% confidence – typically determined by tests on representative samples.

Characteristic loads can be converted to connector capacities as defined in NZS 3604:2011 by applying the appropriate load duration and material strength reduction factors;

Connector Capacity R (kN) = ϕ x k x Q_k

ϕ = material strength reduction factor

k = modification factors from NZS 3603:1993 (Section 4) as appropriate to the specific application

Q_k = Characteristic loads as published in this brochure

Standards

LUMBERLOK® Timber Connectors have been tested to conform to relevant codes of practice including:

NZS 3603:1993 Timber Structures Standard

NZS 3604:2011 Timber-framed buildings

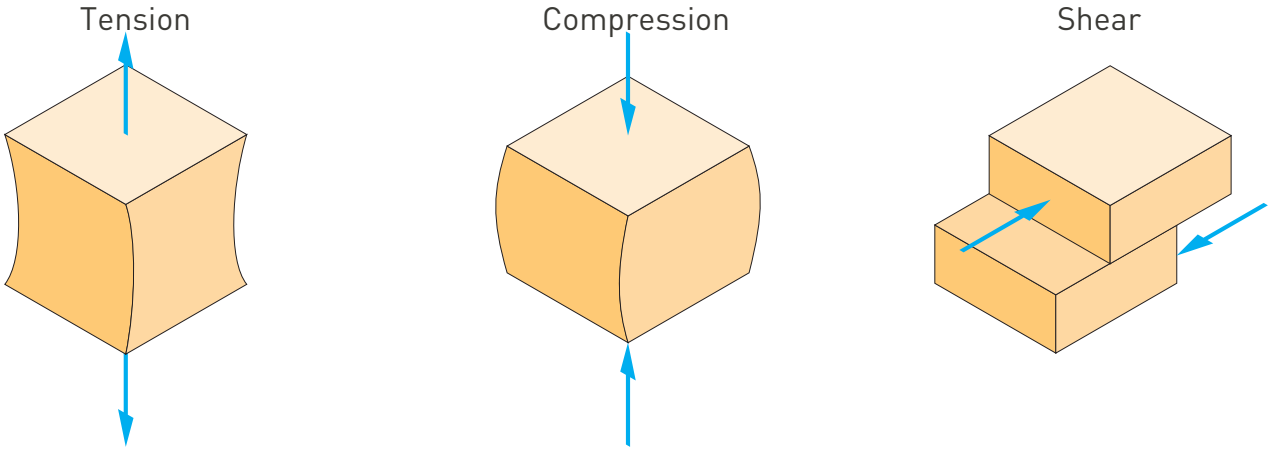
Durability

The use of LUMBERLOK® Timber Connectors in specific environments may affect durability requirements. Refer to the LUMBERLOK® Product Statement and MiTek® Durability Flow Chart in the MiTek® Structural Fixings On-site Guide for Building Code Compliance for further information.

NOTE: Standard LUMBERLOK® Timber Connectors are intended for dry use in a closed environment. For exterior situations use stainless steel.

Timber Specification

Loads published have been derived from joint testing using Pinus Radiata (some with Douglas Fir) and are applicable for MSG8/VSG8 and/or better grades.



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TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

MiTek® ENGINEERING SERVICES

MiTek® Engineering leads the industry in credibility, speed, accuracy and efficiency.

With Professional Design Engineers, MiTek Engineering provides design expertise for our Accredited MiTek Truss and Frame Fabricators throughout New Zealand as well as industry professionals and builders.

We solve our customer's timber engineering design problems when they have exceeded the limitations of NZS 3604 with designs in accordance with NZS 3603 and AS/NZS 1170.

We specialise in timber truss designs for residential and commercial projects.

ENGINEERING QUESTIONS

Auckland
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Christchurch
+64 (3) 348 8691
Mon - Fri, 8:00 am - 5:00 pm

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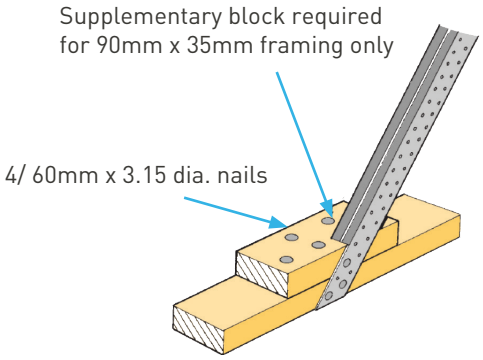
ANGLE BRACE

1.2mm G300 Z275 GALVANISED STEEL

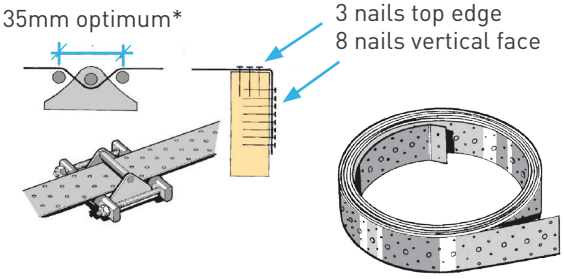
Characteristic Load		Tested at 45^0
End nail fixing: 3/ 75mm x 3.15 dia. F.H. nails		3.9 kN
Steel Tension		8.4 kN
Compression	600mm	4.2 kN
	800mm	3.0 kN



MULTI-BRACE

0.91mm x 53mm G300 Z275 GALVANISED STEEL
0.9mm x 53mm STAINLESS STEEL 304-2B

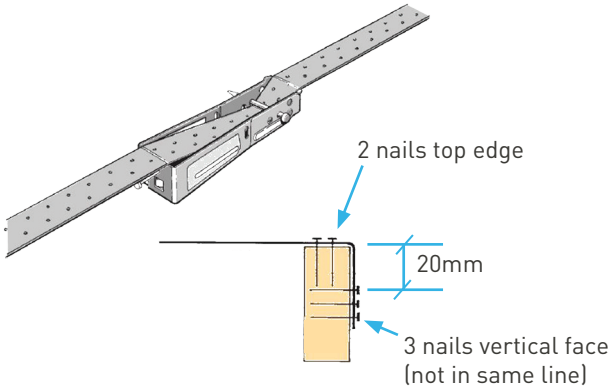
Characteristic Load	Multi-Brace	Multi-Brace with Tensioner*
Tension	14.8 kN	14.8 kN
Elongation 0.2mm/m/kN including nail slip. End nail fixing as shown: 11 x LUMBERLOK Product Nails 30mm x 3.15 dia. *Stainless Steel tensioners are not available so tension must be provided during installation phase.		



STRIP BRACE

0.55mm x 27mm G550 Z275 GALVANISED STEEL
0.9mm x 25mm STAINLESS STEEL 304-2B

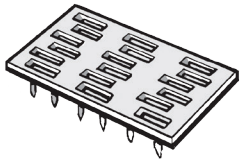
Type	Characteristic Load	Strip Brace	Strip Brace with Tensioner*
Zinc	Tension	7.2 kN	7.2 kN
Stainless	Tension	6.2 kN	-
Elongation 0.5mm/m/kN including nail slip. End nail fixing as shown: 5 x LUMBERLOK Product Nails 30mm x 3.15 dia. *Stainless Steel tensioners are not available so tension must be provided during installation phase.			

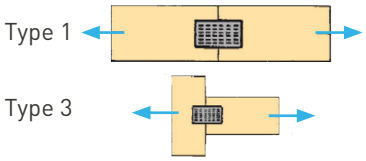


STRAP NAIL

0.95mm G300 Z275 GALVANISED STEEL

Characteristic Load	Type 1	Type 3
Tension	9.1 kN / pair	6.0 kN / pair





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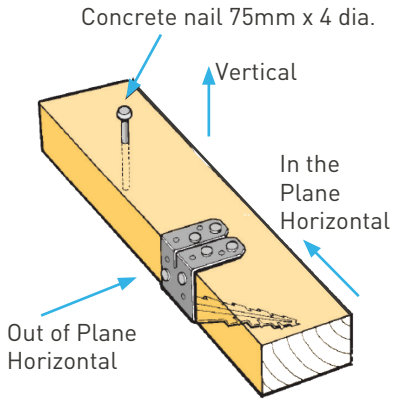
TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

BOTTOM PLATE FIXING ANCHOR

0.95mm G300 Z450 GALVANISED STEEL
0.9mm STAINLESS STEEL 304-2B

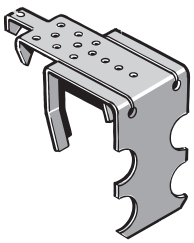
Characteristic Load	
Vertical	8.0 kN
In the Plane Horizontal	7.0 kN
Out of Plane Horizontal	4.0 kN
Nail as shown: 6 x LUMBERLOK Product Nails 30mm x 3.15 dia. AND a 75mm x 4 dia. concrete nail adjacent to Bottom Plate Fixing Anchor.	

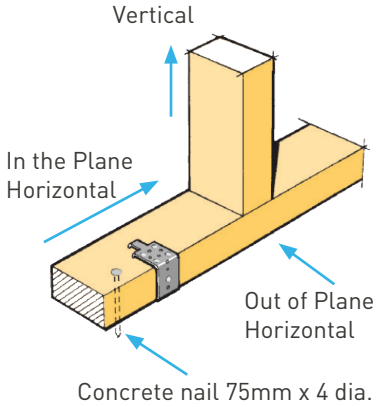


HEADER BLOCK ANCHOR

1.15mm G250 Z275 GALVANISED STEEL
0.9mm STAINLESS STEEL 304-2B

Characteristic Load	
Vertical	9.0 kN
In the Plane Horizontal	7.0 kN
Out of Plane Horizontal	4.0 kN
Nail as shown: 5 x LUMBERLOK Product Nails 30mm x 3.15 dia. AND a 75mm x 4 dia. concrete nail adjacent to Header Block Anchor.	

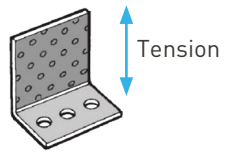


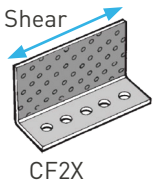


CONCRETE FIXING CLEATS

1.55mm G300 Z275 GALVANISED STEEL

Characteristic Load	CF1 (Single Cleat)		CF2X (Single Cleat)	
No. of Bolts	1 x M12 Bolt with washer (in steel beam or concrete)		2 x M12 Bolt with washer (in steel beam or concrete)	
Fixings	18 x LUMBERLOK Product Nails 30mm x 3.15 dia.	6 x Type 17-14g x 35mm Hex Head Screws	30 x LUMBERLOK Product Nails 30mm x 3.15 dia.	10 x Type 17-14g x 35mm Hex Head Screws
Tension	13.5 kN	13.5 kN	27.0 kN	27.0 kN
Shear	9.5 kN	11.0 kN	16.0 kN	18.5 kN

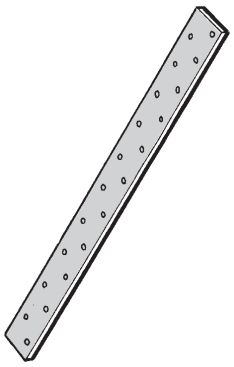


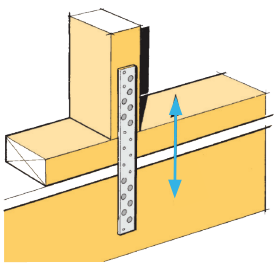


SHEET BRACE STRAPS 200, 300, 400, 600mm

0.91mm x 25mm G300 Z275 GALVANISED STEEL
0.9mm x 25mm STAINLESS STEEL 304-2B

Type	Characteristic Load	
Zinc	Tension	7.7 kN
Stainless	Tension	6.2 kN
Nail as shown: 6 x LUMBERLOK Product Nails 30mm x 3.15 dia. per end.		





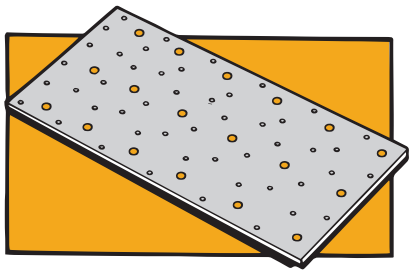
LUMBERLOK

TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

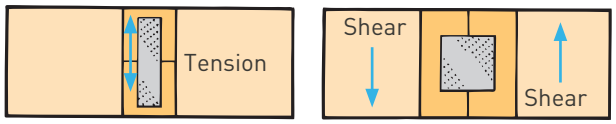
NAILON PLATES

1mm x 110mm wide - 0.91mm G300 Z275 GALVANISED STEEL
1mm x 110mm wide - 0.9mm STAINLESS STEEL 304-2B
2mm x 113mm wide - 1.55mm G300 Z275 GALVANISED STEEL
2mm x 150mm wide - 1.55mm G300 Z275 GALVANISED STEEL
3mm x 130mm wide - 3.0mm NZCC-SD UNGALVANISED BLACK STEEL
3mm x 240mm wide - 3.0mm NZCC-SD UNGALVANISED BLACK STEEL

Characteristic Load (Fastener in single shear)		
Nail	30mm x 3.15 dia.	1.0 kN
Screw	Type 17-14g x 35mm	3.0 kN
	Stainless Steel Type 17-12g x 35mm	2.5 kN



Characteristic Load (Plate)		
1mm Plate Zinc	Tension Shear	200 N/mm per plate 140 N/mm per plate
1mm Plate Stainless Steel	Tension Shear	140 N/mm per plate 110 N/mm per plate
2mm Plate	Tension Shear	340 N/mm per plate 240 N/mm per plate
3mm Plate	Tension Shear	570 N/mm per plate 360 N/mm per plate
110mm wide – 8 nails OR 3 screws per 40mm plate length 113mm wide – 8 nails OR 3 screws per 40mm plate length 130mm wide – 10 nails OR 3 screws per 40mm plate length 150mm wide - 11 nails OR 4 screws per 40mm plate length 240mm wide - 19 nails OR 5 screws per 40mm plate length		

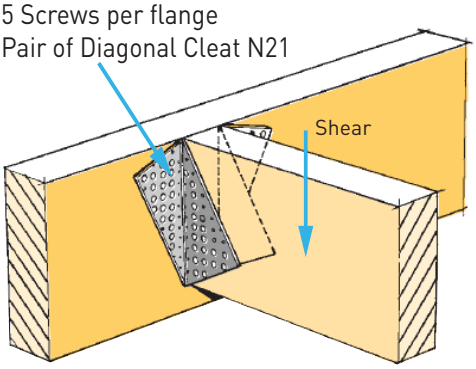


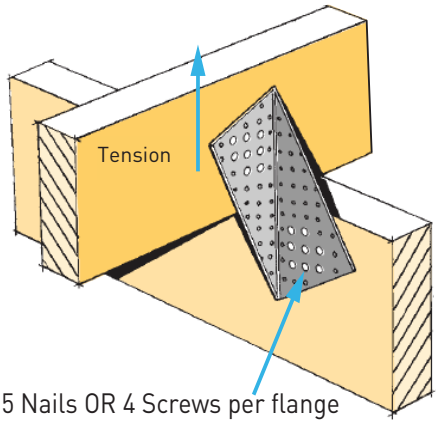
DIAGONAL CLEAT N21

0.91mm G300 Z275 GALVANISED STEEL
0.9mm STAINLESS STEEL 304-2B

Characteristic Load		
Nail	30mm x 3.15 dia.	1.0 kN
Screw	Type 17-14g x 35mm	3.0 kN
	Stainless Steel Type 17-12g x 35mm	2.5 kN
Shear	20 nails OR 5 screws per flange	25 kN / pair of cleats
Uplift	15 nails OR 4 screws per flange	20 kN / pair of cleats

20 Nails OR
5 Screws per flange
Pair of Diagonal Cleat N21





15 Nails OR 4 Screws per flange
Pair Diagonal Cleat N21

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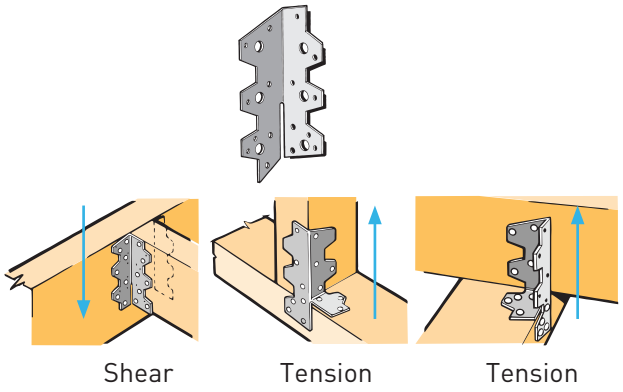
TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

MULTIGRIP

0.91mm G300 Z275 GALVANISED STEEL
0.9mm STAINLESS STEEL 304-2B

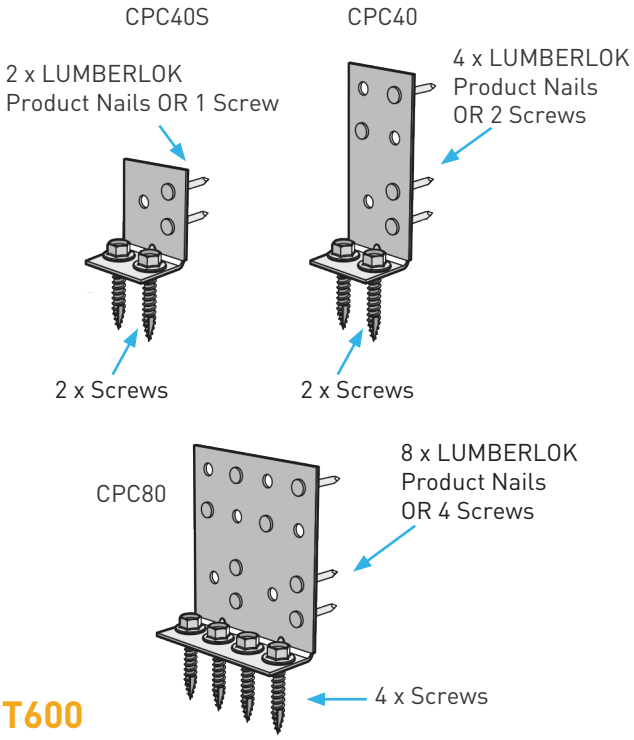
Characteristic Load		
Fixings	Nails: All holes filled with 30mm x 3.15 dia.	Screws: 3 x Type 17-14g x 35mm per flange
Shear	11.9 kN / pair	10.9 kN / pair
Tension	4.0 kN / each	-



CONCEALED PURLIN CLEATS

1.55mm G300 Z275 GALVANISED STEEL
0.9mm STAINLESS STEEL 304-2B (SSCPC40S)
1.5mm STAINLESS STEEL 304-2B (SSCPC40 & SSCPC80)

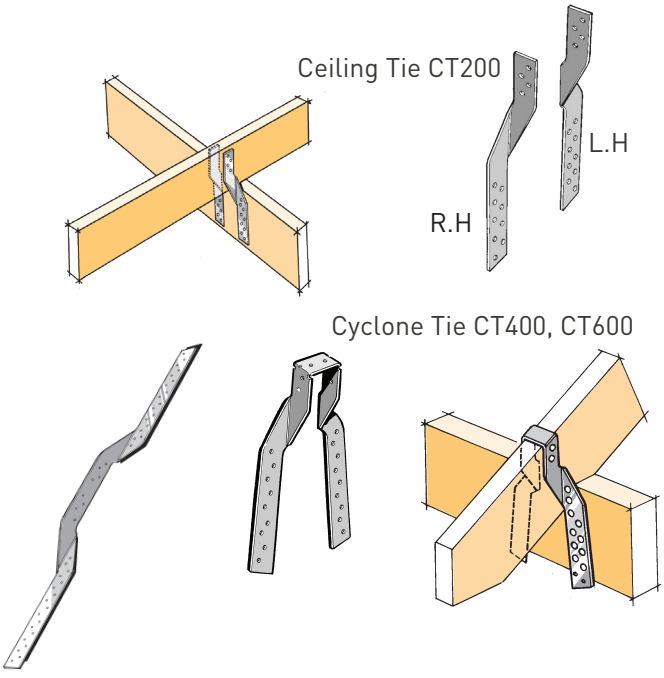
Characteristic Load	CPC40S	CPC40	CPC80
Uplift / Tension	4.0 kN / pair	8.0 kN / pair	16.0 kN / pair
Fix as shown with: LUMBERLOK Product Nails 30mm x 3.15 dia. AND Type 17-14g x 35mm Hex Head Screws			



CEILING TIE CT200 & CYCLONE TIES CT400, CT600

0.91mm G300 Z275 GALVANISED STEEL
0.9mm STAINLESS STEEL 304-2B

Characteristic Load	CT200 (pair)	CT400, CT600
Uplift / Tension (4 nails each end)	10.5 kN	10.5 kN
Uplift / Tension (6 nails each end)	-	12.0 kN
Nails: LUMBERLOK Product Nails 30mm x 3.15 dia.		



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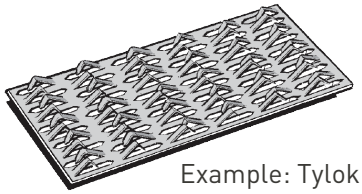
TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

TYLOK PLATES

0.95mm G300 Z275 GALVANISED STEEL



Example: Tylok 6T10
6 rows x 10 teeth wide (60 Teeth)
180mm long x 68mm wide

Joint Configuration **Characteristic Load**

TOOTH LOAD

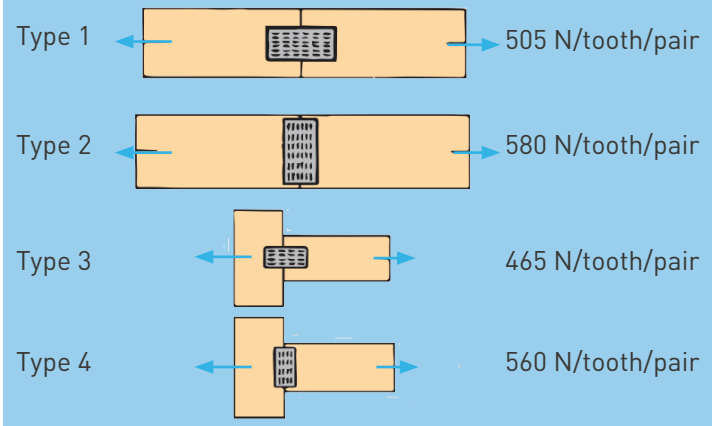


PLATE SHEAR STRENGTH

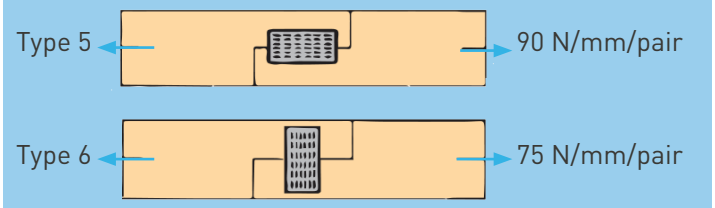
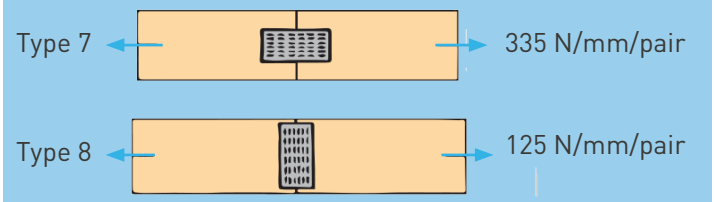


PLATE TENSILE STRENGTH



Width	Length	Code
34mm	60mm	2T5
	120mm	4T5
	180mm	6T5
	240mm	8T5
	300mm	10T5
	360mm	12T5
	420mm	14T5
	480mm	16T5
	15m	Coil T5
68mm	60mm	2T10
	120mm	4T10
	180mm	6T10
	240mm	8T10
	300mm	10T10
	360mm	12T10
	420mm	14T10
	480mm	16T10
	15m	Coil T10
102mm	120mm	4T15
	180mm	6T15
	240mm	8T15
	300mm	10T15
	360mm	12T15
	15m	Coil T15
136mm	180mm	6T20
	240mm	8T20
	300mm	10T20
	360mm	12T20
	420mm	14T20
	15m	Coil T20

Worked example for a pair of Tylok 6T10:
1) TYPE 1 Characteristic Tooth Load = 0.505 x 60/2 = 15.15 kN/pair
2) TYPE 7 Characteristic Tension = 0.335 x 68 = 22.78 kN/pair
3) TYPE 5 Characteristic Shear = 0.090 x 180 = 16.20 kN/pair
4) TYPE 6 Characteristic Shear = 0.075 x 68 = 5.10 kN/pair

Note: ϕ = 0.8 (for Ultimate Limit State design)
k_1 = from Table 2.4 NZS 3603:1993

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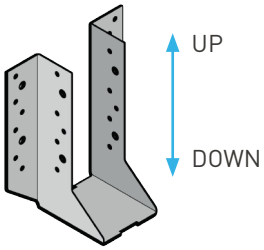
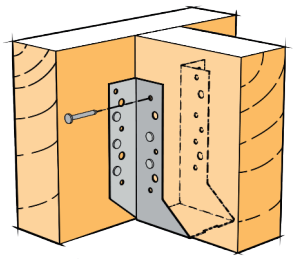
TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

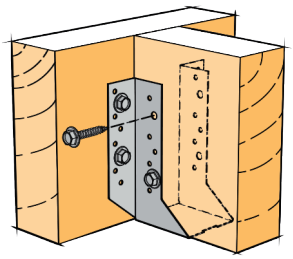
JOIST HANGERS

0.91mm G300 Z275 GALVANISED STEEL
0.9mm STAINLESS STEEL 304-2B





Nail Detail



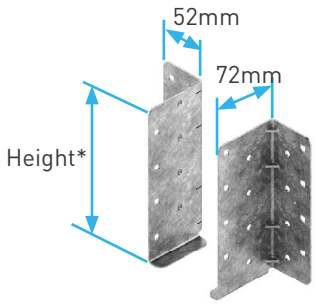
Screw Detail

	Characteristic Load - Nails			Characteristic Load - Screws		
Joist Hanger Type	No. of Nails per Flange*	Down	Uplift	No. of Screws per Flange*	Down	Uplift
JH 47 x 90	3	9.0 kN	6.0 kN	1	7.0 kN	4.7 kN
JH 47 x 120	5	15.0 kN	10.0 kN	2	14.0 kN	12.0 kN
JH 47 x 190	9	27.0 kN	18.0 kN	3	21.0 kN	18.0 kN
JH 95 x 165	8	24.0 kN	16.0 kN	3	21.0 kN	18.0 kN
JH 70 x 180	8	24.0 kN	16.0 kN	3	21.0 kN	18.0 kN
	Nails: LUMBERLOK Product Nails 30mm x 3.15 dia.			Screws: Type 17-12g x 35mm Hex Head		

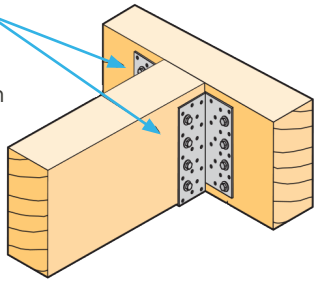
*4 Flanges per hanger
Note: Loads for 47mm Joist Hangers also apply to 52mm.
For roof trusses, Joist Hangers shall be fully nailed or screw fixed.

SPLIT HANGERS

1.55 G300 Z275 GALVANISED STEEL



Left and right hand hangers required for each connection



Split Hangers are available in heights of:
SPH140 - 137mm actual size
SPH180 - 177mm actual size
SPH220 - 217mm actual size

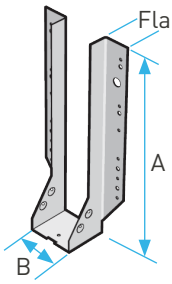
	Characteristic Load (per pair) - Screws					
Split Hanger Type	No. of Screws per Flange	Down	Uplift	No. of Screws per Flange	Down	Uplift
SPH140	3	15.0 kN	15.0 kN	6	36.0 kN	30.0 kN
SPH180	4	24.0 kN	20.0 kN	8	48.0 kN	40.0 kN
SPH220	5	30.0 kN	25.0 kN	10	60.0 kN	50.0 kN
	Fill all round holes with screws Screws: Type 17-14g x 35mm Hex Head			Fill all round and square holes with screws Screws: Type 17-14g x 35mm Hex Head		

LUMBERLOK

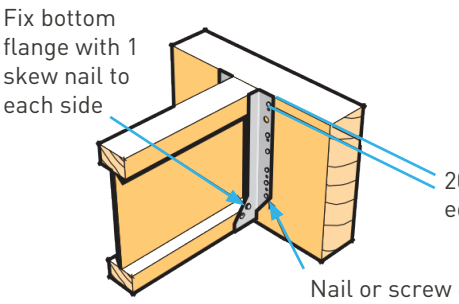
TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

I-BEAM HANGERS - FACE FIX

1.15mm G300 Z275 GALVANISED STEEL



Example: IBHF30065
IBHF = Face Fix
300 = Height (A)
65 = Width (B)

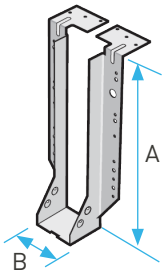


	Characteristic Load - Nails		Characteristic Load - Screws	
I-Beam Hanger Type	No. of Nails per Flange	Down	No. of Screws per Flange	Down
IBHF20090	4	9.6 kN	2	10.0 kN
IBHF24050	5	12.0 kN	3	15.0 kN
IBHF24055	5	12.0 kN	3	15.0 kN
IBHF24065	5	12.0 kN	3	15.0 kN
IBHF24090	5	12.0 kN	3	15.0 kN
IBHF30050	6	14.4 kN	4	20.0 kN
IBHF30065	6	14.4 kN	4	20.0 kN
IBHF30090	6	14.4 kN	4	20.0 kN
IBHF36065	7	16.8 kN	5	24.0 kN*
IBHF36090	7	16.8 kN	5	24.0 kN*
IBHF40090	8	19.2 kN	6	24.0 kN*
	Nails: 40mm x 3.75 dia. nails. Additional 2 nails required for fixing bottom flange		Screws: Type 17-12g x 35mm Hex Head Screws. Additional 2 nails required for fixing bottom flange	

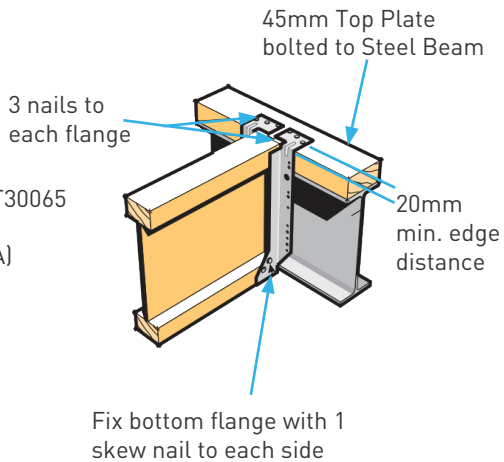
*Maximum hanger load

I-BEAM HANGERS - TOP FIX

1.15mm G300 Z275 GALVANISED STEEL



Example: IBHT30065
IBHT = Top Fix
300 = Height (A)
65 = Width (B)



	Characteristic Load - Nails	
I-Beam Hanger Type	No. of Nails	Down
IBHT20050	6 (3 per flange)	13.8 kN
IBHT24065	6 (3 per flange)	13.8 kN
IBHT24090	6 (3 per flange)	13.8 kN
IBHT30065	6 (3 per flange)	13.8 kN
IBHT30090	6 (3 per flange)	13.8 kN
IBHT36065	6 (3 per flange)	13.8 kN
IBHT36090	6 (3 per flange)	13.8 kN
IBHT40090	6 (3 per flange)	13.8 kN
	Nails: 40mm x 3.75 dia. nails. Additional 2 nails required for fixing bottom flange	

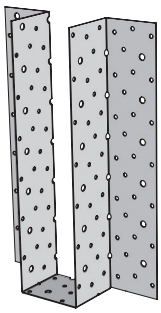
LUMBERLOK

TIMBER CONNECTORS CHARACTERISTIC LOADINGS DATA

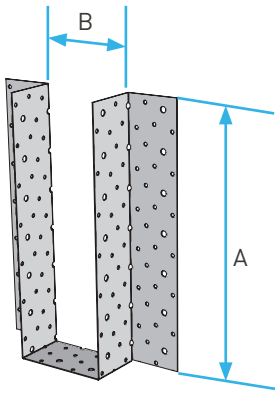
LVL HANGERS

0.91mm G300 Z275 GALVANISED STEEL

JH47270



JH65270

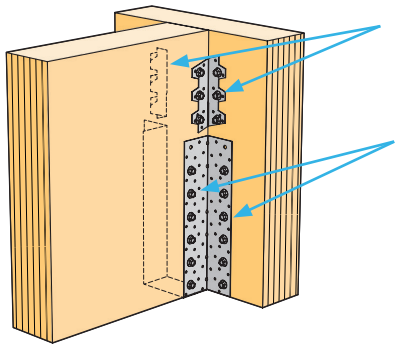


JH95270

Example: JH 95 X 270
270 = Height (A)
95 = Width (B)

	Characteristic Load - Nails			Characteristic Load - Screws		
LVL Hanger Type	No. of Nails per Flange*	Down	Uplift	No. of Screws per Flange*	Down	Uplift
JH 47 x 270	12	36.0 kN	24.0 kN	6	36.0 kN	30.0 kN
JH 65 x 270	12	36.0 kN	24.0 kN	6	36.0 kN	30.0 kN
JH 95 x 270	12	36.0 kN	24.0 kN	6	36.0 kN	30.0 kN
	Nails: LUMBERLOK Product Nails 30mm x 3.15 dia.			Screws: Type 17-14g x 35mm Hex Head Screws		

*4 Flanges per Hanger



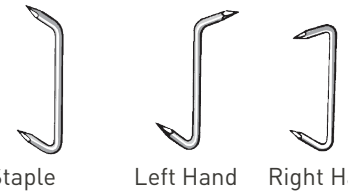
Add pair of LUMBERLOK® Multigrips for LVL depths ⩾400mm

Nail or Screw each flange

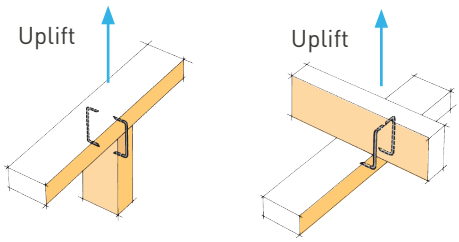
WIRE DOGS

4.9mm DIAMETER GALVANISED WIRE
4.76mm DIAMETER STAINLESS STEEL 304 WIRE

Type	Characteristic Load	
Zinc	Uplift	3.58 kN / pair
Stainless	Uplift	3.42 kN / pair
Additional 2/ 90mm x 3.15 dia. skew nails required		



Staple Left Hand Right Hand



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