SIMPSON Strong-Tie®

TIMBER CONSTRUCTION **CONNECTORS**

2016–2018

C-C-AU16
Revision 1

GENUINE
Simpson Strong-Tie® Connectors

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New Zealand +64 9 477 4440 strongtie.co.nz

South Africa +27 8 7354 0629 strongtie.co.za

Our Commitment

For nearly 60 years, Simpson Strong-Tie has steadfastly served the needs of its customers. During that time, our commitment to leading the construction industry in research and development, product testing and customer service has never wavered.

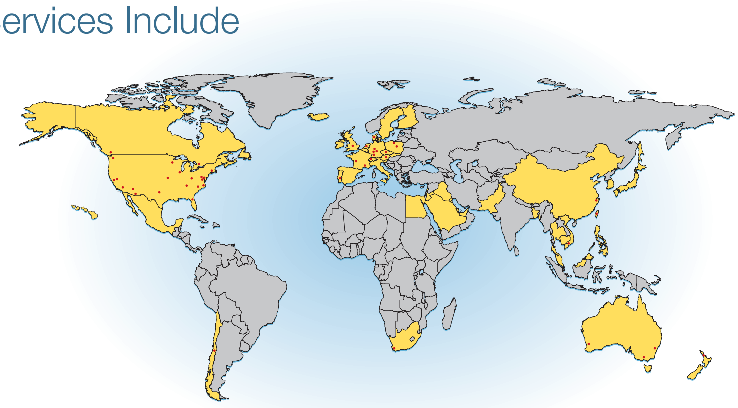
Today, that promise continues to be delivered worldwide – from our manufacturing facilities to the jobsite. Our commitment to maintaining the highest standards of quality and service can be seen when we help educate engineers on applications and specifications, or when we answer questions from contractors or building officials or help train them on a proper installation. We're there to ensure our dealers get their questions answered and to help their customers receive the best service possible.

You can expect Simpson Strong-Tie to be there to assist you. For our more than 2,000 employees, it's not about doing business, it's about our commitment to your success.

Simpson Strong-Tie Company Inc. was founded in Oakland, California, and has been manufacturing timber-to-timber and timber-to-concrete connectors since 1956. Since then, Simpson Strong-Tie has grown to be the world's largest manufacturer of construction connectors. In recent years, the company's growth has included expanding its product offering to include prefabricated shearwalls, anchor systems for concrete and masonry, collated fastening systems and repair, protection and strengthening systems for concrete and masonry.

Simpson Strong-Tie Company Inc. Services Include

- Quality products value-engineered for the lowest installed cost at the highest-rated performance levels
- Most thoroughly tested and evaluated products in the industry
- Strategically located warehouse facilities
- Nationwide field engineering support
- National sales team
- In-house R&D and tool and die professionals
- In-house product testing and quality control engineers



Factories, offices, and warehouses in Australia, Austria, Canada, Chile, China, Czech Republic, Denmark, France, Germany, Netherlands, New Zealand, Poland, Portugal, South Africa, Switzerland, Taiwan, UK and U.S.A.

Distribution in Australia, Canada, Chile, Western Europe, part of Eastern Europe, Middle East, Japan, Korea, Egypt, China, Taiwan & other Asian countries, Mexico, New Zealand, South Africa, UK and U.S.A.

Simpson Strong-Tie Quality Policy

We help people build safer structures economically. We do this by designing, engineering and manufacturing "No Equal" structural connectors and other related products that meet or exceed our customers' needs and expectations.

Everyone is responsible for product quality and is committed to ensuring the effectiveness of the Quality Management System.

Karen Colonias
Chief Executive Officer

We Are ISO 9001-2008 Registered

Simpson Strong-Tie Company Inc. is an ISO 9001-2008 registered company. ISO 9001-2008 is an internationally-recognised quality assurance system which lets our domestic and international customers know that they can count on the consistent quality of Simpson Strong-Tie® products and services.

nqa. ISO 9001 Registered

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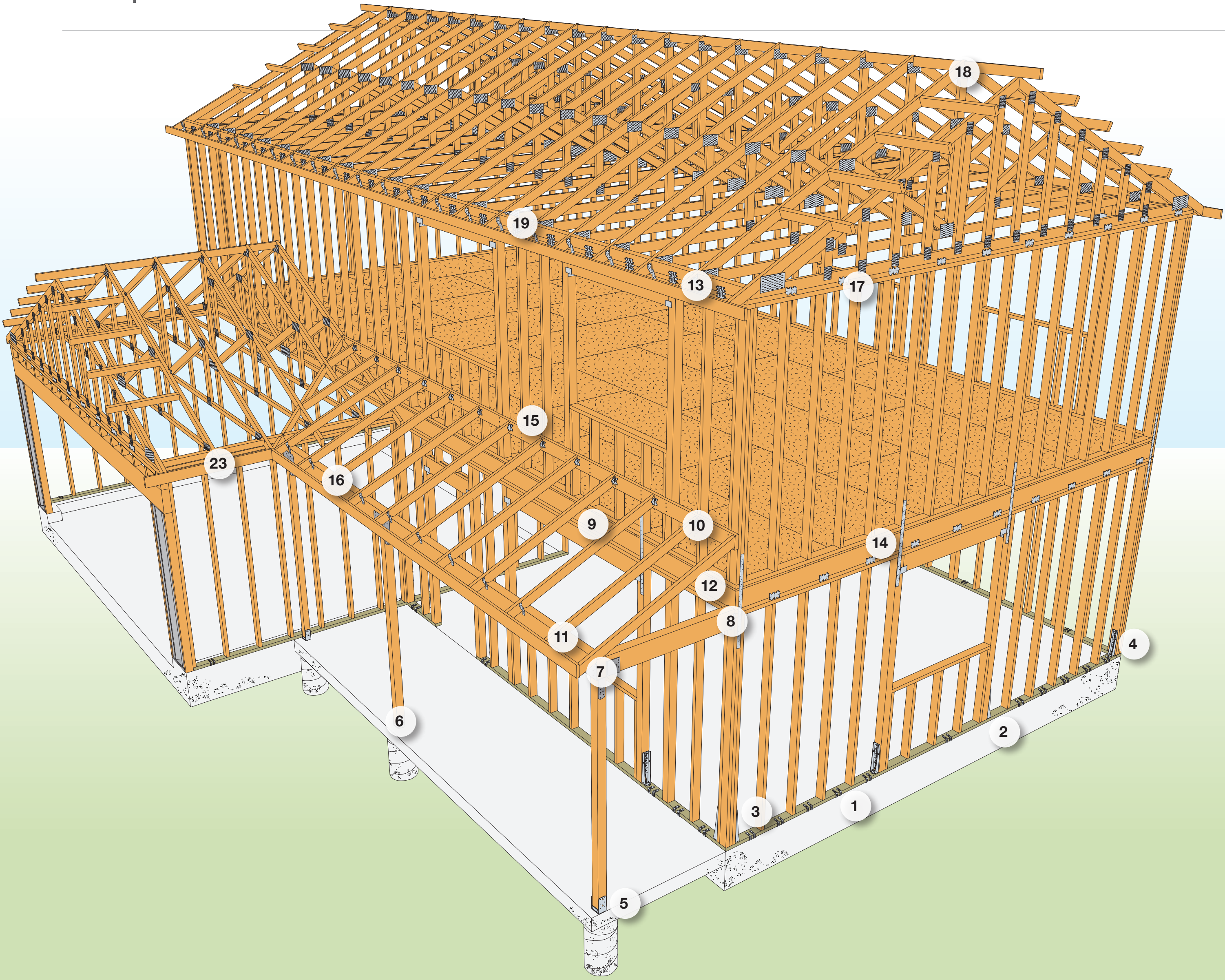

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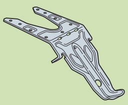

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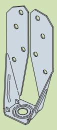

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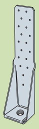

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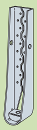

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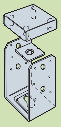

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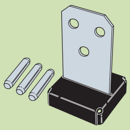

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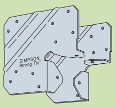

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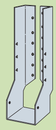

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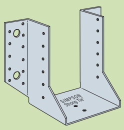

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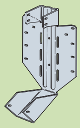

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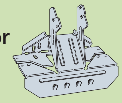

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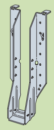

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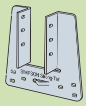

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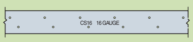

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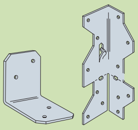

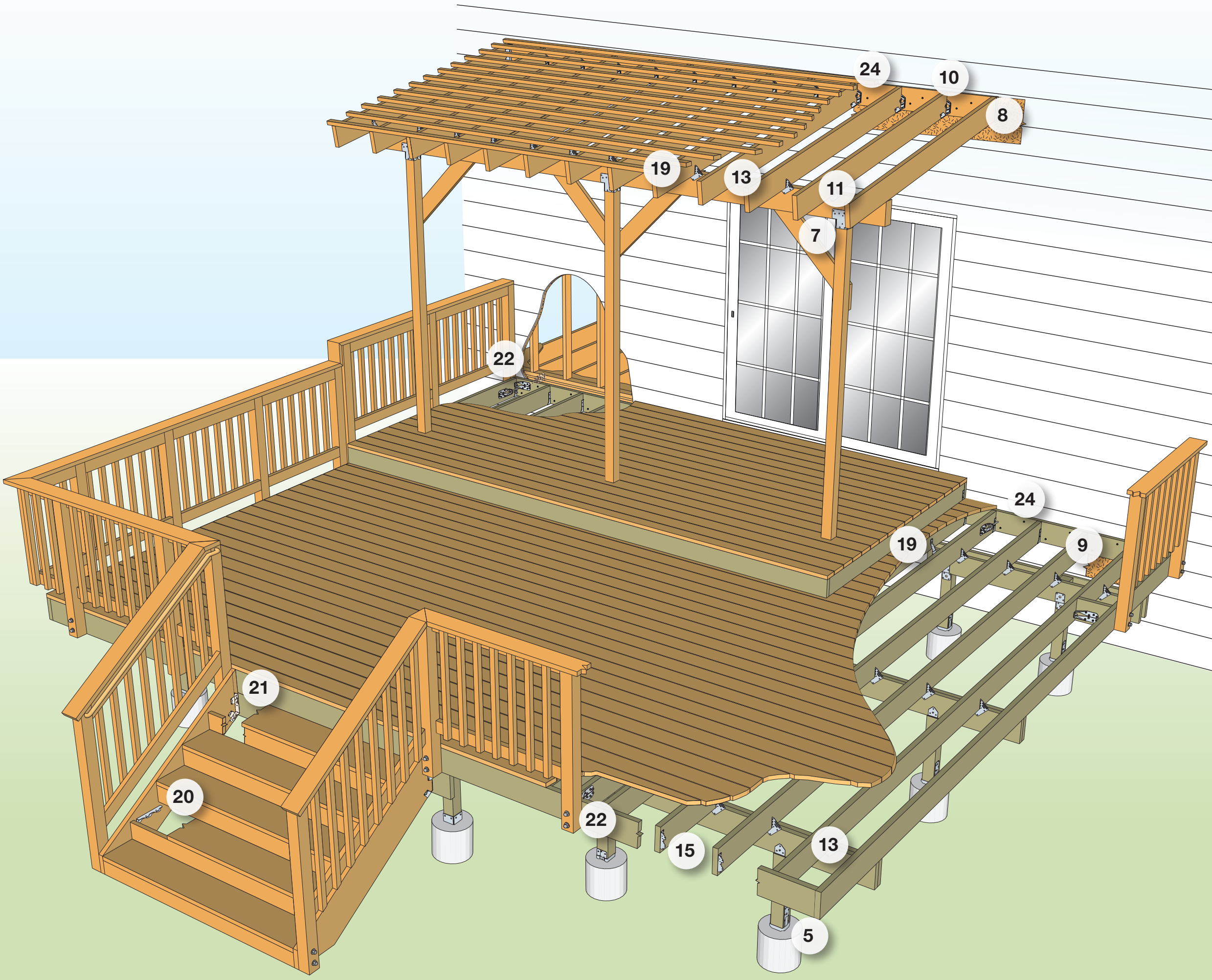

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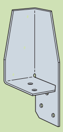

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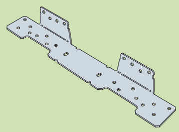

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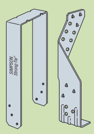

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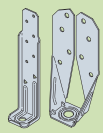

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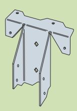

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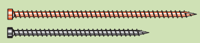

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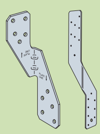

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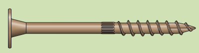

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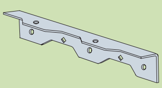


Extra Corrosion Protection

A "**Z**" suffix in the model name indicates a **Zmax**® coating. For example, ABU44**Z**.

A "**SS**" suffix in the model name indicates a product is made from **stainless steel**. For example, ABU44**SS**.

See pages 9–11 for information on available coatings and guidelines for selecting corrosion-resistant connectors and fasteners, and visit our website ***www.strongtie.com/info*** for more technical information on this topic.

How We Determine Design Capacities

Design capacities in this catalogue are determined by calculations and test criteria established by industry, such as Australian, New Zealand and ASTM test standards.

Connectors are typically evaluated in accordance with AS 1649:2001, Timber - Method of Test for Mechanical Fasteners and Connectors. The characteristic capacity is determined taking the lower of the 5th percentile of the lower probability limit of the maximum test loads divided by 5 and the average of the maximum test loads divided by 8, then multiplying that basic working load by 3.65 for a timber test failure or by 1.70 for a steel test failure. The test design capacity is then determined by multiplying the characteristic capacity by the Australian capacity factor (ϕ), or the New Zealand strength reduction factor (ϕ). The serviceability capacity is the average test load at a 3.2mm deflection except for holdowns where the serviceability capacity is the average test load at a 6.4mm deflection. The published design capacity is the lesser of the test design capacity, the serviceability capacity, and the fastener and bearing calculation design capacity determined in accordance with either AS 1720 or NZS 3603 for Australia and New Zealand, respectively. For Australia, the capacity factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Tabulated values should be reduced where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.

Where a test standard is unavailable, testing is conducted per sound engineering principles. Some tests include only portions of a product, such as purlin anchor tests only the embedded hook is tested, not the nailed or bolted section of the strap, which is calculated. Testing to determine design capacities in this catalogue is typically done on single members and does not include repetitive framing or sheathing that typically is used in a building. Testing is conducted under the supervision of an independent laboratory.

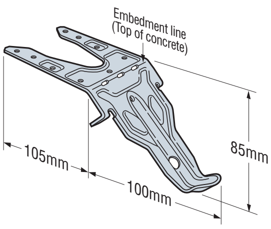
For detailed information regarding how Simpson Strong-Tie tests specific products, contact Simpson Strong-Tie.

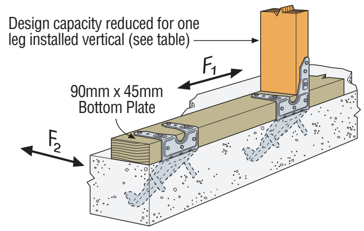
Catalogue Definition

Deflection: The distance a point moves when a load is applied.

Model No.
This is the Simpson Strong-Tie product name.

Product Drawings
Provides a graphic presentation of the product with dimensional information *(often cross referenced to the table).*





Dimensions
This shows the timber dimensions (breadth, depth—as in this case—and height) referenced in the product drawing.

Fasteners
This shows the fastener quantity and type required to achieve the table loads.

Design Capacities
The maximum load that a connection is designed to provide. There may be multiple design loads acting in different directions (up, down, lateral, perpendicular, etc.) imposed on a connection.

Uplift **Download**

Model No.	Sill Size (mm)	Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
		Sides	Top		Uplift	F1	F2
STANDARD INSTALLATION							
MASA	90 x 45, 140 x 45	3 – 40 x 3.75	6 – 40 x 3.75	AU	k_1 = 1.14 5.67	k_1 = 1.14 6.39	k_1 = 1.14 2.26
				NZ	k_1 = 1.0 5.34	k_1 = 1.0 6.01	k_1 = 1.0 2.26
ONE LEG UP INSTALLATION							
MASA	90 x 45, 140 x 45	3 – 40 x 3.75	6 – 40 x 3.75	AU	k_1 = 1.14 —	k_1 = 1.14 4.63	k_1 = 1.14 —
				NZ	k_1 = 1.0 —	k_1 = 1.0 4.35	k_1 = 1.0 —

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip, which includes fastener slip and mudsill anchor deformation. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Minimum normal class concrete strength grade shall be 17 MPa.
6. Design Capacity based on a minimum concrete wall width of 150mm.
7. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation.

Footnote: Throughout this catalogue, footnotes will describe the basis upon which the design capacity was determined (i.e., strength reduction factor, structural joint category, load duration factor, minimum material specifications etc).

Understanding the Corrosion Issue

Many environments and materials can cause corrosion including ocean salt air, fire-retardants, fumes, fertilisers, preservative-treated timber, de-icing salts, dissimilar metals and more. Metal connectors, fasteners and anchors could corrode and lose load-carrying capacity when installed in corrosive environments or when installed in contact with corrosive materials.

The many variables present in a building environment make it impossible to accurately predict if, or when, corrosion will begin or reach a critical level. This relative uncertainty makes it crucial that specifiers and users are knowledgeable of the potential risks and select a product suitable for the intended use. It is also prudent that regular maintenance and periodic inspections are performed, especially for outdoor applications.

It is common to see some corrosion in outdoor applications. Even stainless steel can corrode. The presence of some corrosion does not mean that load capacity has been affected or that failure is imminent. If significant corrosion is apparent or suspected, then the timber, fasteners and connectors should be inspected by a qualified engineer or qualified surveyor. Replacement of affected components may be appropriate.

Some timber-preservative chemicals and fire-retardant chemicals and retentions pose increased corrosion potential and are more corrosive to steel connectors and fasteners than others. Testing by Simpson Strong-Tie has shown that ACQ-Type D is more corrosive than Copper Azole-Type C, Micronised Copper Azole, and CCA-C. At the same time, others have shown that the inorganic boron treatment chemicals, specifically SBX-DOT, are less corrosive than CCA-C.

Due to the many different chemical retention levels, moisture conditions and regional formulation variants, selection of connectors and fasteners has become a complex task. We have attempted to provide basic knowledge on the subject but it is important to fully educate yourself by reviewing our technical bulletins on the topic ***(www.strongtie.com/info)*** and also by reviewing information, literature and evaluation reports published by others.

Integration of Treatment Hazard Categories and Atmospheric Exposure Conditions

The corrosion guidelines in standards, such as ISO 9223, AS 4791, AS 4534 describe corrosion hazard as a function of atmospheric conditions and proximity to ocean salinity. Hazard classification for timber durability based on moisture and ground contact is described in AS 1684.2. In building construction, chemical treatment is used to prevent timber deterioration and many timber treatment chemicals have a pronounced corrosion effect that also has to be considered in the selection of metal hardware and fasteners. The standard AS 1684.4-2010 instructs that the level of corrosion protection should include consideration of weather exposure, timber treatment, and moisture and presence of salt. However, the standard provides no further guidance to assist the designer with this task. Simpson Strong-Tie has attempted to integrate the information related to atmospheric corrosion hazard, hazard classification for durability of timber with the known corrosion effects of timber treatment chemicals and the AS and NZ building codes. See tables on page 11 for recommendations based on the integration of timber treatment chemicals and atmospheric corrosion zones.

A word about timber and its corrosion effects is important. Some timbers are not corrosive to metals. For example, Radiata Pine and Douglas-fir are known to have no significant corrosion effects on metals. However, some tropical and semi-tropical hardwoods are acidic or have naturally occurring compounds that are corrosive to metals. The selection of fasteners and metal hardware should be influenced by this condition. If uncertain about the corrosion effect of the timber being used, select HDG or stainless steel.

Coatings Available

Not all products are available in all finishes. Contact Simpson Strong-Tie for product availability, ordering information and lead times.

Finish/Material	Description	Level of Corrosion Resistance
Gray Paint	Water-based paint intended to protect the product while it is warehoused and in transit to the jobsite.	Low
Powder Coating	Baked on paint finish that is more durable than our standard paint and produces a better looking finished product.	Low
Standard Z275 Zinc Coating	Zinc galvanised coating weight of 275g of zinc per square meter, total both sides. Hot dip galvanised per ASTM A-653.	Low
Electrocoating (E-Coat™)	Electrocoating utilises electrical current to deposit the coating material on the fastener. After application, the coating is cured in an oven. Electrocoating provides a minimum amount of corrosion protection and is recommended for dry, non-corrosive applications only.	Low
ZMAX Z550	Zinc galvanised coating weight of 550g of zinc per square meter, total both sides. Hot dip galvanised per ASTM A-653. These products require hot-dip galvanised fasteners (fasteners which meet the specifications of ASTM A153).	Medium
HOT DIP HDG GALVANIZED®	Products are hot-dip galvanised after fabrication (2.0mm and thicker). The coating weight increases with material thickness. The minimum average coating weight is 600g per square meter, total both sides. Hot dip galvanised per ASTM A-123. These products require hot-dip galvanised fasteners (fasteners which meet the specifications of ASTM A153). Anchor bolts are hot-dip galvanised per ASTM F2329.	Medium
Type 410 Stainless Steel with Protective Top Coat	Carbon martensitic grade of stainless steel which is inherently magnetic, with an added protective top coat. This material can be used in mild atmospheres and many mild chemical environments.	Medium
Mechanically-Galvanised Coating, Class 55	Simpson Strong-Tie Strong-Drive® SD Connector screw is manufactured with a mechanically-applied zinc coating in accordance with ASTM B695, Class 55 with a supplemental overcoat. These fasteners are compatible with painted and zinc-coated (Z275 and ZMAX) connectors.	Medium
Double-Barrier Coating	Simpson Strong-Tie Strong-Drive SDS Heavy-Duty Connector screw is manufactured with two different finishes that together provide a level of corrosion protection that equals that provided by the previous HDG coating.	Medium
SST300 STAINLESS STEEL®	Connectors are manufactured from Type 316L stainless steel, and provide greater durability against corrosion. Stainless-steel nails are required with stainless-steel products, and are available from Simpson Strong-Tie.	High/Severe

SIMPSON Strong-Tie

Simpson Strong-Tie General Recommendations

Simpson Strong-Tie has evaluated the AU/NZ Hazard Categories and atmospheric corrosion zones and developed from that evaluation an integrated set of corrosion resistance recommendations (see Integrated Corrosion Resistance Recommendations table on page 11). The recommendations address the coating systems and materials used by Simpson Strong-Tie for connector and fastener products.

Dry service (or damp service) environments lead to timber moisture contents less than or equal to 19%. The corrosion potential, even in chemically treated timber, is reduced in these conditions. At the same time, outdoor environments are generally more corrosive to steel, either because the moisture exposure is elevated (greater than 19%), the treatment chemical retention level is higher than for interior service, or the metal is directly exposed to the weather and airborne agents.

Types 316/305/304 stainless steel, copper, silicon bronze and hot-dip galvanised are the most effective protection against corrosion risk. Type 316 is the best choice for salt marine and chloride containing environments, regardless of treatment chemicals or timber species. If you choose to use hot-dip galvanised, mechanically galvanised, double-barrier coated or Quik Guard coated fasteners on outdoor projects (e.g. a deck), you should periodically inspect the fasteners or have a professional inspection performed and regular maintenance is a good practice. See the Corrosion Resistance Classifications Table for the Simpson Strong-Tie assessment of the corrosion resistance associated with materials and coatings and an appropriate level of corrosion resistance for various environments.

Simpson Strong-Tie does not recommend painting stainless steel fasteners or hardware. The reason behind this recommendation is that sometimes painting can facilitate corrosion. Stainless steel is "stainless" because it forms a protective chromium oxide film on the surface by passive oxidation with air. The paint film on the stainless steel surface may be imperfect or it can be injured during service, and in either case the metal may be exposed. Microscopic sized film imperfections and scratches facilitate collection of dirt and water that can be stagnant and degrade or block the passive formation of the protective chromium oxide film. When this happens crevice corrosion can initiate. Crevice corrosion eventually becomes visible as a brown stain or red rust. This is the reason that painting usually does not improve corrosion resistance of stainless steel.

Due to the many variables involved, Simpson Strong-Tie cannot provide estimates of service life of connectors and fasteners. We suggest that all users and specifiers obtain recommendations of corrosion from the treated timber supplier for the type of timber used. As long as Simpson Strong-Tie recommendations are followed, Simpson Strong-Tie stands behind its product performance, and our standard warranty applies.

Guidelines for Selecting Corrosion-Resistant Connectors and Fasteners

Evaluate the application.

Consider the importance of the connection.

Evaluate the integrated environment.

Consider these moisture and treatment integrated environments.

Dry Service: Generally INTERNAL applications include roof and wall cavities, raised floor applications in enclosed buildings that have been designed to prevent condensation and exposure to sources of moisture.

Wet Service: Generally EXTERNAL construction in conditions other than elevated service. These include applications that are external sheltered and exposed and general-use ground contact.

Elevated Service: Includes air pollutants, fertilisers, soil, some preservative treated timber, industrial fumes, acid rain, and other corrosive elements in dry and wet service environments.

Marine/Coastal/Tropical: Marine environments that include direct exposure and exterior sheltered exposure to ocean salinity, salt water splash, and elevated moisture due to air or ground moisture.

Uncertain: Unknown exposure, materials, treatment chemicals, or corrosion effects of timber.

Treatment Chemicals: See AS 1604 and Timber Preservers Association of Australia and other related organisations for treatment practices and chemicals. The preservative-treated timber supplier should provide all of the pertinent information about the treated timber being used. The information should include timber treatment chemical and chemical retention. See related chemical product literature for corrosion effects of treatment chemicals and fastener corrosion resistance recommendations.

Use the Simpson Strong-Tie® Corrosion Classification Tables

If the treatment chemical information is incomplete, Simpson Strong-Tie recommends the use of a 300 series stainless steel product. Also if the treatment chemical is not shown in the Corrosion Classification Table, then Simpson Strong-Tie has not evaluated it and cannot make any recommendations other than the use of coatings and materials in the Severe category. Manufacturers may independently provide test results of other product information; Simpson Strong-Tie expresses no opinion regarding such information.

Integrated Corrosion Resistance Recommendations

Integration of treatment hazard and atmospheric corrosion hazard for the purposes of corrosion protection determination for fasteners and metal hardware in timber-frame buildings. References are AS 1604, ISO 9223, AS 1684.2 (appendix B), AS 1684.4, AS 4534 (appendix F), and NZ3604.

Integrated Environment	Corrosion Classification			
	AS Treatments	AS Atmospheric	NZ Zones	ISO 9223
Dry	H1, H2	A, B	B, C	C1
Wet	H3, H4	F	B, C, D	C2, C3
Elevated	—	C, E-I	B, C, D	C4
Marine/Coastal/Tropical	H5, H6	D, F, E-M	D	C4, C5
Uncertain	All	All	All	All

Corrosion Resistance Classifications Table

Integrated Environment	Material To Be Fastened					
	Untreated timber or other material	Preservative-Treated Timber				
		Hazard Class H1, H2	Hazard Class H3	Hazard Class H4, H5, H6	Other Treatments or Uncertain	FRT Timber
Dry Service	Low	Low	N/A	N/A	High	Medium
Wet Service	Medium	N/A	Medium	High	High	High
Elevated Service	High	N/A	High	Severe	Severe	High
Uncertain	High	High	Severe	Severe	Severe	High
Ocean/Water Front	Severe	N/A	Severe	Severe	Severe	Severe

1. These are general guidelines that may not consider all application criteria. Refer to product specific information for additional guidance.
2. Treatments typical of Hazard Classes H1 and H2 are based on inorganic boron or are preservatives in light organic solvents (LOSP).
3. Treatments typical of Hazard Class H3 is ACQ-D (retention 6.4 kg/m3), Copper Azole-B (retention 3.3 kg/m3), Copper Azole-C (retention 2.4 kg/m3)
4. Treatments for sawn products typical of Hazard Classes H4, H5, and H6 are CCA, ACZA, ACQ (retention > 6.4 kg/m3), and creosote.
5. Fire-retardant treated timber may have specific corrosion resistance requirements. See chemical manufacturer guidelines.
6. Type 316/305/304 stainless steels are recommended where preservative treated timber is used in ground contact.
7. Testing by Simpson Strong-Tie following ICC-ES AC257 has shown that mechanical galvanisation, Quik Guard coating, and Double Barrier coating will provide corrosion resistance equivalent to hot-dip galvanisation in contact with chemically treated timber in dry service and wet service exposures (Hazard Classes H1-H3) and will perform adequately subject to regular maintenance and periodic inspection.
8. Mechanical galvanisations C3 and N2000 should not be used in conditions that would be more corrosive than Hazard Class H3 (external, above ground rapid water run off).
9. If uncertain about Hazard Class, treatment chemical, or environment, use Type 316/305/304 stainless steels, silicon bronze, or copper.
10. Type 316 stainless steel, silicon bronze, and copper fasteners are the best recommendation for ocean front and chloride-containing environments. Hot-dipped galvanised fasteners, Class C protection can also be used as an alternate for some applications in environments with ocean air and/or elevated moisture content.

Interior Dry

Exterior

Severe

Warning

Simpson Strong-Tie Company Inc. structural connectors, anchors, and other products are designed and tested to provide specified design capacity. To obtain optimal performance from Simpson Strong-Tie Company Inc. products and achieve maximum design capacity, the products must be properly installed and used in accordance with the installation instructions and design limits provided by Simpson Strong-Tie Company Inc. To ensure proper installation and use, Designers and installers must carefully read the following General Notes, General Instructions for the Installer and General Instructions tor the Designer, as well as consult the applicable catalogue pages for specific product installation instructions and notes.

Proper product installation requires careful attention to all notes and instructions, including these basic rules:

1. Be familiar with the application and correct use of the connector.
2. Follow all installation instructions provided in the applicable catalogue, website or any other Simpson Strong-Tie publications.
3. Install all required fasteners per installation instructions provided by Simpson Strong-Tie Company Inc.: a) use proper fastener type; b) use proper fastener quantity; c) fill all fastener holes as specified; d) do not overdrive or underdrive nails, including when using gun nailers; and e) ensure screws are completely driven.
4. Only bend products that are specifically designed to be bent. For those products that required bending, do not bend more than once.
5. Cut joists to the correct length, do not “short-cut”. The gap between the end of the joist and the header material should be no greater than 3.2mm unless otherwise noted.

In addition to following the basic rules provided above as well as all notes, warnings and instructions provided in the catalogue, installers, designers, engineers and consumers should consult the Simpson Strong-Tie Company Inc. website at ***www.strongtie.com*** to obtain additional design and installation information, including:

- Instructional builder/contractor training kits containing an instructional video, an instructor guide and a student guide in both English and Spanish;
- Information on workshops Simpson Strong-Tie conducts at various training centers throughout the country;
- Product specific installation videos;
- Specialty catalogues;
- Code reports – Simpson Strong-Tie® Code Report Finder software;
- Technical fliers and bulletins;
- Material safety data sheets;
- Corrosion information; and
- Answers to frequently asked questions and technical topics.

Failure to follow fully all of the notes and instructions provided by Simpson Strong-Tie Company Inc. may result in improper installation of products. Improperly installed products may not perform to the specifications set forth in this catalogue and may reduce a structure’s ability to resist the movement, stress, and loading that occurs from gravity loads as well as impact events such as earthquakes and high velocity winds.

Simpson Strong-Tie Company Inc. does not guarantee the performance or safety of products that are modified, improperly installed or not used in accordance with the design and load limits set forth in this catalogue.

General notes

These general notes are provided to ensure proper installation of Simpson Strong-Tie Company Inc. products and must be followed fully.

a. Simpson Strong-Tie Company Inc. reserves the right to change specifications, designs, and models without notice or liability for such changes.

b. Steel used for each Simpson Strong-Tie® product is individually selected based on the product's steel specifications, including strength, thickness, formability, finish, and weldability. Contact Simpson Strong-Tie for steel information on specific products.

c. Unless otherwise noted, dimensions are in millimetres and loads are in kilo Newtons.

d. Unless otherwise noted, welds, screws, bolts and nails may not be combined to achieve highest load capacity.

e. Do Not Overload. Do not exceed catalogue design capacities, which would jeopardise the connection.

f. Light-timber framing in Australia for engineered and prescriptive design shall be in accordance with AS 1720 and AS 1684, respectively. Light-timber framing in New Zealand for engineered and prescriptive design shall be in accordance with NZS 3603 and NZS 3604, respectively.

g. Unless otherwise noted, design capacities are for Seasoned Radiata Pine under continuously dry conditions. Design capacities for other species or conditions must be adjusted according to the code. The following table shows design density (RP equivalent species for LVL) and bearing perpendicular to grain design capacity for different timber members based on AS 1720, Category 1 applications, and for a 5 month effective duration of peak action. Seasoned Radiata Pine value is shown for MGP10 stress grade sawn timber.

Species	$N_{d,p}$ (MPa)	Design Density (kg/m³)
Seasoned Radiata Pine	6.21	550
Glulam (RP)	6.21	550
LVL (RP)	6.21	550

h. All references to bolts or machine bolts (MBs) are for structural quality hex head bolts (*not coach screws or cuphead bolts*).

i. Unless otherwise noted, bending steel in the field may cause fractures at the bend line. Fractured steel will not carry load and must be replaced.

j. A fastener that splits the timber will not take the design load. Evaluate splits to determine if the connection will perform as required. Dry timber may split more easily and should be evaluated as required. If timber tends to split, consider pre-boring holes with diameters not exceeding 0.75 of the nail diameter. Use a 4.0mm bit for SDS Heavy-Duty Connector screws and a 2.5mm bit for SD9/SD10 Connector screws.

k. Timber shrinks and expands as it loses and gains moisture, particularly perpendicular to its grain. Take timber shrinkage into account when designing and installing connections. Simpson Strong-Tie manufactures products to fit seasoned timber dimensions. If you need a connector with dimensions other than those listed in this catalogue, Simpson Strong-Tie may be able to vary connector dimensions; contact Simpson Strong-Tie. The effects of timber shrinkage are increased in multiple timber connections, such as floor-to-floor installations.

l. Top flange hangers may cause unevenness. Possible remedies should be evaluated by a professional and include using a face mount hanger, and routering the beam or cutting the subfloor to accommodate the top flange thickness.

m. Built-up timber (*multiple members*) must be fastened together to act as one unit to resist the applied load (*excluding the connector fasteners*). This must be determined by the Designer/Engineer of Record.

n. Some model configurations may differ from those shown in this catalogue. Contact Simpson Strong-Tie for details.

o. In some cases, combinations of these options may not be installable. Horizontal loads induced by sloped joists must be resisted by other members in the structural system. A qualified Designer must always evaluate each connection, including carried and carrying member limitations, before specifying the product. Fill all fastener holes with fastener types specified in the tables, unless otherwise noted.

p. Truss plates shown are the responsibility of the Truss Designer.

q. Do not weld products listed in this catalogue unless this publication specifically identifies a product as acceptable for welding, or unless specific approval for welding is provided in writing by Simpson Strong-Tie. Some steels have poor weldability and a tendency to crack when welded. Cracked steel will not carry load and must be replaced.

r. Unless noted otherwise, all references to standard cut washers refer to Type A plain washers (W) conforming to the dimensions shown in ASME B18.22.1 for the appropriate rod size. Some products require SAE narrow washers (N) to fit in a tight space and are noted accordingly.

General Instructions for the Installer

These general instructions for the installer are provided to ensure proper selection and installation of Simpson Strong-Tie Company Inc. products and must be followed carefully. These general instructions are in addition to the specific installation instructions and notes provided for each particular product, all of which should be consulted prior to and during installation of Simpson Strong-Tie Company Inc. products.

a. All specified fasteners must be installed according to the instructions in this catalogue. Incorrect fastener quantity, size, placement, type, material, or finish may cause the connection to fail. Prior to using a particular fastener, please consult the Fastener Guide in this catalogue.
   - Unless otherwise noted screws may not be used to replace nails in connectors unless approved and recommended by the Designer/Engineer of Record. Unless stated otherwise, Simpson Strong-Tie cannot and does not make any representations regarding the suitability of use or load-carrying capacities of connectors with screws replacing nails.
   - When using stainless-steel connectors, use stainless-steel fasteners. When using ZMAX®/HDG galvanised connectors, use fasteners that meet the zinc coating specifications of ASTM A153 or other fasteners allowed in this catalogue.

b. Fill all fastener holes as specified in the installation instructions for that product. Refer to page 19 for the requirements of the various shapes of fastener hole.

c. Do not overdrive nails. Overdriven nails reduce shear capacity.

d. Use the materials specified in the installation instructions. Substitution of or failure to use specified materials may cause the connection to fail.

e. Do not add fastener holes or otherwise modify Simpson Strong-Tie Company Inc. products. The performance of modified products may be substantially weakened. Simpson Strong-Tie will not warrant or guarantee the performance of such modified products.

f. Install products in the position specified in the catalogue.

g. Do not alter installation procedures from those set forth in this catalogue.

h. The proper use of certain products requires that the product be bent. For those products, installers must not bend the product more than one time *(one full cycle)*.

i. Bolt holes shall be approximately 10% greater than the bolt diameter, per AS 1720 4.4.1.

j. Install all specified fasteners before loading the connection.

k. Some hardened fasteners may have premature failure if exposed to moisture. These fasteners are recommended to be used in dry interior applications.

l. Use proper safety equipment.

m. Welding galvanised steel may produce harmful fumes; follow proper welding procedures and safety precautions. Unless otherwise noted Simpson Strong-Tie® connectors cannot be welded.

n. Pneumatic or powder-actuated fasteners may deflect and injure the operator or others. Pneumatic nail tools may be used to install connectors, provided the correct quantity and type of nails *(length and diameter)* are properly installed in the nail holes. Tools with nail hole-locating mechanisms should be used. Follow the manufacturer's instructions and use the appropriate safety equipment. Overdriving nails may reduce design capacities. Contact Simpson Strong-Tie. Powder-actuated fasteners should not be used to install connectors.

o. Joist shall bear completely on the connector seat, and the gap between the joist end and the header shall not exceed 3.2mm *(unless specifically noted otherwise)*.

p. For holdowns, anchor bolt nuts should be finger-tight plus ⅓ to ½ turn with a hand wrench, with consideration given to possible future timber shrinkage. Care should be taken to not over-torque the nut. Impact wrenches should not be used as they may preload the holdown.

q. Holdowns and Tension Ties may be raised off the sill as dictated by field conditions to accommodate an anchor mislocated no more than 38mm. The holdown shall be raised off the sill at least 76mm for every 6.4mm that the anchor is offset from the model's centreline. Anchor bolt slope shall be no greater than 1:12 *(or 5 degrees)*. Contact the Designer if the holdown anchor is offset more than 38mm or raised more than 457mm. Raised holdown height is measured from the top of concrete to the top of the holdown bearing plate.

r. Fasteners are permitted to be installed through metal truss plates when approved by the Truss Designer. Installation of Simpson Strong-Tie® Strong-Drive® SDS Heavy-Duty Connector screws through metal connector plates requires the plates to be pre-drilled using a maximum of a 4mm bit. Do not drive nails through the truss plate on the opposite side of single-ply trusses which could force the plate off the truss.

s. For cold-formed steel applications, all screws shall be installed in accordance with the screw manufacturer's recommendations. All screws shall penetrate and protrude through the joined materials a minimum of 3 full exposed threads.

t. Nuts shall be installed such that the end of the threaded rod or bolt is at least flush with the top of the nut.

u. When installing hurricane ties on the inside of the wall, special considerations must be taken to prevent condensation on the inside of the completed structure in cold climates.

v. Unless otherwise noted, connectors shown in this catalogue have been designed to be installed at the time the framing members are installed. Contact Simpson Strong-Tie for retrofit suitability of specific connectors including those manufactured in accordance with the hanger options section of this catalogue.

General Instructions for the Designer

These general instructions for the Designer are provided to ensure proper selection and installation of Simpson Strong-Tie Company Inc. products and must be followed carefully. These general instructions are in addition to the specific design and installation instructions and notes provided for each particular product, all of which should be consulted prior to and during the design process.

a. The term "Designer" used throughout this catalogue is intended to mean a licensed/certified building design professional, a licensed professional engineer, or a licensed architect.

b. All connected members and related elements shall be designed by the Designer.

c. All installations should be designed only in accordance with the design capacities values set forth in this catalogue.

d. Design capacities in this catalogue are determined by calculations and test criteria established by industry, such as Australian, New Zealand and ASTM test standards.

Connectors are typically evaluated in accordance with AS 1649:2001, Timber - Method of Test for Mechanical Fasteners and Connectors. The characteristic capacity is determined taking the lower of the 5th percentile of the lower probability limit of the maximum test loads divided by 5 and the average of the maximum test loads divided by 8, then multiplying that basic working load by 3.65 for a timber test failure or by 1.70 for a steel test failure. The test design capacity is then determined by multiplying the characteristic capacity by the Australian capacity factor (ϕ), or the New Zealand strength reduction factor (ϕ). The serviceability capacity is the average test load at a 3.2mm deflection except for holdowns where the serviceability capacity is the average test load at a 6.4mm deflection. The published design capacity is the lesser of the test design capacity, the serviceability capacity, and the fastener and bearing calculation design capacity determined in accordance with either AS 1720 or NZS 3603 for Australia and New Zealand, respectively. For Australia, the capacity factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Tabulated values should be reduced where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.

e. Simultaneous loads in more than one direction on a single connector must be evaluated as follows:

Design Uplift Load / Design Uplift Capacity + Design Lateral Parallel to Plate Load / Design Lateral Parallel to Plate Capacity + Design Lateral Perpendicular to Plate Load / Design Lateral Perpendicular to Plate Capacity < 1.0.

The three terms in the unity equation are due to the possible directions that exist to generate force on a connector. The number of terms that must be considered for simultaneous loading is at the sole discretion of the Designer and is dependent on their method of calculating wind forces and the utilisation of the connector within the structural system.

As an alternate, certain roof-to-wall connectors *(seismic and hurricane ties, pages 75–76)* can be evaluated using the following: The design load in each direction shall not exceed the published design capacities in that direction multiplied by 0.75.

f. Unless otherwise noted, timber shear is not considered in the loads given; reduce design capacities when timber shear is limiting.

g. Simpson Strong-Tie strongly recommends the following addition to construction drawings and specifications: "Simpson Strong-Tie® connectors are specifically required to meet the structural calculations of plan. Before substituting another brand, confirm design based on reliable published testing data or calculations. The Engineer/Designer of Record should evaluate and give written approval for substitution prior to installation."

h. Verify that the dimensions of the supporting member are sufficient to receive the specified fasteners, and develop the top flange bearing length.

i. Some catalogue illustrations show connections that could cause cross-grain tension or bending of the timber during loading if not sufficiently reinforced. In this case, mechanical reinforcement should be considered.

j. For holdowns, anchor bolt nuts should be finger-tight plus 1⁄3 to ½ turn with a hand wrench, with consideration given to possible future timber shrinkage. Care should be taken to not over-torque the nut. Impact wrenches should not be used as they may preload the holdown.

k. Simpson Strong-Tie will provide upon request testing data on all products that have been tested.

l. The design capacities published in this catalogue are for use when utilising the Limit States Design methodology.

m. For joist hangers, Simpson Strong-Tie recommends the hanger height shall be at least 60% of joist height for stability.

n. Local and/or regional building codes may require meeting special conditions. For compliance with these requirements, it is necessary to contact the local and/or regional building authority. Except where mandated by code, Simpson Strong-Tie products do not require special inspection.

o. Holdown and Tension Tie design capacities are based on installations with an anchor rod length of 152mm from the concrete to top of holdown seat, yet these products may be raised to any height with consideration of the increased deflection due to additional bolt elongation. For cases where the anchor bolt is offset, Simpson Strong-Tie offers recommendations, subject to the approval of the Designer, which permit holdowns to be raised up to 460mm maximum with a corresponding horizontal anchor bolt offset of 38mm. See "General Instructions for the Installer" *(page 14 note q)*.

p. Throughout the catalogue there are installation drawings showing the load transfer from one element in the structure to another. Additional connections may be required to safely transfer the loads through the structure. It is the Designer's responsibility to specify and detail all necessary connections to ensure that a continuous load path is provided as required by the building code.

q. Top flange hanger design capacities are typically based on testing with solid headers. Load reductions may apply when using headers comprised of multiple plies of dimensioned timber or SCL. See technical bulletin T-MPLYHEADER for more information.

Limited Warranty

Simpson Strong-Tie Company Inc. warrants catalogue products to be free from defects in material or manufacturing. Simpson Strong-Tie Company Inc. products are further warranted for adequacy of design when used in accordance with design limits in this catalogue and when properly specified, installed, and maintained. This warranty does not apply to uses not in compliance with specific applications and installations set forth in this catalogue, or to non-catalogue or modified products, or to deterioration due to environmental conditions.

Simpson Strong-Tie® connectors are designed to enable structures to resist the movement, stress, and loading that results from impact events such as earthquakes and high velocity winds. Other Simpson Strong-Tie products are designed to the load capacities and uses listed in this catalogue. Properly-installed Simpson Strong-Tie products will perform in accordance with the specifications set forth in the applicable Simpson Strong-Tie catalogue. Additional performance limitations for specific products may be listed on the applicable catalogue pages.

Due to the particular characteristics of potential impact events, the specific design and location of the structure, the building materials used, the quality of construction, and the condition of the soils involved, damage may nonetheless result to a structure and its contents even if the loads resulting from the impact event do not exceed Simpson Strong-Tie catalogue specifications and Simpson Strong-Tie connectors are properly installed in accordance with applicable building codes.

All warranty obligations of Simpson Strong-Tie Company Inc. shall be limited, at the discretion of Simpson Strong-Tie Company Inc., to repair or replacement of the defective part. These remedies shall constitute Simpson Strong-Tie Company Inc.'s sole obligation and sole remedy of purchaser under this warranty. In no event will Simpson Strong-Tie Company Inc. be responsible for incidental, consequential, or special loss or damage, however caused.

This warranty is expressly in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose, all such other warranties being hereby expressly excluded. This warranty may change periodically – consult our website *www.strongtie.com* for current information.

Terms and Conditions of Sale

Product Use

Products in this catalogue are designed and manufactured for the specific purposes shown, and should not be used with other connectors not approved by a qualified Designer. Modifications to products or changes in installations should only be made by a qualified Designer. The performance of such modified products or altered installations is the sole responsibility of the Designer.

Indemnity

Customers or Designers modifying products or installations, or designing non-catalogue products for fabrication by Simpson Strong-Tie Company Inc. shall, regardless of specific instructions to the user, indemnify, defend, and hold harmless Simpson Strong-Tie Company Inc. for any and all claimed loss or damage occasioned in whole or in part by non-catalogue or modified products.

Non-Catalogue and Modified Products

Consult Simpson Strong-Tie Company Inc. for applications for which there is no catalogue product, or for connectors for use in hostile environments, with excessive timber shrinkage, or with abnormal loading or erection requirements.

Non-catalogue products must be designed by the customer and will be fabricated by Simpson Strong-Tie in accordance with customer specifications.

Simpson Strong-Tie cannot and does not make any representations regarding the suitability of use or load-carrying capacities of non-catalogue products. Simpson Strong-Tie provides no warranty, express or implied, on non-catalogue products. F.O.B. Shipping Point unless otherwise specified.

Conversion Charts

Metric Conversion

Metric	Imperial
25.40mm	1 in
0.3048 m	1 ft
4.448N	1 lb
4.448 kN	1 Kip
6895 Pa	1 psi

Bolt Diameter

mm	in.
9.5	3/8
12.7	1/2
15.9	5/8
19.1	3/4
22.2	7/8
25.4	1

If Common Rafter Roof Pitch is...

Slope	Rise/Run
5°	1/12
10°	2/12
14°	3/12
18°	4/12
23°	5/12
27°	6/12
30°	7/12
34°	8/12
37°	9/12
40°	10/12
42°	11/12
45°	12/12

Then Hip/Valley Rafter Roof Pitch becomes...

Slope	Rise/Run
3°	1/17
7°	2/17
10°	3/17
13°	4/17
16°	5/17
19°	6/17
22°	7/17
25°	8/17
28°	9/17
30°	10/17
33°	11/17
35°	12/17

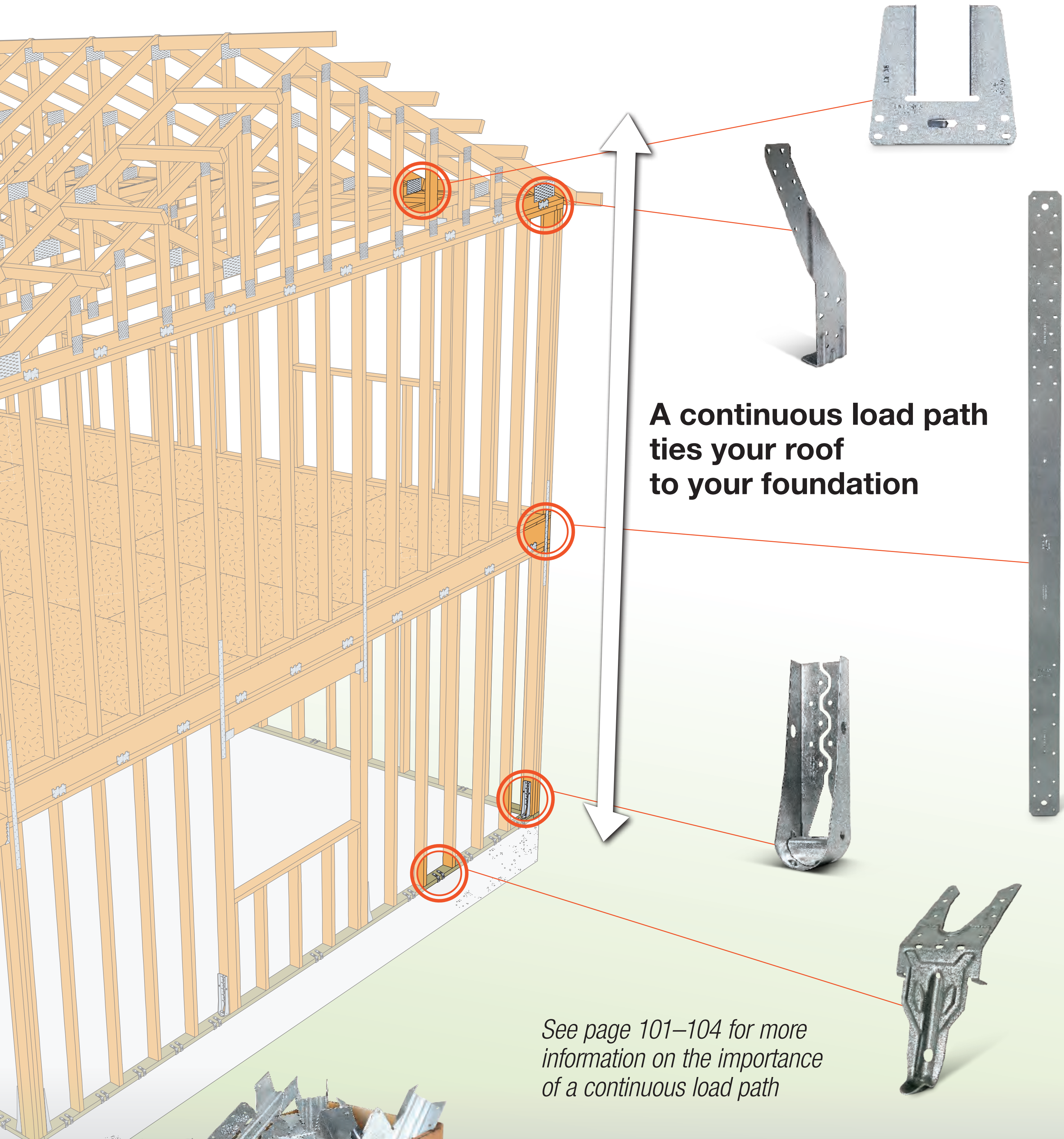
Use these Roof Pitch to Hip/Valley Rafter Roof Pitch conversion tables only for hip/valley rafters that are skewed 45° right or left. All other skews will cause the slope to change from that listed.

US Standard Steel Gauge Equivalents in Nominal Dimensions

Ga	Min. Thick. (mils)	Approximate Dimensions		Decimals (mm)		
		in.	mm	Uncoated Steel	Galvanised Steel (Z275)	ZMAX (Z550)
3	229	1/4	6.0	6.07	—	—
7	171	3/16	4.5	4.55	4.72	—
10	118	9/64	3.5	3.40	3.51	3.56
11	111	1/8	3.1	3.05	3.12	3.18
12	97	7/64	2.7	2.67	2.74	2.79
14	68	5/64	2.0	1.91	1.98	2.03
16	54	1/16	1.6	1.52	1.60	1.65
18	43	3/64	1.3	1.22	1.32	1.37
20	33	1/32	1.0	0.91	1.02	1.07
22	27	1/32	1.0	0.76	0.84	0.89

Steel thickness varies according to mill standards.

Metal Connectors Keep Buildings Safe and Strong



A continuous load path ties your roof to your foundation

See page 101–104 for more information on the importance of a continuous load path

Many people don't think about the structural frame of their house, but as we've seen in recent years with the number of cyclones, tornadoes and earthquakes, it's important to build or retrofit your home to resist Mother Nature.
A construction practice known as a "continuous load path" is used to tie the structural frame of a house together using metal connectors, and helps keep your home safe and strong. Simpson Strong-Tie is the recognised and trusted brand for metal connectors among construction professionals and DIYers, and is available at local hardware stores nationwide.

Simpson Strong-Tie® connectors are proudly made in the U.S.A. and Europe.

Protect Structural Investments with Stainless-Steel Connections

When choosing structural connectors for a project, it is important to consider the long-term effects of corrosion. Simpson Strong-Tie® offers a broad variety of stainless-steel connectors designed to provide a superior level of protection and durability against corrosive environments and materials.

Common Corrosive Factors That Can Negatively Affect Structural Connections

- Ocean salt air
- Water
- Preservative-treated timber
- Fire retardant-treated timber
- Salt used to de-ice or melt snow
- Pool or hot tub chemicals
- Fertilisers
- Soil
- Industrial zones
- Concrete

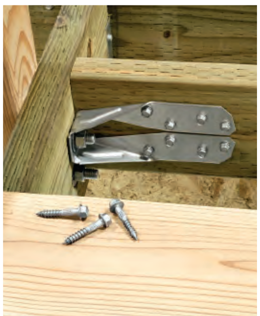
The Science Behind Stainless Steel

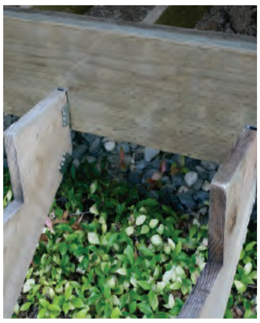
Each Simpson Strong-Tie® stainless-steel connector is made with type 316L stainless steel. Because stainless steel contains nickel and chromium, stainless steel develops a thin layer of chromium oxide on the surface of the metal that protects the connector from corrosive attack. Type 316L stainless steel also includes molybdenum, which helps increase corrosion resistance chloride-type areas, such as salt water environments. Type 316L has shown no visible sign of surface red rust after 1,000 hours of an ASTM B117 salt spray test. For more information about corrosion, visit ***www.strongtie.com/info***.

Always Use Stainless-Steel Fasteners with Stainless-Steel Connectors

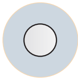
Even with the protection of stainless-steel connections, structures in corrosive environments can be compromised over time when these connectors are installed with fasteners that are not stainless steel. Carbon-steel fasteners with coatings such as hot-dip galvanisation will corrode faster than the stainless-steel connectors that they fasten. This can create a weak link that can eventually lead to failure. Likewise, fasteners made from a lower grade of stainless steel can also corrode at a faster rate than our type 316L stainless-steel connectors. Type 316 stainless-steel nails or screws protect the integrity of the structure and the investment made in stainless-steel connectors. Simpson Strong-Tie offers type 316 stainless-steel nails and Strong-Drive SDS screws that fasten our stainless-steel connectors.

DTT2SS

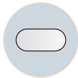




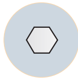
Connector Fastening Identification



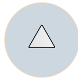
Round Holes
Purpose: to fasten a connector.
Fill Requirements: always fill, unless noted otherwise.



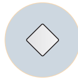
Obround Holes
Purpose: to make fastening a connector in a tight location easier.
Fill Requirements: always fill.



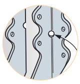
Hexagonal Holes
Purpose: to fasten a connector to concrete or masonry.
Fill Requirements: always fill when fastening a connector to concrete or masonry.



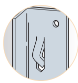
Triangular Holes
Purpose: to increase a connector's strength or to achieve Max strength.
Fill Requirements: when the Designer specifies Max nailing.



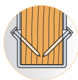
Diamond Holes
Purpose: to temporarily fasten a connector to make installing it easier.
Fill Requirements: none.



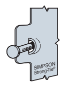
Pilot Holes
Tooling holes for manufacturing purposes. No fasteners required.



Speed Prongs
Used to temporarily position and secure the connector for easier and faster installation.



Positive Angle Nailing (PAN)
Provided when timber splitting may occur, and to speed installation.



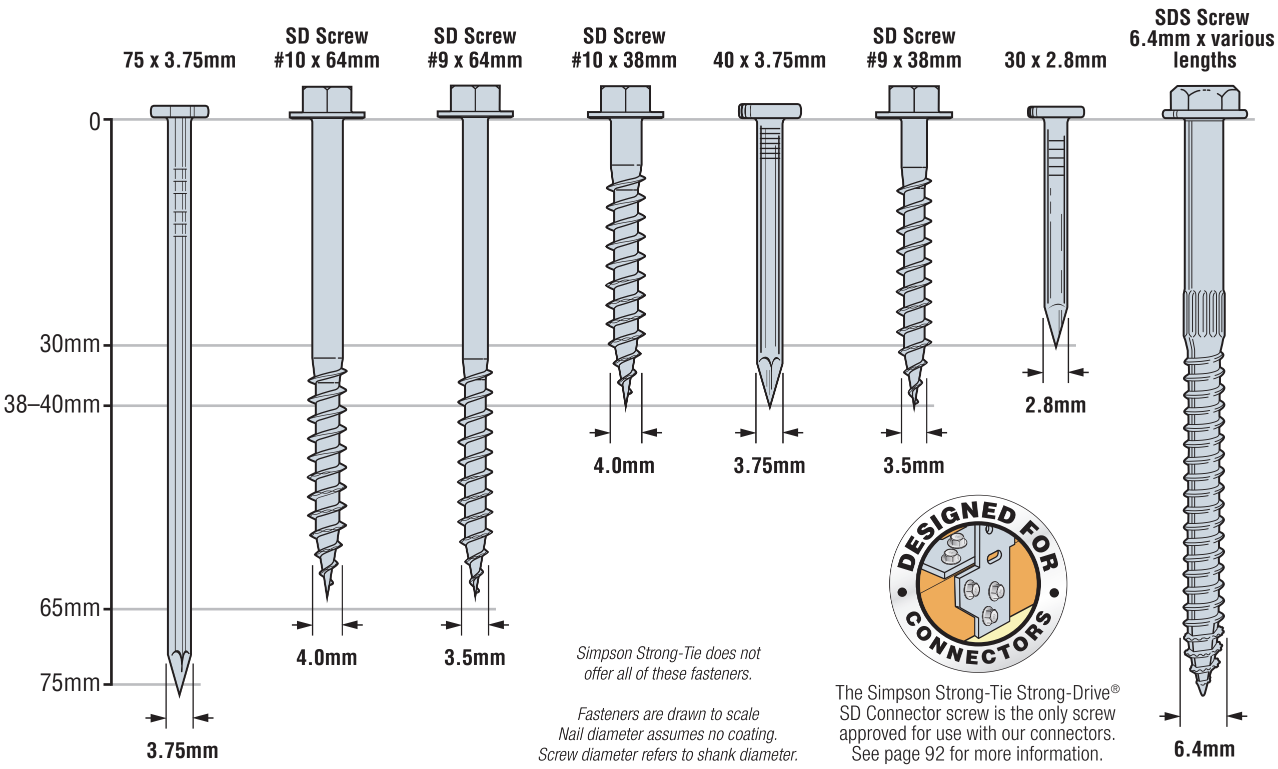
Dome Nailing
This feature guides the nail into the joist and header at a 45° angle.

IUSE Strong-Grip™
The Strong-Grip™ seat allows the I-joist to "snap" in securely without the need for joist nails.

Fastener Types

Fastener Types and Sizes Specified for Simpson Strong-Tie® Connectors

Many Simpson Strong-Tie connectors have been designed and tested for use with specific types and sizes of fasteners. The specified quantity, type and size of fastener must be installed in the correct holes on the connector to achieve published loads. Other factors such as fastener material and finish are also important. Incorrect fastener selection or installation can compromise connector performance and could lead to failure.



Simpson Strong-Tie does not offer all of these fasteners.

Fasteners are drawn to scale
Nail diameter assumes no coating.
Screw diameter refers to shank diameter.

The Simpson Strong-Tie Strong-Drive® SD Connector screw is the only screw approved for use with our connectors. See page 92 for more information.

Simpson Strong-Tie® Connector Nails

Simpson Strong-Tie nails and structural fasteners have been developed as the optimum fasteners for connector products. Special lengths afford economy of purchase and installation, and depth compatibility with framing members.

Retail Packaging

Model No.	Dimensions	Finish
N10DHDG	40mm x 3.75mm	HDG
SSNA10D		SS

1. HDG = hot-dip galvanised; SS = stainless steel.
2. For pneumatic fastener info, request additional technical information.
3. Use HDG nails with ZMAX® and HDG products.
4. HDG nails sold by Simpson Strong-Tie meet the specifications of ASTM A153. Stainless-steel nails are type 316 stainless.
5. Approximately 120 nails per retail tub.

Retail Tub

See How Our Connectors Work

Check out our YouTube Channel for installation and informational videos at ***www.youtube.com/strongtie***

Concrete Connectors

MASA Mudsill Anchor

MASA mudsill anchors provide a time-saving alternative to M12 and M16 cast-in-place anchor bolts on 45mm bottom plates. Designed to install on the formwork before the pour, they simplify concrete finishing and can easily adapt to timer stud interference. Designing with MASA mudsill anchors also eliminates the need for 75mm square plate washers on the anchor bolts for seismic design, and in some cases offers load capacities that meet or exceed the parallel- and perpendicular-to-plate shear capacity of other cast-in-place anchors.

- Attaches easily to the concrete formwork.
- Stays out of the way until needed, making slab finishing easier.
- Eliminates the need to pre-drill bottom plates for anchor bolts.
- Adapts to timber stud placement with two installation scenarios.

Material: 1.6mm thick

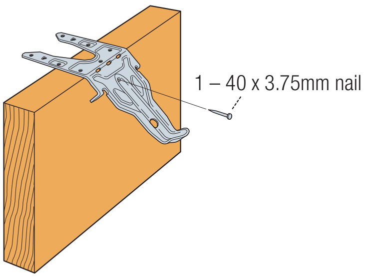
Finish: Galvanised, all available in ZMAX® coating. See Corrosion Information.

Installation

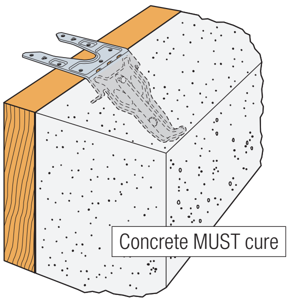
- Use all specified fasteners. See General Notes.
- Concrete shall have a minimum f'_C = 17MPa.
- Spalling—Full loads apply for spalls up to a maximum height of 32mm and a maximum depth of 22mm. Any exposed portion of the mudsill anchor must be protected against possible corrosion.
- For prescriptive anchor spacing refer to table.
- Minimum MASA end distance is 100mm and minimum centre-to-centre spacing is 200mm for full load.
- For continuous load path, MASA should be installed on the same side of wall as uplift connectors.

Typical Installation

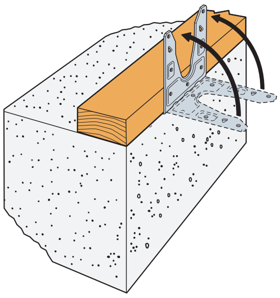
STEP 1: Install MASA on formwork board using two 3.3mm duplex nails (top) or one 40 x 3.75mm nail (face) as shown.



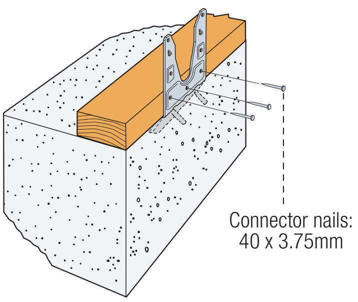
STEP 2: Allow the concrete to cure.



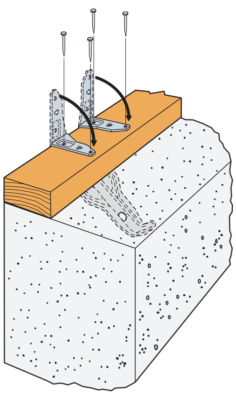
STEP 3: Place the bottom plate and bend the legs of the MASA up to vertical.



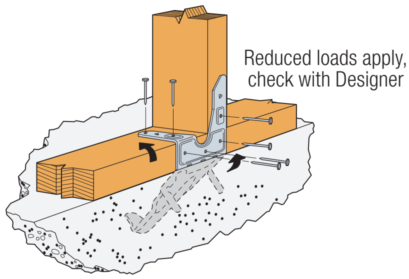
STEP 4: Install the three nails into the edge of the bottom plate, as shown.

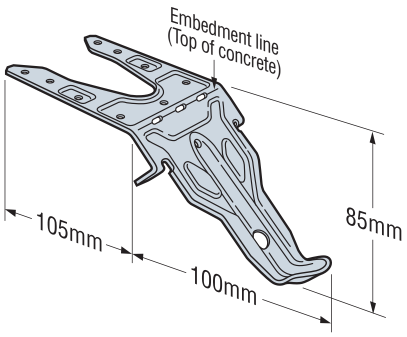


STEP 5: Bend the legs over the top surface of the bottom plate and install remaining nails, filling all nail holes.

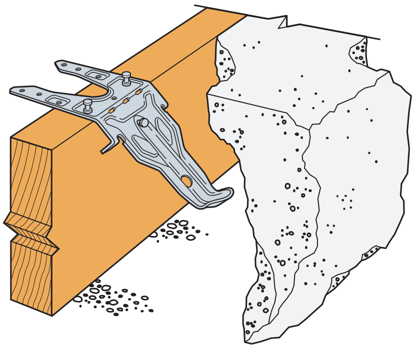


OPTION 2: Optional one leg up installation.

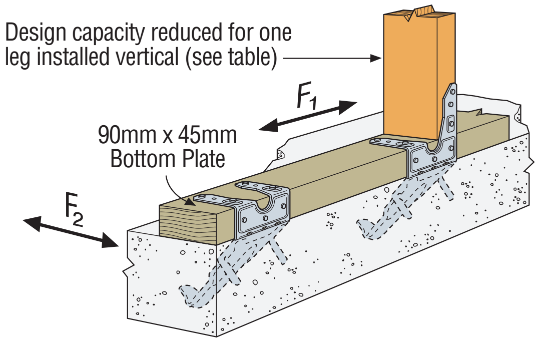




MASA
U.S. Patent D656,391S



Typical MASA installation in concrete



Typical MASA installation on bottom plate

MASA Technical Data

Model No.	Sill Size (mm)	Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
		Sides	Top		Uplift	F1	F2
STANDARD INSTALLATION							
MASA	90 x 45, 140 x 45	3 – 40 x 3.75	6 – 40 x 3.75	AU	k_1 = 1.14 5.67	k_1 = 1.14 6.39	k_1 = 1.14 2.26
				NZ	k_1 = 1.0 5.34	k_1 = 1.0 6.01	k_1 = 1.0 2.26
ONE LEG UP INSTALLATION							
MASA	90 x 45, 140 x 45	3 – 40 x 3.75	6 – 40 x 3.75	AU	k_1 = 1.14 —	k_1 = 1.14 4.63	k_1 = 1.14 —
				NZ	k_1 = 1.0 —	k_1 = 1.0 4.35	k_1 = 1.0 —

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip, which includes fastener slip and mudsill anchor deformation. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Minimum normal class concrete strength grade shall be 17 MPa.
6. Design Capacity based on a minimum concrete wall width of 150mm.
7. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation. See General Note 'e' on page 15.

Holdowns and Tension Ties

DTT/HTT Tension Ties, HDU Holdown

Simpson Strong-Tie offers a wide variety of holdown devices designed and tested to address many applications and load demands.

The DTT2Z tension tie is designed for lighter-duty holdown applications on single or double studs. It installs easily with the Strong-Drive® SDS Heavy-Duty Connector screws (included).

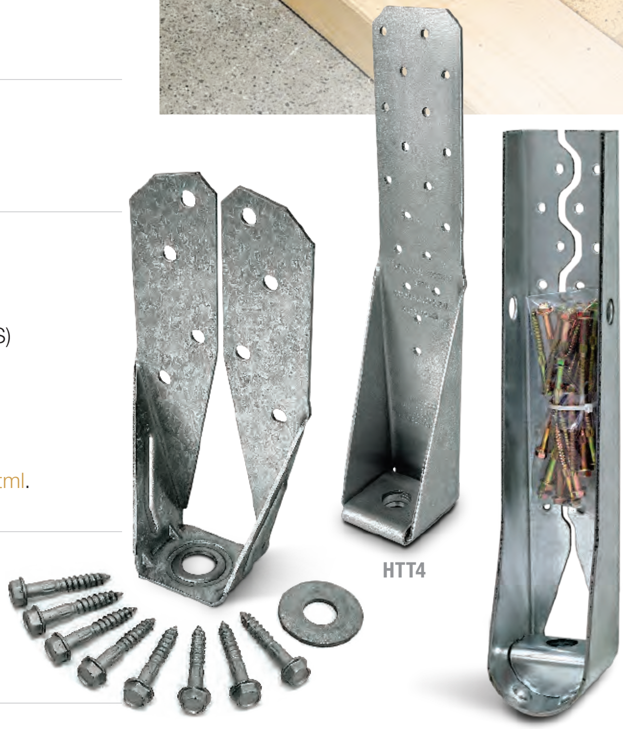
The HTT4 tension tie installs with nails and features a nailing pattern that provides better results with less deflection.

The HDU8 Holdown is pre-deflected during the manufacturing process, virtually eliminating deflection under load due to material stretch. They install with Simpson Strong-Tie® Strong-Drive® SDS Heavy-Duty Connector screws which install easily, reduce fastener slip and provide a greater net section when compared to bolts.

For more information on holdown options, contact Simpson Strong-Tie.

Material: See table on next page.

Finish: Galvanised; DTT2Z galvanised—ZMAX® coating; DTT2SS—stainless steel. See Corrosion Information.



HTT4

DTT2Z

HDU8-SDS2.5

Installation

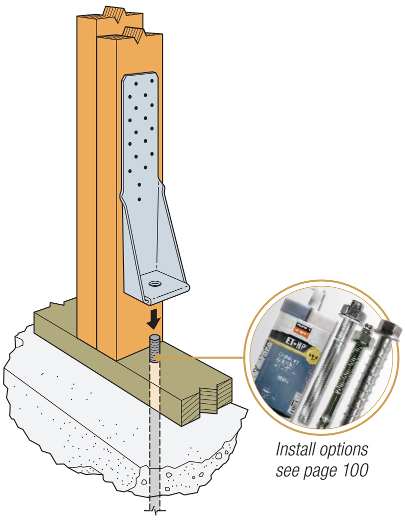
- Use all specified fasteners. See General Notes.
- The DTT requires a standard cut washer (included with DTT2Z, DTT2SS) be installed between the nut and the seat.
- The HDU and HTT requires no additional washer.
- Strong-Drive SDS Heavy-Duty Connector screws install best with a low speed high torque drill with a ⅜" hex head driver.
- Watch an installation video; www.strongtie.com/videolibrary/con-hdq.html.

Note

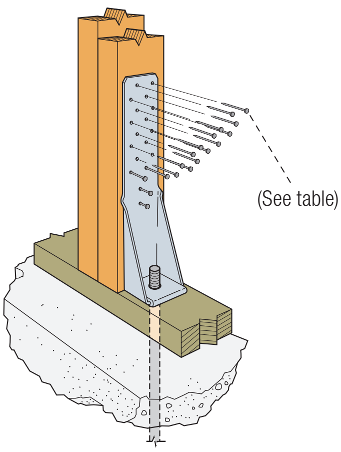
- DTTs and HDUs are supplied with the fasteners required to attach to framing.

HTT4 Typical Installation

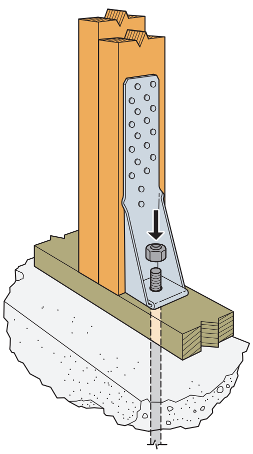
STEP 1: Place holdown over anchor bolt.

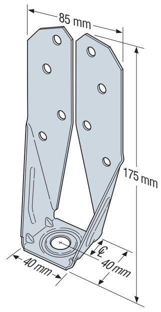


STEP 2: Install specified fasteners, filling all holes.

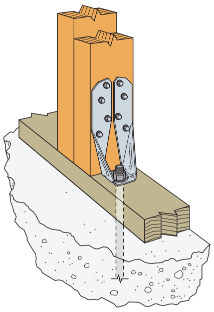


STEP 3: Attach nut to anchor bolt. Anchor bolt nut should be finger tight plus ⅓ to ½ turn with a hand wrench.

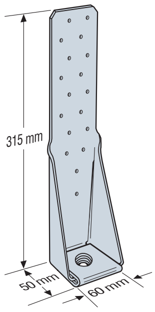




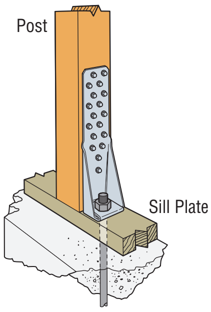
DTT2Z
(DTT2SS similar)



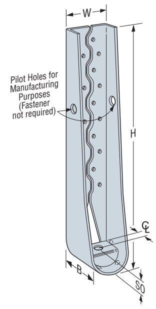
Vertical DTT2Z installation



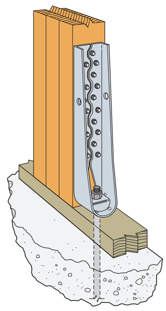
HTT4



Vertical HTT4 installation



HDU8-SDS2.5
U.S. Patents
6,112,495
5,979,130



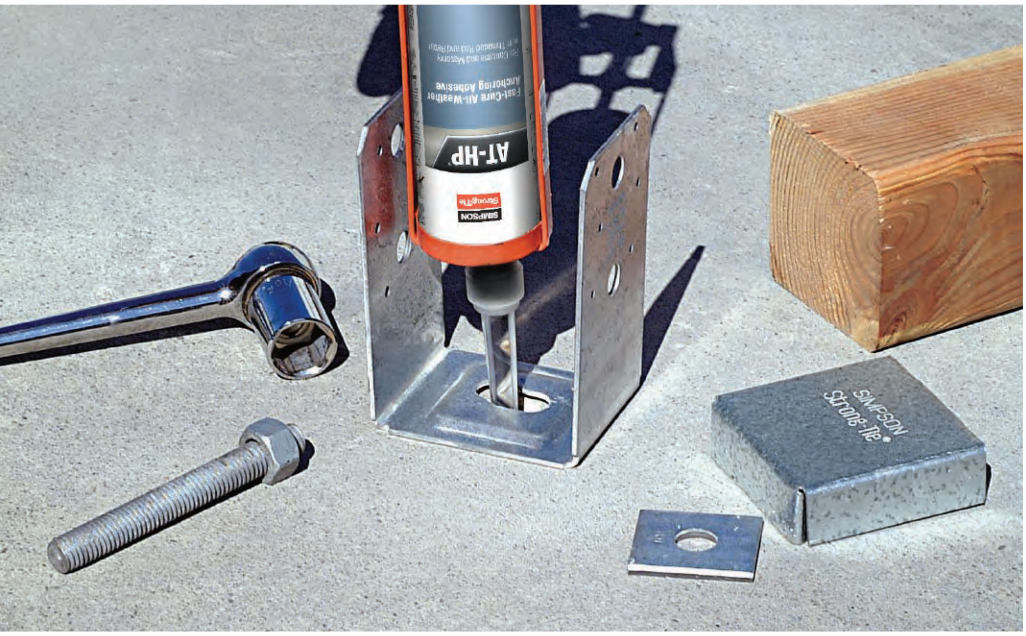
Vertical HDU8-SDS2.5 installation

DTT, HTT and HDU Technical Data

Model No.	Dimensions (mm) Strap Thickness	W	H	B	CL	Fasteners Anchor Bolt Dia (mm)	Post (Nails: No. - Length x Dia., Screws: No. - Dia. x Length, mm)	Minimum Timber Member Size (Depth x Breadth, mm)	Country	Design Tension Capacity (kN)
DTT2Z, DTT2SS	2	85	175	40	21	12	8 – SDS6.4 x 38	90 x 38	AU	$k_1 = 1.14$ 9.37
									NZ	$k_1 = 1.0$ 7.72
								90 x 75	AU	$k_1 = 1.14$ 10.98
									NZ	$k_1 = 1.0$ 9.04
HTT4	3.1	65	315	50	33	16	18 – 40 x 3.75	140 x 38	AU	$k_1 = 1.14$ 15.30
									NZ	$k_1 = 1.0$ 14.40
								90 x 75	AU	$k_1 = 1.14$ 18.38
									NZ	$k_1 = 1.0$ 17.05
							18 – SD#10 x 38	140 x 38 or 90 x 75	AU	$k_1 = 1.14$ 23.04
									NZ	$k_1 = 1.0$ 18.97
HDU8-SDS2.5	3.5	75	420	90	35	20	20 – SDS6.4 x 64	90 x 75	AU	$k_1 = 1.14$ 32.58
									NZ	$k_1 = 1.0$ 26.83
								90 x 90	AU	$k_1 = 1.14$ 36.20
									NZ	$k_1 = 1.0$ 29.81
								115 x 90	AU	$k_1 = 1.14$ 38.85
									NZ	$k_1 = 1.0$ 32.00

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 6.4mm joint slip, which includes fastener slip, anchor elongation and holdown deformation. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Simpson Strong-Tie Strong-Drive SDS Heavy Duty Connector screws are included with the DTT2s and HDU8. Fasteners for the HTT4 are sold separately.
6. The Designer must specify anchor bolt type, length and embedment.
7. Anchor bolt nut should be finger tight plus ⅓ to ½ turn with a hand wrench. Care should be taken not to over-tighten the nut.
8. Post or beam design by Designer. Posts may consist of multiple members provided they are connected independently of the holdown fasteners.
9. Structural composite timber columns have sides that either show the wide face or the edges of the timber strands/veneers, known as the narrow face.
10. Simpson Strong-Tie stainless-steel connectors require stainless-steel fasteners.
11. Values in the table reflect installation into the wide face.
12. Holdowns and tension ties are for use in vertical or horizontal applications.
13. Holdowns and tension ties may be installed raised up to 460mm above the top of the concrete with no load reduction, provided that additional elongation of the anchor rod is taked into account.

Post Bases and Post Caps



ABU Adjustable Post Base

The ABU adjustable post base provides a high-strength connection between the post and concrete. Designed to install on hardened concrete with either a cast-in-place or post-installed anchor, the ABU is designed to provide maximum uplift performance for areas where uplift from high winds is a concern.

- The slotted base enables flexible positioning around the anchor bolt, making precise post placement easier.
- The 25mm standoff meets code requirements and helps prevent rot at the end of the post in applications where weather or moisture are present.
- ZMAX™ galvanisation offers extra corrosion resistance for exterior and preservative-treated timber applications.
- The post can be fastened with either nail, bolts or Strong-Drive® SD Connector screws.

Material: See table on next page.

Finish: Galvanised—ZMAX® coating;
ABU44SS, ABU66SS—stainless steel. See Corrosion Information

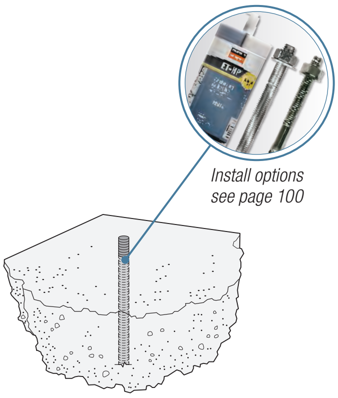
ABU44SS

Installation

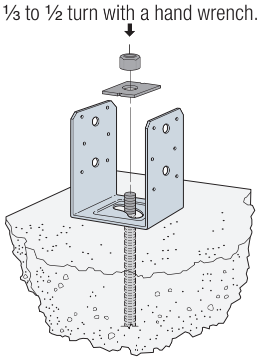
- Use all specified fasteners. See General Notes.
- See Anchoring and Fastening Systems for Concrete and Masonry for retrofit anchor options or reference technical bulletin T-ANCHORSPEC.
- Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for non-top supported installations (such as fences or unbraced carports).

Typical Installation

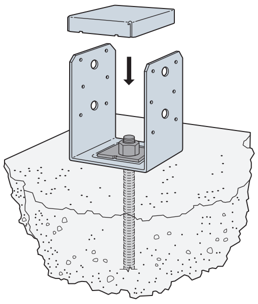
STEP 1: Install anchor bolt.



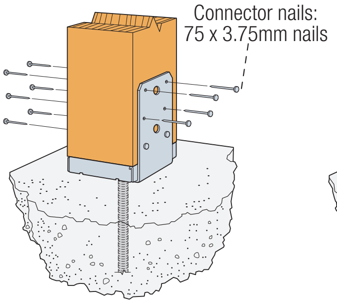
STEP 2: Position the ABU, load transfer plate, and nut on the anchor bolt. Then finger tighten the nut, plus ⅓ to ½ turn with a hand wrench.



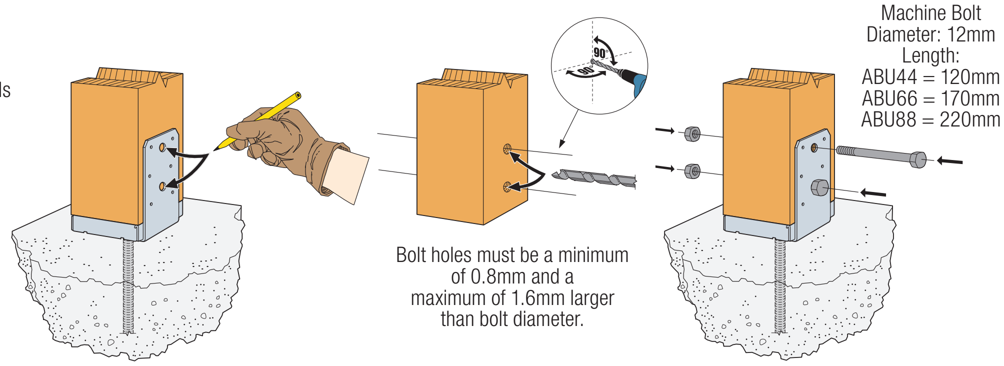
STEP 3: Place the standoff base and then the post in the ABU.

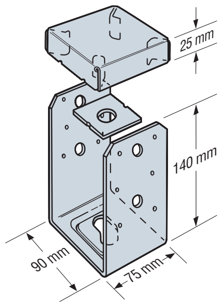


OPTION 1: Fasten using nails or Strong-Drive SD Connector screws (ABU88 – SDS optional).

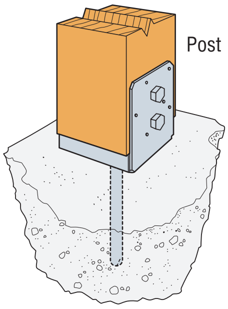


OPTION 2: Fasten using machine bolts.

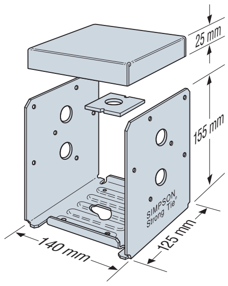




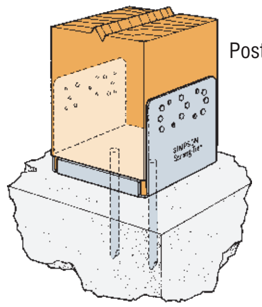
ABU44Z



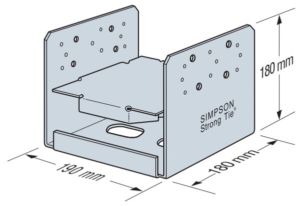
Typical ABU44Z installation
(ABU66Z similar)



ABU66Z



Typical ABU88Z installation



ABU88Z

ABU Technical Data

Model No.	Post Size (mm)	Material (mm) Base Thickness	Material (mm) Strap Thickness	Dimensions (mm) W	Dimensions (mm) L	Dimensions (mm) H	Dimensions (mm) HB[9]	Fasteners Anchor Dia (mm)	Fasteners Nails (No. – Length x Dia., mm)	Fasteners Bolts (No. – Dia., mm)	Country	Design Capacity (kN) Uplift Nails	Design Capacity (kN) Uplift Bolts	Design Capacity (kN) Download[10] Floor	Design Capacity (kN) Download[10] Roof
ABU44Z	90 x 90	1.6	2.7	90	75	140	45	16	12 – 75 x 3.75	2 – M12	AU	$k_1 = 1.14$ 10.23	$k_1 = 1.14$ 8.66	$k_1 = 0.69$ 36.20	$k_1 = 0.77$ 36.20
											NZ	$k_1 = 1.0$ 10.23	$k_1 = 1.0$ 8.66	$k_1 = 0.80$ 34.07	$k_1 = 0.80$ 34.07
ABU66Z	140 x 140	2.7	3.5	140	125	155	45	16	12 – 75 x 3.75	2 – M12	AU	$k_1 = 1.14$ 7.15	$k_1 = 1.14$ 8.68	$k_1 = 0.69$ 70.66	$k_1 = 0.77$ 70.66
											NZ	$k_1 = 1.0$ 6.73	$k_1 = 1.0$ 7.15	$k_1 = 0.80$ 66.50	$k_1 = 0.80$ 66.50
ABU88Z[5]	200 x 200	2.0	2.7	190	180	180	—	2 – 16	18 – 75 x 3.75	—	AU	$k_1 = 1.14$ 10.36	$k_1 = 1.14$ —	$k_1 = 0.69$ 129.91	$k_1 = 0.77$ 129.91
											NZ	$k_1 = 1.0$ 9.75	$k_1 = 1.0$ —	$k_1 = 0.80$ 122.27	$k_1 = 0.80$ 122.27
ABU44SS	90 x 90	1.6	2.7	90	75	140	45	16	12 – 75 x 3.75	2 – M12	AU	$k_1 = 1.14$ 7.05	$k_1 = 1.14$ 6.48	$k_1 = 0.69$ 38.74	$k_1 = 0.77$ 38.74
											NZ	$k_1 = 1.0$ 6.64	$k_1 = 1.0$ 6.48	$k_1 = 0.80$ 36.46	$k_1 = 0.80$ 36.46
ABU66SS	140 x 140	2.7	3.5	140	125	155	45	16	12 – 75 x 3.75	2 – M12	AU	$k_1 = 1.14$ 11.15	$k_1 = 1.14$ 11.81	$k_1 = 0.69$ 68.89	$k_1 = 0.77$ 68.89
											NZ	$k_1 = 1.0$ 10.96	$k_1 = 1.0$ 11.81	$k_1 = 0.80$ 64.84	$k_1 = 0.80$ 64.84

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. ABU88Z may alternately be installed with eight Simpson Strong-Tie SDS 6.4 x 76mm Heavy-Duty Connector screws (sold separately) to achieve table loads.
6. Specifier to design concrete for uplift capacity.
7. Structural composite timber columns have sides that either show the wide face or the edges of the timber strands/veneers, known as the narrow face. Fasteners should be installed in the wide face.
8. Simpson Strong-Tie stainless-steel connectors require stainless-steel fasteners.
9. HB dimension is the distance from the bottom of the post up to the first bolt hole.
10. Downloads shall be reduced where limited by the capacity of the timber post.

CPTZ Concealed Post Tie

The CPTZ concealed post base provides a clean, concealed look while providing a 25mm standoff height above concrete. The 25mm standoff reduces the potential for decay at the post end and satisfies code requirements for posts that are exposed to weather or water splash or are in basements.

- The CPTZ is tested and load-rated for uplift, download and lateral load.
- Simpson Strong-Tie saves installers' time by providing all the necessary components to make the connection in one box.
- The CPTZ anchorage can either be cast-in-place or retrofitted with adhesive or mechanical anchors.

Material: See table on next page.

Finish: Knife plate, washers and standoff base are galvanised—ZMAX® coating. The standoff base has an additional textured, flat black powder coat finish for aesthetic purposes. The ½" (12.7mm) diameter drift dowels are mechanically galvanised. If substituting M12 diameter bolts, a hot-dip galvanised finish is recommended. See Corrosion Information.

Installation

- Use all specified fasteners. See General Notes.
- Post bases do not provide adequate resistance to prevent members from rotating about the base and therefore are not recommended for non-braced or non-top-supported installations.

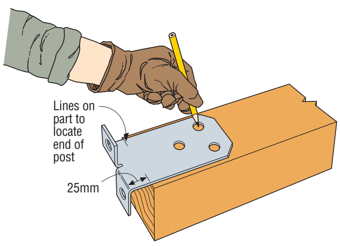
Anchorage Options

- The holes in the CPTZ tabs are sized for 12mm diameter anchors.
- For cast-in-place anchors, there should be 22mm (±3mm) of anchor above the top surface of the concrete.

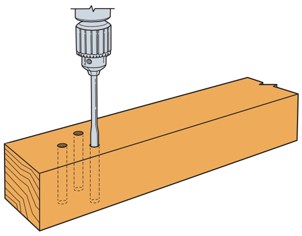
CPT44Z

Typical Installation

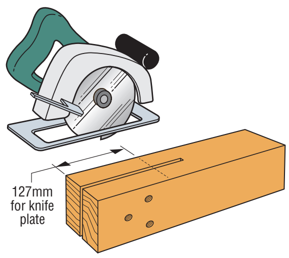
STEP 1: Use the knife plate as a template to mark dowel locations.



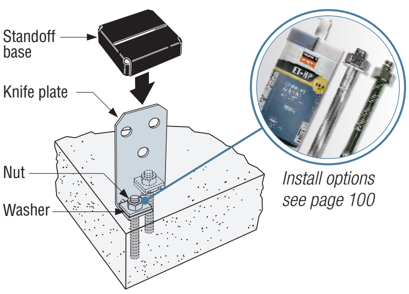
STEP 2: Drill ½" (12.7mm) holes perpendicular to the post at marked locations.



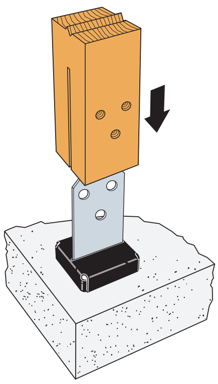
STEP 3: Cut a 5mm wide slot on the side adjacent the drilled holes. Check that the knife plate slides freely.



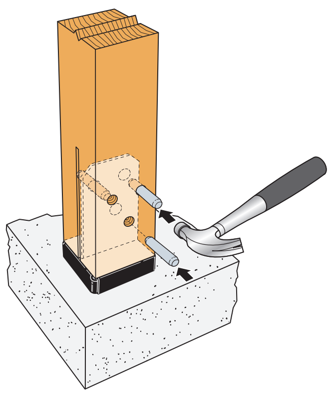
STEP 4: Fix down the knife plate to concrete foundation and lower the standoff over the knife plate.

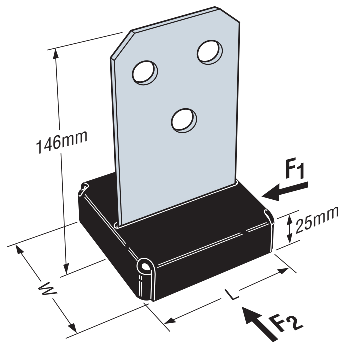


STEP 5: Lower the post onto the knife plate with the drilled holes aligned with the three holes in the knife plate. Be careful to avoid rotating the post during installation.

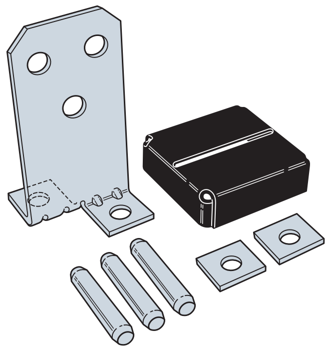


STEP 6: Drive the dowels into the post. They should be roughly centred within the post.

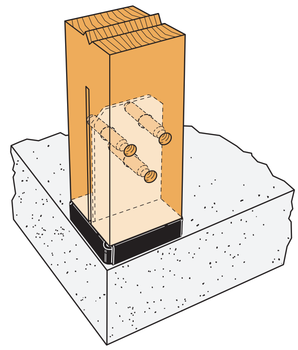




CPT44Z
(others similar)



CPT44Z components
(others similar)



Typical CPT44Z installation

CPTZ Technical Data

Model No.	Post Size (mm)	Material (mm)		Dimensions (mm)		Fasteners				Country	Design Capacity (kN)				
		Base Thickness	Knife Plate Thickness	W	L	Anchor Qty	Anchor Dia (mm)	Type Qty	Type[5] (mm)		Uplift	Download[8] Floor	Download[8] Roof	F1	F2
CPT44Z	90 x 90, 100 x 100	2.7	3.5	90	90	2	12	3	12 x 70 Dowel	AU	k_1 = 1.14 8.97	k_1 = 0.69 47.51	k_1 = 0.77 53.01	k_1 = 1.14 2.67	k_1 = 1.14 3.43
										NZ	k_1 = 1.0 7.39	k_1 = 0.80 40.37	k_1 = 0.80 50.37	k_1 = 1.0 2.67	k_1 = 1.0 2.83
CPT66Z	140 x 140, 152 x 152	2.7	3.5	137	137	2	12	3	12 x 120 Dowel	AU	k_1 = 1.14 11.04	k_1 = 0.69 109.34	k_1 = 0.77 109.34	k_1 = 1.14 2.92	k_1 = 1.14 4.56
										NZ	k_1 = 1.0 9.10	k_1 = 0.80 90.04	k_1 = 0.80 90.04	k_1 = 1.0 2.92	k_1 = 1.0 4.56
CPT88Z	190 x 190, 203 x 203	2.7	3.5	184	184	2	12	3	12 x 120 Dowel	AU	k_1 = 1.14 10.46	k_1 = 0.69 114.30	k_1 = 0.77 114.30	k_1 = 1.14 3.29	k_1 = 1.14 4.80
										NZ	k_1 = 1.0 8.61	k_1 = 0.80 94.13	k_1 = 0.80 94.13	k_1 = 1.0 3.29	k_1 = 1.0 4.80

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. CPTZs are supplied with three 12mm diameter steel dowels. Alternate 12mm diameter hex or square head machine bolts may be substituted and will achieve table loads.
6. Lag or carriage bolts are not permitted.
7. Structural composite timber columns have sides that either show the wide face or the edges of the timber strands/veneers, known as the narrow face. Values in the table reflect installation into the wide face.
8. Downloads shall be reduced where limited by the capacity of the timber post.

Post Bases and Post Caps

SIMPSON Strong-Tie

LCE Post Cap

Designed to provide a secure connection when the end of a beam bears on a post, the versatile, two-piece LCE4 can accommodate 90mm or 140mm timber and features a universal design that eliminates right and left versions.

- Stronger than toenailing.
- Eliminates the need to nail into the end grain of the post.

Material: 1mm thick.

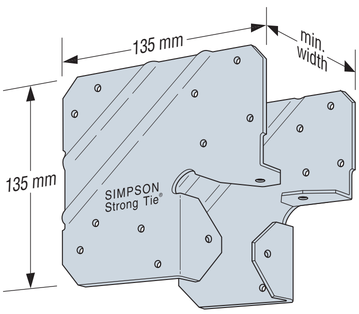
Finish: Galvanised. See Corrosion Information.

Installation

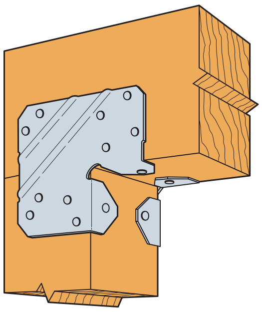
- Use all specified fasteners. See General Notes.
- Must be installed in pairs.

LCE4

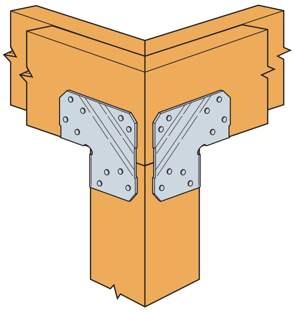
Typical Installation



LCE4



Typical LCE4 installation



Typical LCE4 corner installation

LCE Technical Data

Model No.	Dimensions (mm)		Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)	
	W	L	Beam	Post		Uplift	Lateral
LCE4	135	135	14 – 75 x 3.75	10 – 75 x 3.75	AU	k_1 = 1.14 6.95	k_1 = 1.14 7.90
					NZ	k_1 = 1.0 6.95	k_1 = 1.0 7.44

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. LCE4 Design Uplift Capacity for mitered corner conditions is 8.83 kN for Australia 8.31 kN for NZ. Lateral loads do not apply.
6. Loads only apply when used in pairs.
7. Structural composite timber columns have sides that either show the wide face or the edges of the timber strands/veneers, known as the narrow face. Values in the table reflect installation into the wide face.

Solid Sawn and Glulam Beam Joist Hangers

CJT Concealed Joist Tie

The CJT concealed joist tie offers tested performance in a joist connector with a clean, concealed look. Designed for versatility as well as hidden beauty, the CJT allows the joist to be angled up to 45° up or down with no reduction in load.

- Can be installed three ways: with no routing of the header/post or beam (for a quicker installation) or with the header/post or beam routed for a flush look.
- All pins and fasteners needed for installation are included.

Material: 2.7mm thick.

Finish: Galvanised. See Corrosion Information.

Installation

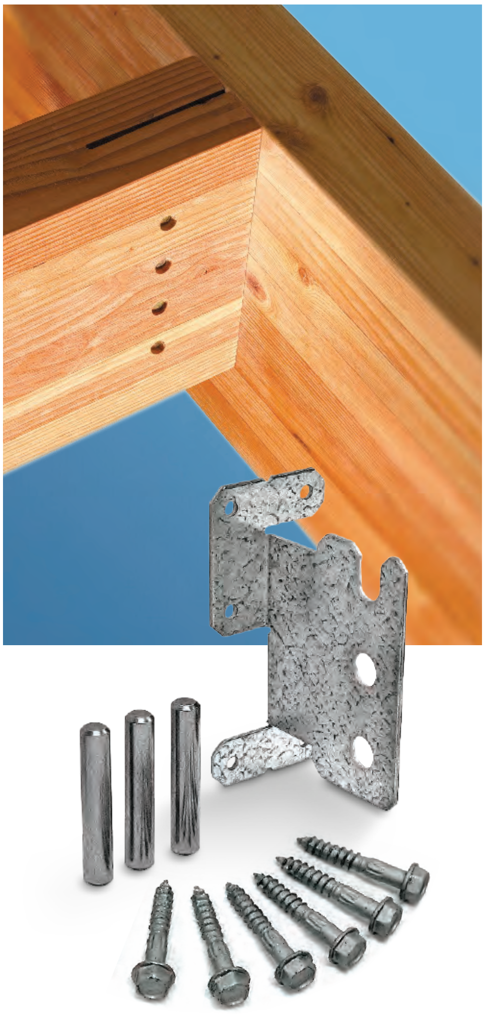
- Use all specified fasteners. See General Notes.
- The CJT Pack is supplied with all dowels and screws required. Screws require a hex-head driver.
- Router end of beam for screw heads for flush installation.
- The carried member may be sloped up or down to 45° with full table loads.
- To provide maximum beam width for use with short dowels, centre in beam.

Note

- Dowels aligned across the grain may cause splitting if the timber shrinks excessively. Install only in glulam, composite timber (PSL, LSL and LVL) or well dried timber.

Warning

This connector requires special attention to ensure correct installation. The beam must be installed perpendicular to the support member. The connection's components may be damaged if the beam is rotated from its opposite end during or after installation. Damaged components may not be noticeable and may reduce the connector's load-carrying capacity.



CJT3S

Typical Installation

NO ROUTING – 9.5mm gap between header/post and beam

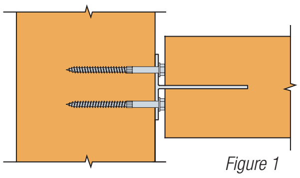


Figure 1

ROUTED HEADER/POST – No gap between header/post and beam

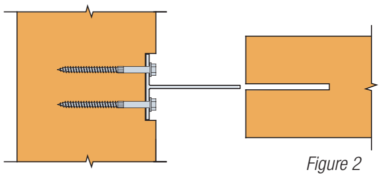


Figure 2

ROUTED BEAM – No gap between header/post and beam.

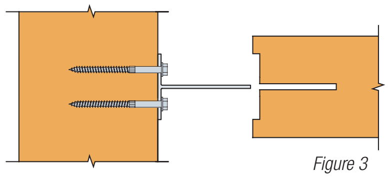


Figure 3

STEP 1: Drill dowel holes in beam
Position connector on the side of the beam to locate and mark dowel holes. If routing into the header/post or beam, allow for 9.5mm routing depths. If not routing, add 6.4mm for screw heads *(Figure 1)*. Drill clean ½" (12.7mm) holes exactly perpendicular to the beam.

STEP 2: Optional routing
If routing header/post or beam for no gap, use connector as a template. Routing must be 9.5mm deep *(Figure 2 and 3)*.

STEP 3: Attach connector to header/post
Position the connector at the predetermined height (minimum 22mm from top of carrying member to top of connector) and attach it using the Strong-Drive® SDS 6.4 x 76mm Heavy-Duty Connector screws provided in all holes. Pre-drilling may be helpful in hardwoods *(Figure 4a)*.

STEP 4: Cut slot in beam
Using a 254mm circular blade, cut a 3mm slot in the centre of the beam to the full depth (95mm) of the blade *(Figure 4b)*.

STEP 5: Position beam
Install a dowel in the uppermost hole, centre dowel within the beam *(Figure 4c)*. Then lower the beam to the connector *(Figure 4d)* and insert the remaining dowels centered within the beam *(Figure 4e)*.

STEP 6: Optional finishing
Fill ends of dowel holes and slot with plugs or putty.

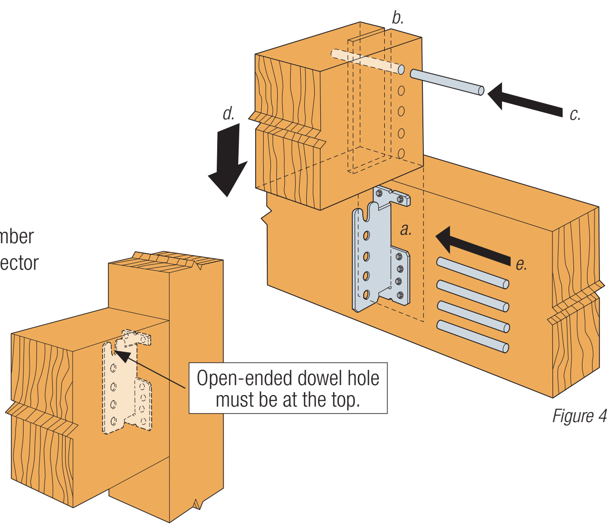
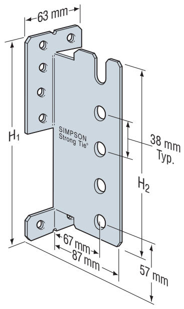
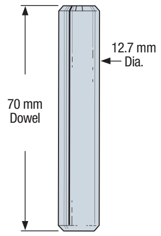


Figure 4

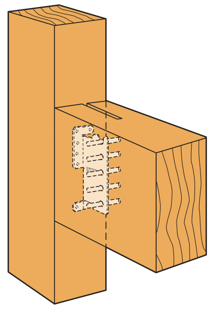
CJT5 installed on a post



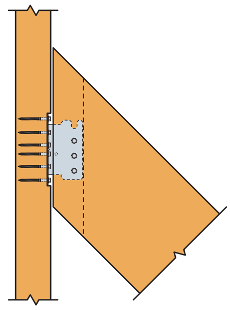
CJT5
(Others similar)



Chamfered steel dowel
(Galvanised)



Typical CJT installation
(Note that dowels should be centered within beam)



CJT sloped view

CJT Technical Data

Each CJT Kit comes complete with 70mm dowels and Simpson Strong-Tie® Strong-Drive® 6.4 x 76mm Heavy-Duty Connector screws.

Spare dowels and screws may be ordered:
- **CJTPS** sold in full cartons of ten 12 x 70mm dowels.
- Strong-Drive® 6.4 x 76mm Heavy-Duty Connector screw (**SDS25300**) sold in full cartons of 25 self-drilling hex head screws.

Model No.	Min. Joist Size	Dimensions (mm)	Fasteners		Country	Design Capacity (kN)		
		H1	Post (No. – Length x Dia., mm)	Joist Pins[5] (No. – 12 x 70 or 120 mm)		Uplift	Download	
							Floor	Roof
CJT3S	90 x 140	141	6 – SDS6.4 x 76	3	AU	$k_1 = 1.14$ 2.90	$k_1 = 0.69$ 6.86	$k_1 = 0.77$ 6.86
					NZ	$k_1 = 1.0$ 2.38	$k_1 = 0.80$ 5.65	$k_1 = 0.80$ 5.65
	90 x 184	141	6 – SDS6.4 x 76	3	AU	$k_1 = 1.14$ 4.74	$k_1 = 0.69$ 8.43	$k_1 = 0.77$ 8.43
					NZ	$k_1 = 1.0$ 3.91	$k_1 = 0.80$ 8.43	$k_1 = 0.80$ 8.43
CJT4S	90 x 235	178	8 – SDS6.4 x 76	4	AU	$k_1 = 1.14$ 7.24	$k_1 = 0.69$ 13.22	$k_1 = 0.77$ 13.22
					NZ	$k_1 = 1.0$ 5.96	$k_1 = 0.80$ 13.22	$k_1 = 0.80$ 13.22
CJT5S	90 x 286	217	10 – SDS6.4 x 76	5	AU	$k_1 = 1.14$ 9.47	$k_1 = 0.69$ 19.12	$k_1 = 0.77$ 19.12
					NZ	$k_1 = 1.0$ 7.80	$k_1 = 0.80$ 15.74	$k_1 = 0.80$ 15.74
CJT6S	90 x 286	254	12 – SDS6.4 x 76	6	AU	$k_1 = 1.14$ 12.08	$k_1 = 0.69$ 22.00	$k_1 = 0.77$ 22.00
					NZ	$k_1 = 1.0$ 9.94	$k_1 = 0.80$ 18.11	$k_1 = 0.80$ 18.11

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Centre dowel in beam. Short dowel (70 x 12mm) for use with a timber member with a breadth of 90mm, otherwise use the long dowel (120 x 12mm)

IUC Concealed Flange Hanger

The IUC is a face-mounted concealed flange hanger for both I-joists and solid timber sections. Ideal for end of ledger/header or post conditions, the IUC also provides cleaner lines for exposed conditions such as overhead decks.

- The IUC has optional triangular nail holes for additional uplift. Properly attached web stiffeners will be required for enhanced uplift.
- Inward facing flanges increase positioning flexibility.
- Stronger than toenailing joists.

Material: 1.2mm thick.

Finish: Galvanised. See Corrosion Information.

IUC

Installation

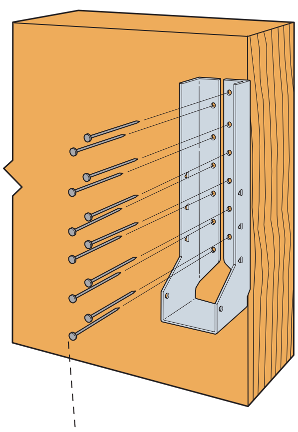
- Use all specified fasteners. See General Notes.
- Verify that the header can take the fasteners specified in the table.
- Web stiffeners are not required with I-joists when the top flange is laterally supported by both sides of the hanger.

Note

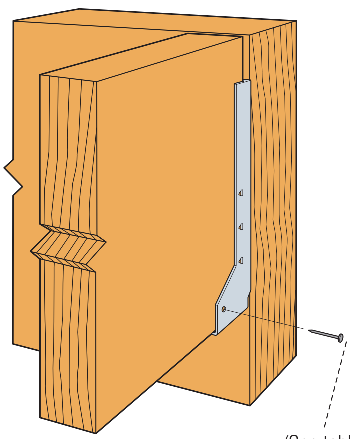
- These hangers cannot be skewed.

Typical Installation

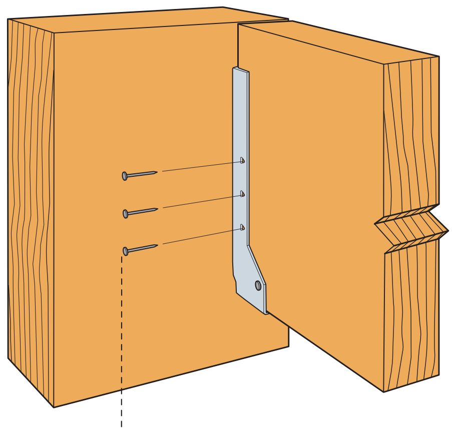
STEP 1: Locate the IUC and install specified fasteners into the carrying member.



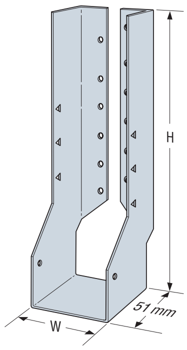
STEP 2: Place the joist in the IUC and install specified fasteners into the joist.



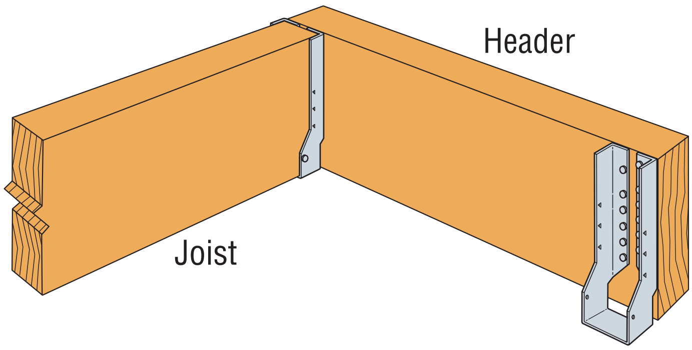
OPTIONAL NAILING: The IUC has optional triangular holes for additional uplift. Properly attached web stiffeners will be required for enhanced uplift in I-joists.



SIMPSON Strong-Tie®



IUC
(Others similar)



Typical IUC installation

IUC Technical Data

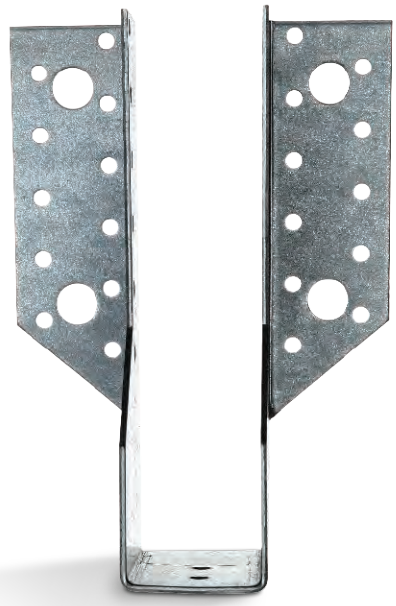
Joist size (mm)		Model No.	Dimensions (mm)			Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)	
									Download	
Width	Height		H	W	B	Face[5]	Joist		Floor	Roof
45	145	IUC142/47	142	47	51	6 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 4.23	$k_1 = 0.77$ 4.23
								NZ	$k_1 = 0.80$ 3.98	$k_1 = 0.80$ 3.98
	195–200	IUC192/47	192	47	51	10 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 5.32	$k_1 = 0.77$ 5.32
								NZ	$k_1 = 0.80$ 5.32	$k_1 = 0.80$ 5.32
50	195–200	IUC192/50	192	50	51	10 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 5.32	$k_1 = 0.77$ 5.32
								NZ	$k_1 = 0.80$ 5.32	$k_1 = 0.80$ 5.32
	220–245	IUC217/50	217	50	51	12 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 5.96	$k_1 = 0.77$ 5.96
								NZ	$k_1 = 0.80$ 5.96	$k_1 = 0.80$ 5.96

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. The Design Capacities may be multiplied by 1.3 when 75mm x 3.75mm face nails are used.

SAE Face Mount Joist Hanger

The SAE face mount joist hanger is designed for applications where extra load resistance is needed.

- May be fastened to the header material with either nails or bolts.
- Can be installed on timber header or concrete/masonry wall.
- Stainless steel versions available for applications that require a superior level of corrosion resistance.



SAE

Material: 2.0mm thick; Stainless steel versions 1.5mm thick.

Finish: Galvanised. Some models available in AISI Type 316L stainless steel. See Corrosion Information.

Installation

- Use all specified fasteners. See General Notes.
- Verify that the header can take the fasteners specified in the table.
- SAE hangers can be installed by filling all round holes, or all bolt holes, with the specified fasteners. A combination of the two would not give any increase to the performance values.
- The hangers have bolt holes for 10mm or 12mm fasteners into the face.
- The timber bolted capacity to be determined according to the relevant standards. Do not exceed the load values given in the table.
- The hanger depth is to be at least 60% of the carried member depth to prevent rotation, unless additional lateral restraint is added to the top of the carried member.

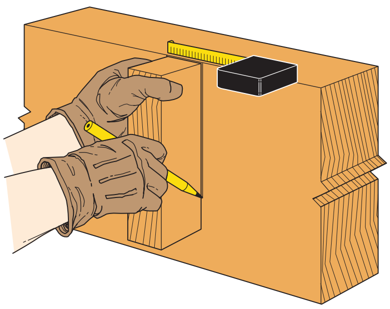
Note

- These hangers cannot be skewed.

Typical Installation

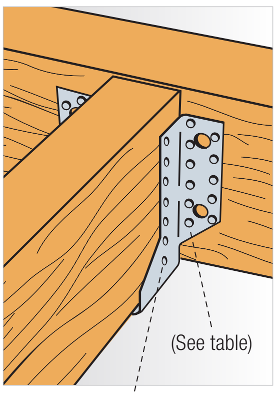
STEP 1: Locate the SAE and install specified fasteners into the carrying member.

PLEASE NOTE: Don't combine bolts and nails.

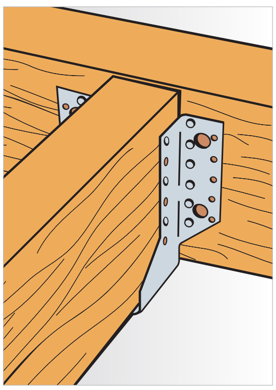


STEP 2: Place the joist and install specified fasteners into the joist.

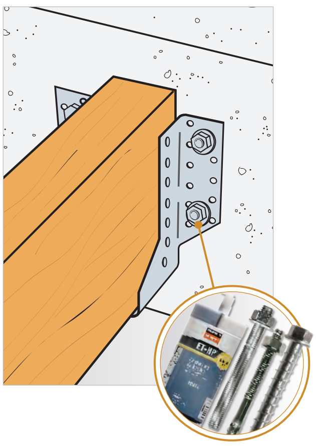
OPTION 1: All holes



OPTION 2: Some holes

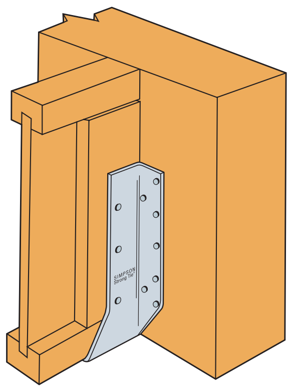


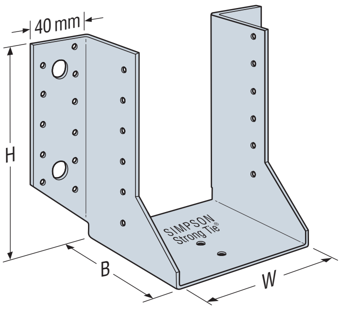
OPTION 3: Concrete/masonry



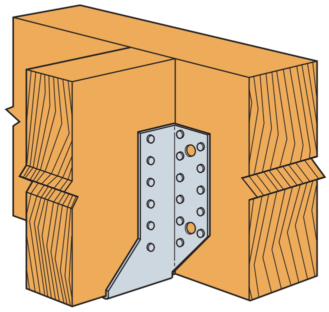
Install options see page 100

OPTION 4: I-joist
If top of I-joist passes top of connector, you will be required to properly attached web stiffeners.





SAE



Typical SAE installation

SAE Technical Data

Joist Size (mm) Width	Joist Size (mm) Height	Model No.	Dimensions[5] (mm) W	H	B	Fasteners (No. – Length x Dia., mm) Face	Joist	Country	Design Capacity (kN) Uplift	Download Floor	Download Roof
35	90–120	SAE200/38/2	38	81	84	8 – 40 x 3.75	5 – 40 x 3.75	AU	$k_1 = 1.14$ 3.98	$k_1 = 0.69$ 6.25	$k_1 = 0.77$ 6.50
								NZ	$k_1 = 1.0$ 3.75	$k_1 = 0.80$ 5.70	$k_1 = 0.80$ 5.70
	115–155	SAE250/38/2	38	106	84	12 – 40 x 3.75	7 – 40 x 3.75	AU	$k_1 = 1.14$ 5.57	$k_1 = 0.69$ 7.27	$k_1 = 0.77$ 7.27
								NZ	$k_1 = 1.0$ 5.24	$k_1 = 0.80$ 6.84	$k_1 = 0.80$ 6.84
	165–225	SAE340/38/2	38	151	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	$k_1 = 1.14$ 9.55	$k_1 = 0.69$ 13.06	$k_1 = 0.77$ 13.06
								NZ	$k_1 = 1.0$ 8.99	$k_1 = 0.80$ 13.06	$k_1 = 0.80$ 13.06
	185–225	SAE380/38/2	38	171	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	$k_1 = 1.14$ 9.55	$k_1 = 0.69$ 13.06	$k_1 = 0.77$ 13.06
								NZ	$k_1 = 1.0$ 8.99	$k_1 = 0.80$ 13.06	$k_1 = 0.80$ 13.06
	240–340	SAE500/38/2	38	231	84	34 – 40 x 3.75	18 – 40 x 3.75	AU	$k_1 = 1.14$ 14.33	$k_1 = 0.69$ 15.35	$k_1 = 0.77$ 15.35
								NZ	$k_1 = 1.0$ 13.49	$k_1 = 0.80$ 14.44	$k_1 = 0.80$ 14.44
	300–475	SAE620/38/2	38	291	75	40 – 40 x 3.75	22 – 40 x 3.75	AU	$k_1 = 1.14$ 17.51	$k_1 = 0.69$ 24.55	$k_1 = 0.77$ 24.55
								NZ	$k_1 = 1.0$ 16.48	$k_1 = 0.80$ 23.11	$k_1 = 0.80$ 23.11
45	90–120	SAE200/46/2	45	77	84	8 – 40 x 3.75	4 – 40 x 3.75	AU	$k_1 = 1.14$ 3.18	$k_1 = 0.69$ 6.25	$k_1 = 0.77$ 6.50
								NZ	$k_1 = 1.0$ 3.00	$k_1 = 0.80$ 5.70	$k_1 = 0.80$ 5.70
	115–150	SAE250/46/2	45	102	84	12 – 40 x 3.75	7 – 40 x 3.75	AU	$k_1 = 1.14$ 5.57	$k_1 = 0.69$ 7.27	$k_1 = 0.77$ 7.27
								NZ	$k_1 = 1.0$ 5.24	$k_1 = 0.80$ 6.84	$k_1 = 0.80$ 6.84
	160–220	SAE340/46/2	45	147	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	$k_1 = 1.14$ 9.55	$k_1 = 0.69$ 13.06	$k_1 = 0.77$ 13.06
								NZ	$k_1 = 1.0$ 8.99	$k_1 = 0.80$ 13.06	$k_1 = 0.80$ 13.06
	240–340	SAE500/46/2	46	227	84	34 – 40 x 3.75	18 – 40 x 3.75	AU	$k_1 = 1.14$ 14.33	$k_1 = 0.69$ 18.60	$k_1 = 0.77$ 18.60
								NZ	$k_1 = 1.0$ 13.49	$k_1 = 0.80$ 18.60	$k_1 = 0.80$ 18.60
	300–475	SAE620/44/2	45	288	75	40 – 40 x 3.75	22 – 40 x 3.75	AU	$k_1 = 1.14$ 17.51	$k_1 = 0.69$ 24.55	$k_1 = 0.77$ 24.55
								NZ	$k_1 = 1.0$ 16.48	$k_1 = 0.80$ 23.11	$k_1 = 0.80$ 23.11
50	90–115	SAE200/50/2	50	75	84	8 – 40 x 3.75	4 – 40 x 3.75	AU	$k_1 = 1.14$ 3.18	$k_1 = 0.69$ 6.25	$k_1 = 0.77$ 6.50
								NZ	$k_1 = 1.0$ 3.00	$k_1 = 0.80$ 5.70	$k_1 = 0.80$ 5.70
	115–150	SAE250/50/2	50	100	84	12 – 40 x 3.75	7 – 40 x 3.75	AU	$k_1 = 1.14$ 5.57	$k_1 = 0.69$ 7.27	$k_1 = 0.77$ 7.27
								NZ	$k_1 = 1.0$ 5.24	$k_1 = 0.80$ 6.84	$k_1 = 0.80$ 6.84
	160–215	SAE340/50/2	50	145	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	$k_1 = 1.14$ 9.55	$k_1 = 0.69$ 13.06	$k_1 = 0.77$ 13.06
								NZ	$k_1 = 1.0$ 8.99	$k_1 = 0.80$ 13.06	$k_1 = 0.80$ 13.06

SAE Technical Data (cont.)

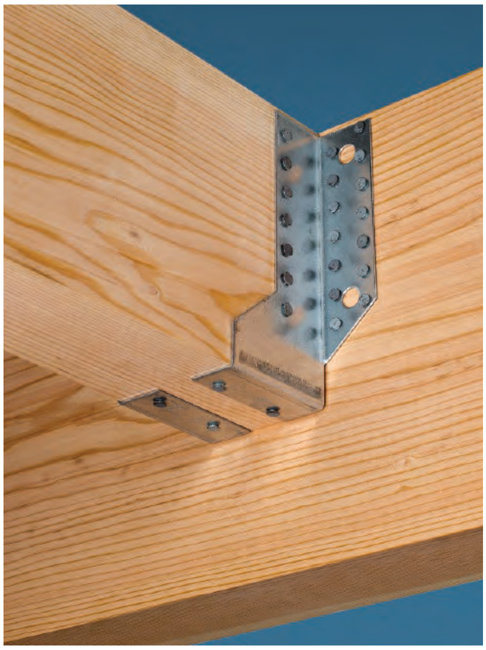
Joist Size (mm)		Model No.	Dimensions[5] (mm)			Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
										Download	
Width	Height		W	H	B	Face	Joist		Uplift	Floor	Roof
63	90–100	SAE200/64/2	64	68	84	8 – 40 x 3.75	4 – 40 x 3.75	AU	k_1 = 1.14 3.18	k_1 = 0.69 6.26	k_1 = 0.77 6.50
								NZ	k_1 = 1.0 3.00	k_1 = 0.80 5.70	k_1 = 0.80 5.70
	115–135	SAE250/64/2	64	93	84	12 – 40 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 5.57	k_1 = 0.69 7.27	k_1 = 0.77 7.27
								NZ	k_1 = 1.0 5.24	k_1 = 0.80 6.84	k_1 = 0.80 6.84
	130–175	SAE300/64/2	64	118	84	18 – 40 x 3.75	10 – 40 x 3.75	AU	k_1 = 1.14 6.37	k_1 = 0.69 9.07	k_1 = 0.77 9.07
								NZ	k_1 = 1.0 5.99	k_1 = 0.80 9.07	k_1 = 0.80 9.07
	170–205	SAE340/64/2	64	138	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 9.55	k_1 = 0.69 13.06	k_1 = 0.77 13.06
								NZ	k_1 = 1.0 8.99	k_1 = 0.80 13.06	k_1 = 0.80 13.06
	170–235	SAE380/64/2	64	158	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 9.55	k_1 = 0.69 13.06	k_1 = 0.77 13.06
								NZ	k_1 = 1.0 8.99	k_1 = 0.80 13.06	k_1 = 0.80 13.06
	225–340	SAE500/64/2	64	218	84	34 – 40 x 3.75	18 – 40 x 3.75	AU	k_1 = 1.14 14.33	k_1 = 0.69 18.60	k_1 = 0.77 18.60
								NZ	k_1 = 1.0 13.49	k_1 = 0.80 18.60	k_1 = 0.80 18.60
	285–460	SAE620/64/2	64	279	75	40 – 40 x 3.75	22 – 40 x 3.75	AU	k_1 = 1.14 17.51	k_1 = 0.69 24.55	k_1 = 0.77 24.55
								NZ	k_1 = 1.0 16.48	k_1 = 0.80 23.11	k_1 = 0.80 23.11
70	170–225	SAE380/70/2	70	155	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 9.55	k_1 = 0.69 13.06	k_1 = 0.77 13.06
								NZ	k_1 = 1.0 8.99	k_1 = 0.80 13.06	k_1 = 0.80 13.06
75	95–130	SAE250/76/2	76	87	84	12 – 40 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 5.57	k_1 = 0.69 7.27	k_1 = 0.77 7.27
								NZ	k_1 = 1.0 5.24	k_1 = 0.80 6.84	k_1 = 0.80 6.84
	115–150	SAEL300/76/2	76	112	84	16 – 40 x 3.75	8 – 40 x 3.75	AU	k_1 = 1.14 6.37	k_1 = 0.69 7.27	k_1 = 0.77 7.27
								NZ	k_1 = 1.0 5.99	k_1 = 0.80 6.84	k_1 = 0.80 6.84
	165–225	SAE380/76/2	76	152	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 9.55	k_1 = 0.69 13.06	k_1 = 0.77 13.06
								NZ	k_1 = 1.0 8.99	k_1 = 0.80 13.06	k_1 = 0.80 13.06
	225–340	SAE500/76/2	76	212	84	34 – 40 x 3.75	18 – 40 x 3.75	AU	k_1 = 1.14 14.33	k_1 = 0.69 18.60	k_1 = 0.77 18.60
								NZ	k_1 = 1.0 13.49	k_1 = 0.80 18.60	k_1 = 0.80 18.60
	285–450	SAE620/76/2	76	273	75	40 – 40 x 3.75	22 – 40 x 3.75	AU	k_1 = 1.14 17.51	k_1 = 0.69 24.55	k_1 = 0.77 24.55
								NZ	k_1 = 1.0 16.48	k_1 = 0.80 23.11	k_1 = 0.80 23.11
90	160–215	SAE380/90/2	90	145	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 9.55	k_1 = 0.69 13.06	k_1 = 0.77 13.06
								NZ	k_1 = 1.0 8.99	k_1 = 0.80 13.06	k_1 = 0.80 13.06
45	115–150	SAE250/46/1.5SS	46	102	84	12 – 40 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 5.57	k_1 = 0.69 8.74	k_1 = 0.77 8.90
								NZ	k_1 = 1.0 5.24	k_1 = 0.80 8.38	k_1 = 0.80 8.38
	160–220	SAE340/46/1.5SS	46	147	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 10.67	k_1 = 0.69 11.01	k_1 = 0.77 11.01
								NZ	k_1 = 1.0 10.67	k_1 = 0.80 11.01	k_1 = 0.80 11.01
50	115–150	SAE250/50/1.5SS	50	100	84	12 – 40 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 5.57	k_1 = 0.69 8.74	k_1 = 0.77 8.90
								NZ	k_1 = 1.0 5.24	k_1 = 0.80 8.38	k_1 = 0.80 8.38
	160–215	SAE340/50/1.5SS	50	145	84	22 – 40 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 10.67	k_1 = 0.69 11.01	k_1 = 0.77 11.01
								NZ	k_1 = 1.0 10.67	k_1 = 0.80 11.01	k_1 = 0.80 11.01

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Dimensions W, H and B are for the interior of the hanger.

SDE Split Face Mount Joist Hanger

The SDE is a two-piece, width-adjustable joist hanger that can accommodate joist widths from 60mm and 120mm. Each SDE is comprised of one left and one right piece.

- One joist hanger can handle multiple applications, simplifying purchasing.
- The hangers have bolt holes for 10mm or 12mm fasteners into the face.



Material: 2.0mm thick.

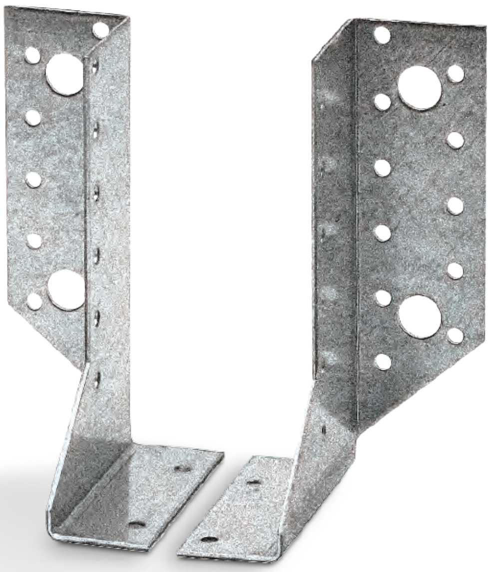
Finish: Galvanised. See Corrosion Information.

Installation

- Use all specified fasteners. See General Notes.
- Verify that the header can take the fasteners specified in the table.
- Each SDE piece must also be nailed through the holes underneath the joist.

Note

- The hangers have bolt holes for 12mm fasteners into the face.
- The timber bolted capacity to be determined according to the relevant standards. Do not exceed the load values given in the table.
- The hanger depth is to be at least 60% of the carried member depth to prevent rotation, unless additional lateral restraint is added to the top of the carried member.
- These hangers cannot be skewed.

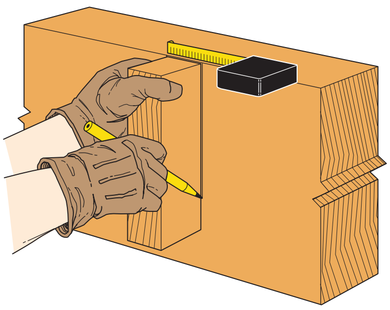


SDE

Typical Installation

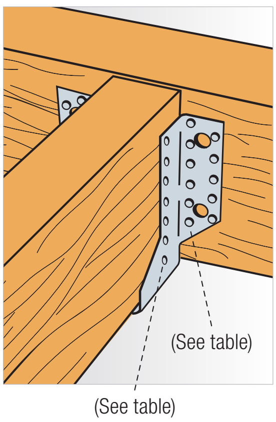
STEP 1: Locate the SDE and install specified fasteners into the carrying member.

PLEASE NOTE: Don't combine bolts and nails.

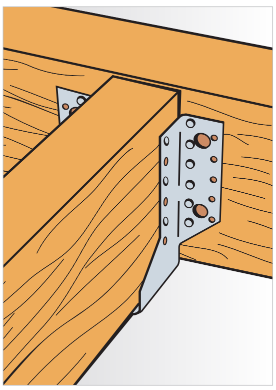


STEP 2: Place the joist and install specified fasteners into the joist, both vertical face and bottom of seat.

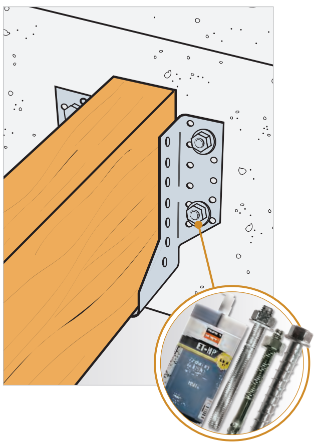
OPTION 1: All holes



OPTION 2: Some holes

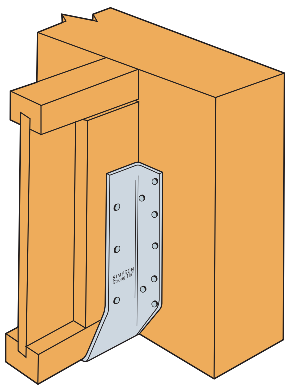


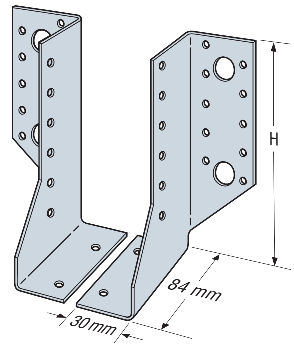
OPTION 3: Concrete/masonry



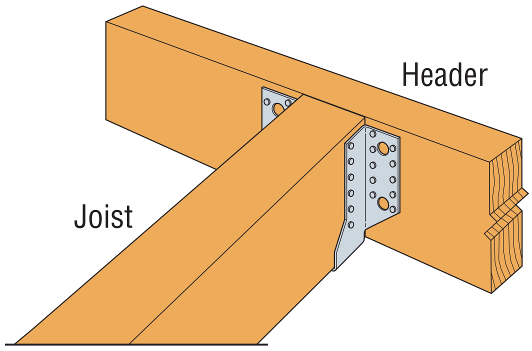
Install options see page 100

OPTION 4: I-joist
If top of I-joist passes top of connector, you will be required to properly attached web stiffeners.





SDE



Typical SDE installation

SDE Technical Data

Joist Size (mm)		Model No.	Dimensions (mm)			Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
									Uplift	Download	
Width	Height		W	H	B	Face	Joist			Floor	Roof
60–120	140–207	SDE340/30	30	140	84	22 – 40 x 3.75	16 – 40 x 3.75	AU	k_1 = 1.14	k_1 = 0.69	k_1 = 0.77
									11.48	7.82	7.82
								NZ	k_1 = 1.0	k_1 = 0.80	k_1 = 0.80
									10.80	7.36	7.36
	160–237	SDE380/30	30	160	84	22 – 40 x 3.75	16 – 40 x 3.75	AU	k_1 = 1.14	k_1 = 0.69	k_1 = 0.77
									11.48	7.82	7.82
								NZ	k_1 = 1.0	k_1 = 0.80	k_1 = 0.80
									10.80	7.36	7.36
	190–282	SDE440/30	30	190	84	28 – 40 x 3.75	20 – 40 x 3.75	AU	k_1 = 1.14	k_1 = 0.69	k_1 = 0.77
									17.89	10.50	10.50
								NZ	k_1 = 1.0	k_1 = 0.80	k_1 = 0.80
									13.95	9.89	9.89

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.

LSSU Adjustable Light Slopeable/ Skewable U Hanger

The innovative design of the LSSU joist hanger allows it to adjust to any slope or skew up to 45°, eliminating the need for pre-skewed/sloped or custom-order hangers. Now one hanger can handle a wide range of framing applications.

- All models are slope and skew adjustable on site.
- Sizes for both solid sawn timber and engineered wood.

Material: LSSU410 – 1.6mm, all others 1.3mm.

Finish: Galvanised. See Corrosion Information.

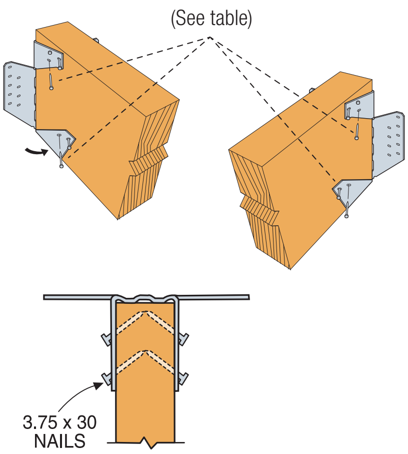
LSSU

Installation

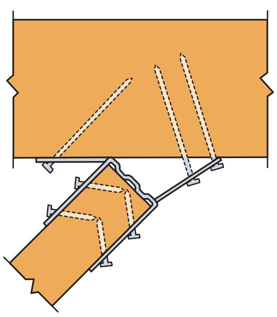
- Use all specified fasteners. See General Notes.
- Verify that the header can take the fasteners specified in the table.
- Attach the sloped joist at both ends so that the horizontal force developed by the slope is fully supported by the supporting members.
- Watch an installation video; www.strongtie.com/videolibrary/con-lssui.html.

Typical Installation

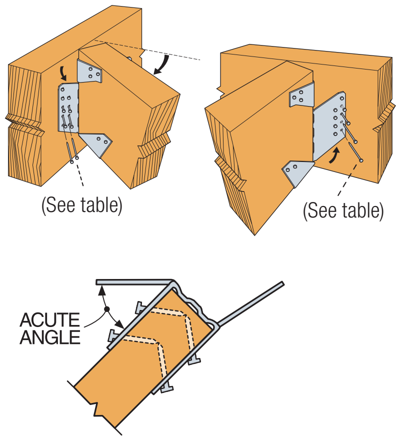
STEP 1: Nail hanger to slope-cut carried member, installing seat nail first. No bevel necessary for skewed installation. Install joist nails at 45° angle.

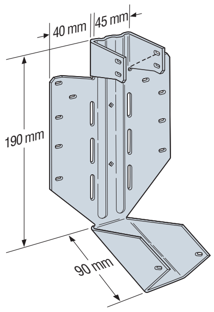


STEP 2: Skew flange from 0-45°. Bend other flange back along centreline of slots until it meets the header. Bend one time only.

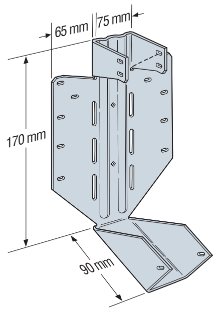


STEP 3: Attach hanger to the carrying member, acute angle side first (see footnote 5). Install nails at an angle.

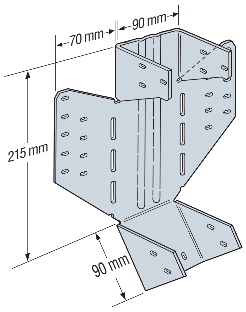




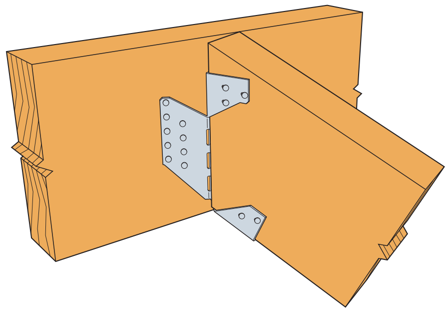
LSSUI25
(LSSUI2.06 similar)



LSSU170



LSSU410



Typical LSSU installation

LSSU Technical Data

Joist Size (mm)		Model No.	Dimension (mm)		Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
									Download	
Width	Height		W	B	Face	Joist		Uplift	Floor	Roof
SLOPED ONLY HANGERS										
45	241–356	LSSUI25	45	90	10 – 75 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 6.64	k_1 = 0.77 6.64
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 6.25	k_1 = 0.80 6.25
58	241–356	LSSUI2.06	52	90	10 – 75 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 6.64	k_1 = 0.77 6.64
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 6.25	k_1 = 0.80 6.25
63	195–245	LSSU170/66	66	90	10 – 75 x 3.75	11 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 7.38	k_1 = 0.77 7.38
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 6.94	k_1 = 0.80 6.94
89	241–356	LSSU410	90	90	18 – 75 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 12.44	k_1 = 0.77 12.44
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 11.70	k_1 = 0.80 11.70
SLOPED AND SKEWED HANGERS										
45	241–356	LSSUI25	45	90	9 – 75 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 4.96	k_1 = 0.77 4.96
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 4.67	k_1 = 0.80 4.67
58	241–356	LSSUI2.06	52	90	9 – 75 x 3.75	7 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 5.84	k_1 = 0.77 5.84
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 5.50	k_1 = 0.80 5.50
63	195–245	LSSU170/66	66	90	9 – 75 x 3.75	11 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 5.51	k_1 = 0.77 5.51
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 5.18	k_1 = 0.80 5.18
89	241–356	LSSU410	90	90	14 – 75 x 3.75	12 – 40 x 3.75	AU	k_1 = 1.14 3.06	k_1 = 0.69 6.76	k_1 = 0.77 6.76
							NZ	k_1 = 1.0 2.88	k_1 = 0.80 6.51	k_1 = 0.80 6.51

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Some face nails are not fitted in the flange on the acute angle side for skewed installations. Fill all nail holes on the obtuse angle side.
6. Do not substitute 40mm x 3.75mm nails for face nails on slope and skew combinations or skewed only LSSU/LSSUI hangers.
7. Attach the sloped joist at both ends so that the horizontal force developed by the slope is fully supported by the supporting members.
8. Web stiffeners required for I-joist applications.

VPA Variable Pitch Connector

The VPA variable pitch connector is a versatile, field-adjustable solution for connecting rafters to the wall top plate. It adjusts in the field to accommodate slopes between 3:12 and 12:12, making it a complement to the versatile LSSU joist hanger.

- Easy to adjust the pitch in the field to match the application.
- Eliminates the need for time-consuming notching of rafters.
- Available for solid sawn and engineered wood applications.

VPA

Material: 1.3mm thick.

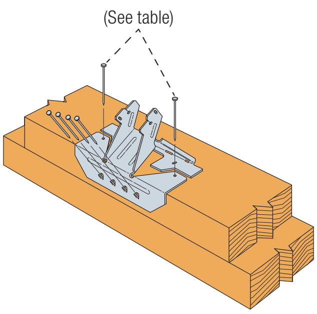
Finish: Galvanised. See Corrosion Information.

Installation

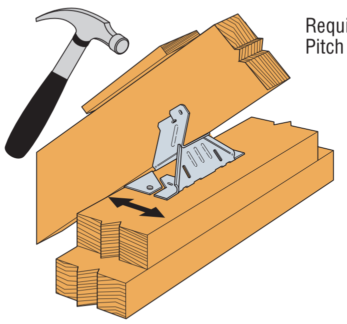
- Use all specified fasteners. See General Notes.
- Watch an installation video; www.strongtie.com/videolibrary/con-vpa.html.

Typical Installation

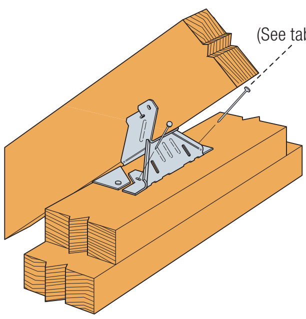
STEP 1: Install top nails and face PAN nails in "A" flange to outside wall top plate.



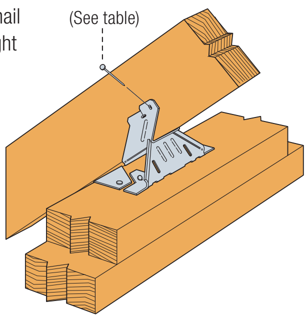
STEP 2: Seat rafter with a hammer, adjusting "B" flange to the required pitch.

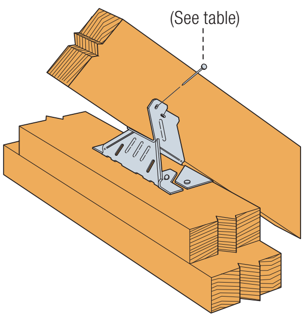


STEP 3: Install "B" flange nails in the obround nail holes, locking the pitch.

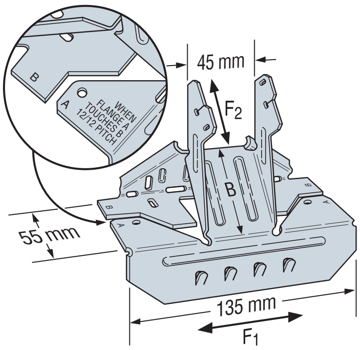


STEP 4: Install nail into tab nail hole. Hammer nail in at a slight angle to prevent splitting.

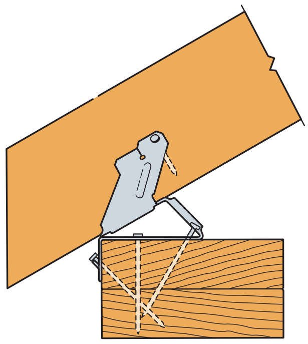




Solid Sawn and Glulam Beam Joist Hangers



VPA25
(VPA2.06 similar)



Typical VPA installation

VPA Technical Data

Joist Width (mm)	Model No.	Dimensions (mm)		Fasteners (No. – Length x Dia.,mm)		Country	Design Capacity (kN)				
		W	B	Carrying Member	Carried Member		Uplift	Download – Floor	Download – Roof	F1	F2
45	VPA25	46	51	8 – 75 x 3.75	2 – 40 x 3.75	AU	k_1 = 1.14	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14	k_1 = 1.14
							1.58	2.88	2.88	1.85	1.16
						NZ	k_1 = 1.0	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0	k_1 = 1.0
							1.49	2.71	2.71	1.74	1.16
50	VPA2.06	52	51	9 – 75 x 3.75	2 – 40 x 3.75	AU	k_1 = 1.14	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14	k_1 = 1.14
							1.89	5.06	5.06	1.85	1.16
						NZ	k_1 = 1.0	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0	k_1 = 1.0
							1.74	4.76	4.76	1.74	1.16

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. F1 load direction is parallel to the supporting timber member and F2 is parallel to the rafter seat.
6. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation. See General Note 'e' on page 15.

Engineered Wood and Structural Composite Timber Connectors

IUSE Face Mount I-Joist Hanger

The IUSE is a hybrid hanger that incorporates the advantages of a face mount and top mount hanger. Installation is fast with the Strong-Grip™ seat, easy-to-reach face nails and self-jigging locator tabs.

- This hanger incorporates the Strong-Grip™ seat which secures the I-joist without the need for any fasteners—where no uplift is required.
- Positive angle nailing (PAN) minimises splitting of the joist flanges.

Material: See table on next page.

Finish: Galvanised. See Corrosion Information.

Uplift Loads

- Models have optional triangle joist nail holes for additional uplift. Properly attached web stiffeners are required.
- See the load tables for minimum required fasteners and design uplift capacity.

Installation

- Use all specified fasteners. See General Notes. Verify that the header can take the required fasteners specified in the table. See more installation information.
- For additional important installation information, see page 55.
- Position I-joist into hanger and snap into place. No joist nailing required. Some models have triangle and round header nail holes. To achieve Max. download, fill both round and triangle holes.
- Locator tabs are not structural. They may be bent back to adjust for hanger placement.
- For rimboard applications see T-RIMBDHGR.
- I-joists with web stiffeners or rectangular sections can be used with the installation of 2 – 40 x 3.75mm nails into the optional triangle joist nails.
- Web stiffeners are not required with I-joists when the top flange is laterally supported by the sides of the hanger unless the manufacturer's no-web-stiffener reaction is exceeded.
- Watch an installation video; www.strongtie.com/videolibrary/con-ius.html.

IUSE

Note

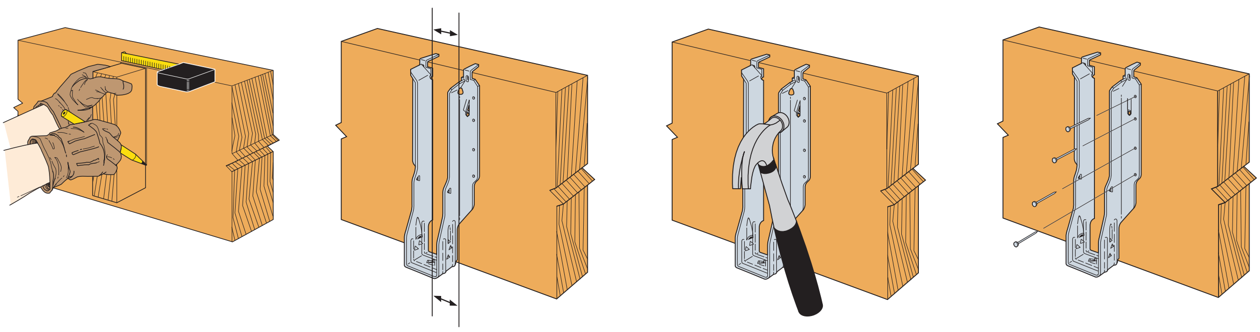
- These hangers cannot be modified. However, these models will normally accommodate a skew of up to 5°. For sloped joists up to ¼:12 there is no reduction, between ¼:12 and up to ½:12, tests show a 10% reduction in ultimate hanger strength. Local crushing of the bottom flange or excessive deflection may be limiting; check with joist manufacturer for specific limitations on bearing of this type.

Typical Installation

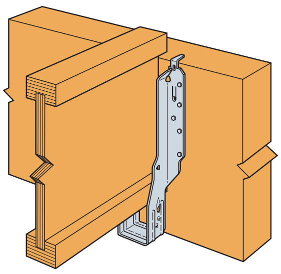
STEP 1: Locate the hanger.

STEP 2: Temporarily fix using the speed prongs (IUSE).

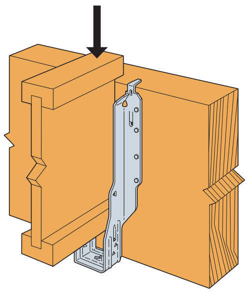
STEP 3: Install specified fasteners into the carrying member.



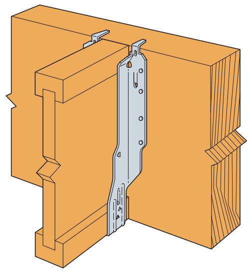
STEP 4: Slide the I-joist downward into the IUSE until it rests above the large teardrop.

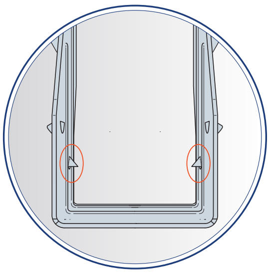


STEP 5: Firmly push or snap I-joist fully into the seat of the IUSE.

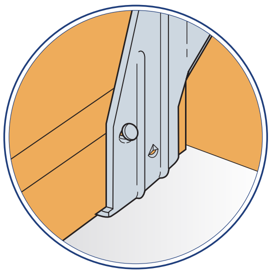


NO NAILS required in joist—where no uplift is required.



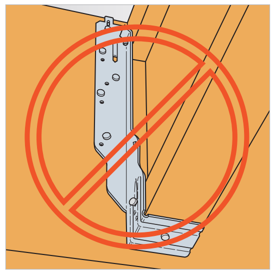


The Strong-Grip™ seat secures I-joists in position without joist nails.

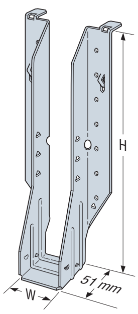


Use specified fastener installed as shown where uplift is required.

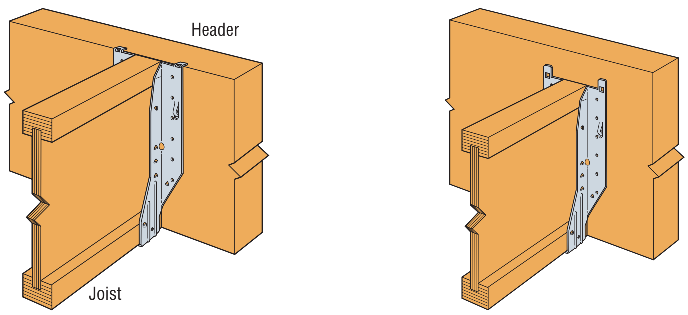
AVOID A MISINSTALLATION



Do not make your own holes. Do not nail the bottom flange.



IUSE



Typical IUSE installation

IUSE Technical Data

Joist Size (mm)		Model No.	Dimensions (mm)			Fasteners (No. – Length x Dia.,mm)		Country	Design Capacity (kN)	
									Download	
Width	Height		H	W	B	Face[5]	Joist		Floor	Roof
38	240	IUSE239/41	239	41	51	14 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 5.83	$k_1 = 0.77$ 5.83
								NZ	$k_1 = 0.80$ 5.83	$k_1 = 0.80$ 5.83
	300	IUSE299/41	299	41	51	16 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 5.83	$k_1 = 0.77$ 5.83
								NZ	$k_1 = 0.80$ 5.83	$k_1 = 0.80$ 5.83
45	200	IUSE199/48	199	48	51	10 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 4.37	$k_1 = 0.77$ 4.37
								NZ	$k_1 = 0.80$ 4.37	$k_1 = 0.80$ 4.37
	240	IUSE239/48	239	48	51	14 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 5.83	$k_1 = 0.77$ 5.83
								NZ	$k_1 = 0.80$ 5.83	$k_1 = 0.80$ 5.83
	300	IUSE299/48	299	48	51	16 – 40 x 3.75	2 – 40 x 3.75	AU	$k_1 = 0.69$ 5.62	$k_1 = 0.77$ 5.62
								NZ	$k_1 = 0.80$ 5.29	$k_1 = 0.80$ 5.29

SIMPSON Strong-Tie®

IUSE Technical Data (cont.)

Joist Size (mm) Width	Joist Size (mm) Height	Model No.	Dimensions (mm) H	Dimensions (mm) W	Dimensions (mm) B	Fasteners (No. – Length x Dia.,mm) Face[5]	Fasteners (No. – Length x Dia.,mm) Joist	Country	Design Capacity (kN) Download Floor	Design Capacity (kN) Download Roof
51	240	IUSE239/54	239	54	51	14 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 5.62	k_1 = 0.77 5.62
								NZ	k_1 = 0.80 5.29	k_1 = 0.80 5.29
	300	IUSE299/54	299	54	51	16 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 5.62	k_1 = 0.77 5.62
								NZ	k_1 = 0.80 5.29	k_1 = 0.80 5.29
58-59	360	IUSE359/61	359	61	51	20 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 7.29	k_1 = 0.77 7.29
								NZ	k_1 = 0.80 6.86	k_1 = 0.80 6.86
60	200	IUSE199/63	199	63	51	10 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 4.33	k_1 = 0.77 4.33
								NZ	k_1 = 0.80 4.07	k_1 = 0.80 4.07
63	240	IUSE239/66	239	66	51	14 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 5.22	k_1 = 0.77 5.22
								NZ	k_1 = 0.80 4.91	k_1 = 0.80 4.91
	245	IUSE244/66	244	66	51	14 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 6.20	k_1 = 0.77 6.20
								NZ	k_1 = 0.80 5.83	k_1 = 0.80 5.83
	300	IUSE299/66	299	66	51	16 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 5.62	k_1 = 0.77 5.62
								NZ	k_1 = 0.80 5.29	k_1 = 0.80 5.29
	360	IUSE359/66	359	66	51	20 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 7.29	k_1 = 0.77 7.29
								NZ	k_1 = 0.80 6.86	k_1 = 0.80 6.86
70	240	IUSE239/73	239	73	51	14 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 6.20	k_1 = 0.77 6.20
								NZ	k_1 = 0.80 5.83	k_1 = 0.80 5.83
	300	IUSE299/73	299	73	51	16 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 5.62	k_1 = 0.77 5.62
								NZ	k_1 = 0.80 5.29	k_1 = 0.80 5.29
90	200	IUSE199/92	199	92	51	10 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 4.29	k_1 = 0.77 4.29
								NZ	k_1 = 0.80 4.29	k_1 = 0.80 4.29
	240	IUSE239/92	239	92	51	14 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 6.35	k_1 = 0.77 6.35
								NZ	k_1 = 0.80 5.98	k_1 = 0.80 5.98
	300	IUSE299/92	299	92	51	16 – 40 x 3.75	2 – 40 x 3.75	AU	k1 = 0.69 5.62	k_1 = 0.77 5.62
								NZ	k_1 = 0.80 5.29	k_1 = 0.80 5.29
	360	IUSE359/92	359	92	51	20 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 7.29	k_1 = 0.77 7.29
								NZ	k_1 = 0.80 6.86	k_1 = 0.80 6.86
	400	IUSE399/92	399	92	51	22 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 0.69 7.29	k_1 = 0.77 7.29
								NZ	k_1 = 0.80 6.86	k_1 = 0.80 6.86

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. The Design Capacities may be multiplied by 1.3 when 75mm x 3.75mm face nails are used.
6. The Design Uplift Capacity is 0.55kN for Australia and 0.52kN for New Zealand when two joist nails are installed.

LSSU Adjustable Light Slopeable/ Skewable U Hanger

The innovative design of the LSSU joist hanger allows it to adjust to any slope or skew up to 45°, eliminating the need for pre-skewed/sloped or custom-order hangers. Now one hanger can handle a wide range of framing applications.

- All models are slope and skew adjustable on site.
- Sizes for both solid sawn timber and engineered wood.

Material: LSSU410 – 1.6mm, all others 1.3mm.

Finish: Galvanised. See Corrosion Information.

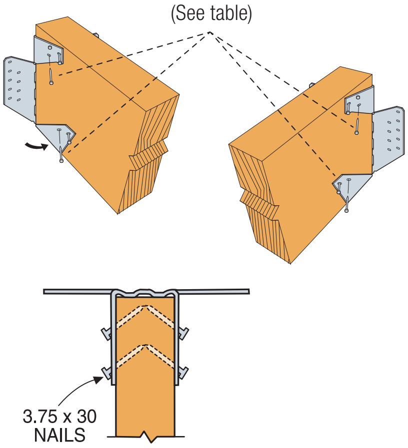
LSSU

Installation

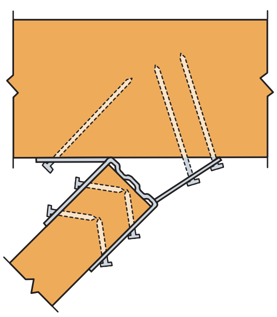
- Use all specified fasteners. See General Notes.
- Verify that the header can take the fasteners specified in the table.
- Attach the sloped joist at both ends so that the horizontal force developed by the slope is fully supported by the supporting members.
- Watch an installation video; www.strongtie.com/videolibrary/con-lssui.html.

Typical Installation

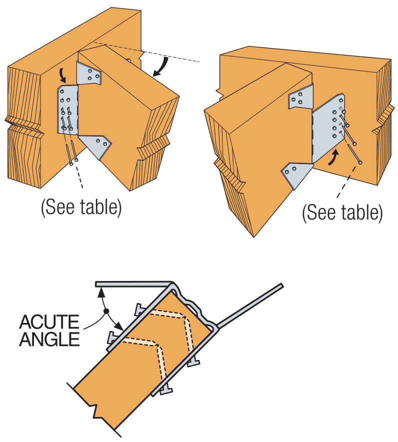
STEP 1: Nail hanger to slope-cut carried member, installing seat nail first. No bevel necessary for skewed installation. Install joist nails at 45° angle.



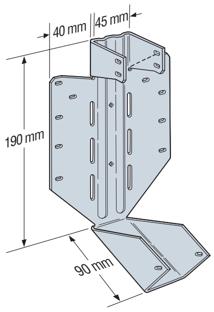
STEP 2: Skew flange from 0-45°. Bend other flange back along centreline of slots until it meets the header. Bend one time only.



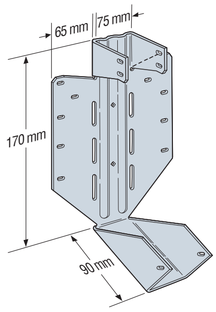
STEP 3: Attach hanger to the carrying member, acute angle side first (see footnote 5). Install nails at an angle.



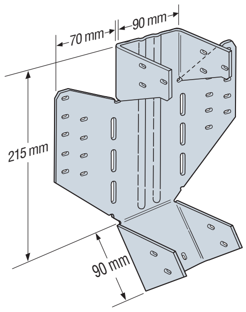
SIMPSON Strong-Tie®



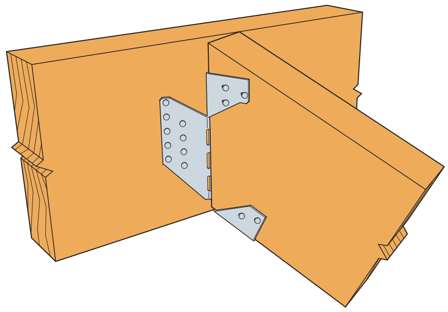
LSSUI25
(LSSUI2.06 similar)



LSSU170



LSSU410



Typical LSSU installation

LSSU Technical Data

Joist Size (mm)		Model No.	Dimension (mm)		Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
									Download	
Width	Height		W	B	Face	Joist		Uplift	Floor	Roof
SLOPED ONLY HANGERS										
45	241–356	LSSUI25	45	90	10 – 75 x 3.75	7 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 6.64	$k_1 = 0.77$ 6.64
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 6.25	$k_1 = 0.80$ 6.25
58	241–356	LSSUI2.06	52	90	10 – 75 x 3.75	7 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 6.64	$k_1 = 0.77$ 6.64
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 6.25	$k_1 = 0.80$ 6.25
63	195–245	LSSU170/66	66	90	10 – 75 x 3.75	11 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 7.38	$k_1 = 0.77$ 7.38
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 6.94	$k_1 = 0.80$ 6.94
89	241–356	LSSU410	90	90	18 – 75 x 3.75	12 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 12.44	$k_1 = 0.77$ 12.44
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 11.70	$k_1 = 0.80$ 11.70
SLOPED AND SKEWED HANGERS										
45	241–356	LSSUI25	45	90	9 – 75 x 3.75	7 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 4.96	$k_1 = 0.77$ 4.96
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 4.67	$k_1 = 0.80$ 4.67
58	241–356	LSSUI2.06	52	90	9 – 75 x 3.75	7 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 5.84	$k_1 = 0.77$ 5.84
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 5.50	$k_1 = 0.80$ 5.50
63	195–245	LSSU170/66	66	90	9 – 75 x 3.75	11 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 5.51	$k_1 = 0.77$ 5.51
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 5.18	$k_1 = 0.80$ 5.18
89	241–356	LSSU410	90	90	14 – 75 x 3.75	12 – 40 x 3.75	AU	$k_1 = 1.14$ 3.06	$k_1 = 0.69$ 6.76	$k_1 = 0.77$ 6.76
							NZ	$k_1 = 1.0$ 2.88	$k_1 = 0.80$ 6.51	$k_1 = 0.80$ 6.51

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Some face nails are not fitted in the flange on the acute angle side for skewed installations. Fill all nail holes on the obtuse angle side.
6. Do not substitute 40mm x 3.75mm nails for face nails on slope and skew combinations or skewed only LSSU/LSSUI hangers.
7. Attach the sloped joist at both ends so that the horizontal force developed by the slope is fully supported by the supporting members.
8. Web stiffeners required for I-joist applications.

VPA Variable Pitch Connector

The VPA variable pitch connector is a versatile, field-adjustable solution for connecting rafters to the wall top plate. It adjusts in the field to accommodate slopes between 3:12 and 12:12, making it a complement to the versatile LSSU joist hanger.

- Easy to adjust the pitch in the field to match the application.
- Eliminates the need for time-consuming notching of rafters.
- Available for solid sawn and engineered wood applications.

VPA

Material: 1.3mm thick.

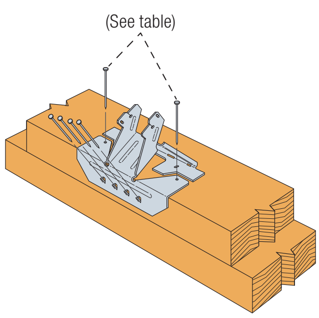
Finish: Galvanised. See Corrosion Information.

Installation

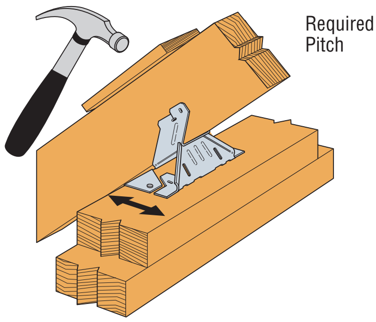
- Use all specified fasteners. See General Notes.
- Watch an installation video; www.strongtie.com/videolibrary/con-vpa.html.

Typical Installation

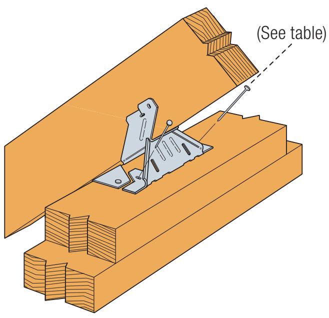
STEP 1: Install top nails and face PAN nails in "A" flange to outside wall top plate.



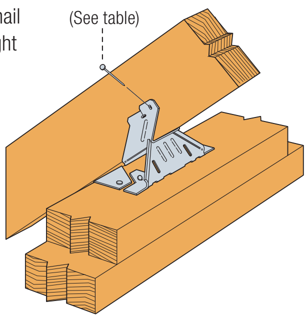
STEP 2: Seat rafter with a hammer, adjusting "B" flange to the required pitch.

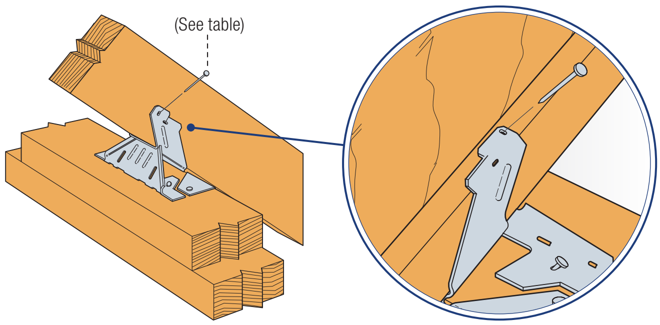


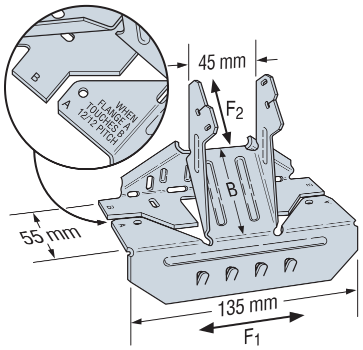
STEP 3: Install "B" flange nails in the obround nail holes, locking the pitch.



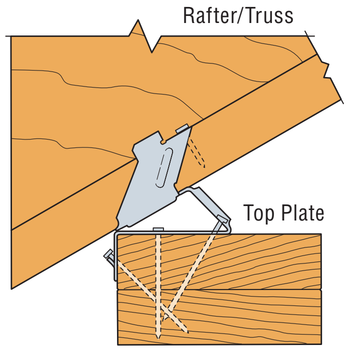
STEP 4: Install nail into tab nail hole. Hammer nail in at a slight angle to prevent splitting.







VPA25
(VPA2.06 similar)



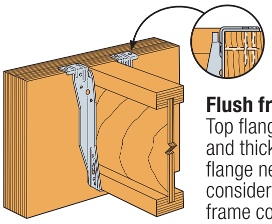
Typical VPA installation

VPA Technical Data

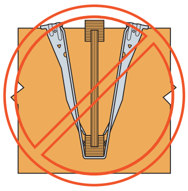
Joist Width (mm)	Model No.	Dimensions (mm)		Fasteners (No. – Length x Dia.,mm)		Country	Design Capacity (kN)				
		W	B	Carrying Member	Carried Member		Uplift	Download: Floor	Download: Roof	F1	F2
45	VPA25	46	51	8 – 75 x 3.75	2 – 40 x 3.75	AU	$k_1 = 1.14$ 1.58	$k_1 = 0.69$ 2.88	$k_1 = 0.77$ 2.88	$k_1 = 1.14$ 1.85	$k_1 = 1.14$ 1.16
						NZ	$k_1 = 1.0$ 1.49	$k_1 = 0.80$ 2.71	$k_1 = 0.80$ 2.71	$k_1 = 1.0$ 1.74	$k_1 = 1.0$ 1.16
50	VPA2.06	52	51	9 – 75 x 3.75	2 – 40 x 3.75	AU	$k_1 = 1.14$ 1.89	$k_1 = 0.69$ 5.06	$k_1 = 0.77$ 5.06	$k_1 = 1.14$ 1.85	$k_1 = 1.14$ 1.16
						NZ	$k_1 = 1.0$ 1.74	$k_1 = 0.80$ 4.76	$k_1 = 0.80$ 4.76	$k_1 = 1.0$ 1.74	$k_1 = 1.0$ 1.16

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. F1 load direction is parallel to the supporting timber member and F2 is parallel to the rafter seat.
6. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation. See General Note 'e' on page 15.

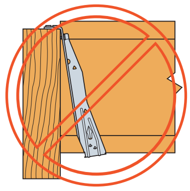
Top-flange hangers



Flush framing
Top flange configuration and thickness of top flange need to be considered for flush frame conditions.



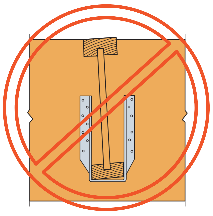
Hanger over-spread
If the hanger is over-spread, it can raise the I-joist above the header and may cause uneven surfaces and squeaky floors.



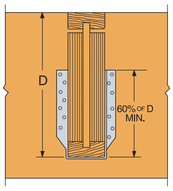
Hanger not plumb
A hanger "kicked-out" from the header can cause uneven surfaces and squeaky floors.

Prevent rotation

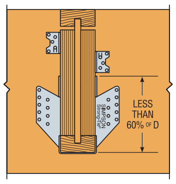
Hangers provide some joist rotation resistance; however, additional lateral restraint may be required for deep joists.



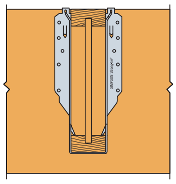
No rotation resistance
Lack of web stiffeners combined with short hanger allows unwanted rotation.



Rotation prevented by web stiffeners
Hanger height should be at least 60% of the joist height.

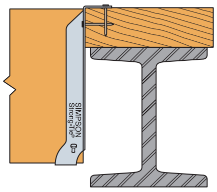


Rotation prevented by web stiffeners
If hanger height is less than 60% of the joist height, add clips or blocking near the top.

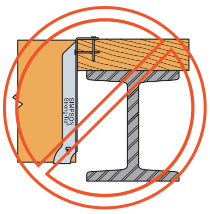


Rotation prevented by lateral flange support
Sides of hanger laterally support the top flange of the I-joist. No web stiffeners required!

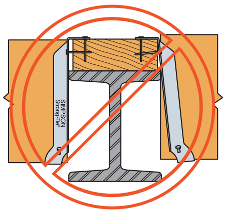
Timber nailers



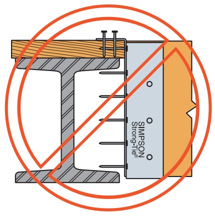
Correct attachment



Nailer too wide
The loading may cause cross-grain bending. As a general rule, the maximum allowable overhang is 6mm, depending on nailer thickness.

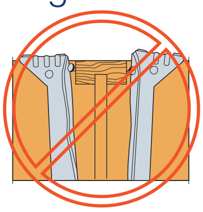


Nailer too narrow
Nailer should be full width.



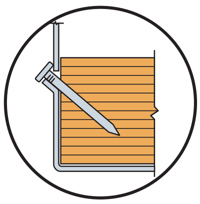
Nailer too thin
or the wrong hanger for the application.

Toenailing

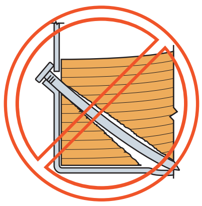


Toenailing causes squeaks and improper hanger installations. Do not toenail I-joists before installing top flange or face mount hangers.

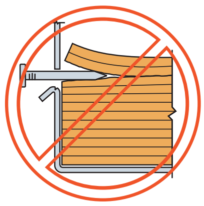
Positive angle nailing



Correct Nailing
Approx. 45° angle



Nail too long



Nail at wrong angle

Timber I-joists

Sloped Joists
For sloped joists up to ¼:12 there is no reduction. For slopes greater than ¼:12 see individual product pages.

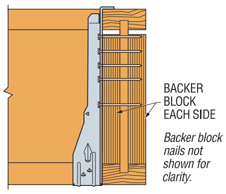
Multiple Joists
Multiple joists should be adequately connected together to act as one unit.

Fasteners
Use the correct nails. Timber may split if the nails are too large. Hanger nails into flanges should not exceed 3.75mm, no longer than 40mm. Nails into web stiffeners should not exceed 90 x 40mm.

Eccentrically-Loaded I-Joists
Supporting a top flange hanger may require bottom flange restraining straps, blocking or directly-applied ceiling systems to prevent rotation at the hanger location.

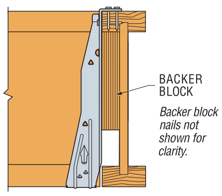
Skewed Joists
Joists may be skewed up to 2½ degrees in a non-skewed hanger without any load reduction. Refer to individual hanger descriptions for information allowing any further skew applications.

I-joist as a header installations



Face mount hanger

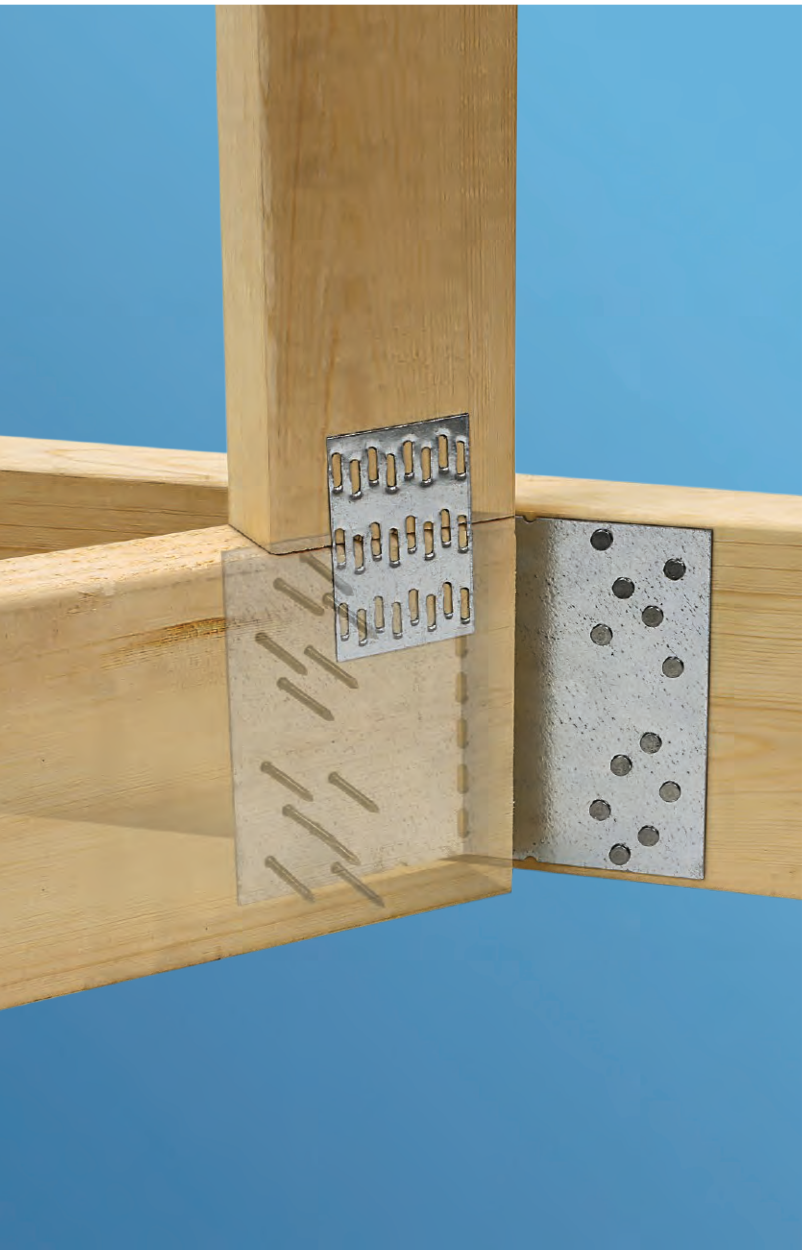
When face mount hangers are attached to I-joist headers, backer blocks must be installed to provide a nailing surface for the hanger nails. The backer blocks should be installed on both sides of the web and attached together with a minimum of 10 – 40mm x 3.75mm nails. The hanger nails should extend through the web. Contact the I-Joist manufacturer for additional design considerations.



Top flange hanger

When top flange hangers are attached to I-joist headers, a backer block must be installed to prevent the top flange from rotating under load. The backer blocks should be installed with a minimum of 10 – 40mm x 3.75mm nails clinched. Check with the joist manufacturer for additional design considerations.

Truss Connectors



TJC Jack Truss Connector

TJC is a versatile connector for jack trusses. Adjustable from 0 to 85 degree (shipped with 67.5 degree bend). Nail hole locations allow for easy installation.

- Minimum nailing option provides faster installation and lower installed cost.
- Can be used back-to-back on a single member (a load reduction applies, see table notes).

TJC

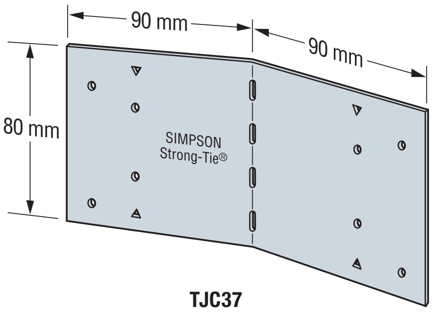
Material: 1.6mm thick.

Finish: Galvanised. See Corrosion Information.

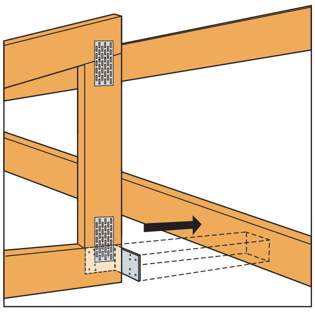
Installation

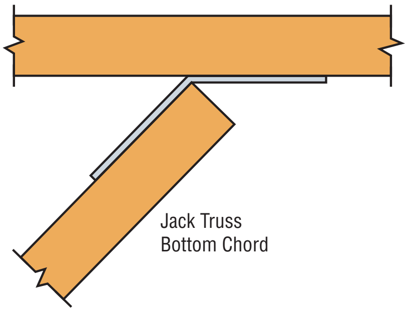
- Use all specified fasteners. See General Notes.
- TJC37 can be installed filling round holes only, or filling round and triangle holes for maximum values.
- To reduce the potential for splitting, install the TJC with a minimum 5mm edge distance on the chord members.
- Position the jack truss on the inside of the bend line with the end of the jack truss flush with the bend line.
- Bend the TJC to the desired position (one bend cycle only).
- No bevel cut required.
- Attachment of TJC to the top chord requires the Designer to check connection geometry for placement on both carried and carrying chord members. See Top Chord Member Sizes table below for suggested chord sizes.
- Supported jack member is a minimum 39mm think.

Typical Installation



TJC37





TJC Technical Data

Model No.	Fasteners (No. – Length x Dia., mm) Carrying Member	Fasteners (No. – Length x Dia., mm) Carried Member	Country	Design Capacity (kN) 0° Floor	0° Roof	1° to 60° Floor	1° to 60° Roof	61° to 67.5° Floor	61° to 67.5° Roof	68° to 85° Floor	68° to 85° Roof
TJC37 (Min)	4 – 30 x 2.8	4 – 30 x 2.8	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 0.69	k_1 = 0.77	k_1 = 0.69	k_1 = 0.77	k_1 = 0.69	k_1 = 0.77
				1.21	1.21	1.20	1.20	1.40	1.40	1.14	1.14
			NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80
				1.21	1.21	1.20	1.20	1.31	1.31	1.14	1.14
TJC37 (Max)	6 – 30 x 2.8	6 – 30 x 2.8	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 0.69	k_1 = 0.77	k_1 = 0.69	k_1 = 0.77	k_1 = 0.69	k_1 = 0.77
				2.69	2.69	2.03	2.03	1.75	1.75	2.04	2.04
			NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80	k_1 = 0.80
				2.45	2.45	1.91	1.91	1.65	1.65	1.93	1.93

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. TJC37 requires a single-ply carried member with minimum 89 x 38mm chord members.
6. For back-to-back installation on a single-ply girder/hip member, use a 0.70 reduction of table loads.
7. Design capacities are for an upward or downward direction.

STCT Roof Truss Clip

The STCT roof truss clip ensures alignment between a roof truss and non-bearing wall when the truss or rafter is not in contact with the top plates of the wall.

- The 38mm slot permits vertical movement of the truss chord when loads are applied.
- Embossed for greater rigidity.

STCT

Material: 1.3mm thick.

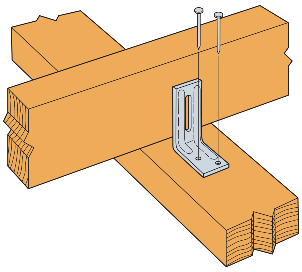
Finish: Galvanised. See Corrosion Information.

Installation

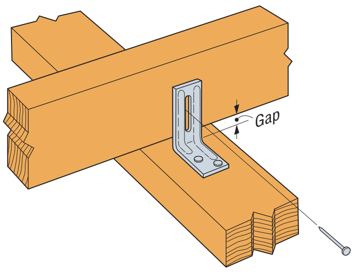
- Use all specified fasteners. See General Notes.
- Install slot nails in the middle of the slot.
- To allow vertical truss movement, nails should not be driven completely flush against the connector.
- Products not intended for floor applications due to the frequency of floor joist deflections and potential for squeaks.

Typical Installation

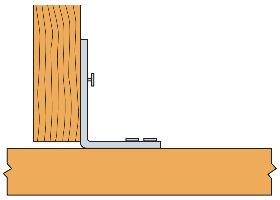
STEP 1: Align on the centre of the top plate and install nails.

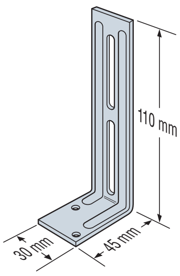


STEP 2: Install nail in centre of slot.

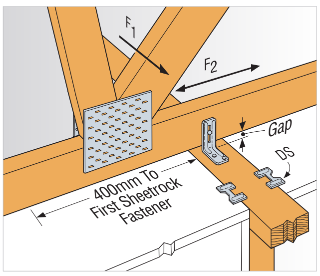


STEP 3: Truss nails not driven flush.





STCT



To allow vertical truss movement, nails should not be driven completely flush against the connector.

Typical STCT installation

STCT Technical Data

Model No.	Fasteners (No. – Length x Dia., mm)	
	Base	Slot
STCT	2 – 30 x 2.8	1 – 30 x 2.8

TC Truss Connector

The TC truss connector is designed to attach trusses to the top of walls. They are typically used at each end of the truss as determined by the Designer.

- Ideal for scissor trusses and can allow up to 32mm of horizontal movement.
- Attaches plated trusses to top plates and sill plates to resist uplift loads.

Material: 1.6mm thick.

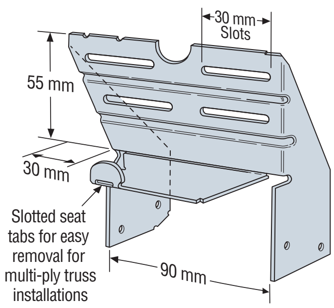
Finish: Galvanised. See Corrosion Information.

TC

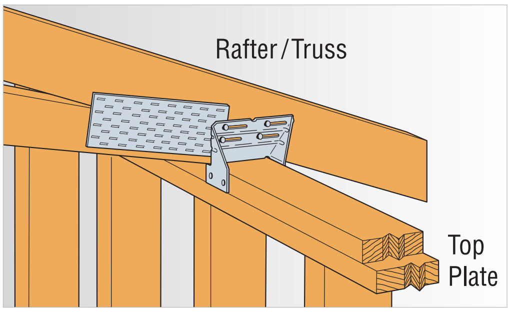
Installation

- Use all specified fasteners. See General Notes.
- Drive 40 x 3.75mm nails into the truss at the inside end of the slotted holes (inside end is towards the centre of the truss and clinch on back side). Do not seat these nails into the truss – allow room under the nail head for movement of the truss with respect to the wall.
- After installation of roofing materials nails may be required to be fully seated into the truss. (As required by the Designer or Truss Designer.)
- Optional TC Installation:
  Bend one flange up 90°. Drive specified nails into the top and face of the top plates or install Titen® screws into the top and face of masonry wall. See optional load tables and installation details.

Typical Installation



TC24



Typical TC24 installation

TC Technical Data

Model No.	Fasteners (No. – Length x Dia., mm)		Country	Design Uplift Capacity (kN)
	Truss	Plate		
TC24	4 – 75 x 3.75	4 – 75 x 3.75	AU	k_1 = 1.14
				2.06
			NZ	k_1 = 1.0
				1.94

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Nail values based on a single truss member with a minimum breadth of 38mm.

HTC Heavy Truss Clip

The HTC roof truss clip ensures alignment between a roof truss and non-bearing wall when the truss or rafter is not in contact with the top plates of the wall. Designed for applications where high lateral capacity is needed.

- The 63.5mm slot permits vertical movement of the truss chord when load are applied.
- Embossed for greater rigidity.
- The S/HTC is available for steel truss applications.


HTC

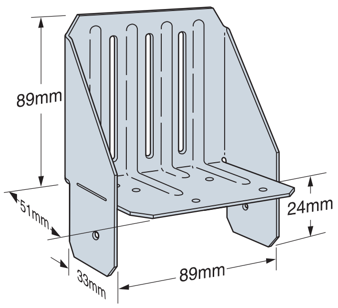
Material: 1.3mm thick.

Finish: Galvanised. See Corrosion Information.

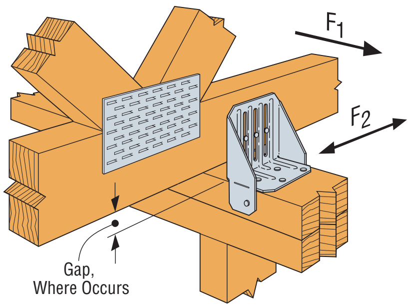
Installation

- Use all specified fasteners. See General Notes.
- Install slot nails in the middle of the slot.
- To allow vertical truss movement, nails should not be driven completely flush against the connector.
- Products not intended for floor applications due to the frequency of floor joist deflections and potential for squeaks.

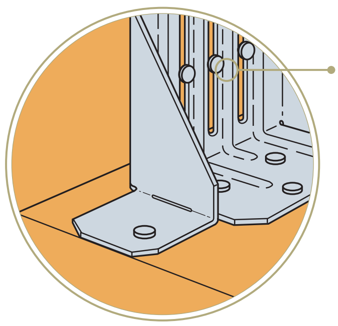
Typical Installation



HTC4



Typical HTC4 installation on a 90 x 45mm plate



Typical HTC4 installation on a 140 x 45mm or larger plate

HTC Technical Data

Model No.	Dimensions (mm)	Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN) Without Gap[5]		Design Capacity (kN) With 32mm Gap[6]	
	Top Plate (Min.)	Base	Slot		F1	F2	F1	F2
HTC4	90 x 45	6 – 75 x 3.75	3 – 75 x 3.75	AU	$k_1 = 1.14$	$k_1 = 1.14$	$k_1 = 1.14$	$k_1 = 1.14$
					2.39	1.85	0.38	0.76
				NZ	$k_1 = 1.0$	$k_1 = 1.0$	$k_1 = 1.0$	$k_1 = 1.0$
					2.25	1.75	0.36	0.72
	140 x 45	6 – 75 x 3.75	3 – 75 x 3.75	AU	$k_1 = 1.14$	$k_1 = 1.14$	$k_1 = 1.14$	$k_1 = 1.14$
					2.79	1.57	0.95	0.72
				NZ	$k_1 = 1.0$	$k_1 = 1.0$	$k_1 = 1.0$	$k_1 = 1.0$
					2.62	1.48	0.90	0.68

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Truss or rafter must be bearing on top plate to achieve the Design Capacities under "Without Gap."
6. When installed with maximum 32mm space between rafter or truss and top plate use loads under "With 32mm Gap." Where loads are not required, space is not limited to 32mm.

TCP Truss Clip

The TCP truss clip provides a connection between girders, trusses and rafters and top plates to provide resistance to high-wind loads. It is also ideal for strongback attachments and as an all-purpose connector where one member crosses another.

- The speed prong provides temporary attachment for ease of installation.
- Obround holes make driving nails easier.

TCP38

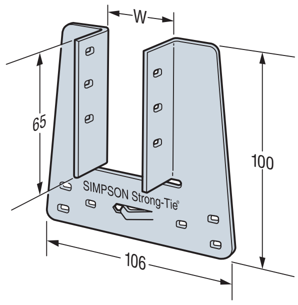
Material: 0.9mm thick.

Finish: Galvanised. See Corrosion Information.

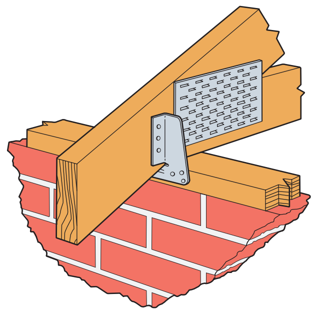
Installation

- Use all specified fasteners. See General Notes.

Typical Installation



TCP


Typical TCP installation

TCP Technical Data

Model No.	Truss/Rafter (mm)	Width (mm)	Fasteners (No. – Length x Dia., mm) To Truss	Fasteners (No. – Length x Dia., mm) To Plate	Country	Design Uplift Capacity (kN)
TCP38	35	38	6 – 40 x 3.75	6 – 40 x 3.75	AU	k_1 = 1.14 1.83
					NZ	k_1 = 1.0 1.72
TCP47	45	47	6 – 40 x 3.75	6 – 40 x 3.75	AU	k_1 = 1.14 2.19
					NZ	k_1 = 1.0 2.07
TCP50	50	50	6 – 40 x 3.75	6 – 40 x 3.75	AU	k_1 = 1.14 1.83
					NZ	k_1 = 1.0 1.72

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.

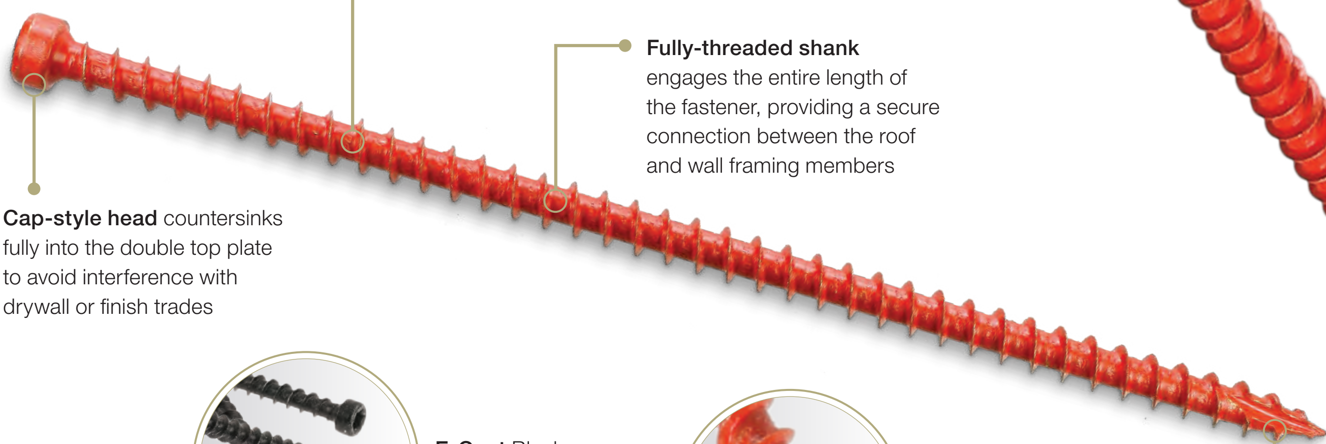
Strong-Drive® SDWC **TRUSS** Screw

Truss/Rafter-to-Plate and Stud-to-Plate Connection Screws

The SDWC Truss screw is tested in accordance with ICC-ES AC233 (screw) and AC13 (wall assembly and roof-to-wall assembly) for uplift and lateral loads between wall plates and vertical wall framing and between the top plate and the roof rafters or trusses. SDWC15450 is recognised for use in chemically treated timber as described in the evaluation report.

Orange color for easy inspection of 152mm screws

6-Lobe Drive reduces cam out, enabling easier driving



Fully-threaded shank engages the entire length of the fastener, providing a secure connection between the roof and wall framing members

Cap-style head countersinks fully into the double top plate to avoid interference with drywall or finish trades

E-Coat Black electrocoating for 115mm screws

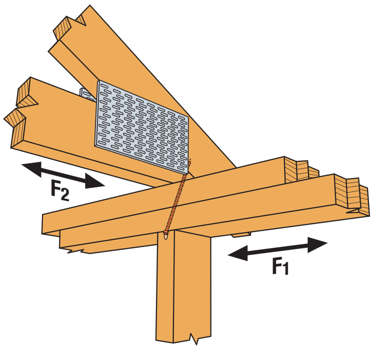
Type-17 point for faster starts and easier driving

Material: Carbon steel

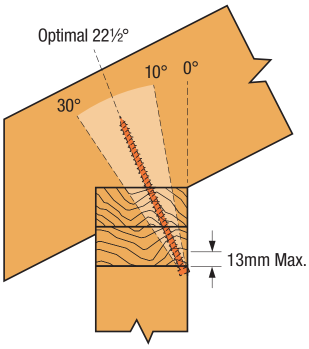
Finish: SDWC15450—E-Coat™; SDWC15600—Clear Zinc Coating (with Orange Topcoat)

Installation: See General Notes.

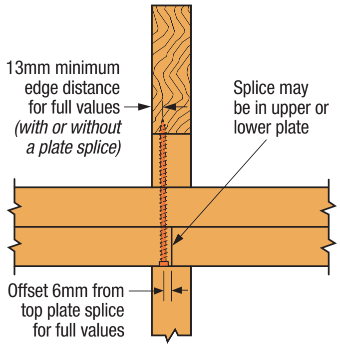
Typical Roof-to-Wall Connection



Typical SDWC installation – truss aligned with stud
(Offset truss similar)

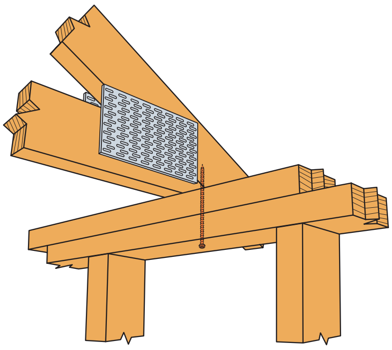


Installation angle limit

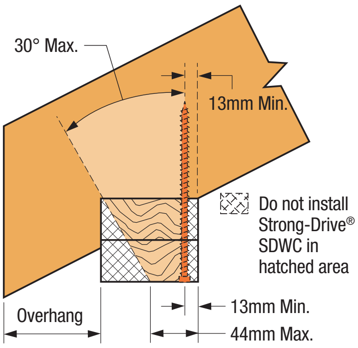


Min. edge distance for top plate splice

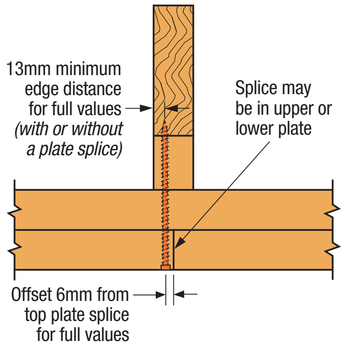
Optional Roof-to-Wall Connection



Optional SDWC installation – truss offset from stud

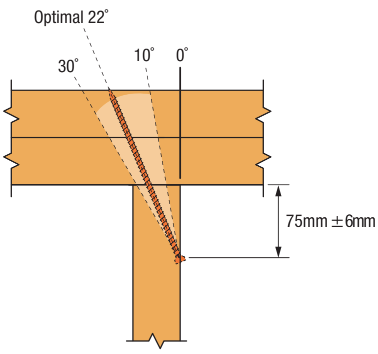


Allowable installation range
(Truss offset from stud only)

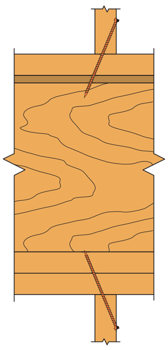


Min. edge distance for top plate splice

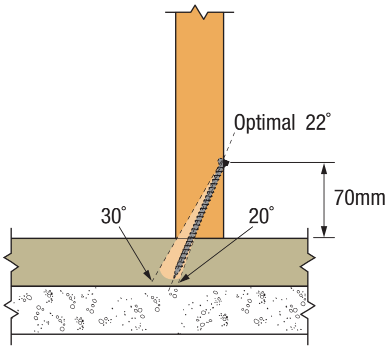
Stud-to-Plate Connections



Stud-to-top plate connection
(This application requires SDWC15600)



Stud-to-bottom plate connection over timber floor
(SDWC15600 shown)



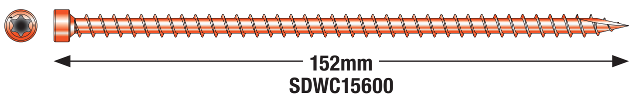
Stud-to-bottom plate connection over concrete/masonry foundation
(This application requires SDWC15450)

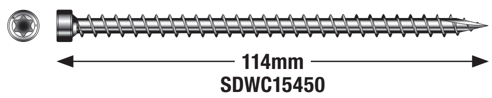
Truss Connectors

Product and Packaging Information

SDWC15450-KT and SDWC15600-KT contains:

- (50) Strong-Drive® SDWC screws
- (1) Matched-tolerance driver bit
  (Part no. BIT30T-2-RC3; also sold separately)
- (1) Metal installation guide tool
  - SDWC-GUIDE *(for SDWC15600 only; also sold separately)* or
  - SDWC-GUIDE275 *(for SDWC15450 only; also sold separately)*





Strong-Drive SDWC TRUSS Screw Specifications for Australian Design

Fastener Model	Fastener Length (mm)	Thread Length (mm)	Diameter (mm)			Fastener Strength		
			Head	Major	Minor	Bending Yield Strength (MPa)	Tension (kN)	Shear (kN)
SDWC15450	114	108	8.31	5.97	3.86	1345	15.5	10.9
SDWC15600	152	146						

1. For the purposes of measuring overall length, fasteners shall be measured from the top of the head to the end of the point. Length of thread includes the point.
2. Bending yield strength is the 5%-offset value based on the minor diameter as determined following ASTM F1575.
3. Tension and shear properties are average ultimate values. Shear strength is shear through the threads.

Characteristic Single-Shear Lateral Design Values for the Strong-Drive SDWC Truss Screws

Fastener Model	Fastener Length (mm)	Thread Length (mm)	Side Member		Main Member		Lateral Characteristic Design Value, Q_{kL} (N)			
			Thickness (mm)	Grain	Min. Thickness (mm)	Grain	Q_{kL} para		Q_{kL} perp	
							JD4	JD5	JD4	JD5
SDWC15450	114	108	38	Face	38	End	—	—	2220	2220
SDWC15600	152	146	2–38	Face	38	Edge	4200	3500	5300	5100
			38	Face	38	End	—	—	2950	2650
			2–38	Face	38	End	—	—	4650	4150

1. The Main Member is the part where the fastener tip is embedded; the Side Member is part adjacent to the head.
2. Minimum penetration into the main member shall be 25mm.
3. The main and side members shall be sawn timber or structural composite timber with the design density or equivalent design density typical of JD4 and JD5 grades.
4. Characteristic design values shall be multiplied by applicable adjustment factors from AS 1720.1.
5. Screws shall be installed into the side grain of the wood side member with the screw axis at a 90-degree angle to the surface of the member.
6. Para: Parallel-to-grain loading in the side member and perpendicular-to-grain loading in the main member.
7. Perp: Perpendicular-to-grain loading in the side member and perpendicular-to-grain loading in the main member, except where the main member is loaded parallel-to-grain.

Characteristic Withdrawal and Pull-Through for the Strong-Drive SDWC Truss Screws

Fastener Model	Thread Length (mm)	Thread Length (mm)	Main Member		Withdrawal Characteristic Design Value, Q_{kw} (N/mm)		Pull-Through Characteristic Design Value, Q_{kp} (N/mm)	
			Min. Thickness (mm)	Grain	JD4	JD5	JD4	JD5
SDWC15450	114	108	38	Edge	133	84	—	—
SDWC15600	152	146	38	End	78	50	96	82
			38	Face	110	75	108	97
			2–38	Face	118	102	131	105

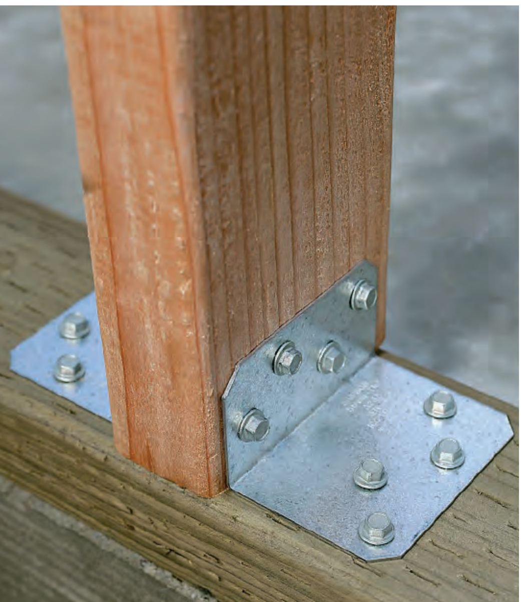
1. Withdrawal and pull-through characteristic values are in N/mm of thread penetration into the main member and side member, respectively.
2. Face and edge installations are at 90 degrees to the grain and end installation is along the grain.
3. Withdrawal and Pull-through loads shall be checked against tension strength in design.

Connection Geometry for Strong-Drive SDWC Truss Screws

Condition		Minimum Distance or Spacing (mm)	
		SDWC15450	SDWC15600
Edge Distance	Load in any direction	30	30
End Distance	Load Along Grain Toward End	60	60
	Load Along Grain Way From End	60	60
	Loading Across Grain	60	60
Spacing Between Fasteners in a Row	Loaded Along Grain	90	90
	Loaded Across Grain	60	60

1. Edge distances, end distances, and spacing of screws shall be sufficient to prevent splitting of the timber or as required in this table, or when applicable, as recommended by the structural composite timber manufacturer, whichever is more restrictive.
2. Edge and end distances based on AS 1720.1, Table 4.8.

Bracing and Tiedowns



WBT Wall Brace Tensioner

The WBT is an easy-to-use wall strap-brace tensioner that takes the slack out of strap bracing, saving time over other methods. With the ability to pull as much as 20mm of slack out of a single strap, the WBT can play an important role in reducing deflection in braced wall panels. It resists tension loads only and should be used in pairs (one of each X-brace strap).

- Can be used on bracing up to 32mm wide.
- Includes tensioning bridge, bolt and nut.

Material: 3mm thick.

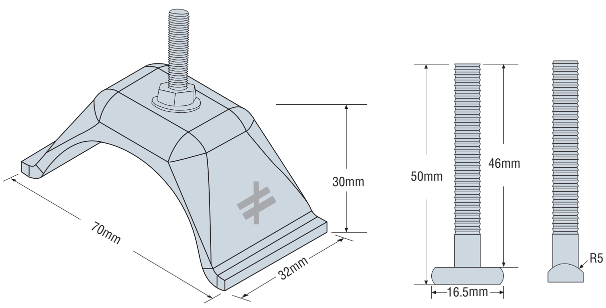
Finish: Galvanised. See Corrosion Information.

S/WBT32

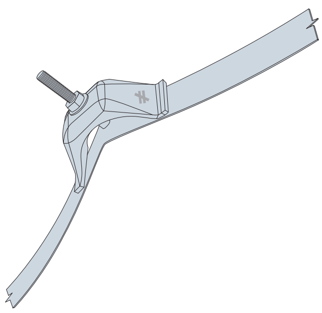
Installation

- Place WBT near centre of diagonal wall brace.
- Install bolt through strap and WBT with nut facing towards the wall cavity.
- Tightening the nut requires 10mm hex head deep socket setter. Tighten until the slack is taken out of the strap.

Typical Installation



S/WBT32



Typical S/WBT32 installation

WBT Technical Data

Model No.	Dimensions (mm)		
	W	L	H
S/WBT32	32	70	30

CS Coiled Straps

CS are continuous utility straps which can be cut to length on the jobsite. Packaged in lightweight (about 18kg) cartons.

- Provides maximum versatility – no need to shop for straps of a particular length
- Always have the right strap when you need it

Material: See table below.

Finish: Galvanised. See Corrosion Information.

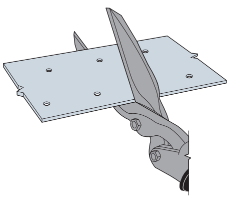
Installation

- Use all specified fasteners. See General Notes.
- Timber shrinkage after strap installation across horizontal timber members may cause strap to buckle outward.
- Refer to the applicable code for minimum nail penetration and minimum timber edge and end distances.
- The table shows the maximum design capacities and the nails required to obtain them. Fewer nails may be used; reduce the design capacities as shown in footnote #3.
- The cut length of the strap shall be equal to twice the "End Length" noted in the table plus the clear span dimension.

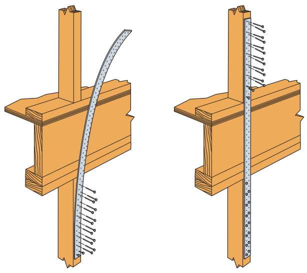
CS

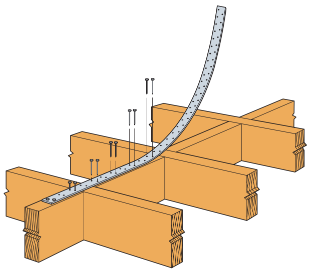
Typical Installation

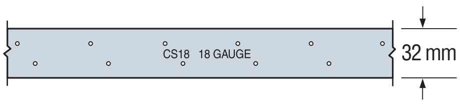
STEP 1: Cut strap to required length.



STEP 2: Use half the required nails in each member being connected. (No nails required in clear span.)







CS18 *(CS20 similar)*

CS Technical Data

Model No.	Total Length (m)	Thickness (mm)	Fasteners (No. – Length x Dia., mm)	End Length (mm)	Country	Design Tension Capacity (kN)
CS18	61	1.3	16 – 75 x 3.75	229	AU	$k_1 = 1.14$ 9.31
					NZ	$k_1 = 1.0$ 7.12
			18 – 30 x 2.8		AU	$k_1 = 1.14$ 6.32
					NZ	$k_1 = 1.0$ 4.68
CS20	76	1.0	12 – 75 x 3.75	153	AU	$k_1 = 1.14$ 7.22
					NZ	$k_1 = 1.0$ 5.28
			14 – 30 x 2.8		AU	$k_1 = 1.14$ 5.00
					NZ	$k_1 = 1.0$ 3.60

1. Design Capacity is the minimum of the steel strap design tensile capacity calculated in accordance with AS/NZS 4600 and the structural joint design capacity using the applicable the k modification factors following AS 1720.1 and NZS 3603.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Use half of the required nails in each member being connected to achieve the listed loads.
6. Calculate the connector value for a reduced number of nails as follows: Design capacities = (No. of nails used)/(No. of nails in table) X table load
7. Tension loads apply for uplift when installed vertically.

A/GA/ULT Framing and Reinforcing Angles

Our line of angles provides a way to make a wide range of 90° connections.

- The A35 anchor's exclusive bending slot allows instant, accurate field bends for all two- and three-way ties. Balanced, completely reversible design permits the A35 to secure a great variety of connections.
- The GA Gusset Angles' embossed bend section provides added strength.
- The ULT's pre-bent angle speeds up onsite installation.

Material: See table on next page.

Finish: Galvanised, Some products available in stainless steel. See Corrosion Information.

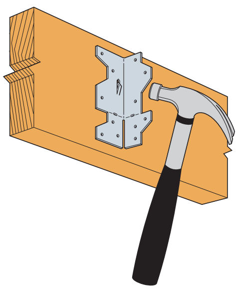
Installation

- Use all specified fasteners. See General Notes.

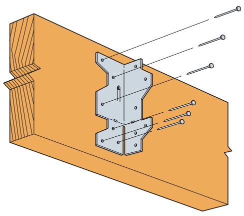
A35 Typical Installation

TWO-WAY CONNECTION

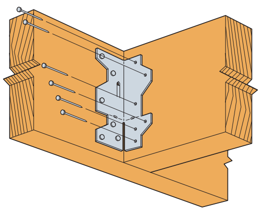
STEP 1: Use speed prong to temporarily hold A35 in place.



STEP 2: Install nails as shown.

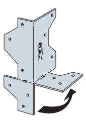


STEP 3: Install nails as shown.

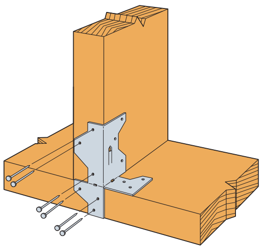


THREE-WAY CONNECTION

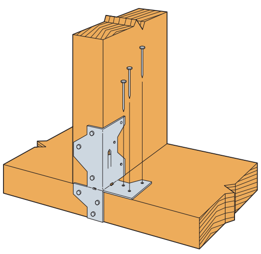
STEP 1: Field bend tab to match framing configuration.



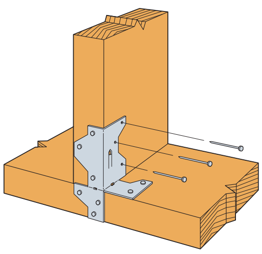
STEP 2: Use speed prong to temporarily hold A35 in place. Install nails as shown.

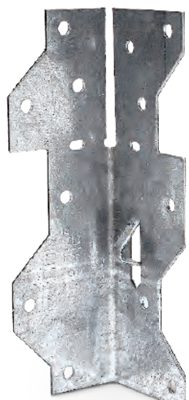


STEP 3: Install nails as shown.



STEP 4: Install nails as shown.

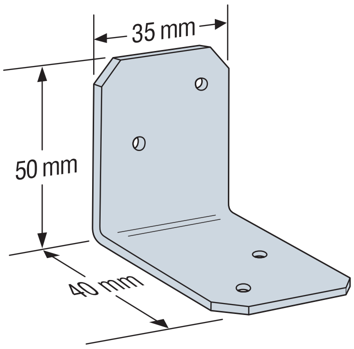




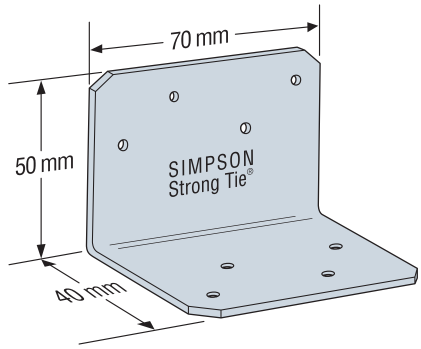
A35

A21

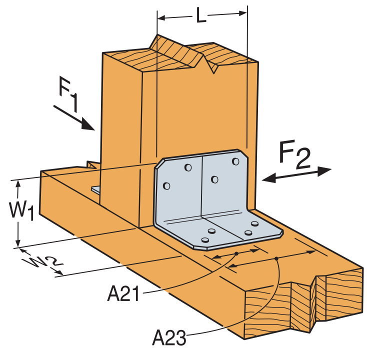
GA1



A21



A23

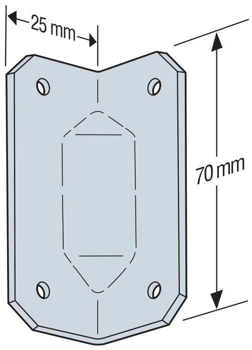


Typical A21/A23 installation

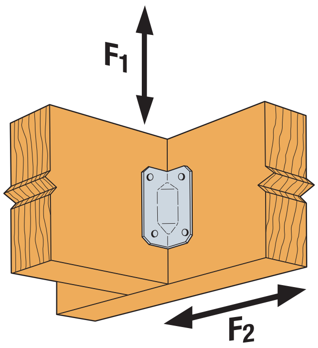
A21 and A23 Technical Data

Model No.	Dimensions (mm)		Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)	
	W1	W2	Base	Post		F1[5]	F2
A21	50	40	2 – 40 x 3.75	2 – 40 x 3.75	AU	k_1 = 1.14 1.03	k_1 = 1.14 0.43
					NZ	k_1 = 1.0 0.97	k_1 = 1.0 0.41
A23	50	40	4 – 40 x 3.75	4 – 40 x 3.75	AU	k_1 = 1.14 1.33	k_1 = 1.14 1.77
					NZ	k_1 = 1.0 1.33	k_1 = 1.0 1.66

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Connectors are required on both sides to achieve F1 loads in both directions.
6. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation. See General Note 'e' on page 15.



GA1

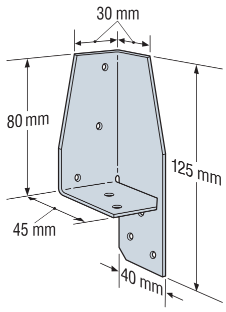


Typical GA1 installation

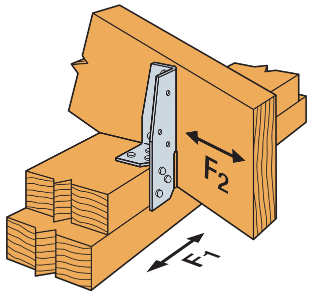
GA Technical Data

Model No.	Fasteners (No. – Length x Dia., mm)	Direction of Load	Country	Design Capacity (kN)		
				Floor	Roof	Wind/EQ
GA1	4 – 40 x 3.75	F1	AU	k_1 = 0.69 1.38	k_1 = 0.77 1.38	k_1 = 1.14 1.38
			NZ	k_1 = 0.80 1.38	k_1 = 0.80 1.38	k_1 = 1.0 1.38
		F2[5]	AU	k_1 = 0.69 1.30	k_1 = 0.77 1.30	k_1 = 1.14 1.30
			NZ	k_1 = 0.80 1.23	k_1 = 0.80 1.23	k_1 = 1.0 1.23

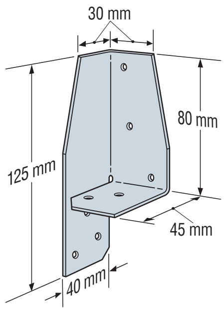
1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Connectors are required on both sides to achieve F2 loads in both directions.
6. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation. See General Note 'e' on page 15.



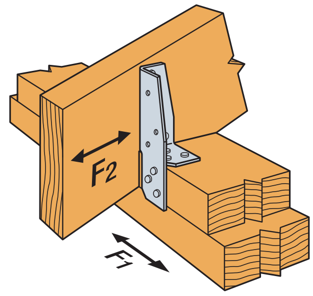
ULT-L (Left)



Typical ULT-L installation



ULT-R (Right)

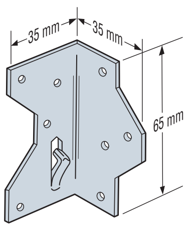


ULT-R (Right)

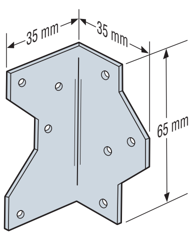
ULT Technical Data

Model No.	Thickness (mm)	Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
		To Rafter/Truss	To Plates		Uplift	Lateral F1	Lateral F2
ULT	1.3	3 – 40 x 3.75	5 – 40 x 3.75	AU	k_1 = 1.14	k_1 = 1.14	k_1 = 1.14
					2.87	0.55	0.68
				NZ	k_1 = 1.0	k_1 = 1.0	k_1 = 1.0
					2.60	0.52	0.64

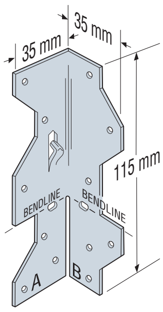
1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Design capacities are for one cyclone tie.
6. Design capacities in the F1 direction are not intended to replace diaphragm boundry members or resist cross-grain bending of the truss or rafter members.
7. When cross-grain bending or cross-grain tension cannot be avoided in the members, mechanical reinforcement to resist such forces may be considered.8
8. Cyclone ties installed on the outside of the wall assume a minimum 90mm overhang of the rafter/truss member.



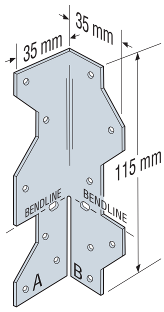
A34



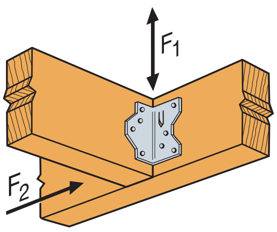
A34SS



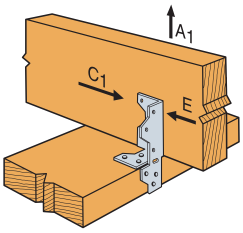
A35



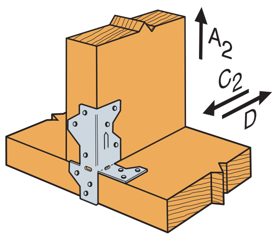
A35SS



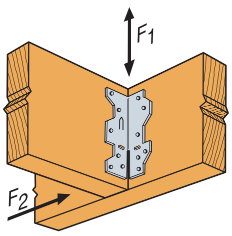
1 A34



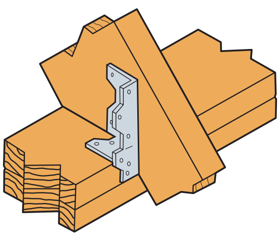
2 A35



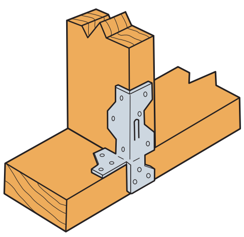
3 A35



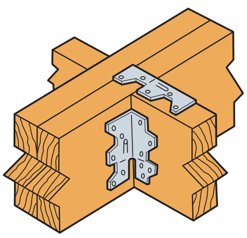
4 A35



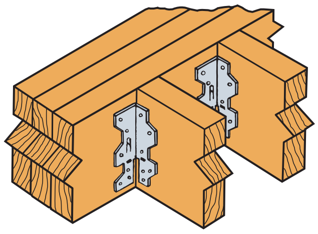
Joists to Plate
with A Leg Inside



Studs to Plate
with B Leg Outside



Joists to Beams



Ceiling Joists to Beam

A34 and A35 Technical Data

Model No.	Dimension (mm)		Type of Connection	Fasteners (No. – Length x Dia., mm)	Direction of Load	Country	Design Capacity (kN)		
	W1	W2					Floor	Roof	Wind/EQ
A34	35	35	1	8 – 30 x 2.8	F1	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.99	0.99	0.99
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.93	0.93	0.93
					F2[7]	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.95	0.95	0.95
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.90	0.90	0.90
A35	35	35	2	9 – 30 x 2.8	A1, E	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							1.40	1.47	1.47
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							1.21	1.21	1.38
					C1	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.44	0.44	0.44
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.42	0.42	0.42
			3	12 – 30 x 2.8	A2	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							1.40	1.57	1.68
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							1.21	1.21	1.51
					C2	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.86	0.86	0.86
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.81	0.81	0.81
					D	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							1.05	1.05	1.05
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.99	0.99	0.99
			4	12 – 30 x 2.8	F1	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							2.21	2.21	2.21
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							2.08	2.08	2.08
					F2[7]	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							1.43	1.43	1.43
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							1.34	1.34	1.34
A34SS	35	35	1	8 – 30 x 2.8	F1	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.67	0.67	0.67
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.63	0.63	0.63
					F2[7]	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.65	0.65	0.65
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.61	0.61	0.61
A35SS	35	35	2	9 – 30 x 2.8	A1, E	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.88	0.88	0.88
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.83	0.83	0.83
					C1	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.31	0.31	0.31
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.29	0.29	0.29
			3	12 – 30 x 2.8	A2	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							1.26	1.26	1.26
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							1.18	1.18	1.18
					C2	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.65	0.65	0.65
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.61	0.61	0.61
					D	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							0.84	0.84	0.84
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							0.79	0.79	0.79
			4	12 – 30 x 2.8	F1	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							1.76	1.76	1.76
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							1.66	1.66	1.66
					F2[7]	AU	k_1 = 0.69	k_1 = 0.77	k_1 = 1.14
							1.14	1.14	1.14
						NZ	k_1 = 0.80	k_1 = 0.80	k_1 = 1.0
							1.08	1.08	1.08

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Design capacities are for one part. When parts are installed on each side of the joist, the minimum joist beadth is 75mm.
6. Some illustrations show connections that could cause cross–grain tension or bending of the timber during loading if not reinforced sufficiently. In this case, mechanical reinforcement should be considered.
7. Connectors are required on both sides to achieve F2 load in both directions.
8. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation. See General Note 'e' on page 15.

TSP/SP Stud Plate Ties

The TSP and SP4 stud plate ties are two versatile solutions for connecting the stud to the top and bottom wall plates.

- The TSP connects from one side and is suitable for single bottom plates and double top plates.
- The SP4 wraps around the plate, requires no nailing into the plate and is suitable for single bottom plates and double top plates.

Material: TSP—1.6mm thick; SP—1.0mm thick.

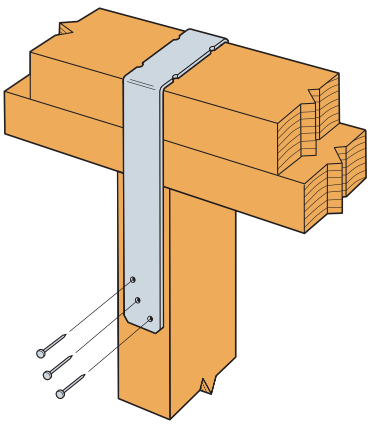
Finish: Galvanised. See Corrosion Information.

Installation

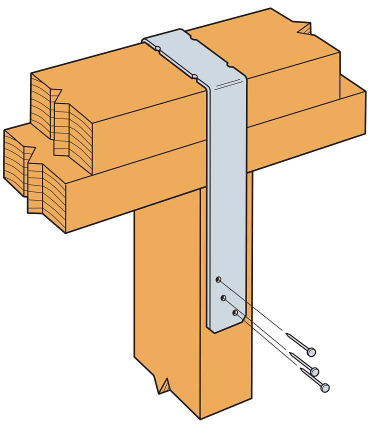
- Use all specified fasteners. See General Notes.

Typical Installation

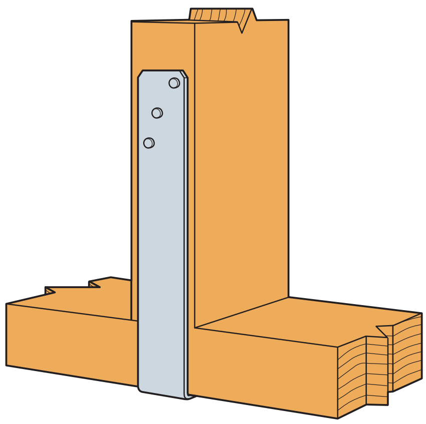
STEP 1: Place SP4 over plates, lined up with studs (as shown). Install specified fasteners into studs.

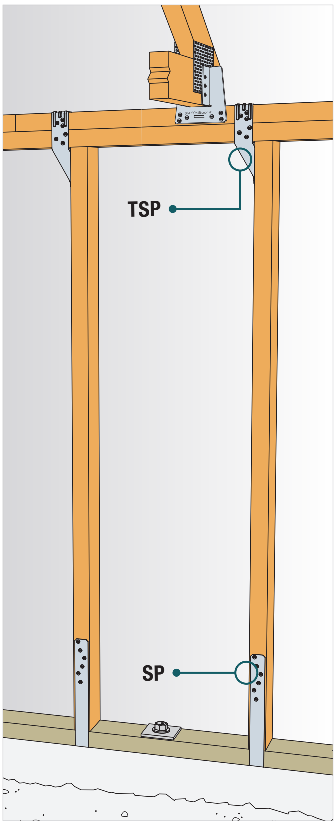


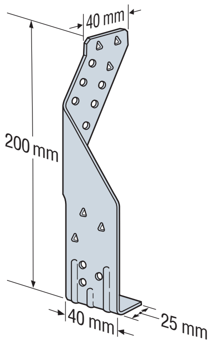
STEP 2: Install specified fasteners into studs.



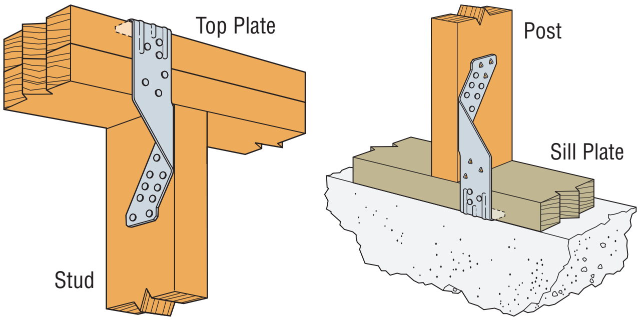
OPTION 2: Installation at bottom of stud similar.



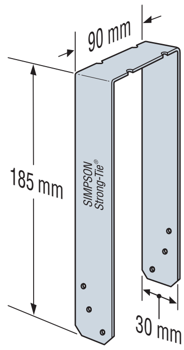




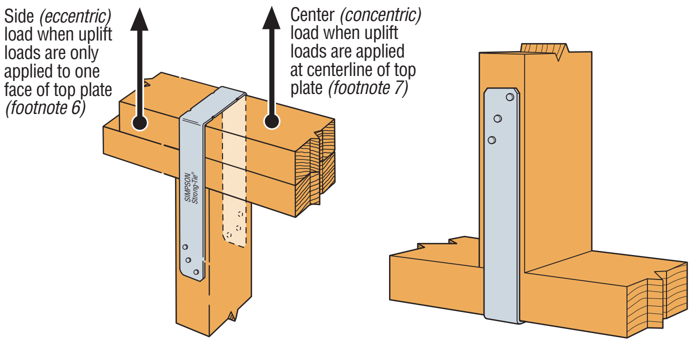
TSP



Typical TSP installation



SP



Typical SP4 installation

TSP Technical Data

Model No.	Dimensions (mm)		Fasteners (No. – Length x Dia., mm)			Country	Design Uplift Capacity (kN)	
	W	L	Studs	Dbl Top Plate	Single Sill Plate		Double Top Plate	Single Sill Plate
TSP	40	200	6 – 40 x 3.75	—	3 – 40 x 3.75	AU	$k_1 = 1.14$ —	$k_1 = 1.14$ 2.19
						NZ	$k_1 = 1.0$ —	$k_1 = 1.0$ 2.06
			9 – 40 x 3.75	6 – 40 x 3.75	—	AU	$k_1 = 1.14$ 4.60	$k_1 = 1.14$ —
						NZ	$k_1 = 1.0$ 4.33	$k_1 = 1.0$ —
				6 – 75 x 3.75		AU	$k_1 = 1.14$ 5.46	$k_1 = 1.14$ —
						NZ	$k_1 = 1.0$ 5.14	$k_1 = 1.0$ —

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.

SP Technical Data

Model No.	Dimensions (mm)		Plate Width	Fasteners (No. – Length x Dia., mm)		Country	Design Uplift Capacity (kN)	
	W	L		Stud	Plate		Side	Centre
SP4	90	185	90	6 – 40 x 3.75	—	AU	$k_1 = 1.14$ 2.25	$k_1 = 1.14$ 4.49
						NZ	$k_1 = 1.0$ 2.25	$k_1 = 1.0$ 4.49

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. When cross-grain bending or cross-grain tension cannot be avoided, mechanical reinforcement to resist such forces should be considered.
6. Use Side (eccentric) load when uplift loads are applied to only one face of the top plate.
7. Use Center (concentric) loads when uplift loads are applied at the centerline of the top plate, or where equal loads are applied to both sides of the top plate. Center loads should also be used for stud to bottom plate loads.

RR Ridge Rafter Connector

The RR ridge rafter connector provides a solid connection between rafter and ridge beam.

- Interlocking top-flange design eliminates interference and helps ensure rafter alignment.
- May be used with rafters sloped up to 30°.
- For face-mount applications, the top flange can be bent up straight and nailed off.
- Diamond holes allow for attachment to rafter prior to attachment to ridge.

Material: 1.2mm thick.

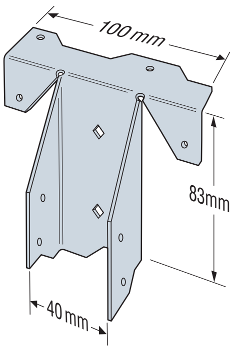
Finish: Galvanised. See Corrosion Information.

RR

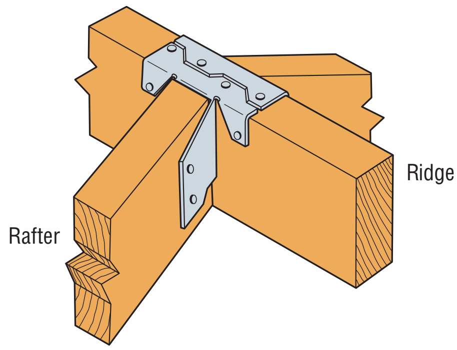
Installation

- Use all specified fasteners. See General Notes.

Typical Installation



RR



Typical RR installation

RR Technical Data

Model No.	Min Rafter Size		Fasteners (No. – Length x Dia., mm)		Country	Design Capacity (kN)		
	W	H	Header	Rafter		Uplift	Download	
							Floor	Roof
RR	40	83	4 – 40 x 3.75	4 – 40 x 3.75	AU	k_1 = 1.14	k_1 = 0.69	k_1 = 0.77
						0.34	2.16	2.16
					NZ	k_1 = 1.0	k_1 = 0.80	k_1 = 0.80
						0.32	2.03	2.03

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.

H Hurricane Tie

Hurricane ties provide a positive connection between the truss/rafter and the wall of the structure to resist wind and seismic forces.

- The H2.5A connects the truss/rafter to the top plate and is available in galvanised and stainless steel for extra corrosion protection.
- The H3 connects the truss/rafter to the top plate and is available in galvanised and stainless steel for extra corrosion protection.
- The H6 wraps from the stud up and over the top plate for a high-strength connection. It can also be used as a stud-to-band-joist connection.

Material: See table on next page.

Finish: Galvanised, Some products available in stainless steel. See Corrosion Information.

H2.5A

H3

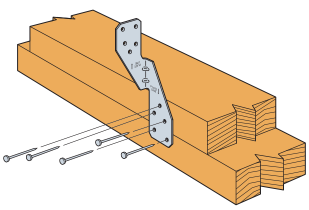
H6

Installation

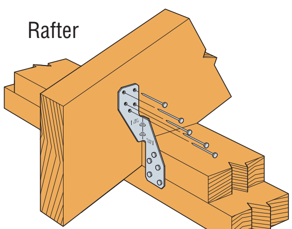
- Use all specified fasteners. See General Notes.
- H3 and H6 ties are shipped in equal quantities of right and left versions *(right versions shown)*.
- Hurricane ties do not replace solid blocking.
- When installing ties on plated trusses *(on the side opposite the truss plate)* do not fasten through the truss plate from behind. This can force the truss plate off of the truss and compromise truss performance.

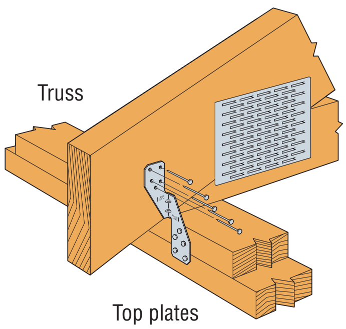
H2.5A Typical Installation

STEP 1: Install specified fasteners into the top plates.

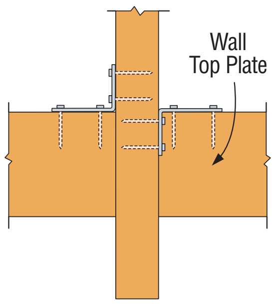


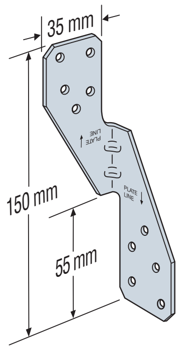
STEP 2: Install specified fasteners into the truss or rafter.



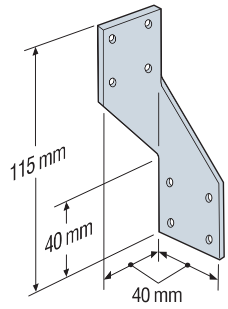


STEP 3: Install diagonally across from each other, as shown. Both connectors shall be same model.

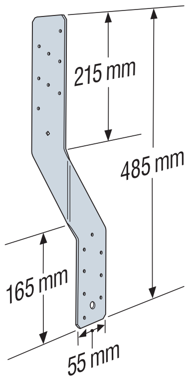




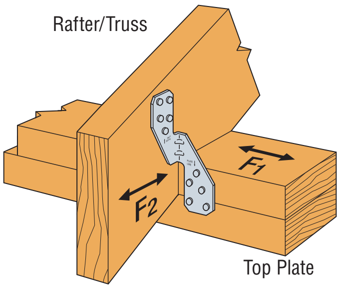
H2.5A
(H2.5SS similar)



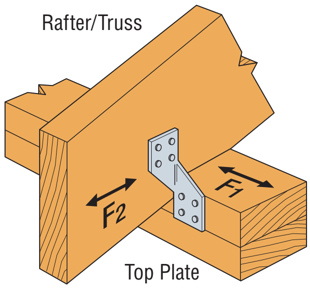
H3
(H3SS similar)



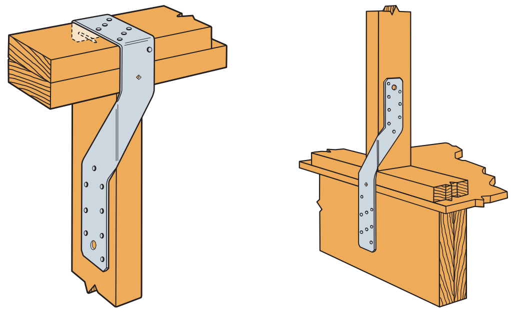
H6



Typical H2.5A installation



Typical H3 installation



Stud to top plate installation

Stud to band joist

Typical H6 installation

H Technical Data

Model No.	Thickness (mm)	Fasteners (No. – Length x Dia., mm)			Country	Design Capacity (kN)		
		To Rafter/Truss	To Plates	To Studs		Uplift	Lateral F1	Lateral F2
H2.5A	1.3	5 – 30 x 2.8	5 – 30 x 2.8	—	AU	k_1 = 1.14 2.35	k_1 = 1.14 0.49	k_1 = 1.14 0.48
					NZ	k_1 = 1.0 2.32	k_1 = 1.0 0.49	k_1 = 1.0 0.48
H2.5ASS	1.3	5 – 30 x 2.8	5 – 30 x 2.8	—	AU	k_1 = 1.14 1.88	k_1 = 1.14 0.34	k_1 = 1.14 0.34
					NZ	k_1 = 1.0 1.85	k_1 = 1.0 0.34	k_1 = 1.0 0.34
H3	1.3	4 – 30 x 2.8	4 – 30 x 2.8	—	AU	k_1 = 1.14 1.98	k_1 = 1.14 0.31	k_1 = 1.14 0.76
					NZ	k_1 = 1.0 1.86	k_1 = 1.0 0.29	k_1 = 1.0 0.76
H3SS	1.3	4 – 30 x 2.8	4 – 30 x 2.8	—	AU	k_1 = 1.14 1.34	k_1 = 1.14 0.31	k_1 = 1.14 0.76
					NZ	k_1 = 1.0 1.26	k_1 = 1.0 0.29	k_1 = 1.0 0.76
H6	1.6	—	8 – 30 x 2.8	8 – 30 x 2.8	AU	k_1 = 1.14 3.47	k_1 = 1.14 —	k_1 = 1.14 —
					NZ	k_1 = 1.0 3.47	k_1 = 1.0 —	k_1 = 1.0 —

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral loading.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Design capacities are for one cyclone tie.
6. Design capacities in the F1 direction are not intended to replace diaphragm boundry members or resist cross-grain bending of the truss or rafter members.
7. When cross-grain bending or cross-grain tension cannot be avoided in the members, mechanical reinforcement to resist such forces may be considered.
8. Cyclone ties installed on the outside of the wall assume a minimum 90mm overhang of the rafter/truss member.
9. Simpson Strong-Tie stainless-steel connectors require stainless-steel fasteners.
10. For continuous load path, hurricane ties and stud to plate ties (reference page 73) must be on the same side of the wall.

Outdoor Structures

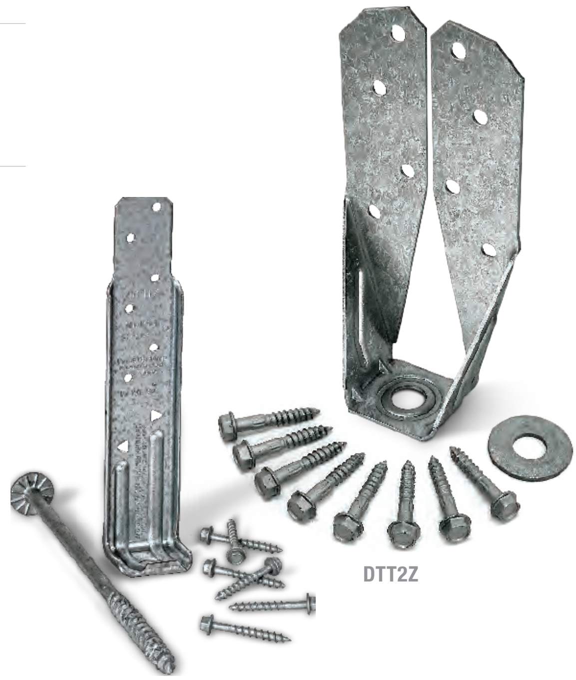
DTT Deck Tension Ties

The DTT1Z and DTT2Z tension ties are safe, cost-effective connectors designed to help build stronger, safer decks that meet or exceed code requirements. The DTT1 is an easy-to-install method to provide a lateral-load connection between the deck and the adjacent structure. The DTT2 can be used for the lateral-load connection as well, but is ideal for the installation of guardrail posts that are able to resist the lateral forces that occur at the top of railing assemblies.

- The DTT1Z provides a lateral connection from the outside of the house, eliminating the need to connect to joists inside the structure (which typically requires drywall removal).
- The DTT2Z simplifies the building of safe, code-compliant guard rails by anchoring the posts back into the deck framing for a more secure attachment. A stronger and more reliable connection than through bolting or lag screws, it is available ZMAX® galvanised or in stainless steel for maximum corrosion protection.
- Both DTTs include the Strong-Drive SDS® Heavy-Duty Connector screws needed to attach to framing. The DTT2Z also includes a washer to place in the seat during installation.

Material: 2mm thick.

Finish: DTT1Z/DTT2Z galvanised—ZMAX® coating; DTT2SS—stainless steel. See Corrosion Information



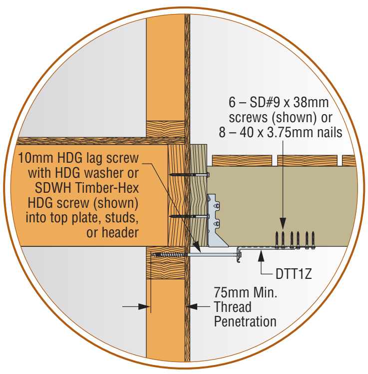
DTT2Z

DTT1Z-KT

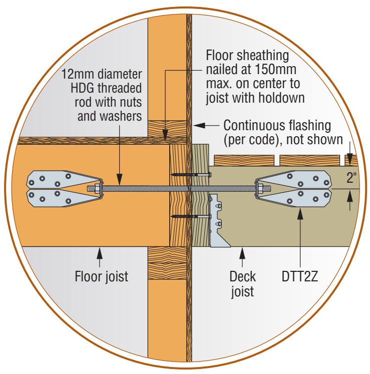
Installation

- The DTT1Z fastens to the narrow or wide face of a single 45mm member using Strong-Drive SDS Heavy-Duty Connector screws or nails and can be fastened to the structure with the Strong-Drive SDWH Timber Hex HDG screw (included). Alternatively it can be attached to the structure using an M10 machine bolt, anchor bolt or lag screw (washer required).
- The DTT2Z fastens to the narrow or wide face of a single 45mm member using Strong-Drive SDS screws or nails and can be fastened to the structure with an M12 machine bolt or anchor bolt.
- The DTT2Z requires a standard cut-washer installed between the nut and the seat (included).
- Strong-Drive® SDS screws install best with a low-speed, high-torque drill with a ⅜" hex-head driver.
- Watch an installation video; www.strongtie.com/videolibrary/dtt1z.html

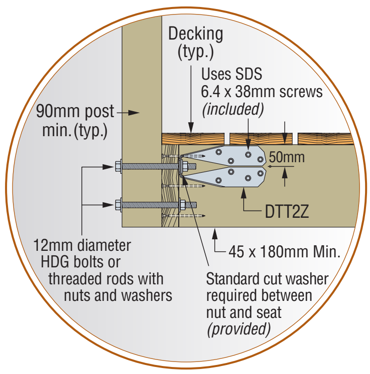
Typical Installation



Typical DTT1Z Deck-to-House Lateral-load Connection
For more information on lateral-load connections, see technical bulletin T-DECKLATLOAD

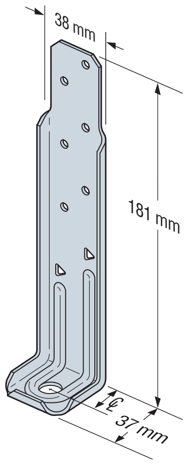


Typical DTT2Z Deck-to-House Lateral-load Connection
For more information on lateral-load connections, see technical bulletin T-DECKLATLOAD

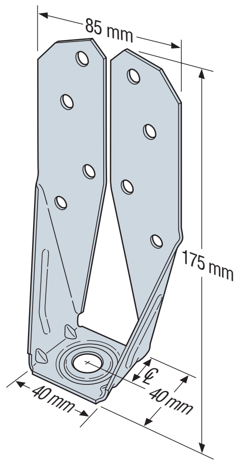


DTT2Z Installed as a Lateral Connector for a Deck Guardrail Post
For more information on guardrail post connections, see technical bulletin T-GRDRLPST.

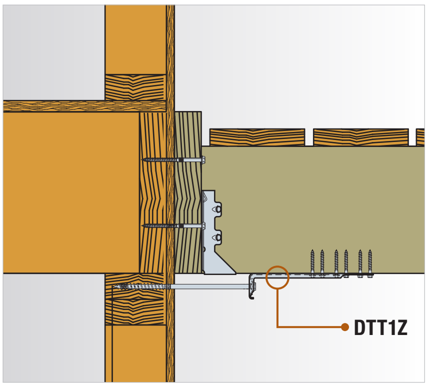
SIMPSON Strong-Tie



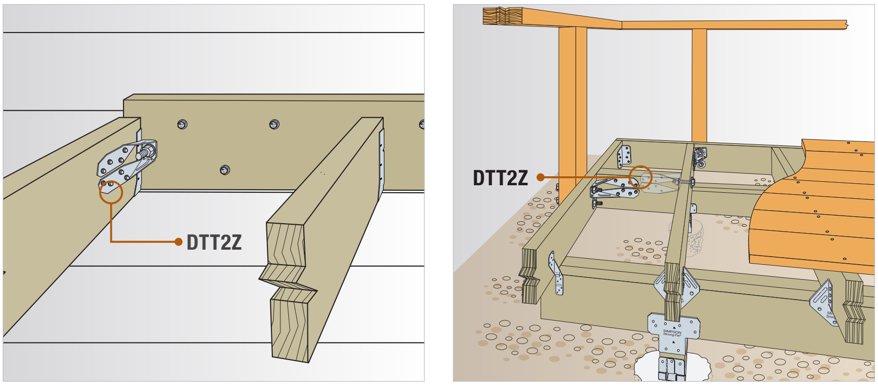
DTT1Z



DTT2Z
(DTT2SS similar)



DTT1Z installation



Horizontal DTT2Z installation

DTT Technical Data

Model No.	Dimensions (mm)					Fasteners		Minimum Timber Member Size (Depth x Breadth, mm)	Country	Design Tension Capacity (kN)
	Strap Thickness	W	H	B	CL	Anchor Bolt Dia (mm)	Post (Nails: No. - Length x Dia., Screws: No. - Dia. x Length, mm)			
DTT1Z-KT	2	38	181	37	19	10	6 – 40 x 3.75	90 x 38	AU	k_1 = 1.14 5.03
									NZ	k_1 = 1.0 4.74
							6 – SD#9 x 38		AU	k_1 = 1.14 4.43
									NZ	k_1 = 1.0 3.65
DTT2Z	2	85	175	40	21	12	8 – SDS6.4 x 38	90 x 38	AU	k_1 = 1.14 9.37
									NZ	k_1 = 1.0 7.72
								90 x 75	AU	k_1 = 1.14 10.98
									NZ	k_1 = 1.0 9.04

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 6.4mm joint slip, which includes fastener slip, anchor elongation and holdown deformation. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. The DTT2 is also available in stainless steel (DTT2SS). Table loads for DTT2Z apply to the DTT2SS.
6. Simpson Strong-Tie Strong-Drive SD Connector screws are included with the DTT2s. Fasteners for the DTT1Z and HTT4 are sold separately.
7. Anchor bolt nut should be finger tight plus ⅓ to ½ turn with a hand wrench. Care should be taken not to over-tighten the nut.
8. Structural composite timber columns have sides that either show the wide face or the edges of the timber strands/veneers, known as the narrow face.
9. Simpson Strong-Tie stainless-steel connectors require stainless-steel fasteners.
10. Values in the table reflect installation into the wide face.

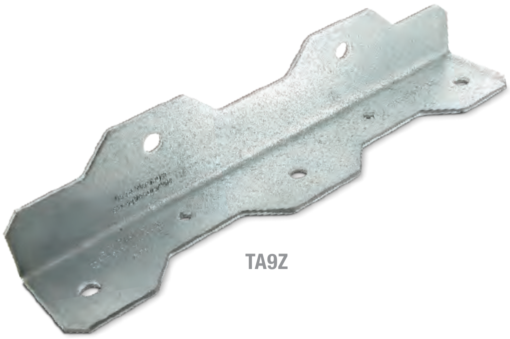
TA Staircase Angles

TA staircase angles make it easier to build structurally sound stairs. Installing stair treads with TA angles instead of notching the stringers saves time and results in a full cross-section stringer.

- Installs easily with Strong-Drive® SDS Heavy-Duty Connector screws; no pre-drilling required.
- Available in stainless steel for applications where maximum corrosion resistance is required.

Material: 2.7mm thick.

Finish: TA9Z—ZMAX coating; TA9SS—stainless steel. See Corrosion Information.

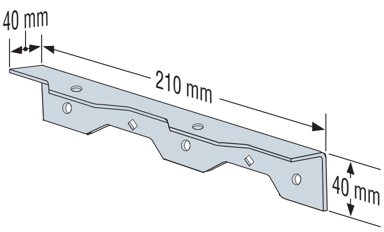


TA9Z

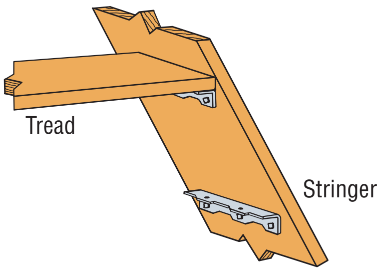
Installation

- Use all specified fasteners. See General Notes.

Typical Installation



TA9Z



Typical TA9Z installation

TA9SS

TA Technical Data

Model No.	Fasteners (No. – Dia. x Length, mm)		Country	Design Download Capacity (kN)
	Stringer	Tread		
TA9Z	3 – SDS6.4 x 38	2 – SDS6.4 x 38	AU	$k_1 = 0.69$ 3.6
			NZ	$k_1 = 0.80$ 4.2
TA9SS[5]	3 – SDS6.4 x 38	2 – SDS6.4 x 38	AU	$k_1 = 0.69$ 3.6
			NZ	$k_1 = 0.80$ 4.2

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Simpson Strong-Tie stainless-steel connectors require stainless-steel fasteners.

LSC Adjustable Stair-Stringer Connector

The LSC adjustable stair-stringer connector offers a versatile, concealed connection between the stair stringer and the carrying header or rim joist while replacing costly framing. Field slopeable to all common stair-stringer pitches, the LSC connector is suitable for either solid or notched stringers.

- Replaces additional framing and toenailing.
- Suitable for most installations on 45 x 250mm or 45 x 300mm header/rim joist.
- May be installed flush with the top of the carrying member or lower on the face.
- Interchangeable for left or right applications.
- LSCZ features a ZMAX® coating for additional corrosion protection. Suitable for interior and some exterior applications.

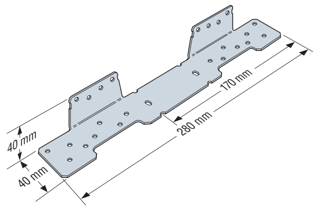
Material: 1.3mm thick.

Finish: LSCZ—ZMAX coating; LSCSS—stainless steel. See Corrosion Information.

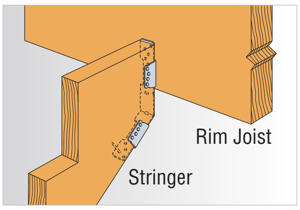
Installation

- Use all specified fasteners. See General Notes.
- Before fastening, position the stair stringer with the LSC on the carrying member to verify where the bend should be located.
- Tabs on the LSC must be positioned to the inside of the stairs.
- The fastener that is installed into the bottom edge of the stringer must go into the second-to-last hole.

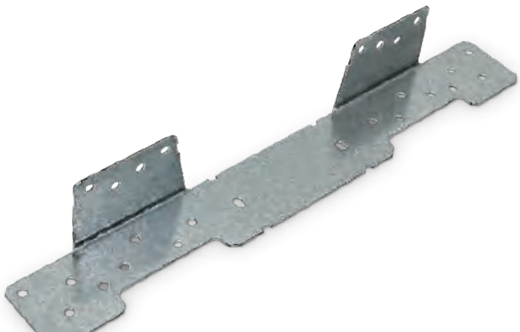
Typical Installation



LSC



Typical LSC installation



LSCZ

LSC Technical Data

Model No.	Rim Joist Installation	Fasteners (Nails: No. - Length x Dia., Screws: No. - Dia. x Length, mm)			Country	Design Download Capacity (kN)
		Rim Joist[6]	Stringer Wide Face	Stringer Narrow Face		
LSCZ LSCSS[5]	Supported[8]	8 – 40 x 3.75	8 – 40 x 3.75	1 – 40 x 3.75	AU	k_1 = 0.69 3.47
					NZ	k_1 = 0.80 3.26
		8 – SD#9 x 38	8 – SD#9 x 38	—	AU	k_1 = 0.69 2.33
					NZ	k_1 = 0.80 1.92
	Standard	8 – 40 x 3.75	8 – 40 x 3.75	1 – 40 x 3.75	AU	k_1 = 0.69 4.14
					NZ	k_1 = 0.80 3.89
		8 – SD#9 x 38	8 – SD#9 x 38	1 – SD#9 x 38	AU	k_1 = 0.69 4.14
					NZ	k_1 = 0.80 3.41
	Cantilever	8 – 40 x 3.75	8 – 40 x 3.75	1 – 40 x 3.75	AU	k_1 = 0.69 2.24
					NZ	k_1 = 0.80 2.11
		8 – SD#9 x 38	8 – SD#9 x 38	—	AU	k_1 = 0.69 3.07
					NZ	k_1 = 0.80 2.53

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Simpson Strong-Tie stainless-steel connectors require stainless-steel fasteners
6. When cross-grain bending or cross-grain tension cannot be avoided in the members, mechanical reinforcement to resist such forces may be considered.
7. A minimum distance of 19mm measured from the lowest rim-joist fastener to edge of rim joist is required.
8. Simpson Strong-Tie SD#9 x 38 Strong-Drive SD Connector screws may be substituted for 40 x 3.75 nails to achieve published nail values if the extra screw is installed in the narrow face of stringer.

RT Rigid Tie Connectors

The Rigid Tie™ RTC series secures two timber members to a vertical post forming a 90° corner. The RTC42 and RTC44 are heavy-duty structural connectors.

- RTA—connects two 45mm timber members at a 90° angle.
- RTF—connects two members in a "pass-through" application.

Material: RTA – 1.6mm thick; all others 1.3mm thick.

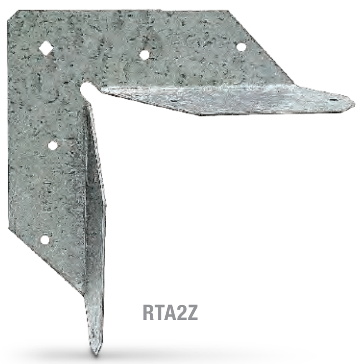
Finish: Galvanised; Some products available in ZMAX® coating. See Corrosion Information.

Installation

- Use all specified fasteners. See General Notes.
- Install vertical members first, then attach horizontal members for easier alignment.
- Seat timber member in bracket with a C-clamp before securing to aid positioning and prevent skewing.
- Always follow manufacturer's instructions when using power tools and building equipment.

To learn more about the new WBSK Workbench and Shelving Unit Hardware Kit that includes RTC2Zs, fasteners and plans to build a workbench or shelving unit, visit ***www.diydoneright.com****.*

RTC2Z

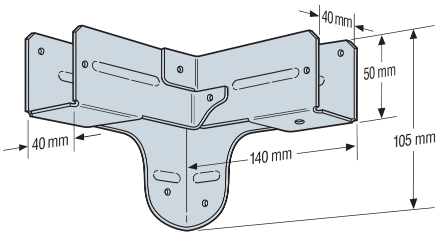


RTA2Z

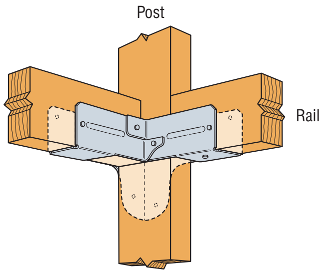
RTF2Z

RTT2Z

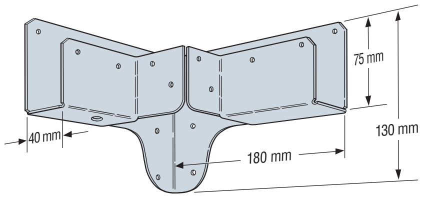
Typical Installation



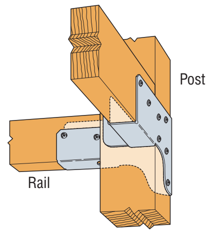
RTC2Z



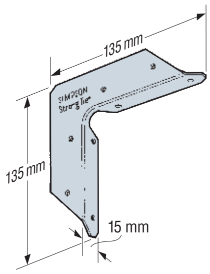
Typical RTC2Z installation



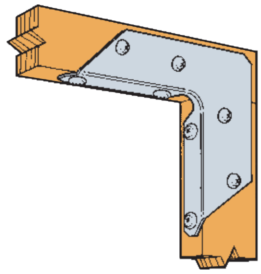
RTC42



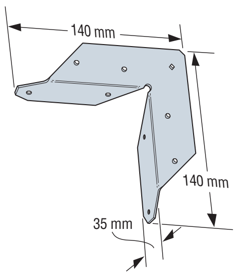
Typical RTC42 installation



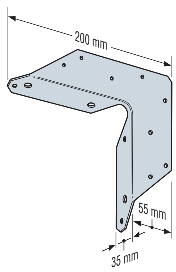
RTA12



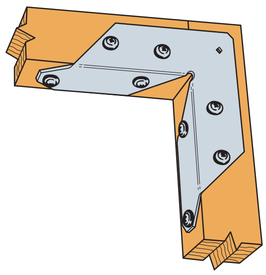
Typical RTA12 installation



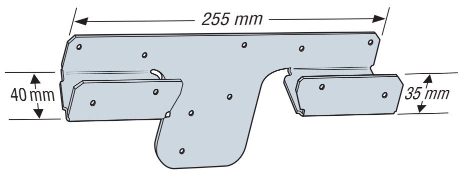
RTA2Z



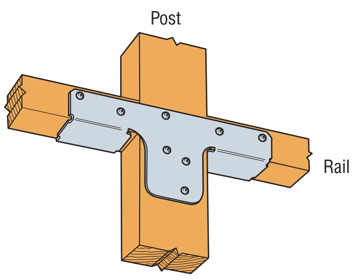
RTA4



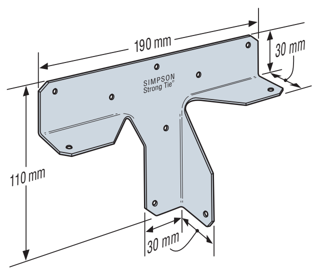
Typical RTA2Z installation



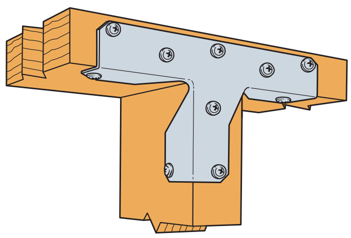
RTF2Z



Typical RTF2Z installation



RTT22Z



Typical RTT22Z installation

RT Technical Data

Model No.	Post Size (mm)	Joist Size (mm)	Fasteners (No. – Length x Dia., mm)		Country	Design Download Capacity (kN)	
			Joist	Joist		Floor	Roof
RTC2Z	90 x 38	38	6 – 75 x 3.75	6 – 75 x 3.75	AU	k_1 = 0.69	k_1 = 0.77
						2.05	2.05
					NZ	k_1 = 0.80	k_1 = 0.80
						1.93	1.93
			6 – SD#8 x 32	6 – SD#8 x 32	AU	k_1 = 0.69	k_1 = 0.77
						0.9	0.9
					NZ	k_1 = 0.80	k_1 = 0.80
						0.74	0.74
			6 – SD#9 x 38	6 – SD#9 x 38	AU	k_1 = 0.69	k_1 = 0.77
						3.01	3.01
					NZ	k_1 = 0.80	k_1 = 0.80
						2.48	2.48
RTC42	90 x 90	38	14 – SD#8 x 32	8 – SD#8 x 32	AU	k_1 = 0.69	k_1 = 0.77
						1.98	1.98
					NZ	k_1 = 0.80	k_1 = 0.80
						1.63	1.63
			14 – SD#10 x 38	8 – SD#10 x 38	AU	k_1 = 0.69	k_1 = 0.77
						7.90	7.90
					NZ	k_1 = 0.80	k_1 = 0.80
						6.51	6.51
RTA12	19	19	8 – SD#8 x 32	8 – SD#8 x 32	AU	k_1 = 0.69	k_1 = 0.77
						—	—
					NZ	k_1 = 0.80	k_1 = 0.80
						—	—
RTA2Z	38	38	4 – SD#9 x 38	4 – SD#9 x 38	AU	k_1 = 0.69	k_1 = 0.77
						0.37	0.37
					NZ	k_1 = 0.80	k_1 = 0.80
						0.31	0.31
RTA4	90	89	7 – SD#8 x 32	5 – SD#8 x 32	AU	k_1 = 0.69	k_1 = 0.77
						—	—
					NZ	k_1 = 0.80	k_1 = 0.80
						—	—
RTF2Z	90 x 38	38	4 – SD#9 x 38	8 – SD#9 x 38	AU	k_1 = 0.69	k_1 = 0.77
						1.86	1.86
					NZ	k_1 = 0.80	k_1 = 0.80
						1.53	1.53
RTT22Z	38	38	3 – SD#9 x 38	7 – SD#9 x 38	AU	k_1 = 0.69	k_1 = 0.77
						2.73	2.73
					NZ	k_1 = 0.80	k_1 = 0.80
						2.25	2.25

1. Design Capacity is the lesser of (1) the Characteristic Capacity multiplied by the Australian Capacity Factor, or the NZ Strength Reduction Factor (ϕ), and applicable the k modification factors following AS 1720.1 and NZS 3603 and (2) the Serviceability Capacity which is the load at 3.2mm joint slip. Design Capacity is the minimum of test data and structural joint calculation.
2. For Australia, the Capacity Factor (ϕ) is 0.85 for nails and screws for structural joints in a Category 1 application. Reduce tabulated values where other Category applications govern. For NZ, the Strength Reduction Factor (ϕ) is 0.80 for nails in lateral load and 0.70 for other fasteners.
3. Duration of Load Factor (k_1) is as shown. Reduce Duration of Load Factor where applicable. Capacities may not be increased.
4. Timber species for joint design is seasoned Radiata Pine, which is Australia Joint Group JD4 per AS 1720.1 Table H2.4 and New Zealand Joint Group J5 per NZS 3603 Table 4.1.
5. Design capacities must be equally distributed on both joists.

RFC/PPJ Round and Square Post Connectors

The RFC fence connectors help make building a strong fence with round posts and rails easier.

- The rounded flanges are designed to cradle the timber to provide support and a secure connection.
- RFC is available for 80mm and 120mm posts, and both sizes install with 10mm bolts or screws (not included).

The PPJ post bases are ideal for small, non-load-bearing projects as well as temporary structures. They are not recommended for structural applications or non-top-supported installations such as fences.

Material: RFC—2.0mm thick; PJRB100—2.0mm thick; PPJBT—2.5mm thick.

Finish: Galvanised. See Corrosion Information.

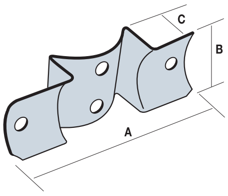
Installation

- Use all specified fasteners. See General Notes.
- RFC—10mm diameter Hot-dipped galvanised bolts or screws.
- PPJ—Post: 10mm diameter Hot-dipped galvanised bolts or screws.
  Base: Mechanical anchor (WA10083MG) or AT-HP™ anchoring adhesive and threaded rod (RFB10X130HDG).

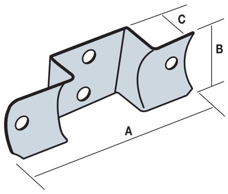
Caution

This range is not suitable for structural applications.

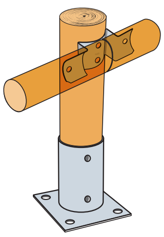
Typical Installation



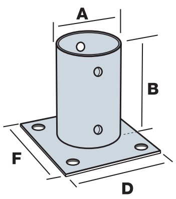
RFC80/120



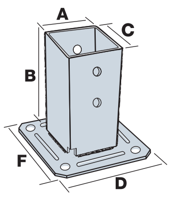
RFCP80



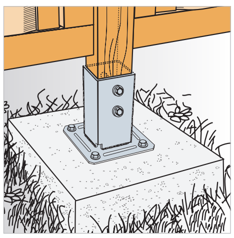
Typical RFC80/120 with PPJRB installation



PPJRB



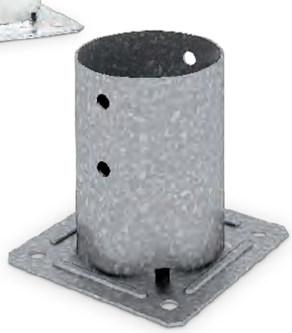
PPJBT



Typical PPJBT installation

RFCP80

PPJBT



PPJRB

RFC Technical Data

Model No	Dimensions (mm)			Bolts	Post Size (mm)
	A	B	Thickness		
RFC80/120	185	70	2	4	80–120
RFCP80	195	70	2	4	80

1. Not designed for structural use.

PPJ Technical Data

Model No	Post Type	Dimensions (mm)							Bolts	
		A	B	C	D	E	Tube Thickness	Base Thickness	Tube	Base
PPJRB100	Round	101	150	—	150	150	2	2	4	4
PPJBT90	Square	91	150	91	150	150	2	2.5	4	4

1. Not designed for structural use.

SIMPSON Strong-Tie®

PGT® Pipe Grip Ties®

Pipe Grip Ties attach timber fence rails to steel fence posts, eliminating rotted and failed timber posts. The PGT is suitable for standard applications as well as corners and splices.

- The PGT1.5Z-R is for 38mm pipe (48mm outside diameter).
- The PGT2Z-R for 50mm pipe (60mm outside diameter).
- The PGTIC2Z-R is an interior corner pipe grip tie.

Material: 2.7mm thick.

Finish: PGT2-R—galvanised; PGTIC2Z, PGT1.5Z, PGT2Z-R—ZMAX® coating. See Corrosion Information.

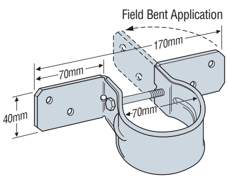
Installation

- Use all specified fasteners. See General Notes.
- PGTIC2Z-R to Post - install two set screws (supplied) with ⅜" hex socket in predrilled holes.
- PGTIC2Z-R to Rails - use Simpson Strong-Tie® Strong-Drive® 6.4 x 38mm SDS Heavy-Duty Connector screws (not supplied).
- Install on vertical pipes, offsetting corners to allow for the correct rail alignment.
- Use 3 to 4 PGTs per pipe; line up to stringline.
- Fasten PGT with 6mm hex head bolt (supplied).
- PGT attaches to rails with four 6.4 x 38mm SDS Heavy-Duty Connector screws (not supplied). See SDS screw information.
- 6mm cup head bolts may be used. Follow the code requirements for pre-drilling.
- Nail or screw fence boards to rails.
- Field-bend PGT flanges to fit corner and angled conditions (bend one time only).

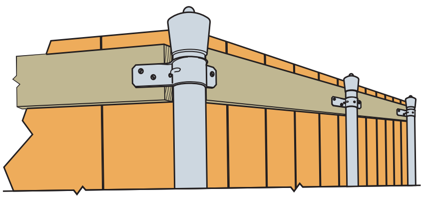
PGT2Z-R

PGTIC2Z-R

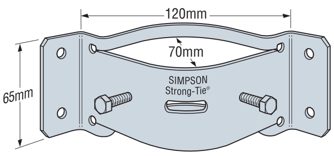
Typical Installation



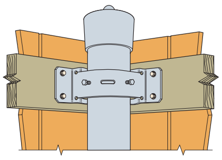
PGT2Z-R
(PGT1.5Z-R similar)



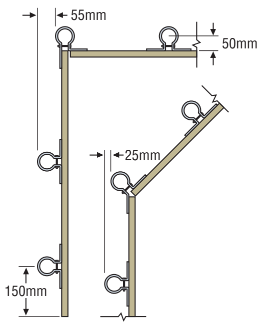
Typical PGT2Z-R installation



PGTIC2Z-R



Typical PGTIC2Z-R installation



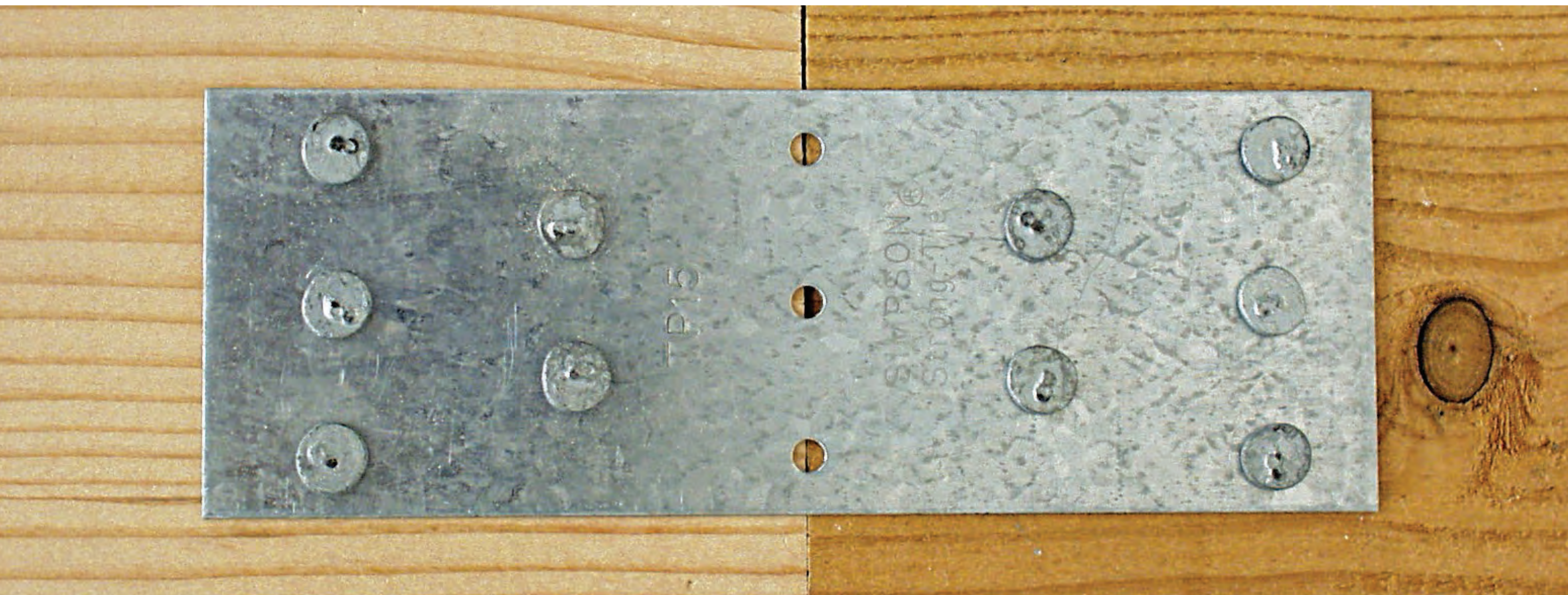
PGT2Z-R corner installation - top view

PGT Technical Data

Model No	Pipe Outer Dia.
PGT1.5Z-R	48mm
PGT2Z-R	60mm
PGTIC2Z-R	48–60mm

1. Not designed for structural use.

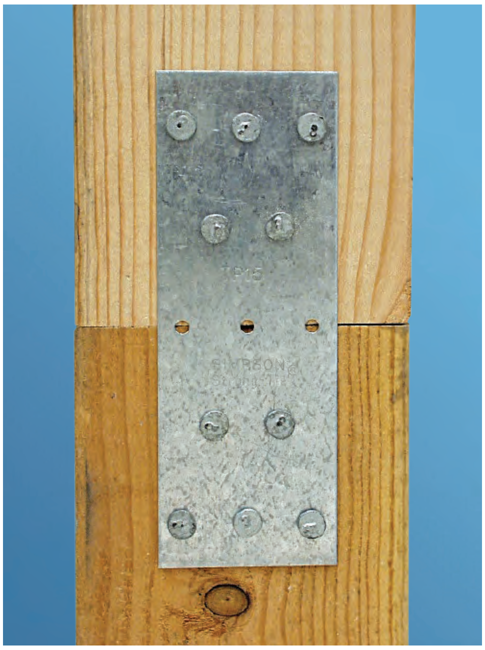
Brackets, Fixes and Miscellaneous



TP Tie Plates

TP tie plates are ideal for a range of reinforcement and repair applications. They can be fastened with nails or Strong-Drive® SD Connector screws.

- Make stronger splices without additional timber or toenailing.
- A range of sizes for any project.



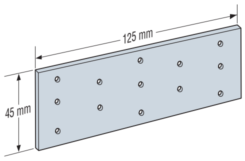
Material: 1mm thick.

Finish: Galvanised. See Corrosion Information.

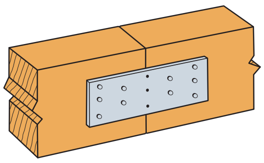
Installation

- Use all specified fasteners. See General Notes.

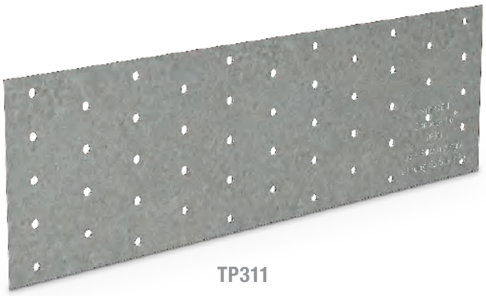
Typical Installation



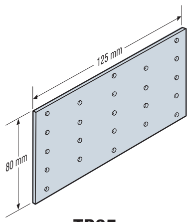
TP15



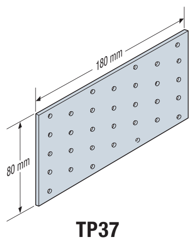
Typical TP15 installation



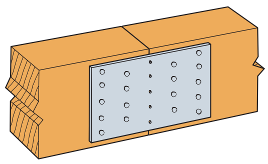
TP311



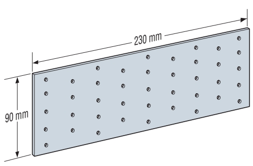
TP35



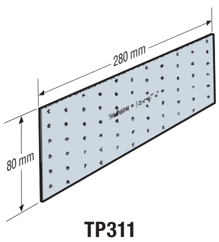
TP37



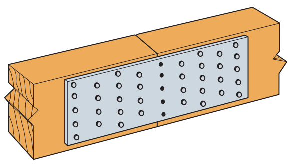
Typical TP35 installation
(TP37 similar)



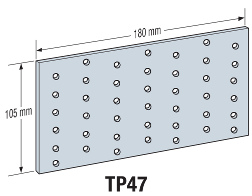
TP39



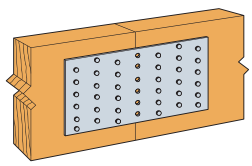
TP311



Typical TP39 installation
(TP311 similar)



TP47



Typical TP47 installation

TP Technical Data

Model No.	Dimensions (mm)	
	W	L
TP15	45	125
TP35	80	125
TP37	80	180
TP39	80	230
TP311	80	280
TP47	105	180

IS Insulation Supports

IS24 insulation supports are cut from specialty wire for optimal flexibility and strength. Support ends secure into the timber allowing the insulation to be installed between joists and rafters.

- Ideal for confined spaces.
- 100 insulation supports covers approximately 21m² with 600mm joist spacing.

IS24

Material: 2mm thick specialty wire.

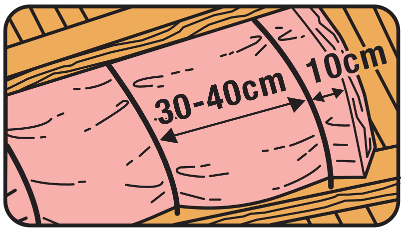
Finish: None. See Corrosion Information.

Installation

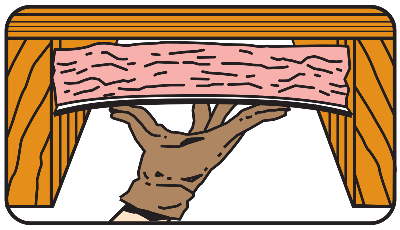
- Follow insulation manufacturer's installation instructions.
- Wear appropriate Personal Protection Equipment (PPE).

Typical Installation

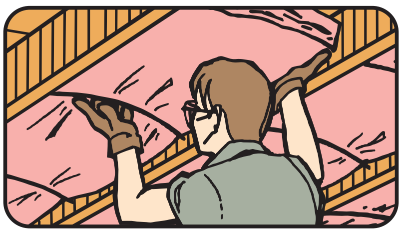
STEP 1: Start 10cm from end.
Install one support every 30-40cm.



STEP 2: Easy one-hand push-in installation holds insulation securely in place. Ends secure into timber for permanent installation.



IS24



Typical IS24 installation

IS Technical Data

Model No.	Dimensions (mm)	
	W	L
IS24-R100	2	92

Everything you need to take on any project with confidence

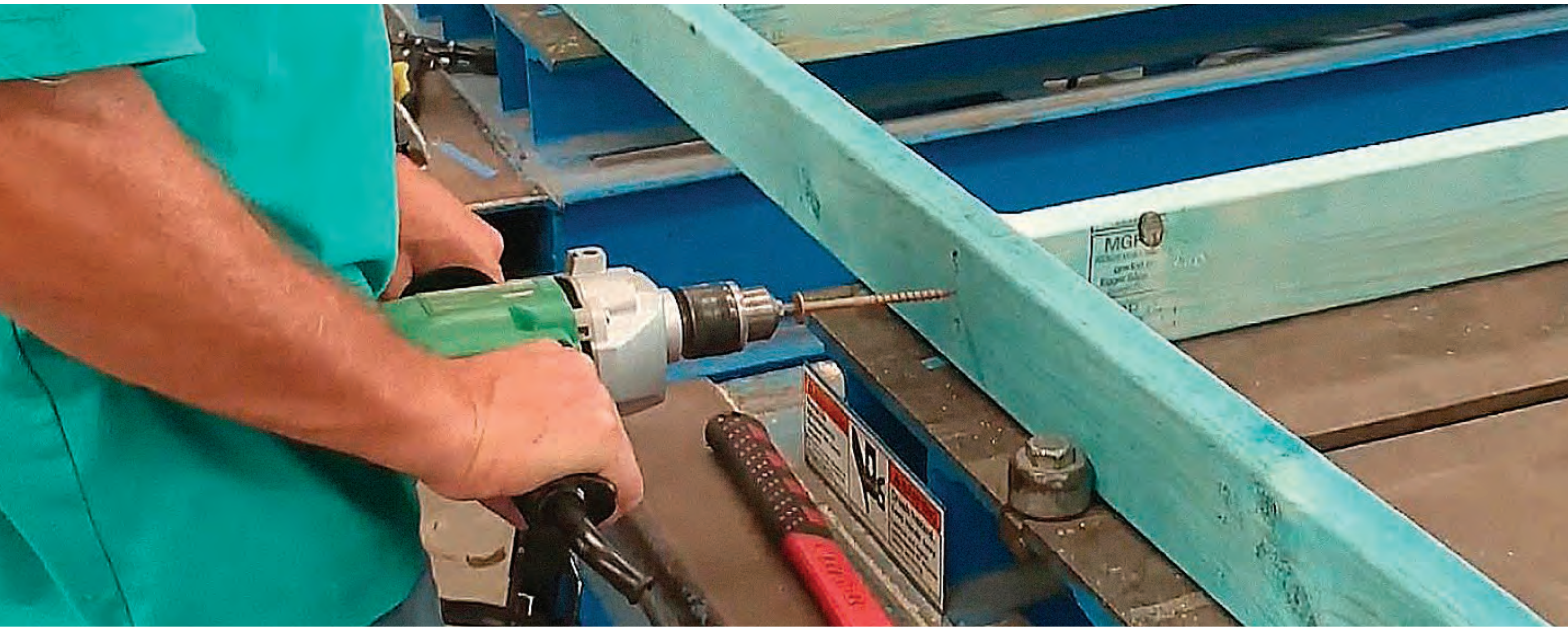
DIY DONE RIGHT™

WBSK has all the hardware you need to build sturdy and strong projects for your home, office or jobsite.
Just add Timber!

RTC2Z bracket joins three pieces of 90mm x 35mm timber in all different directions.
See page 82–84

Check out our installation and building tip videos at ***www.diydoneright.com***

Concrete Anchors and Fastening Systems



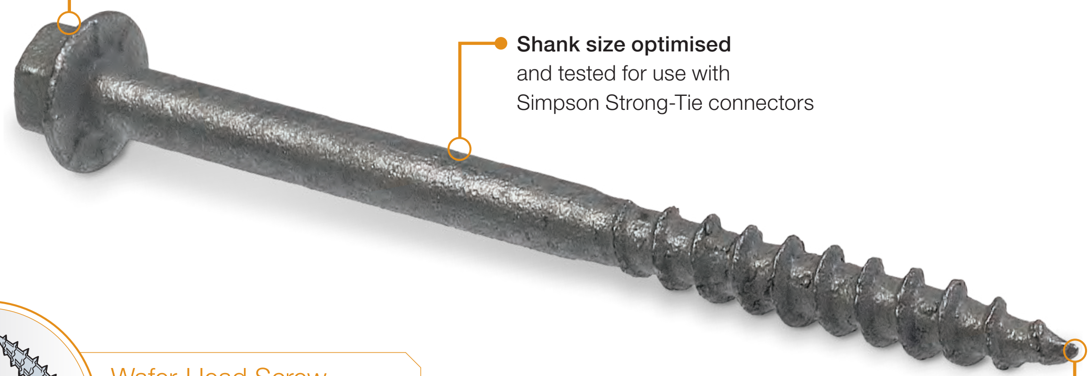
Strong-Drive® SD CONNECTOR Screw

Designed to replace nails in certain products, the load-rated Strong-Drive® SD Connector screw has been tested and approved for use in many popular Simpson Strong-Tie® connectors. It is great for use in tight spaces where using a hammer is inconvenient.

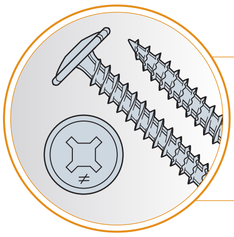
The #8 x 32mm SD Connector wafer-head screw is ideal for miscellaneous fastening applications. The needle point ensures fast starts and deep #2 Phillips drive reduces cam-out and stripping.

Mechanically galvanized coating meets ASTM B695 Class 55, is recommended for use with certain preservative-treated woods and recognized as an alternate to hot-dip galvanized in ESR-3046

¼" washer head stamped with No-Equal symbol and length for easy inspection

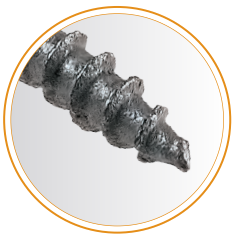


Shank size optimised and tested for use with Simpson Strong-Tie connectors



Wafer-Head Screw

SD8x1.25 is a general timber-to-timber fastener, used in non-structural applications



Sharp point for faster starts

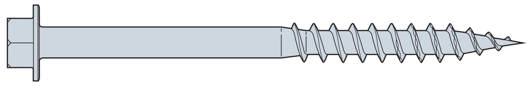
Material: Heat-treated carbon steel

Finish: SD8x1.25—Electro Galvanised; SD—Mechanically galvanised (ASTM B695 Class 55)

Warning: Industry studies show that hardened fasteners can experience performance problems in wet or corrosive environments. Accordingly, the SD8x1.25 should be used in dry, interior, and noncorrosive environments only.

SIMPSON Strong-Tie

Identification on all SDS screw heads
(SD10212 shown)



SD10
(SD9 similar)
U.S. Patent 7,101,113

Strong-Drive SD Connector Screw Dimensions

Model No.	Nominal Size (G)	Shank Diameter (mm)	Length (mm)	Thread Length (mm)	Hex Drive (mm)
SD9112	9	3.30	38	25	6.35
SD9212			63		
SD10112	10	4.04	38		
SD10212			63		

1. Length is measured from point to bottom of washer head.

Strong-Drive SD Connector Screw Strength Properties

Model No.	Tensile Strength (kN)	Shear Strength (kN)	Bending Yield Strength (MPa)
SD9112	6.81	5.67	1300
SD9212			
SD10112	7.41	5.94	
SD10212			

1. Tensile and shear strengths are average ultimate properties.
2. Bending yield strength is based on testing per ASTM F1575 and is the average 5% offset value.

Characteristic Loads for SD Connector Screws Used in Metal-to-Timber Connections

Model No.	Nominal Size	Thread Length (mm)	JD4 Characteristic Loads		JD5 Characteristic Loads	
			Shear, Q_{kL} (N) Steel side plates 1.0–2.7mm	Withdrawal Q_{kw} (N/mm)	Shear, Q_{kL} (N) Steel side plates 1.0–2.7mm	Withdrawal Q_{kw} (N/mm)
SD9112	#9 x 38	25	2535	101	1655	71
SD9212	#9 x 63		2695			
SD10112	#10 x 38		2520		2045	
SD10212	#10 x 63		3220		2450	

1. Withdrawal and pull-through characteristic values are in N/mm of thread penetration into the main member and side member, respectively.
2. Face and edge installations are at 90 degrees to the grain and end installation is along the grain.
3. Withdrawal and Pull-through loads shall be checked against tension strength in design.

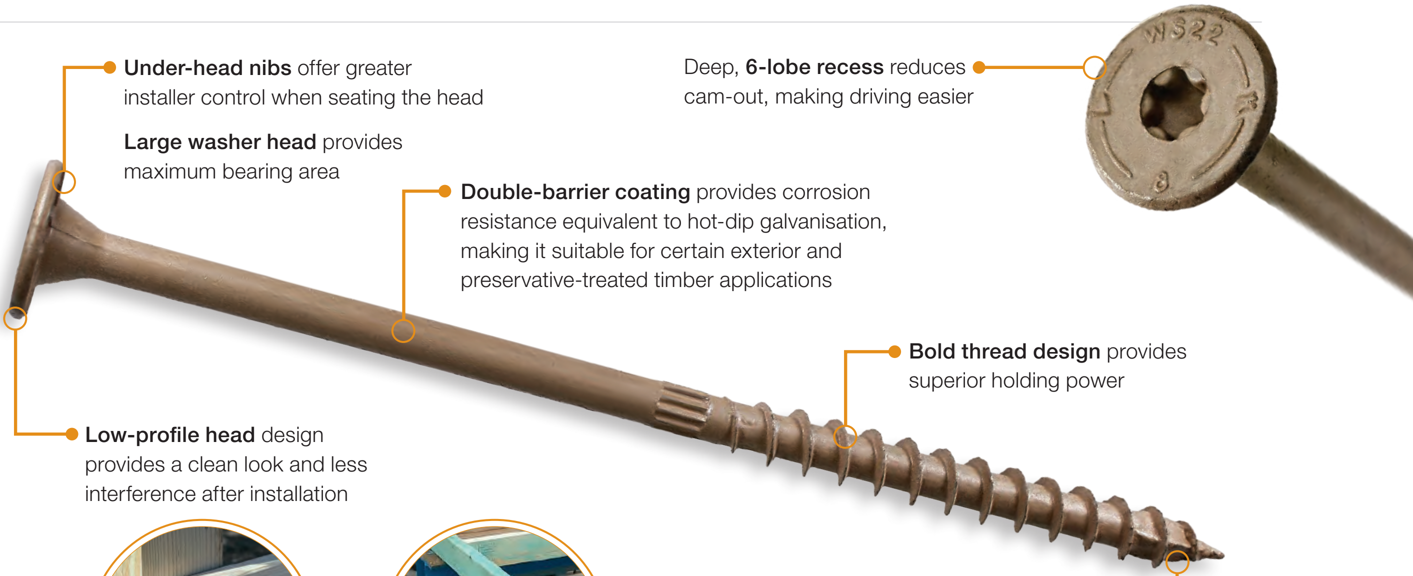
Connection Geometry for the SD Connector Screws Based on the Timber Main Member

Spacing Type	Loading Orientation	SD9 and SD10 Screws (mm)
End distance	Along (loaded away from end) and across grain	50
Edge distance	Along or across grain	25
- Along grain	—	40
- Across grain	—	20
Between staggered rows	—	13
Between fasteners in a row	—	50

1. Edge distances, end distances, and spacing of screws shall be sufficient to prevent splitting of the timber or as required in this table, or when applicable, as recommended by the structural composite timber manufacturer, whichever is more restrictive.
2. Edge and end distances based on AS 1720.1, Table 4.8.

Strong-Drive® SDWS **TIMBER** Screw

The Strong-Drive® SDWS Timber screw is designed to provide an easy-to-install, high-strength alternative to through-bolting and traditional coach screws. The new SDWS Timber screw is specifically designed for structural timber-to-timber applications and is also ideal for a wide variety of projects where a high-strength attachment is needed – for the contractor and do-it-yourselfer alike.



Under-head nibs offer greater installer control when seating the head

Large washer head provides maximum bearing area

Deep, **6-lobe recess** reduces cam-out, making driving easier

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanisation, making it suitable for certain exterior and preservative-treated timber applications

Bold thread design provides superior holding power

Low-profile head design provides a clean look and less interference after installation

Patented 4CUT™ tip ensures fast starts, reduces installation torque and eliminates the need for pre-drilling in most applications

Maximum bearing area

The combination of a large washer head and bold thread design firmly secures timbers together to close gaps in multi-timber connection assemblies

Material: Heat-treated carbon steel

Finish: Double-barrier coating. Screws with double barrier coatings are not used in exterior environments where there is airborne salinity or salinity splash.

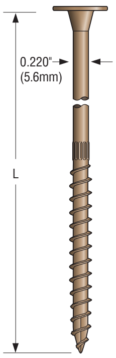
Installation

- See General Notes.
- Strong-Drive SDWS Timber screws install best with a low-speed 13mm drill and a T-40 6-lobe bit. The matched bit included with the screws is recommended for best results.
- Pre-drilling is typically not required. Where pre-drilling is necessary, use a 5⁄32" or 4.00mm drill bit.
- Screw heads that are countersunk flush to the timber surface are acceptable if the screw has not spun out.

Product and Packaging Information

<table>
<tr><th rowspan="2">Size Dia (mm)</th><th rowspan="2">Length L (mm)</th><th colspan="3">Retail Pack[1]</th><th colspan="3">Mini-Bulk Pack[1]</th><th colspan="2">Bulk Pack[1]</th></tr>
<tr><th>Fasteners Per Pack</th><th>Packs Per Master Carton</th><th>Model No.</th><th>Fasteners Per Pack</th><th>Packs Per Master Carton</th><th>Model No.</th><th>Fasteners Per Pack</th><th>Model No.</th></tr>
<tr><td rowspan="6">5.6</td><td>75</td><td rowspan="6">12</td><td rowspan="6">10</td><td>SDWS22300DB-RC12</td><td rowspan="6">50</td><td rowspan="6">6</td><td>SDWS22300DB-R50</td><td>950</td><td>SDWS22300DB</td></tr>
<tr><td>100</td><td>SDWS22400DB-RC12</td><td>SDWS22400DB-R50</td><td>600</td><td>SDWS22400DB</td></tr>
<tr><td>125</td><td>SDWS22500DB-RC12</td><td>SDWS22500DB-R50</td><td>600</td><td>SDWS22500DB</td></tr>
<tr><td>150</td><td>SDWS22600DB-RC12</td><td>SDWS22600DB-R50</td><td>500</td><td>SDWS22600DB</td></tr>
<tr><td>200</td><td>SDWS22800DB-RC12</td><td>SDWS22800DB-R50</td><td>400</td><td>SDWS22800DB</td></tr>
<tr><td>250</td><td>SDWS221000DBRC12</td><td>SDWS221000DB-R50</td><td>250</td><td>SDWS221000DB</td></tr>
</table>

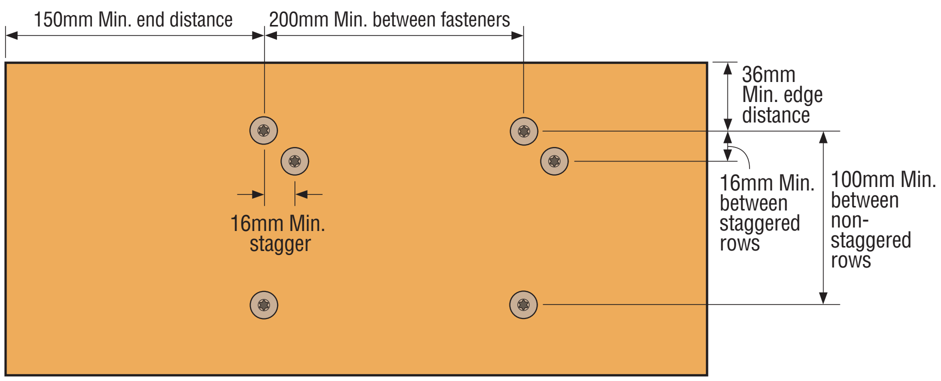
1. Retail and mini-bulk packs include one deep, 6-lobe, T-40 driver bit; bulk packs include two driver bits.



Strong-Drive® SDWS TIMBER Screw Characteristic Shear Loads – Radiata Pine

<table>
<tr><th rowspan="3">Model No.</th><th rowspan="3">Thread Length (mm)</th><th colspan="9">Characteristic Shear Loads (N)</th></tr>
<tr><th colspan="9">Timber Side Member Thickness (mm)</th></tr>
<tr><th>38</th><th>51</th><th>63</th><th>76</th><th>89</th><th>102</th><th>114</th><th>152</th><th>203</th></tr>
<tr><td>SDWS22300DB</td><td>38</td><td>6630</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>SDWS22400DB</td><td>60</td><td rowspan="2">7400</td><td>6100</td><td rowspan="2">6100</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>SDWS22500DB</td><td>70</td><td>7400</td><td>5655</td><td>5655</td><td>—</td><td>—</td><td>—</td><td>—</td></tr>
<tr><td>SDWS22600DB</td><td>70</td><td>7550</td><td>7550</td><td>7550</td><td>7550</td><td>5865</td><td>5865</td><td>5840</td><td>—</td><td>—</td></tr>
<tr><td>SDWS22800DB</td><td>70</td><td rowspan="2">8055</td><td rowspan="2">8055</td><td rowspan="2">8055</td><td rowspan="2">8055</td><td rowspan="2">7040</td><td rowspan="2">7040</td><td rowspan="2">7040</td><td>6100</td><td>—</td></tr>
<tr><td>SDWS221000DB</td><td>70</td><td>7040</td><td>6100</td></tr>
</table>

1. Conditions without numbers in the matrix shall not be used.
2. The main and side members shall have a minimum design density for Joint Group JD4 (550kg/m^3, OD specific gravity 0.50).
3. The tabulated characteristic lateral loads are for normal duration of load.
4. Screws shall be installed straight into the side grain of the timber main member with the screw axis at a 90-degree angle to the timber fibers.
5. Minimum fastener penetration shall be equal to the screw length less the thickness of the timber side member.



Strong-Drive® SDWS Timber Spacing Requirements

Table 5. Connection Geometry for the SDWS Timber Screws[1]

<table>
<tr><th colspan="2">Condition</th><th>Minimum Distance or Spacing (mm)</th></tr>
<tr><td rowspan="2">Edge Distance</td><td>Perpendicular to grain loading</td><td rowspan="2">37</td></tr>
<tr><td>Parallel to grain loading</td></tr>
<tr><td rowspan="2">End Distance</td><td>Perpendicular to grain loading</td><td rowspan="2">150</td></tr>
<tr><td>Parallel to grain loading</td></tr>
<tr><td rowspan="3">Spacing</td><td>Between fasteners in a row</td><td>200</td></tr>
<tr><td>Between non-staggered rows</td><td>100</td></tr>
<tr><td>Between staggered rows</td><td>16</td></tr>
</table>

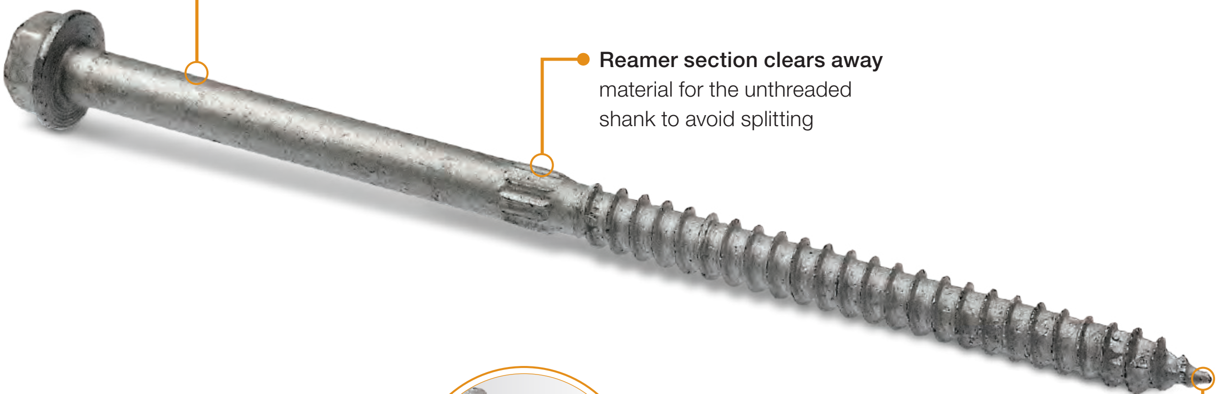
1. Edge distances, end distances, and spacing of screws shall be sufficient to prevent splitting of the timber or as required this table, or when applicable as recommended by the structural composite timber manufacturer, whichever is more restrictive.

Strong-Drive® SDS **HEAVY-DUTY CONNECTOR** Screw

The Simpson Strong-Tie® Strong-Drive® SDS Heavy-Duty Connector screw is a 6.4mm diameter structural timber screw ideal for various connector installations as well as timber-to-timber applications. It installs with no pre-drilling and has been extensively tested in various applications. Available with a double-barrier coating or in Type 316 stainless steel. Carbon steel loads apply to corresponding stainless steel models.

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanisation, making it suitable for certain exterior and preservative-treated timber applications

⅜" washer head stamped with No-Equal symbol and length for easy inspection



Reamer section clears away material for the unthreaded shank to avoid splitting

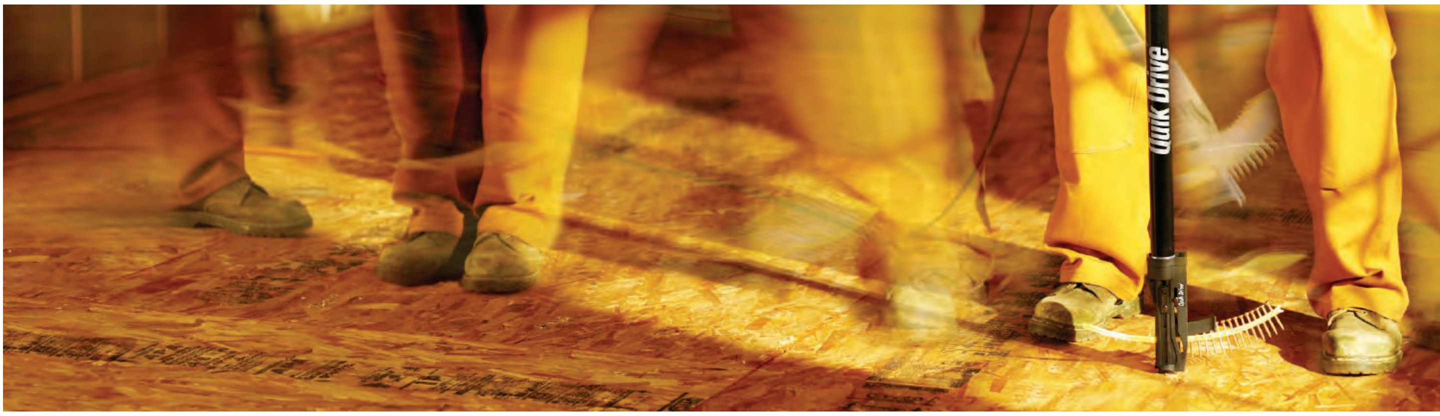
Patented 4CUT tip ensures fast starts and less installation torque and eliminates the need for pre-drilling in most applications

Material: Heat-treated carbon steel, Type 316 stainless steel

Finish: SDS—double barrier (all lengths); SDS—stainless steel (38mm thru 89mm lengths). Screws with double barrier coatings are not used in exterior environments where there is airborne salinity or salinity splash.

Installation: See General Notes.

Strong-Drive® WSNTL **SUBFLOOR** Screw



Collated Screws Exceed Values of Nails

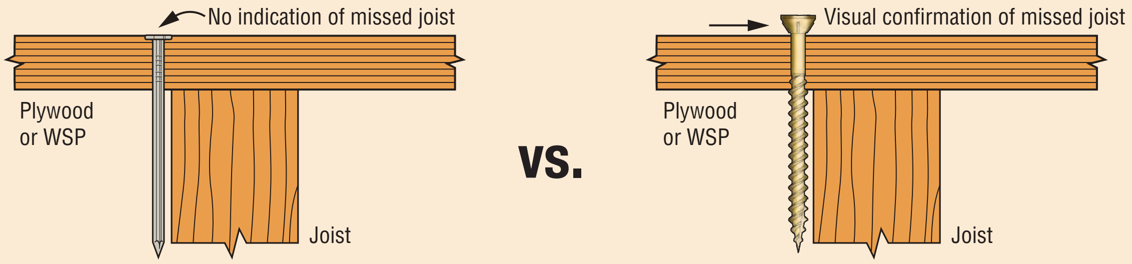
WSNTL wood screws are ideal for fastening subfloor, bracing, sill plate and stair applications using the Simpson Strong-Tie® Quik Drive® auto-feed screw driving system. With withdrawal and pull-through values that exceed those of 3.75mm nails, the holding power of WSNTL screws reduces the gaps between the joist and subfloor that cause floor squeaks. Our auto-feed screw driving system increases productivity, reducing costs. Using screws that can be backed out easily allows future access to floor cavities.

Features

- Eliminates subfloor nail squeaking and costly call backs
- Variety of lengths to cover subfloor, wall plates, and stair treads
- WSNTL screw design draws subfloor and joist tightly together, giving visual confirmation of proper screw placement

See the Difference on the Jobsite

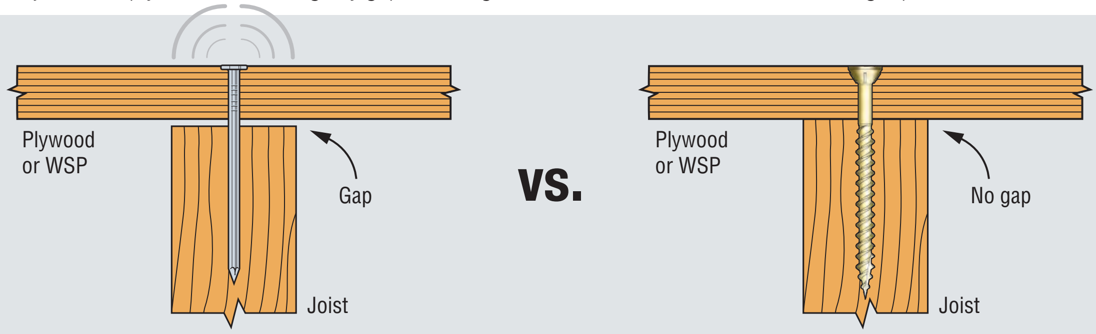
The WSNTL wood screw gives visual confirmation of a secure joist connection by countersinking, while "shot-in" pneumatic fasteners look the same whether or not they hit the joist. Missed fasteners could result in floor flexing that can cause squeaking in other parts of the structure and reduced diaphragm load capacity.



Subfloor Fastened with Pneumatic Fasteners | **Subfloor Fastened with WSNTL Wood Screws**

Hear the Difference over Time

Squeaking of newly installed floors can result in the expenses (in travel, labor, materials) of callbacks and possibly a damaged reputation. Fastening subflooring with WSNTL wood screws rather than pneumatic fasteners provides the power necessary to pull together joists and plywood, eliminating any gaps, holding the materials firm and therefore reducing squeaks.



Subfloor Fastened with Pneumatic Fasteners
Fastening with pneumatic fasteners can leave gaps or allow gaps to develop over time. These gaps cause the subfloor to ride up and down on the pneumatic fastener's shank, which leads to squeaks.

Subfloor Fastened with WSNTL Wood Screws
Subfloor fastened with screws is pulled down tight against the joist, and kept tight with no gaps to cause squeaking.

Quik Drive® Auto-feed Screw Driving Systems

Decking | Subfloor | Underlay | Cladding | Sheathing | Plasterboard

Save Time and Money with Faster Installation Speeds and Consistent Performance

PDECKNC-RC (sold separately)

The decking nose clip positions the screw on the deck board and positions it over the joist for an easy, uniform installation from a standing position.

For more information, please visit one of our websites for your region.

Features

1. Expanded depth settings for high-density flooring materials
2. Reversible and replaceable non-skid teeth
3. Sure-grip guide tube increases stability for a broad range of screws
4. Smooth nose will limit marking the plasterboard surface
5. Rigid strip collation prevents jamming
6. Extension enables stand-up driving to save time and reduce worker fatigue
7. QuikLock™ coupling allows for easy assembly and disassembly so system can be used without extension pole
8. Built-in bit wrench makes bit changes quick and easy

- Uniform toenailing and countersink on smooth surfaces
- PRO300S drives 8–10 gauge and 40mm to 75mm Quik Drive screws
- PRO200 drives 6–8 gauge and 25mm to 50mm Quik Drive screws

Bottom-plate anchorage and fastening solutions

Simpson Strong-Tie offers many fastening and post-installed anchorage solutions for sill plate applications in concrete or concrete block foundations. These products are often used in retrofit/expansion applications or when cast-in-place anchors are omitted or mislocated. Various product finishes are available to address most environmental or preservative-treated timber conditions. For more information on product performance, installation requirements, corrosion and appropriate code listings for Simpson Strong-Tie® products, please visit ***www.strongtie.com***.

Anchoring Adhesives


Mechanical Anchors


Direct Fastening Systems

Software Tools to Help You Select the Right Products

Anchor Designer™ ACI 318, ETAG and CSA

Adhesive Cartridge Estimator

For more information, visit ***www.strongtie.com/software.***

Anchoring systems for cracked and uncracked concrete applications

SET-XP® High-Performance Epoxy Anchoring Adhesive

High-strength, epoxy-based anchoring adhesive formulated for optimum performance in both cracked and uncracked concrete

Features

- ETA and ICC-ES listing
- Seismically qualified per ACI 355.4
- Long-term loading (creep) applications
- Cracked concrete
- Non-shrink
- High-strength
- Economical and safe
- Versatile: for use in concrete, brick and concrete block
- Non-sag formulation: ideal for vertical and most overhead applications
- Each cartridge is supplied with 2 mixing nozzles
- Manufactured in the USA using global materials

Approvals: ETA-11/0360 (OPTION 1); ICC-ES ESR-2508 (concrete); IAPMO UES ER-265 (masonry); NSF/ANSI Standard 61 (313cm²/1000L)

ET-HP® High-Strength Epoxy Anchoring Adhesive

A two-part epoxy anchoring adhesive system formulated for threaded rod and rebar anchoring into concrete (cracked and uncracked) and masonry.

Features

- Non-shrink
- Suitable for cracked and uncracked concrete
- Seismically qualified for all threaded rod applications
- Long-term loading (creep) applications
- 2-Year shelf life (from date of manufacture)
- Each cartridge is supplied with 2 mixing nozzles
- Over 2 decades of performance history

Approvals: ICC-ES-ESR-3372 (concrete); ICC-ES-ESR-3638 (unreinforced masonry); IAPMO UES ER-241 (masonry)

AT-HP® High-Performance Acrylic Anchoring Adhesive

AT-HP is a high-quality styrene-free methacrylate resin suitable for high performance fixing applications of threaded rod and rebar into concrete. Specially made and designed by Simpson Strong-Tie for structural fixings and construction uses.

Features

- Fast curing
- Low odour
- Non-flammable
- Each cartridge is supplied with 2 mixing nozzles
- Full range of tools and accessories also available
- Available in 280 ml, 380 ml and 825 ml

Approvals: ETA-14/0383 (Option 7); ETA-11/0139; ETA-13/0416; Fire Test N° 26026461; Water Quality Test N° 1205519

Titen HD® Heavy-Duty Screw Anchor for Concrete and Masonry

U.S. Patent 5,674,035 and 6,623,228

The patented, high-strength screw anchor that offers industry-leading performance in cracked and uncracked concrete and uncracked masonry, the Titen HD installs with low installation torque for maximum efficiency.

Features

- Seismically qualified per ACI 355.2
- Reduced installation time
- Low installation torque
- No special drill bits
- Removable
- Built in hex head
- Easy post-installation inspection
- Vibration and shock resistance
- Excellent close edge distance performance
- Ductile anchor through proprietary heat-treatment process

Approvals: ETA-12/0060 (Option 1); ICC-ES ESR-2731 (concrete); ESR-1056 (masonry)

Throughbolt WA Expansion Anchor

A simple and economical wedge-type expansion anchor for medium-duty loads into uncracked concrete.

Features

- Application of the installation torque draws the cone end of the stud into the expansion clip. The expansion clip expands and develops a frictional grip with the sidewalls of the hole. This gives the anchor its resistance to tension loads.
- Economical anchor for medium-duty loads
- Approved for use in non-cracked concrete

Approvals: ETA-11/0080 (Option 7)

For more information please visit one of our websites for your region.

Building and Product Information

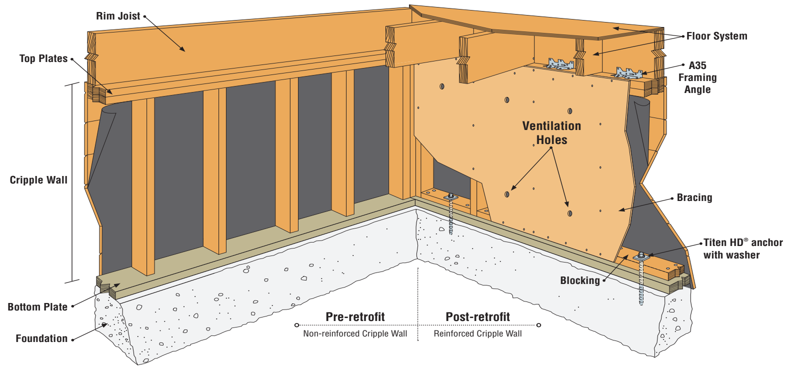
What is a connector?

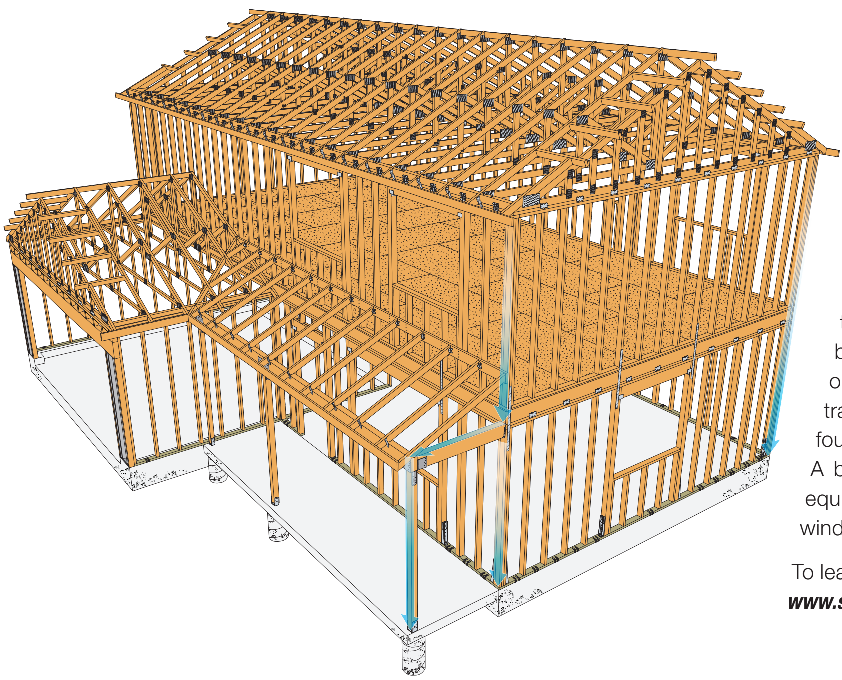
Structural connectors are made out of steel, and are engineered to connect and strengthen the frame of a building. Reinforcing the frame of a building with structural connectors helps the building resist damage caused by earthquakes, high winds and cyclones. Framing materials secured with connectors are much stronger than those secured only with nails (called toenailing).

Connectors come in all shapes and sizes, and have a variety of names, such as joist hangers, holdowns and hurricane ties. Homeowners don't typically see connectors in their homes because they are covered up behind the walls.

What is a shearwall?

Shearwalls are reinforced walls within a building that have been engineered to help resist the shear (racking) forces caused by high winds or the lateral forces caused by earthquakes. Shearwalls are typically constructed by attaching timber bracing and holdown connectors to a section of the timber framing along a wall.





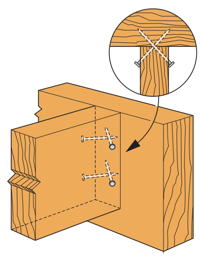
What is a continuous load path and why is it important for a building?

A continuous load path is a method of construction that uses a system of timber, metal connectors, fasteners (like nails and screws) and shearwalls to connect the structural frame of the house together. It ties the house together from the roof to the foundation. A continuous load path is important because it helps redistribute outside pressures or forces caused by earthquakes and high winds, transferring these external forces from the frame to the foundation, which is securely anchored into the ground. A building with a continuous load path is much better equipped to withstand the strong forces caused by high winds, tornadoes, cyclones and earthquakes.

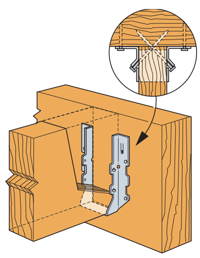
To learn more, visit *Build with a Continuous Load Path* ***www.safestronghome.com/protect/02.asp***

When framing a house, why is it better to use connectors than the traditional practice of toenailing?

Framing materials held together with structural connectors can withstand much stronger forces than those held together with nails. Connectors have a higher load capacity than nails (see example at right). In a high wind storm, for example, nails are much more likely to pull apart or pop out than a metal connector. A connection made with a metal connector can be pulled apart, but it takes much greater force to separate it than a simple toenailed connection. A building built with connectors is better able to resist forces from high winds and earthquakes.



Toenail connection load capacity: **1.30kN**



Connector load capacity: **4.7kN**

High Winds

How do high winds affect a building?

During a cyclone, thunderstorm, tornado, blizzard or other high-wind storm, the force of the wind can affect a building in four ways:

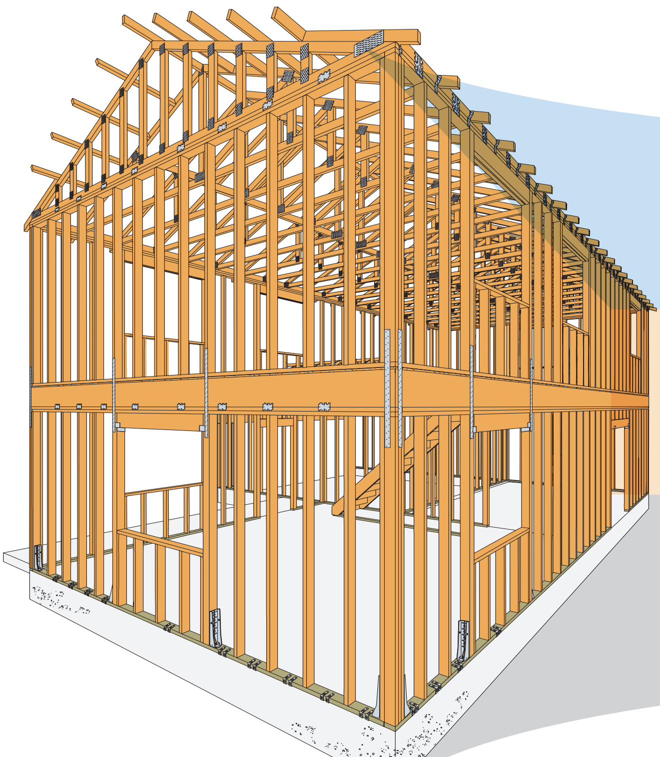
1. **Uplift** – wind flows over the roof of the building, creating a lifting effect.
2. **Racking** – wind exerts horizontal pressure which can cause the building to tilt.
3. **Sliding** – wind exerts horizontal pressure which can cause the building to slide off its foundation.
4. **Overturning** – when the building is unable to rack or slide, wind can cause the walls to rotate off the foundation.

To learn more, visit *How Wind Affects Your Home:* ***www.safestronghome.com/highwind/01.asp***.

How do I protect my home from high winds, such as cyclones?

The best way to protect your home from high winds is to make sure it is built with a continuous load path. Many new homes are built with a continuous load path, but some are not, so it's best to have your home inspected by a professional home surveyor or structural engineer who can help make that determination and recommend retrofit solutions if needed. For more information, see *Retrofitting Your Home* at ***www.safestronghome.com/highwind/06.asp***.

A continuous load path ties your house together from the roof to the foundation using a system of framing materials, metal connectors, fasteners (like nails and screws) and shearwalls. This system, which connects the roof, walls, floors and foundation together, strengthens the structural frame of the house. If your home is built with a continuous load path, it will be better equipped to resist the forces of high winds by redistributing the pressure of the wind from the exterior of your house to the frame, and then to the foundation. It's also important in high-wind areas to protect windows and other openings by installing such products as storm shutters or impact-resistant windows and wind-resistant garage doors.

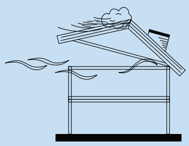


Continuous Load Path

Ties your home together from the roof to the foundation

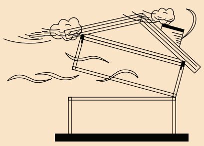
Roof-to-Top-Story Connection

Fastens the roof to the top story



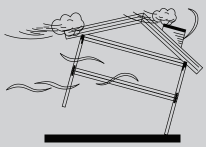
Floor-to-Floor Connection

Ties the second story to the first story



Bottom-Floor-to-Foundation Connection

Anchors the bottom floor to the foundation

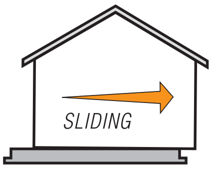


Earthquakes

How does an earthquake affect my home?

During an earthquake, the forces can affect a home in three ways:

1. **Racking** – earthquake forces can cause the home to move or tilt from side to side.



2. **Sliding** – earthquake forces can shake the house and weaken its frame, causing it to slide off the foundation.

3. **Overturning** – earthquake forces can cause the walls of the home to lift or rotate off the foundation.

To learn more, visit *How Earthquake Forces Affect a Home:* ***www.safestronghome.com/earthquake/01.asp***.

How do connectors, fasteners and shearwalls protect homes from natural disasters, such as high winds and earthquakes?

In order to resist forces from earthquakes and high winds, the frame of the house must be properly connected and secured to the foundation, which is the strongest part of the home. The walls, floors and roof also must be securely attached to the frame of the house. When all these key connections are made throughout the home, a continuous load path is created.

How do I protect my home from earthquakes?

The best way to protect your home from an earthquake is to first make sure the frame of your home is properly attached to the foundation. If you have a basement or a crawl space underneath your home, you can see how your home is attached and determine whether you need additional connectors, anchor bolts and bracing. For more information, see our *Seismic Retrofit Guide* at ***www.strongtie.com/literature/f-plans.html***.

If possible, you also want to make sure your home has a continuous load path, which means all parts of the house – roof, walls, floors and foundation – are properly attached using metal connectors. This is a little more difficult to determine because you need to see what's behind your walls. However, a home built with a continuous load path is more likely to withstand an earthquake and stay intact because the home is better able to redistribute the earthquake forces from the frame to the foundation, which is securely anchored into the ground. If you are unsure whether your home was built with a continuous load path, you'll want to have your home inspected by a professional home surveyor or structural engineer who can help make that determination and recommend retrofit solutions if needed.

How do I know if my home is built to resist earthquakes and high winds?

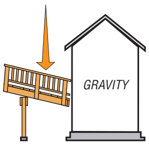
Today, quality builders use structural connectors, fasteners and shearwalls when building a home. Depending on where you live, local building codes often require the use of these products when building a home. However, for peace of mind, it's best to know for sure how your house was built even if you live in a newer home.

Simpson Strong-Tie recommends working with a licensed, qualified professional, such as a contractor, home surveyor or structural engineer to evaluate your home and determine if additional reinforcement is needed. If you're buying a new home, don't be afraid to ask your builder what types of structural products are being using to reinforce your home. You'll want to make sure your home is being built with a continuous load path. See our *Homeowner Checklist* at ***www.safestronghome.com/earthquake/03.asp*** and *What to Look for When Buying Home* at ***www.safestronghome.com/protect/03.asp***.

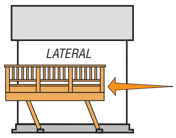
Decks

What do I need to know to make my deck strong and safe?

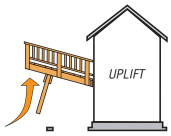
For most homeowners, the deck is a popular gathering place for friends and family. Like a house, a deck must be designed to support the weight of people and objects placed on it as well as natural forces such as wind, snow and earthquakes. Knowing how weight and other forces can affect the safety of your deck is important. There are three types of forces that put pressure on your deck, straining to the critical connections that keep it together:



1. **Gravity** – downward pressure typically caused from people standing on the deck or snow and ice.



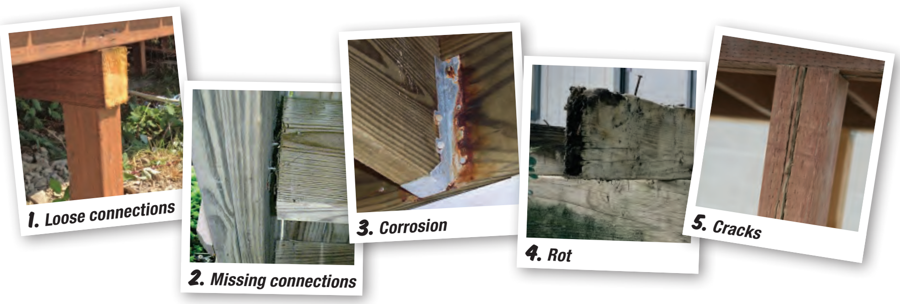
2. **Lateral** – a back and forth (horizontal) motion caused by people walking on the deck and/or leaning on a railing. Wind and earthquakes also can create lateral movement.



3. **Uplift** – wind flows under the deck creating a lifting effect. People standing on the overhang of the deck also creates upward pressure on the connection that attaches the deck to the adjacent support structure, which is typically your home.

How do I inspect my deck?

To evaluate the safety of your deck, you should look for the five warning signs of an unsafe deck:



1. Loose connections

2. Missing connections

3. Corrosion

4. Rot

5. Cracks

1. Your deck should be sturdy; look for wobbly railings or loose stair steps.
2. Your deck should be built with the proper hardware; you'll want to go underneath your deck and make sure the correct hardware (connectors) is used and check to see how your deck is connected to the side of the house – it should be bolted, not nailed.
3. Hardware can corrode over time; look for signs of red rust on nails and metal connectors.
4. Timber can rot and weaken your deck; take a hammer and tap on the timber framing of your deck, if the timber is soft (leaves an indent), it may be rotted.
5. Cracked timber can also weaken your deck; look for large or excessive cracking, particularly in posts and other structural framing.

If you see any of these warning signs, you'll want to have your deck repaired or retrofitted immediately. In some cases, especially with older decks, rebuilding your deck may be necessary. If you're not comfortable inspecting your deck yourself, hire a licensed, qualified home surveyor, structural engineer or deck contractor.

Note: The most common deck failures are when the deck is not properly attached to the house and when railings are loose and give way.
To learn more, visit *The 5 Warning Signs of an Unsafe Deck* at ***www.safestronghome.com/deck/05.asp***.

How often should I inspect my deck?

Simpson Strong-Tie recommends inspecting your deck at least once a year. A good time to do this is the beginning of spring before you and your family start using your deck regularly.

What's the typical lifespan of a deck?

Well-built decks made out of timber should last 10–15 years with proper inspection and maintenance.

Can I repair my deck myself?

A skilled homeowner can tackle most deck repair projects. However, if you're not handy in construction, Simpson Strong-Tie highly recommends working with a qualified, professional home surveyor or structural engineer to perform a structural evaluation and then a licensed contractor to do the work for you. When hiring a design professional, you want to make sure they are licensed and have a good reputation. It's also a good idea to understand the work that is to be done and get involved in the process, so that you can make sure the project is done right. A good resource to review is our *Deck Framing Connection Guide* at ***www.strongtie.com/ftp/fliers/F-DECKCODE13.pdf***.

Notes

Notes

Every day we work hard to earn your business, blending the talents of our people with the quality of our products and services to exceed your expectations. This is our pledge to you.

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This catalogue reflects changes in the design capacities and configurations of some Simpson Strong-Tie Company Inc. products. ***This catalogue is effective until December 31, 2018****, and supersedes all information in all earlier publications, including catalogues, brochures, fliers, technical bulletins, etc. Use this edition as a current printed reference. Information on design capacities and configurations is updated annually.*

We post our catalogues on our website. Please visit our site and sign up for any information updates. *Design capacities in this catalogue are for the described specific applications of properly installed products. Product modifications, improper loading or installation procedures, or deviations from recommended applications will affect connector design capacities.*


Can You Define Genuine?
We Can.
We believe in:
• Doing what's right
• Tackling problems differently
• Sharing our knowledge
• Going the extra mile
• Having the right solutions at the right time
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