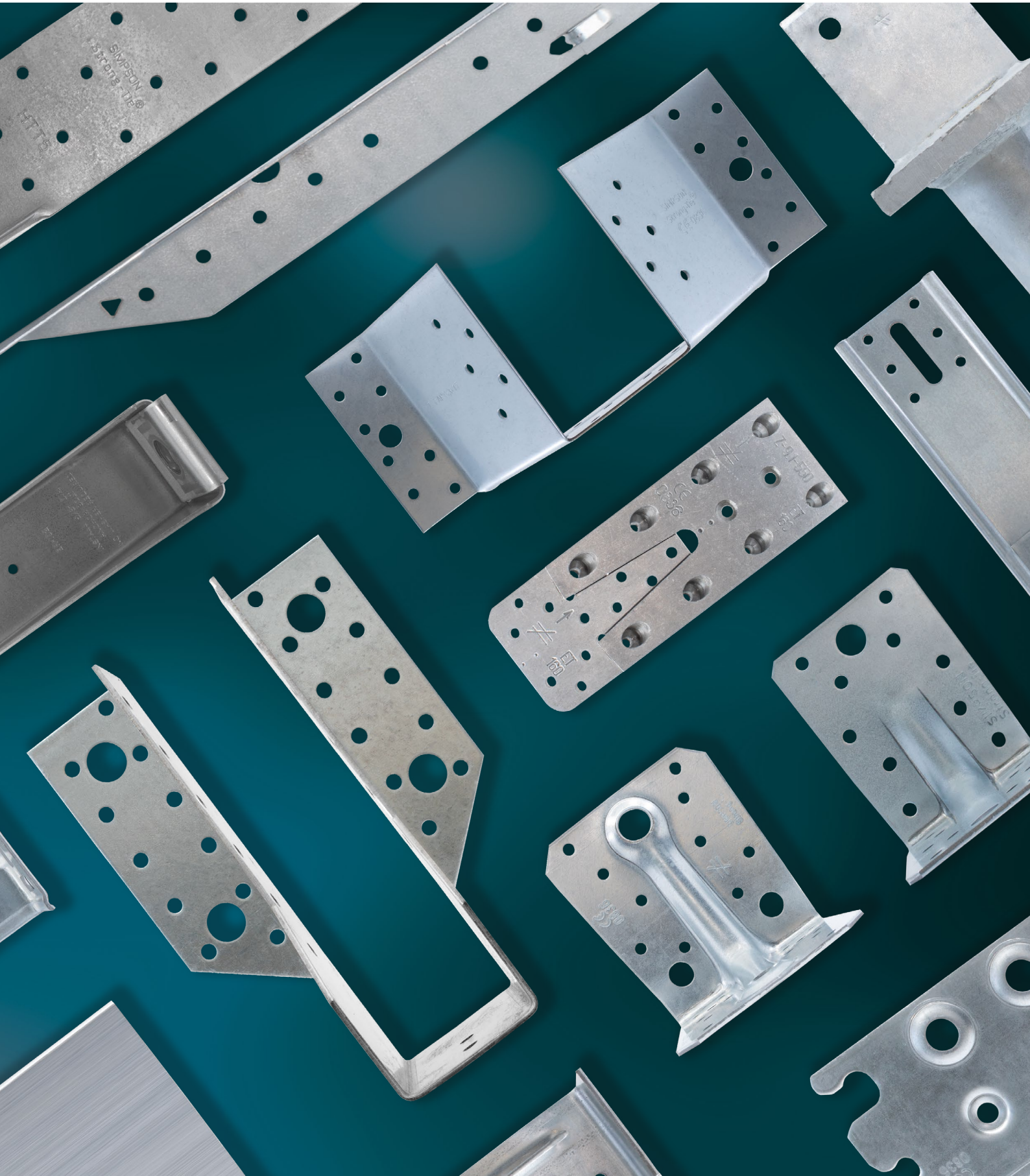
Metal Connectors

Anchorage System and Fasteners

www.strongtie.pl

SIMPSON Strong-Tie®



Since very beginning, Simpson Strong-Tie is focused on the quality of the products and customers' satisfaction. For years of global development company became leader of innovative and safe solution for building industry, in all the places where connectors might be helpful. Our engineers everyday works with the designers, structural engineers and our customers and forward any comments and feedback to our Research and development departments located in USA, France, UK and Germany. This allows us to fulfill all the requirements of the markets, sometimes in very difficult seismic areas.

It all began in 1956 when Barclay Simpson met his neighbour, who asked if he can create a product which allows connecting two beams together. Barclay accepted the challenge the stared to work on the concept. He made few sketches and created first beam hanger. It was the beginning of something more than just creating the new product or fulfilling neighbour's need. Barclay's conclusion was that the customer is the most important – "Customers are our bosses". It was the beginning of the Simpson Strong-Tie philosophy which is still present on the company nowadays.

Since then became undisputed leader in the industry. We are present on six continents, hire dozens of engineers across the world, who are supporting our customers and constantly working on the development of the products to meet the requirements of modern building market. Despite the global range, we are always close to our local partners – design offices, investors, builders and distributors.

Założyciel - Barclay Simpson (1921 - 2014)

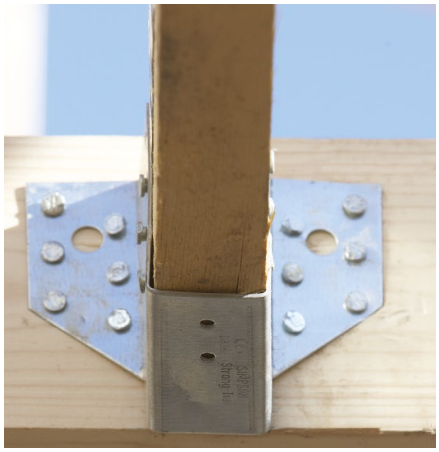
Our mission

Ensuring all required elements to allow reliable, safe and efficient building. Continuous quality improvement of all aspects of our work includes:

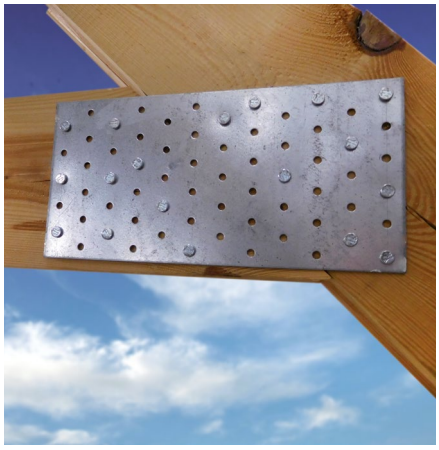
- Availability of our products when the customer needs it
- Ensure top quality of customer support
- Products that meet all requirements of standards and safety regulations. keep the position of the most innovative company on the market.
- Meet customers' expectations and their demands.

Safety guarantee – Customers can be sure that our products are designed to their needs, are tested and certified.








Alphabetical Index

SIMPSON Strong-Tie®

Alphabetical Index

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New Products

VAC+VAS High Performance Capsule Resin

VAC is vinylester anchor without styrene. Resin suitable for high performance fixing applications of threaded rods into concrete. Easy to dispense and fast curing, specifically designed for structural fixings and very technical construction sites. The capsule contains the exact amount of resin and hardener, making it a very productive product.

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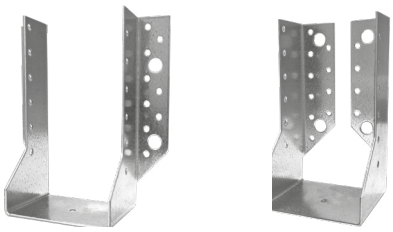

BSNN i BSIN Face Fix Hangers

BSNN beam hangers are an optimized version of the classic BSN beam hanger with a new hole layout and a modified shape. Used for timber-timber and timber-concrete connection.

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GBE Large Face Fix Hangers

The GBE beam hanger has been specially developed to connect large sections of the beam made of glued laminated timber. The installation of the beam hanger is maximally simplified due to the use of anchor bolts Ø16 or metric M16 fixed through. Possible Fixing for timber or concrete.

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SPR Timber Joist Hangers Slope Adjustable

SPR allows the fastening of rafters on timber.
The slope is adjusted on site for slopes up to 45° downward or upward. This adjustment should be done only once in the required slope direction.

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ABRL98 Adjustable Reinforced Angle Bracket

ABRL angle bracket is used to create a sliding connection support whilst maintaining the static performance during construction. This product is dedicated to prefabricated roof trusses with a static beam design that is freely supported. A great advantage of the angle bracket is the possibility of using to a timber wallplate or concrete ring (Holes Ø13)

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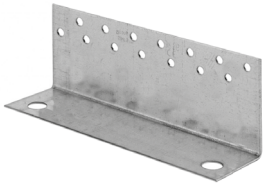

AB6983 Angle Bracket

The AB6983 connector is designed to create a connection between the foundation and the sole plate of the timber structure wall of the ground floor.

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New Products

AB36125 Angle Bracket
Angle AB36125 is designed to connect the timber structure walls of higher floors to the construction of a wooden ceiling below.These connectors are used mainly in prefabricated skeletal joints, eliminating the need to make installation holes in prefabricated elements

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HTT22E i HTT31 Hold Downs
HTT group anchor connectors are designed for transferring high tension force resulting from the rotation of the timber structure wall. Different heights allow you to choose an adequate connector model for the required loads. HTT22E HTT 31 connectors are used in anchoring „open" timber structure walls, i.e. in which we have access to a wooden supporting structure during assembly.

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MAH Banding Hold Down
The MAH hold down allows two anchoring methods to the foundation. The first is the standard connection of the timber structure post with the top of the foundation slab. To make such a connection, bend the connector at 90 degrees and install it like other hold downs. An alternative way of anchoring is instalation with a straight connector.

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ICST Wall Panel Connectors
ICST is a two-part symmetrical connector designed for the assembly of closed prefabricated wall panels. When using this connector, it is not necessary to use inspection holes in the wall panel.

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GAR Steel Mesh Protecting
Steel mesh protecting the ventilated space of the facade. Prevents the entry of rodents and insects. The diameter of the hole (3mm) also protects against small insects. The proper area of holes per meter of tape enables efficient ventilation of the facade.

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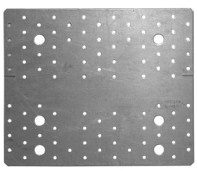

NPB Anchoring Nail Plate
Perforated plates have many applications to simple overlay connections. Perforated nail plate NPB255 was developed for fixing CLT panels to timber or concrete elements. Easy installation thanks to the marking line that allows the positioning of two elements

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General information

Introduction:

Choosing the correct connector for the connection should be based on the connection geometry, direction and the value of the loads, installation methods and other requirements like corrosion protection, fire resistance, architecture. Unless noted otherwise, connections with the metal connectors should be treated as hinge joints. The most effective load-carrying performance is provided when the fasteners are sheared and forces act in the plane of the connector's plate. For some connectors due to manufacturing, installation methods or esthetic requirements this rule is not followed. In such a cases there are additional withdrawal loads on the fasteners and bending of the connector's steel plate.

Capacity tables on the catalogue:

Unless noted otherwise, load carrying performances presented in the catalogue are the characteristic values based on the European Technical Assessments (ETA) and EN Standard 1995 (Eurocode 5). Calculation examples which shows how to change characteristic values to design values are using K_{mod} factor and partial safety factor γ_M in most of the cases equals to 1,3.

To fulfill the ultimate limit state it is needed to check the folowing formula:

$$\frac{F_d}{R_d} \leq 1$$

F_d is design value of the load
R_d is design capacity of the connector
:

$$R_{i,d} = \frac{R_{i,k} \times k_{mod}}{\gamma_M}$$

Published values of the characteristic load-carrying capacities R_k are based on the newest technical knowledge of the steel and timber connections. It is in many cases justified by testing in certified laboratories. In the following catalogue next to the products, are references to the Europeans Technical Assessments (ETA). ETA should be read as complete documents with all the additional condition if stated. Full ETA can be downloaded from the www.strongtie.eu web site. Characteristic load-carrying capacities of CNA nails and CSA screws are based on the ETA 04/0013. Transferring load onto the further elements of the structure, as well as checking their capacity isn't covered by the catalogue.

Eurocode

According to the international agreements all European Standards (EN), published by CEN (European Committee for Standardization) are treated as local standards without other justification.
The Eurocode program includes the following standards:
EN 1990 – Eurocode 0: Basis of structural design
EN 1991 – Eurocode 1: Actions on structures
EN 1992 – Eurocode 2: Design of concrete structures
EN 1993 – Eurocode 3: Design of steel structures
EN 1994 – Eurocode 4: Design of composite steel and concrete structures
EN 1995 – Eurocode 5: Design of timber structures
Characteristic load-carrying capacities R_k published in the following catalogue are based on the European Technical Assessments (ETA) and the standard EN 1995 - Eurocode 5.
EN 1996 – Eurocode 6: Design of masonry structures
EN 1997 – Eurocode 7: Geotechnical design
EN 1998 – Eurocode 8: Design of structures for earthquake resistance
EN 1999 – Eurocode 9: Design of aluminum structures

CE marking

CE marking is a passport which allows to use the product on each and every market in the EU member state. CE marking ensures that the product fulfill the requirements of Construction Product Regulation 305/2011 – CPR.
Since 1st of July 2013 building materials on the market covered by harmonized European standards (EN) or ETA needs to have Declaration of Performance (DoP). DoP is key element in the CPR document which allows the CE marking.
Manufacturer, Importer or Distributor have a legal responsibility to ensure conformity of the product with the characteristics described in the DoP.
Together with the technical specification, the DoP provides all necessary information (capacities and other characteristics …) allowing the user to check if the products meets the local regulation and can or cannot be used on the particular market.

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

bsi. ISO 9001 Quality Management

Environmental Health and Safety Policy

Simpson Strong-Tie® continues to look for ways to build safer and stronger homes while being mindful of how we can help protect the environment and the health and safety of our employees. We are committed to environmental management, including health, safety and ecological protection.
Simpson Strong-Tie® is accredited to the internationally recognised standards for environmental health & safety management systems.

bsi. ISO 14001 Environmental Management

bsi. OHSAS 18001 Occupational Health and Safety Management

Testing Laboratory Accreditation

Our European Test Laboratory located in Tamworth, Staffordshire is the first manufacturer’s facility to achieve third party accreditation to the international standard BS EN ISO/IEC 17025

UKAS TESTING

TECHNICAL INFORMATION

Service class according Eurokode 5
Environment service class definition is given in EN1995-1-1

Service Class	Description	Example
	Moisture content in the materials corresponding to a temperature of 20°C and the relative humidity of the surrounding air only exceeding 65% for a few weeks per year.	Warm roof, intermediate floors, timber frame walls - internal and party walls
	Moisture content in the materials corresponding to a temperature of 20°C and the relative humidity of the surrounding air only exceeding 85% for a few weeks per year	Cold roof, ground floors, timber frame walls - external walls where member is protected from direct wetting
	Climatic conditions leading to higher moisture contents than in service class 2.	External uses - fully exposed.

Load duration class:

The load duration classes are characterized by the effect of constant loads acting for a certain period of time in the life of a structure. For a variable action the appropriate class shall be determined on the basis of an estimate of the typical variation of the load with time. Loads shall be assigned to one of the loads in the table below:
EN 1995 – Eurocode 5 Describes five load duration classes.

k_{mod} Factor

After defining the Service class and load duration class it is possible, using table 3.1 in the Eurocode 5, to get the value of the k_{mod} factor

k_{mod} modification factor values according to EN 1995-1-1 (Eurocode 5)					
Service class	Load duration class				
	Permanent	Long term	Medium term	Short term	Instantaneous
1	0,60	0,70	0,80	0,90	1,10
2	0,60	0,70	0,80	0,90	1,10
3	0,50	0,55	0,65	0,70	0,90

Spacing and egde distances for fasteners (nails and screws) for timber structures:

Standard EN 1995 – Eurocode 5 describes limitation regarding fasteners spacing and edge distances. It is important to get to know and follow those limitations. Effective no. of fasteners in the row parallel to the timber grain should be calculated according to EC5, unless fasteners are staggered at least 1d (d – diameter of fastener). For CSA5,0 connector screws it is needed to fulfill the same spacing and edge distances as per CNA4,0 ringshank nails. For the fasteners used with the connectors, spacing and the edge distances are limited by the ETA and does not have to fulfill any other regulation.

TECHNICAL INFORMATION

The product description contains information the type of material, quality and anti-corrosion protection.

Coatings used	
YZG	**Electroplated Zinc:** This coating system consists of an electroplated zinc base layer with a top coat. It provides corrosion resistance that is adequate for medium corrosion environments.
EZG	**Electrogalvanised:** This coating system consists of a thin electroplated zinc base layer. It provides corrosion resistance that is adequate for low corrosion environments.
SHR 15 µm	**Sherardizing (thermal diffusion):** Thermal diffusion process in which articles are heated in the presence of a sherardizing mixture consisting of zinc dust with or without an inert material. The process is carried out in a slowly rotating closed container at temperatures ranging from about 300 °C to 500 °C. The normal processing temperature is below the melting point of zinc (419 °C).
Zn 20 µm	**Sendzimir Galvanizing:** Anticorrosive coating obtained through the hot-dip galvanizing after rolling of the steel, with a "continuous" process of: surface preparation, dipping into cast zinc at about 450°C. The zinc coating thickness is normally about 15 µm for the Z 200 type (200 gr/m2) and about 20 µm for the Z 275 type (275 gr/m2)
HDG 50 µm	**Hot Dip Galvanised:** Products are dipped in melted zinc 550-560°c, chemical reaction between the steel and the zinc. It provides a good corrosion resistance in most environments.
ALU	**Aluminium:** Can withstand rain but shouldn't be used together with other metals where there is a risk of galvanic corrosion. Certain Aluminum alloys can be used outdoor together with 1.4401, 1.4404 and 1.4571 in the absence of chlorides.
A4	**Acid Proof Stainless Steel 316, 316L –A4 (1.4401, 1.4404 …):** Type 316 stainless steel is a nickel-chromium austenitic grade of stainless steel with 2-3% Molybdenum. Type 316 stainless steel is not hardened by heat treatment and is inherently nonmagnetic. It provides a level of corrosion protection suitable for severe environments.

Icon

AD — Anchor Designer -software

CS — Connector Selecor - software

DWG — DWG library 2D, 2D Revit, 3D and 3D Revit

Cracked concrete

Non-cracked concrete

R30 — Fire Resistance

Installation in wet boreholes

Installation in the seismic zone

Spacings and edge distances

TECHNICAL INFORMATION

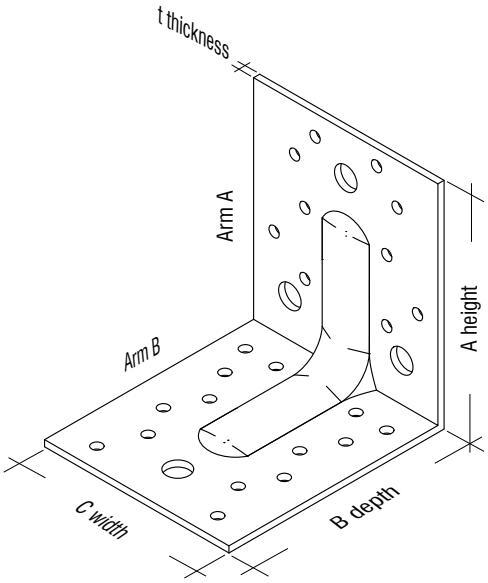
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ABR70	70	70	55	2,0	6-Ø5 1-Ø8,5	6-Ø5 1-Ø8,5
ABR90	90	90	65	2,5	10-Ø5 1-Ø11	10-Ø5 1-Ø11
ABR105	105	105	95	3,0	10-Ø5 3-Ø11	14-Ø5 1-Ø11

Catalogue product number

Dimensions: A, B, C, t
The columns contain product dimensions height, width, depth and thickness

The columns contain information about the number of holes in the connector.
Not every case the number of holes = number of fasteners



Connection type

Characteristic capacity is given for timber class C24 timber. The characteristic carrying capacity is defined as the average value in statistical terms on the basis of tests made for repetitive fastening conditions in accordance with the applicable standards.

Beam to Beam connection (full nailing)

Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 connectors per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABR7015	6 pcs.	8 pcs.	CNA4,0x35	5,2	6,7	$4,2/k_{mod}^{0,3}$
			CNA4,0x60	6,1	7,3	$4,8/k_{mod}^{0,3}$
ABR9020	8 pcs.	10 pcs.	CNA4,0x35	9,7	9,4	$4,6/k_{mod}^{0,7}$
			CNA4,0x60	14,9	13,0	$5,8/k_{mod}^{0,6}$

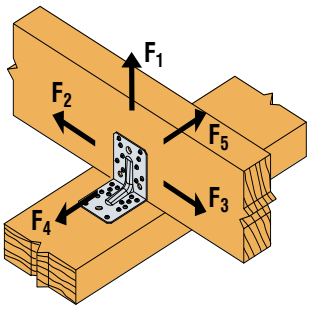
Catalogue product number

Fasteners quantity

Fasteners type

Capacity for each force direction

Capacity corresponds to the force of the load scheme. The capacity R_x corresponds to the force F_x



NOTE

Pictures in the catalog may slightly differ from their actual state (eg color, details). Product drawings are for reference only and have been made in order to properly identify technical data. In order to verify the correctness of the offer or in case of doubt, please contact the sales department or the technical support department.

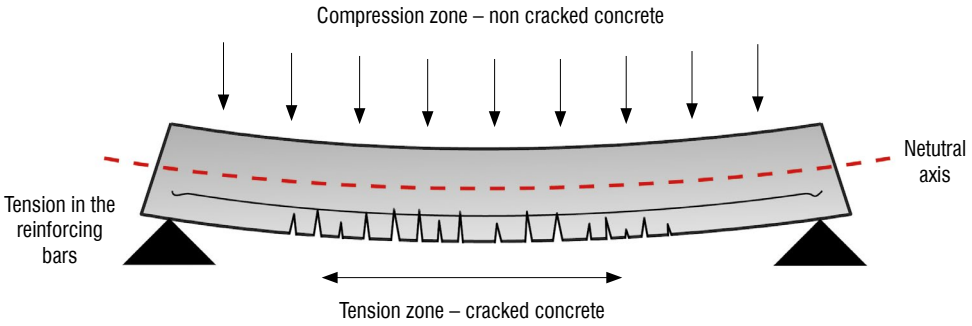
email: poland@strongtie.com or pohone 22 865 22 00.

Simpson Strong-Tie reserves the right to update the ETA, reference document and change the technical parameters of the products presented in this catalog, without informing the users of the catalog. Using the load capacity, nailing patterns, load scheme and any other technical parameters, the catalog user is obliged to verify their correctness with the relevant ETA, reference document.
The current European Technical Assessments (ETA) and Declarations of Performance (DoP) are available on the website www.strongtie.pl or made available on request after prior contact with the technical support department.

Anchorage System

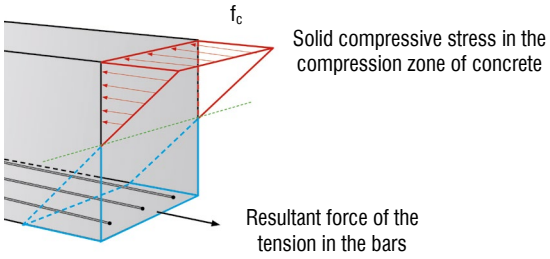
chemical and mechanical anchors

Concrete structures – basic information



Theory of concrete design

Concrete as a building material has very good compression resistance, but around ten times less resistance for tension. In the design process in general the tension resistance of concrete is ignored. The theory of concrete structures reinforced with steel bars is based on the assumption the all the tension is resisted by the steel bars. For that reason, in the zones of the concrete elements where tension appears, steel bars need to be used to take the tesion load.



Definition of cracked and non-cracked concrete

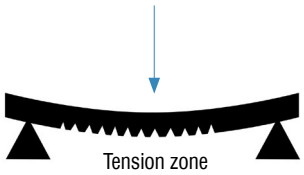
Cracked and non-cracked concrete terms are not related to the age of the structure or any defects of concrete surface or cracks and gaps in the concrete due to corrosion of concrete.

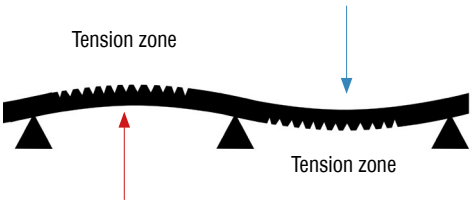
Basically, cracked concrete can be identified with the tension zone and non-cracked concrete with the compression zone of the concrete element.

Cracking of concrete element in the tension zone is natural process and is a result of low resistance for tension of concrete as a material.

In most of the cases cracks with width not exciding 0,4mm don't have negative influence on the load-carrying capacity and durability of the structure.

In typical bent elements models (simply supported beams loaded downward) tension zone is the bottom part of the element. But this is not a general rule, there might appear some models or loads that will cause tension zone in the top part of the element. Some examples are shown on the pictures. When identifying the tension and compression zone isn't easy, the worst case scenario should be taken under further consideration – tension zone (cracked concrete) or the designer should analyze the situation according to ETAG 001, annex C, p.4.1.

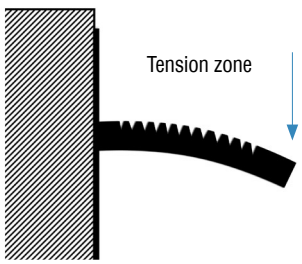




Concrete can be treated as non-cracked if the following formula is true: $\sigma_L + \sigma_R < 0$

σ_L - Stresses in the concrete due to external loads, including those applied by the fastener

σ_R - Stresses in the concrete due to intrinsic imposed deformations (such as shrinkage) or extrinsic imposed deformations (such as displacement of supporting members of structure, thermal expansion/contraction, etc.). In the absence of a detailed analysis, EN 1992-4 suggests $\sigma = 3$MPa (according to EC2).



non-cracked concrete

cracked concrete

TECHNICAL INFORMATION anchorage system

European Technical Assessments – Anchor options

Option No	Cracked and non-cracked concrete	Non-cracked concrete	C20/25	C20/25 for C50/60	F_{rk} Same for all directions	F_{rk} Different for different directions	Characte-ristic edge distance c_{cr}	Charac-teristic spacing s_{cr}	Minimum edge distance c_{min}	Minimum spacing s_{min}	Design method
1	●			●		●	●	●	●	●	A
2	●		●			●	●	●	●	●	
3	●			●	●		●	●	●	●	B
4	●		●		●		●	●	●	●	
5	●			●	●		●	●			C
6	●		●		●		●	●			
7		●		●		●	●	●	●	●	A
8		●	●			●	●	●	●	●	
9		●		●	●		●	●	●	●	B
10		●	●		●		●	●	●	●	
11		●		●	●		●	●			C
12		●	●		●		●	●			

Based on the intended application of the anchor manufacturer may choose one of the 12 options for testing during certification process. The more testing is involved, the more information designer will receive for design calculation. Every anchor option is related to the correct ETAG 001 design method

CRACKED / NON-CRACKED CONCRETE

- Anchor for both cracked and non-cracked concrete
- Anchor for non-cracked concrete only

CONCRETE CLASS

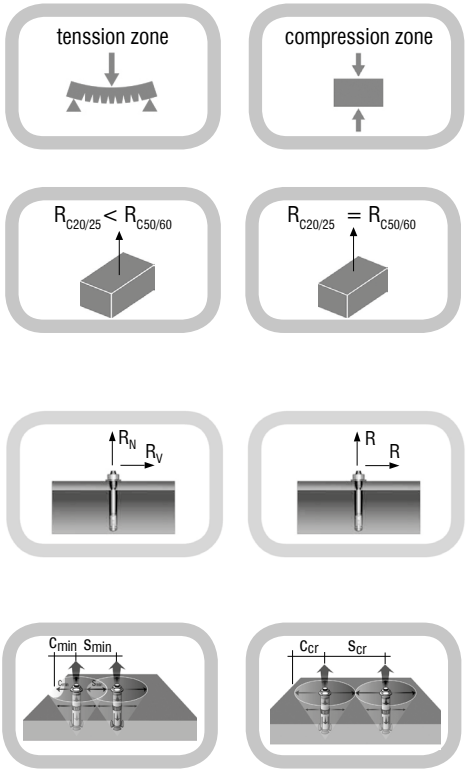
- Anchor capacity differs between classes (options 1, 3, 5, for cracked concrete and options 7, 9, 11 for non-cracked concrete). Testing conducted on concrete classes C20/25 and C50/60
- All testing conducted on the concrete class C20/25. As a result for higher classes, the same values are assumed. (options 2, 4, 5, for cracked concrete and options 8,10, 12 for non-cracked concrete)

LOAD DIRECTION

- Anchor capacity stated for all load directions (options 1 and 2 for cracked concrete and options 7 and 8 for non-cracked concrete)
- Stated capacity value related to all load directions (options 3 to 6 for cracked concrete and options 9 to 12 for non-cracked concrete)

ANCHOR SPACING AND EDGE DISTANCE

- Tested both characteristic and minimum spacing s_{cr} and s_{min}. Tested both characteristic and minimum Edge distance c_{cr} and cmin (options 1 to 4 for cracked concrete and options 7 to 10 for non-cracked concrete). For design process it allows to interpolate the anchor capacity for different spacing and edge distance according to design method.
- If the characteristic spacing and characteristic edge distance are the only values stated, then. Those values should be treated as minimum. (options 5 and 6 for cracked concrete and options 11 and 12 for non-cracked concrete).



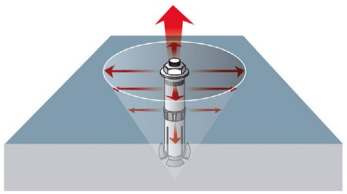
DESIGN METHODS

For the design of anchorages in the ultimate limit state, there are three different design methods available. The linkage of the design methods and the required tests for admissible service conditions is given in ETAG 001. The design method to be applied is given in the relevant ETA.

- **Design method A** - In design method A it shall be shown that all equations are observed for all loading directions (tension, shear) as well as all failure modes (steel failure, pull-out failure, concrete cone failure, splitting failure, concrete edge failure and concrete pry-out failure). In case of a combined tension and shear loading (oblique loading) the condition of interaction shall be observed.
- **Design method B** - Design method B, is based on a simplified approach in which the design value of the characteristic resistance is considered to be independent of the loading direction and the mode of failure.
- **Design method C** is based on a simplified approach in which only one value for the design resistance F_{Rd} is given, independent of loading direction and mode of failure. The actual spacing and edge distance shall be equal to or larger than the values of s_{cr} and c_{cr}. F_{Rd}, s_{cr} and c_{cr} are given in the relevant ETA.

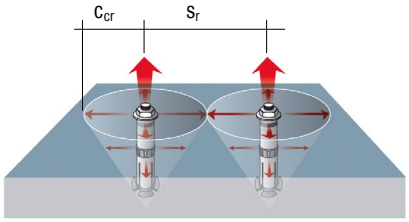
Anchor spacing and concrete edge distance

Full capacity



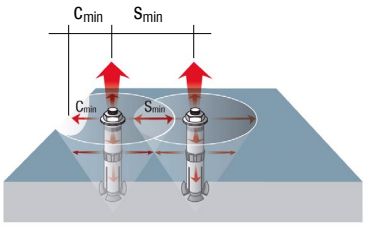
Single anchor is located in the middle of the concrete element. There are no reduction due to anchors spacing or concrete edge distances.
Full stress cone in the concrete can be created and anchor can reach full capacity.

Characteristic spacing and edge distance



Distance between the anchors in the group is at least equal to the characteristic spacing s_{cr}. Distance between the each anchor and the concrete edge is at least equal to the characteristic edge distance c_{cr}. Full stress cones in the concrete can be created and anchors can reach full capacity.

Minimum spacing and edge distance



Distance between anchors in the group and Edge distance is less than characteristic values s_{cr}, c_{cr}. Full stress cones in the concrete cannot be created and anchors will not reach full capacity. In such a cases it is recommended to design connection using our free Anchor Designer software.

Anchor load-carrying capacity

Anchor load-carrying capacities published in the following catalogue are design capacities (N_{Rd}, V_{Rd}) including partial safety factors, material safety factors for anchors which values are stated in the relevant ETA. Those safety factors relates the particular product and have been assessed during certification and testing. Capacities refers to non-reinforced concrete and reinforced concrete with bars at spacing s ≥ 15cm for any bar diameter or at spacing s ≥ 10cm if the bar diameter is 10mm or less. Shear capacity is stated for a single anchor without edge distance reduction. For the anchorage close to the edge (c ≤ max{$10h_{ef}$; 60d}) it is designer responsibility to check the ETAG001 pry-out failure mechanism according to annex C, design method A. If the distances between the anchors in the group are smaller than the characteristic values (i.e. s ≤ $s_{cr,\ M}$ and/or c ≤ $c_{cr,N}$) designer needs to follow the calculation according to ETAG 001, annex C, design method A or run the calculation using Simpson Strong-Tie Anchor Designer software.

How to choose the correct anchor lenght?

To specify the anchor length it is needed to know anchor diameter and length. Anchor diameter in many cases depends on the diameter of the hole in the fixing element. To reach the full capacity of the anchor it is needed to provide correct embedment depth in the concrete. The optimum embedment depths have been chosen for each diameter of the anchor. It is not needed to increase the embedment depth of the anchor by using longer than recommended anchors as it does not guarantee better anchorage capacity. By increasing embedment depth concrete cone resistance will be bigger but the other failure mechanism might become decisive (i.e. steel failure). For the anchors of the same diameter choosing anchor length should be based on the thickness of the fixing element. Simpson Strong-Tie anchors include the information about the maximum thickness of the fixture in the product code (i.e. WA M8x103/**40**).

WA M8x103/40

WA	M8	x	103	/	40
Anchor type	Anchor diameter		Anchor length		Maximum thickness of the fixing element

Definition of the symbols used in the anchors chapter

c_{cr}	Characteristic concrete edge distance to reach the full anchor capacity.	M_{rd}	Design moment capacity
$c_{cr,N}$	Characteristic concrete edge distance to reach the full anchor tension capacity.	N_{rd}	Design tension capacity
$c_{cr,V}$	Characteristic concrete edge distance to reach the full anchor shear capacity.	V_{rd}	Design shear capacity
c_{min}	Minimum concrete edge distance	s_{cr}	Characteristic anchors spacing to reach the full capacity
d_0	Diameter	$s_{cr,N}$	Characteristic anchors spacing to reach the full tension capacity.
d_f	Hole diameter in the fixture	s_{min}	Minimum anchors spacing
h_{ef}	Effective embedment depth	sw	Wrench size
h_{min}	Minimum base material thickness	T_{inst}	Installation torque
h_1	Depth of drilling	t_{fix}	Fixture thickness

WA Wedge Anchor Bolt

CE ETA 11/0080

Throughbolt WA is an approved expansion anchor for simple and economical applications. Easy to install with high performances and small space and edge distances for use in non-cracked concrete..

Application:
Option 7 (non-Cracked Concrete). Wide range of sizes from M6 to M16.
High load capacity. Optimised design for fast installation.
Suitable for small spacings between anchors.
Suitable for small edge distances.

Material:
Carbon steel, zinc plated and blue passivated

EZG 5 µm CL.2 AD

Available Sizes

Model No.	Type		Anchor size	Ø Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Length	Thread Length
				$d_0 \times h_1$	t_{fix}	d_f	h_{ef}	L	f
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
WA06060	WA6/5	M6 x 60	M6	6 x 55	5	7	40	60	30
WA06065	WA6/10	M6 x 65			10			65	30
WA06075	WA6/20	M6 x 75			20			75	35
WA06085	WA6/30	M6 x 85			30			85	40
WA08068	WA8/5	M8 x 68	M8	8 x 65	5	9	45	68	40
WA08073	WA8/10	M8 x 73			10			73	45
WA08083	WA8/20	M8 x 83			20			83	45
WA08093	WA8/30	M8 x 93			30			93	50
WA08103	WA8/40	M8 x 103			40			103	50
WA08113	WA8/50	M8 x 113			50			113	60
WA08133	WA8/70	M8 x 133			70			133	85
WA08163	WA8/100	M8 x 163			100			163	100
WA10078	WA10/5	M10 x 78	M10	10 x 65	5	12	50	78	40
WA10083	WA10/10	M10 x 83			10			83	40
WA10093	WA10/20	M10 x 93			20			93	50
WA10103	WA10/30	M10 x 103			30			103	50
WA10113	WA10/40	M10 x 113			40			113	60
WA10123	WA10/50	M10 x 123			50			123	60
WA10143	WA10/70	M10 x 143			70			143	70
WA10173	WA10/100	M10 x 173			100			173	80
WA12104	WA12/5	M12 x 104	M12	12 x 70	5	14	65	104	60
WA12109	WA12/10	M12 x 109			10			109	60
WA12119	WA12/20	M12 x 119			20			119	70
WA12129	WA12/30	M12 x 129			30			129	70
WA12139	WA12/40	M12 x 139			40			139	80
WA12149	WA12/50	M12 x 149			50			149	100
WA12179	WA12/80	M12 x 179			70			179	110
WA12199	WA12/100	M12 x 199			100			199	110
WA12219	WA12/120	M12 x 219			120			219	125
WA12239	WA12/140	M12 x 239			140			239	125
WA12259	WA12/160	M12 x 259			160			259	125

WA Wedge Anchor Bolt

CE ETA 11/0080

SIMPSON Strong-Tie®

WA16151	WA16/30	M16 x 151	M16	16 x 110	30	18	80	151	80
WA16171	WA16/50	M16 x 171			50			171	80
WA16201	WA16/80	M16 x 201			80			201	100
WA16221	WA16/100	M16 x 221			100			221	100
WA16261	WA16/140	M16 x 261			140			261	110

Technical data for anchor WA

Anchor size				**M6**	**M8**	**M10**	**M12**	**M16**
Design tension loads for single anchors with no edge distances or spacings [1) 4)]								
N_{Rd}	Non-cracked concrete[3)] 	C20/25	[kN]	6,0	8,0	10,7	17,6	24,1
		C30/37	[kN]	6,5	9,8	13,0	21,5	29,4
		C40/50	[kN]	7,0	11,3	15,0	24,9	34,0
		C50/60	[kN]	7,4	12,4	16,5	27,3	37,3
Design shear load for single anchors with no edge distances or spacings [1) 2) 4)]								
V_{Rd}	Non-cracked concrete[3)] 	C20/25	[kN]	4,8	7,6	11,9	20,0	37,6
		C30/37	[kN]			13,6		
		C40/50	[kN]					
		C50/60	[kN]					
Design bending moments [1)]								
M_{Rd}			[Nm]	8,0	19,3	38,0	66,0	155,3

Spacings, edge distances and member thicknesses							
			M6	M8	M10	M12	M16
Effective embedment depth	h_{ef}	[mm]	40	45	50	65	80
Characteristic anchor spacing	$S_{cr,N}$	[mm]	120	135	150	195	240
Minimum anchor spacing	S_{min}	[mm]	30	40	50	70	90
Characteristic edge distance	$C_{cr,N}$	[mm]	60	67,5	75	97,5	120
Minimum edge distance	C_{min}	[mm]	40	40	50	70	90
Minimum member thickness	h_{min}	[mm]	100	100	120	140	170

Installation data							
Drill hole diameter	d_0	[mm]	6	8	10	12	16
Drill hole diameter	$h_1 \geq$		55	65	70	90	110
Clearance hole in the fixture	d_f		7	9	12	14	18
Wrench size	sw		10	13	17	19	24
Torque moment	T_{inst}	[Nm]	8	15	30	50	100

1. The design capacities have been calculated using the partial safety factors for resistances stated in ETA. The loading figures are valid for unreinforced concrete and reinforced concrete with a rebar spacing s ≥ 15 cm (any diameter) or with a rebar spacing s ≥ 10 cm, if the rebar diameter is 10 mm or smaller.
2. The figures for shear are based on a single anchor without influence of concrete edges. For anchorages close to edges (c ≤ max [10 h_{ef}; 60d]) the concrete edge failure shall be checked per ETAG 001, Annex C, design method A.
3. Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R < 0$. absence of detailed verification $\sigma_R = R = 3$ N/mm² can be assumed ($\sigma_L$equals the tensile stress within the concrete induced by external loads, anchors loads included).
4. For combined tension and shear loads or anchor groups and/or in case of edge influence, a calculation per ETAG 001, Annex C, design method A shall be performed.

BOAXII Throughbolt

CE ETA 08/0276

Throughbolt BOAX is an approved expansion anchor for simple and economical applications. Easy to install with high performances and small space and edge distances for use in non-cracked and cracked concrete.

Application:

Option 1 (non-cracked and cracked concrete). Wide range of sizes from M8 to M16.
High load capacity. Optimised design for fast installation.
Suitable for small spacings between anchors.
Suitable for small edge distances.

Material:

Carbon steel, zinc plated / A4 stainless steel

EZG 5 µm | CL.2 | A4 | CL.3 | R30 | AD

Available Sizes

Type	Model No. BOAX-II zinc plated	Model No. BOAX-II A4 stainless steel	Anchor Size	Ø Depth of Drilled Hole	Max. Fixture Thickness	Ø Fixture Hole	Eff. Embedment Depth	Length	Thread Length
				d_0 x h_1	t_{fix}	d_f	h_{ef}	L	f
			[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
BoAX-II 8/10	BOAXII08045010	BOAXII08045010 A4	M8	8 x60	10	9	45	72	32
BoAX-II 8/30	BOAXII08045030	BOAXII08045030 A4			30			92	52
BoAX-II 8/50	BOAXII08045050	BOAXII08045050 A4			50			112	72
BoAX-II 8/85	BOAXII08045085	-			85			147	107
BoAX-II 10/10	BOAXII10060010	BOAXII10060010 A4	M10	10 x 75	10	12	60	92	47
BoAX-II 10/20	BOAXII10060020	BOAXII10060020 A4			20			102	57
BoAX-II 10/30	BOAXII10060030	BOAXII10060030 A4			30			112	67
BoAX-II 10/50	BOAXII10060050	BOAXII10060050 A4			50			132	87
BoAX-II 10/80	BOAXII10060080	-			80			162	115
BoAX-II 12/5	BOAXII12070005	BOAXII12070005 A4	M12	12 x 90	5	14	70	103	53
BoAX-II 12/20	BOAXII12070020	BOAXII12070020 A4			20			118	68
BoAX-II 12/30	BOAXII12070030	BOAXII12070030 A4			30			128	78
BoAX-II 12/50	BOAXII12070050	BOAXII12070050 A4			50			148	98
BoAX-II 12/65	BOAXII12070065	BOAXII12070065 A4			65			163	113
BoAX-II 12/80	BOAXII12070080	-			80			178	115
BoAX-II 16/5	BOAXII16085005	BOAXII16085005 A4	M16	16 x 110	5	18	85	123	65
BoAX-II 16/20	BOAXII16085020	BOAXII16085020 A4			20			138	80
BoAX-II 16/50	BOAXII16085050	BOAXII16085050 A4			50			168	110
BoAX-II 16/60	BOAXII16085060	BOAXII16085060 A4			60			178	115

BOAXII Throughbolt

CE ETA 08/0276

SIMPSON Strong-Tie®

Technical data BOAX-II carbon steel zinc plated

				Anchor size	M8	M10	M12	M16
Design tension loads for single anchors with no edge distances or spacings [1) 4)]								
N_{Rd}	Cracked concrete[3)]	C20/25	[kN]		2,8	5,0	6,7	13,3
		C30/37	[kN]		3,1	5,5	7,3	14,7
		C40/50	[kN]		3,3	6,0	8,0	16,0
		C50/60	[kN]		3,6	6,4	8,5	17,1
	Non-cracked concrete[3)]	C20/25	[kN]		5,0	8,9	11,1	23,3
		C30/37	[kN]		5,5	9,8	12,2	25,7
		C40/50	[kN]		6,0	10,7	13,3	28,0
		C50/60	[kN]		6,4	11,4	14,2	29,9
Design shear load for single anchors with no edge distances or spacings [1) 2) 4)]								
V_{Rd}	Cracked concrete[3)]	C20/25	[kN]		7,2	14,4	18,4	35,2
		C30/37	[kN]		8,0	14,4	18,4	35,2
		C40/50	[kN]		8,0	14,4	18,4	35,2
		C50/60	[kN]		8,0	14,4	18,4	35,2
	Non-cracked concrete[3)]	C20/25	[kN]		8,0	14,4	18,4	35,2
		C30/37	[kN]		8,0	14,4	18,4	35,2
		C40/50	[kN]		8,0	14,4	18,4	35,2
		C50/60	[kN]		8,0	14,4	18,4	35,2
Design bending moments [1)]								
M_{Rd}			[Nm]		16,8	38,4	57,6	148,8

Technical data BOAX-II A4

				Anchor size	M8	M10	M12	M16
Design tension loads for single anchors with no edge distances or spacings [1) 4)]								
N_{Rd} A4	Cracked concrete[3)]	C20/25	[kN]		2,8	**5,0**	**6,7**	**13,3**
		C30/37	[kN]		3,1	5,5	7,3	14,7
		C40/50	[kN]		3,3	6,0	8,0	16,0
		C50/60	[kN]		3,6	6,4	8,5	17,1
	Non-cracked concrete[3)]	C20/25	[kN]		5,0	8,9	11,1	23,3
		C30/37	[kN]		5,5	9,8	12,2	25,7
		C40/50	[kN]		6,0	10,7	13,3	28,0
		C50/60	[kN]		6,4	11,4	14,2	29,9
Design shear load for single anchors with no edge distances or spacings [1) 2) 4)]								
V_{Rd} A4	Cracked concrete[3)]	C20/25	[kN]		7,2	13,6	20,0	37,6
		C30/37	[kN]		8,8	13,6	20,0	37,6
		C40/50	[kN]		8,8	13,6	20,0	37,6
		C50/60	[kN]		8,8	13,6	20,0	37,6
	Non-cracked concrete[3)]	C20/25	[kN]		8,8	13,6	20,0	37,6
		C30/37	[kN]		8,8	13,6	20,0	37,6
		C40/50	[kN]		8,8	13,6	20,0	37,6
		C50/60	[kN]		8,8	13,6	20,0	37,6
Design bending moments [1)]								
M_{Rd}			[Nm]		17,6	36,0	63,2	160,0

BOAXII Throughbolt

ETA 08/0276

Spacings, edge distances and member thicknesses

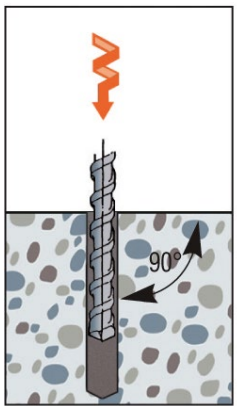
	Anchor size		M8	M10	M12	M16
Effective embedment depth	h_{ef}	[mm]	45	60	70	85
Charakterystyczny rozstaw kotew	$S_{cr,N}$	[mm]	135	180	210	255
Minimum anchor spacing	S_{min}	[mm]	50	55	60	70
Charakterystyczna odległość od krawędzi	$C_{cr,N}$	[mm]	68	90	105	128
Minimum edge distance	C_{min}	[mm]	50	50	55	85
Minimum member thickness	h_{min}	[mm]	100	120	140	170

Installation data

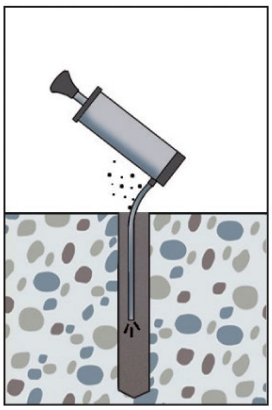
Drill hole diameter	d_0	[mm]	8	10	12	16
Drill hole diameter	$h_1 \geq$		60	75	90	110
Clearance hole in the fixture	d_f		9	12	14	18
Wrench size	sw		13	17	19	24
Torque moment	T_{inst}	[Nm]	20	35	50	120

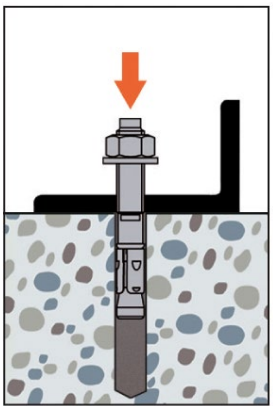
1. The design loads have been calculated using the partial safety factors for resistances stated in ETA.The loading figures are valid for unreinforced concrete and reinforced concrete with a rebar spacing s ≥ 15 cm (any diameter) or with a rebar spacing s ≥ 10 cm, if the rebar diameter is 10 mm or smaller.
2. The figures for shear are based on a single anchor without influence of concrete edges. For anchorages close to edges (c ≤ max [10 h_{ef}; 60d]) the concrete edge failure shall be checked per ETAG 001, Annex C, design method A.
3. Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R < 0$. absence of detailed verification
$\sigma_R = R = 3$ N/mm² can be assumed ($\sigma_L$equals the tensile stress within the concrete induced by external loads, anchors loads included).
4. For combined tension and shear loads or anchor groups and/or in case of edge influence, a calculation per ETAG 001, Annex C, design method A shall be performed.

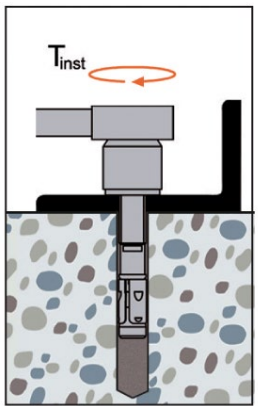
BOAXII Installation



1. Drill hole


2. Clean hole (blowing)


3. Insert anchor through the fixture



4. Apply recommended installation torque with a calibrated torque wrench.

Anchor Designer
software for anchoring system

ANCHOR DESIGNER SOFTWARE:

This is a new design software by Simpson Strong-Tie for structural engineers and designers. Anchor Designer allows the user to easily design connection using mechanical and chemical Simpson Strong-Tie anchors according to ETAG 001 annex C or EOTA TR029.

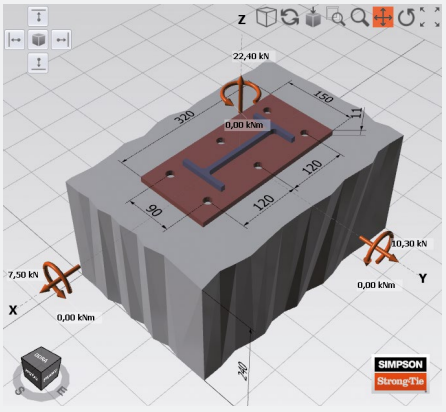
Anchor Designer will quickly guide the designer through the calculations and will conduct any necessary analysis to fulfill the Limit States as well as will suggest the product that will be most efficient in the connection.

The software allows the designer to input any necessary data needed for the calculation: Cracked/non-cracked concrete, concrete class, loads directions, steel plate geometry etc.

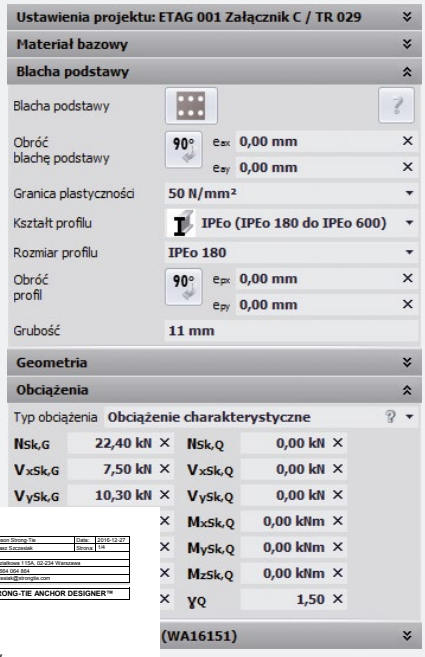
Design and calculation are done in the real time while the designer is changing the data in the interactive 3D model. Software is able to specify any Simpson Strong--Tie mechanical and chemical anchors. Anchor Designer give possibilities to design Anchorage connections with up to 16 anchors in the group. After the design process Anchor Designer creates calculation output that can be printed or saved as PDF file and attached to the design documentation.

NTERACTIVE 3D DESIGN MODEL

One of the biggest advantages of Anchor Designer is the fact that the software is user-friendly and process of data input is very easy. The 3D interactive design model is very important feature of the program. It allows the user to see the data being implemented into the model in the real time. Design model give possibility to check if the anchorage model is properly defined. All dimensions are visible on the model and can be modified by simply clicking on them



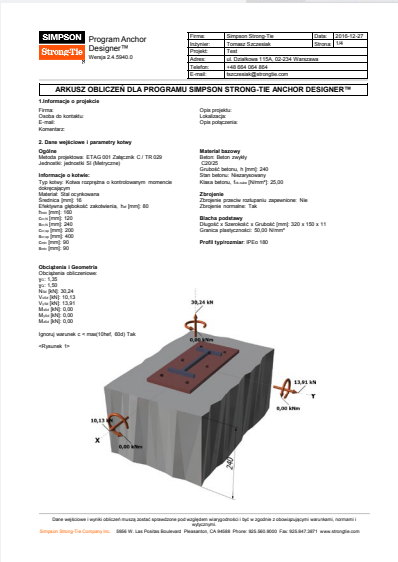
EASE OF DATA INPUT AND DESIGN PROCESS

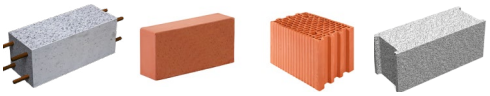


DOCUMENTATION

Anchor designer after calculation Generates the design summary as a document which can be attached to the design documentation of the structure.

The output includes the input data, design procedure, calculation, Limit State check and all additional information that might be critical for correct installation.



POLY - GP Green	AT - HP Blue i Winter	SET - XP
Chemical anchor for general purposes	**Chemical anchor for non-cracked concrete**	**Pure Epoxy chemical anchor for cracked concrete**
Green	Blue Winter	
		
		
		
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Basic chemical anchor Poly-GP for general purposes to be applied in the masonry. Dedicated for solid and hollow masonry. Can be used in the temperature range from -5°C up to 30°C. Working and curing time set to match this temperature range – specified in the working/curing time table.	AT-HP BLUE is Unique type of chemical anchor, thanks to the fact that the user does not need to know the temperature to know if the anchor cured and can be loaded. The innovative feature is the color-proof. During the installation the anchor is blue. After the curing process the anchor is gray. For winter application, AT-HP winter version is available. AT-HP can be applied in masonry (solid and hollow), non-cracked concrete with threaded rods, as well as for rebar application in the concrete	Pure epoxy chemical anchor design for cracked concrete application (tension zone). Thanks to lack of shrinkage can be used in large diameter holes. ETA covers seismic application. Can be used with threaded rods in cracked and non-cracked concrete as well as for rebar in the concrete.

POLY-GP General Purpose Resin

CE ETA 13/0415

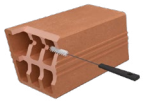
Chemical anchor for use in masonry. Specially formulated for light or medium duty fixing into hollow or solid base materials.
Poly-GP300 is easy to use and fast curing, it enables good performance when used in applications such as fixing architectural steel work, cable trays, hand rails and gates.
For proper fastening of the threaded rods in the masonry elements, perform all the actions shown on the product label.

Model No.	Type	Volume	Dispensing Tools	Qty in box
POLY-GP Green 300-PL	Green	300 ml	DT300*	12
POLY-GP 380-PL	Gray	380 ml	DT380	12

* standard silicone dispensing tools

POLY-GP Installation

1. Drill a hole to the correct diameter and depth using a rotary machine



2. The hole shall be cleaned by at least 2 brushing operations

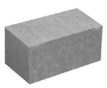
3. Insert the sleeve into the hole

4. Place the mixer at the bottom of the sleeve and inject the mortar by withdrawing the nozzle slowly step by step after each trigger until the sleeve is completely filled up.

5. Insert a clean, oil free threaded rod, turning slowly until the stud contacts the bottom of the sleeve.

6. After required curing time, the anchor can be loaded. Apply the installation torque T_{inst} using a calibrated torque wrench.

Performance POLY-GP + threaded rod LMAS carbon steel, grade 5.8, zinc plated

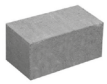
Block type		Block parameters	Sleeve size	Anchor size	Characteristic capacity tension N_{Rk} 1)	Characteristic capacity shear V_{Rk} 1)
Solid clay bricks		$p \geq 1830$ kg/m^3 $f_b = 22$ MPa	N/D	M8	2,5	2,5
				M10	2,5	2,5
				M12	2,5	2,5
Hollow clay brick POROTON– Type 2 according to EN 771-1 – LD		$p \geq 650$ kg/m^3 $f_b = 8$ MPa	16 x 130	M8	1,5	1,5
				M10	1,2	1,2
				M12	2,0	2,0
Autoclaved aerated concrete blocks according to EN 771 – 4		$p \geq 350$ kg/m^3 $f_b = 3$ MPa	N/D	M8	0,9	0,9
				M10	1,2	1,2
				M12	1,2	1,2

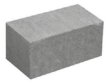
1) To obtain the design load capacity, the characteristic values should be divided by the safety factor $\gamma_M = 2,5$ (according to ETA)

POLY-GP General Purpose Resin

CE ETA 13/0415

SIMPSON Strong-Tie

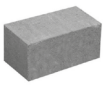
Edge distances and spacings					
Characteristic anchor spacing	S_{cr}	[mm]	20 x d	L_{unit}	20 x d
Minimum anchor spacing	S_{min}		50	100	50
Characteristic edge distance	C_{cr}		10 x d	0,5 x L_{unit}	10 x d
Minimum edge distance	C_{min}		50	100	50

Installation data											
Anchor size			**M8**	**M10**	**M12**	**M8**	**M10**	**M12**	**M8**	**M10**	**M12**
Drill hole diameter	d_0	[mm]	10	12	14	16			10	12	14
Sleeve size	d_s x l_s		N/D			16 x 130			N/D		
Clearance hole in the fixture	d_{fx}		9	12	14	9	12	14	9	12	14
Embedment depth	h_{ef}		80			130			80		
Drill hole depth	h_1		85			135			85		
Torque moment	T_{inst}	[Nm]	4	6	8	4	6	6	2	3	5

Curing schedule POLY-GP			
Chemical anchor temperature	Temperature of Anchorage Base	Working Time [1]	Curing Time [2]
5°C	-5°C	25 min	4h
5°C	0°C	15 min	3h
5°C	5°C	12 min	2h 30 min
10°C	10°C	8 min	1h 15 min
15°C	15°C	7 min	55 min
20°C	20°C	4 min	30 min
30°C	30°C	2 min	20 min

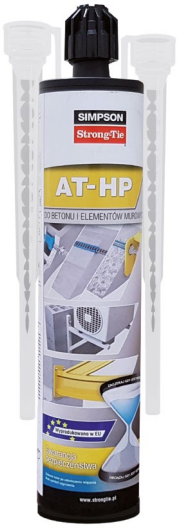
[1] Working time is the maximum time that may elapse from resin injection until the insertion of the rod into the hole. Assembling the bar after exceeding the working time can destroy the already formed bonds, so that the anchorage will not reach the full load capacity.

[2] Curing time is the time after which anchorage obtains the declared load. After the curing time has elapsed, he connection can be loaded.

Usage chemical anchors using threaded rods in brick materials [ml]			
Block type			
Drill hole diameter:	**85 mm**	**Sleeve 16x130**	**85 mm**
M8	2,40	21,46	2,40
M10	2,94		2,94
M12	3,47		3,47

AT-HP High Performance Resin

CE ETA 14/0383



AT-HP is a styrene free methacrylate resin suitable for high performance fixing applications of threaded rods and rebar into concrete. easy to dispense and fast curing, specifically designed for structural fixings and very technical construction sites.

ETA-11/0139 - post installed rebar application
ETA-14/0383 - fixing non-cracked concrete
ETA-13/0416 - fixing in masonry

Model No.	Type	Valume	Dispensing Tools	Qty in box
AT-HP280-BLUE-PL	Blue	280 ml	DT300*	12
AT-HP380-BLUE-PL	Blue	380 ml	DT380	12
AT-HP280W-PL	Gray / Winter	280 ml	DT300*	12
AT-HP380W-PL	Gray / Winter	380 ml	DT380	12

* standard silicone dispensing tools

AT-HP Installation (concrete)

1. Drill a hole to the specified diameter (d_0) and effective embedment depth (h_{ef}) using a hammer drill.

2. The drill hole must be cleaned by blowing and brushing operations – depending on the anchorage base (concrete, solid masonry),

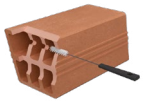
3. Fill up the hole approximately 2/3rd with mortar starting from the bottom of the cleaned drilled hole. Withdraw the nozzle slowly step by step after each trigger to avoid creating air pockets.

4. Insert a clean, oil free threaded rod, turning slowly until the stud contacts the bottom of the hole or until to the marking of h_{ef}. After installing the stud the annular gap must be completely fi lled with adhesive mortar. Setting control: Excess mortar flows out of the borehole after the stud/rebar has been fully inserted.

5. After required curing time, the anchor can be loaded. Apply the installation torque T_{inst} using a calibrated torque wrench.

AT-HP Installation (masonry)

1. Drill a hole to the correct diameter and depth using a rotary machine



2. The hole shall be cleaned by at least 2 brushing operations

3. Insert the sleeve into the hole

4. Place the mixer at the bottom of the sleeve and inject the mortar by withdrawing the nozzle slowly step by step after each trigger until the sleeve is completely filled up.

5. Insert a clean, oil free threaded rod, turning slowly until the stud contacts the bottom of the sleeve.

6. After required curing time, the anchor can be loaded. Apply the installation torque T_{inst} using a calibrated torque wrench.

AT-HP High Performance Resin

ETA 14/0383

Performance AT-HP + threaded rod LMAS carbon steel, grade 5.8, zinc plated

Design tension loads for single anchors with no edge distances or spacings [1) 4)] non-cracked concrete N_{Rd}

	Thread size			M8			M10			M12			M16		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	60	64	160	60	80	200	70	96	240	80	128	320
N_{Rd}	Non-cracked concrete [3)]	C20/25	[kN]	8,0	8,5	12,2	9,4	12,6	19,3	13,2	18,1	28,1	17,9	28,6	52,3
		C30/37		8,9	9,5		10,6	14,1		14,8	20,3		20,0	32,0	
		C40/50		9,8	10,4		11,6	15,5		16,2	22,3		22,0	35,2	
		C50/60		10,3	11,0		12,3	16,3		17,2	23,5		23,2	37,2	

	Thread size			M20			M24			M27			M30		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	90	160	400	100	192	480	110	216	540	120	240	600
N_{Rd}	Non-cracked concrete [3)]	C20/25	[kN]	23,6	41,9	81,7	28,1	56,3	117,7	32,4	66,2	153,0	36,9	75,4	187,0
		C30/37		26,4	46,9		32,8	63,1		37,7	74,1		42,2	84,4	
		C40/50		29,0	51,5		36,1	69,2		41,4	81,4		46,4	92,7	
		C50/60		30,6	54,5		38,1	73,2		43,8	86,0		49,0	98,0	

Design shear load for single anchors with no edge distances or spacings [1) 2) 4)] non-cracked concrete V_{Rd}

	Thread size			M8			M10			M12			M16		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	60	64	160	60	80	200	70	96	240	80	128	320
V_{Rd}	Non-cracked concrete [3)]	C20/25	[kN]	7,4			11,6			16,9			31,4		
		C30/37													
		C40/50													
		C50/60													

	Thread size			M20			M24			M27			M30		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	90	160	400	100	192	480	110	216	540	120	240	600
V_{Rd}	Non-cracked concrete [3)]	C20/25	[kN]	49,0			67,3	70,6		77,7	91,8		88,5	112,2	
		C30/37					70,6			91,8			108,0		
		C40/50											112,2		
		C50/60													

Design bending moments [1)]

Thread size		M8	M10	M12	M16	M20	M24	M27	M30
M_{Rd} Design bending moments	[Nm]	15,0	29,9	52,4	133,2	259,6	449	665,8	900

AT-HP High Performance Resin

CE ETA 14/0383

Performance AT-HP + threaded rod LMAS stainless steel

Design tension loads for single anchors with no edge distances or spacings [1) 4)] non-cracked concrete N_{Rd}

	Thread size			M8			M10			M12			M16		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	60	64	160	60	80	200	70	96	240	80	128	320
N_{Rd} A4	Non-cracked concrete [3)]	C20/25	[kN]	8,0	8,5	13,7	9,4	12,6	21,7	13,2	18,1	31,6	17,9	28,6	58,8
		C30/37		8,9	9,5		10,6	14,1		14,8	20,3		20,0	32,0	
		C40/50		9,8	10,4		11,6	15,5		16,2	22,3		22,0	35,2	
		C50/60		10,3	11,0		12,3	16,3		17,2	23,5		23,2	37,2	

	Thread size			M20			M24			M27			M30		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	90	160	400	100	192	480	110	216	540	120	240	600
N_{Rd} A4	Non-cracked concrete [3)]	C20/25	[kN]	23,6	41,9	91,7	28,1	56,3	132,1	32,4	66,2	80,2	36,9	75,4	98,1
		C30/37		26,4	46,9		32,8	63,1		37,7	74,1		42,2	84,4	
		C40/50		29,0	51,5		36,1	69,2		41,4	80,2		46,4	92,7	
		C50/60		30,6	54,5		38,1	73,2		43,8			49,0	98,0	

Design shear load for single anchors with no edge distances or spacings [1) 2) 4)] non-cracked concrete V_{Rd}

	Thread size			M8			M10			M12			M16		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	60	64	160	60	80	200	70	96	240	80	128	320
V_{Rd} A4	Non-cracked concrete [3)]	C20/25	[kN]	8,2			13,0			18,9			35,3		
		C30/37													
		C40/50													
		C50/60													

	Thread size			M20			M24			M27			M30		
	Effective embedment depth h_{ef}		[-]	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d	min	opt. 8d	max. 20d
			[mm]	90	160	400	100	192	480	110	216	540	120	240	600
V_{Rd} A4	Non-cracked concrete [3)]	C20/25	[kN]	55,0			67,3	79,2		48,2			58,9		
		C30/37					79,2								
		C40/50													
		C50/60													

Design bending moments [1)]

Thread size		M8	M10	M12	M16	M20	M24	M27	M30
M_{Rd}	[Nm]	16,8	33,5	58,8	149,4	291,3	503,7	349,7	472,7

AT-HP High Performance Resin

ETA 14/0383

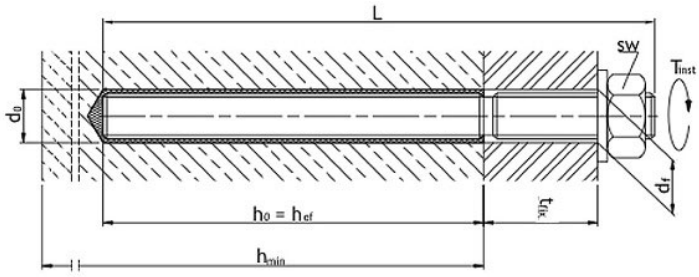
SIMPSON Strong-Tie

Spacings, edge distances and member thicknesses														
Thread size			M8			M10			M12			M16		
Effective embedment depth	h_{ef}	[mm]	60	64	160	60	80	200	70	96	240	80	128	320
Characteristic anchor spacing	$S_{cr,N}$	[mm]	180	180	180	180	219	219	210	263	263	240	330	330
Minimum anchor spacing	S_{min}	[mm]	40			50			60			80		
Characteristic edge distance	$C_{cr,N}$	[mm]	90			90	110	110	105	131	131	120	165	165
Minimum edge distance	C_{min}	[mm]	40			50			60			80		
Minimum member thickness	h_{min}	[mm]	100	100	190	100	110	230	100	126	270	116	164	356

Thread size			M20			M24			M27			M30		
Effective embedment depth	h_{ef}	[mm]	90	160	400	100	192	480	110	216	540	120	240	600
Characteristic anchor spacing	$S_{cr,N}$	[mm]	270	400	400	300	464	464	330	503	503	360	537	537
Minimum anchor spacing	S_{min}	[mm]	100			120			135			150		
Characteristic edge distance	$C_{cr,N}$	[mm]	135	200	200	150	232	232	165	251	251	180	268	268
Minimum edge distance	C_{min}	[mm]	100			120			135			150		
Minimum member thickness	h_{min}	[mm]	134	204	444	156	248	536	170	276	600	190	310	670

Installation data														
Thread size			M8			M10			M12			M16		
Drill hole diameter	d_0	[mm]	10			12			14			18		
Drill hole diameter	$h_1 \geq$		60	64	160	60	80	200	70	96	240	80	128	320
Clearance hole in the fixture	d_f		9			12			14			18		
Wrench size	sw		13			17			19			24		
Torque moment	T_{inst}	[Nm]	10			20			40					

Thread size			M20			M24			M27			M30		
Drill hole diameter	d_0	[mm]	22			28			30			35		
Drill hole diameter	$h_1 \geq$		90	160	400	100	192	480	110	216	540	120	240	600
Clearance hole in the fixture	d_f		22			26			30			33		
Wrench size	sw		30			36			41			46		
Torque moment	T_{inst}	[Nm]	150			200			270			300		



1. The design resistances have been calculated using the partial safety factors for resistances stated in ETA approvals(s).
2. The load figures are valid for reinforced concrete with a rebar spacing ≥ 15cm (any diameter) or with a rebar spacing ≥ 15cm if the rebar diameter is 10mm or smaller.
3. The figures for shear are based on a single anchor without influence of concrete edges. For anchorages close to the edges ($c \leq h_{ef}$ 60d) the concrete edge failure shall be calculated per ETAG 001, Annex C, design method A.
4. Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete induced by external loads, anchors loads included).
5. For combined tension and shear loads or anchor groups and/or in the case of edge influence, a calculation per ETAG 001, Annex C, design method A shall be performed. For details see the ETA.
6. Temperature range I for details see the ETA

AT-HP High Performance Resin

ETA 14/0383

Usage[1] chemical anchors using threaded rods in solid materials [ml]								
Thread size	M8	M10	M12	M16	M20	M24	M27	M30
minimum embedment	1,70	2,07	2,86	4,27	5,93	16,33	14,77	30,62
optimal (8d) embedment	1,81	2,76	3,92	6,83	10,55	31,35	28,99	61,23
maximum (20d) embedment	4,52	6,91	9,80	17,08	26,38	78,37	72,49	153,08

[1] This table shows the theoretical amount of resin [ml] needed to make the connection. Take into account the loss of resin during assembly. The values in the table should be increased by:
Approximately 100% for inexperienced users
Approximately 50% for regular users
Approximately 20% for very experienced users
Does not apply to sleeve anchors - the volumes given are actual volumes.
To determine the approximate number of connections that can be made from one cartridge, the values in the table should be divided by the volume of the cartridge, taking into account the loss of resin respectively.
Example:
By mounting M12 rods using AT-HP380 anchor (380ml) in concrete for optimal anchorage depth (8d). assuming 50% loss of resin during assembly.
Estimated resin usage per connection after installation loss: 3.92 ml + 0.50 x 3.92 ml = 5.88 ml / one connection
Estimated number of connections from one cartridge : 380 ml / 5.88 ml ≈ 64 connections

Capacity AT-HP + rebar in concrete

Installation parameters [6]					
Rebar diameter	ø d_0	d_f	$l_{b,min}$ [5]	$l_{0,min}$ [5]	$l_{V,max}$
	Drill bit diameter	Brush head diameter	Min. depth of anchorage	Min. depth of anchorage (overlap connection)	Max. depth of anchorage
ø8	12	17	115	200	400
ø10	14	20	145	200	500
ø12	16	30	170	200	600
ø14	18	30	200	210	700
ø16	20	30	230	240	800
ø20	25	32	285	300	1000
ø25	30	35	355	375	1000
ø28	35	37	600	630	1000
ø32	40	42	685	720	1000

The design strength of the bond according to EN 1992-1-1									
Rebar diameter	The design strength of the bond according to EN 1992-1-1								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
Ø8 / Ø10 / Ø12	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3
Ø14 / Ø16	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,0
Ø20 / Ø25	1,6	2,0	2,3	2,7	3,0	3,4	3,4	3,4	3,7
Ø28	1,6	2,0	2,3	2,7	3,0	3,4	3,4	3,4	3,4
Ø32	1,6	2,0	2,3	2,7	2,7	3,0	3,0	3,4	3,4

AT-HP High Performance Resin

ETA 14/0383

Performance AT-HP + threaded rod LMAS carbon steel, grade 5.8, zinc plated

Block type		Block parameters	Sleeve size	Anchor size	Characteristic capacity tension N_{Rk} 1)	Characteristic capacity shear V_{Rk} 1)
Solid clay bricks		$p \geq 1830$ kg/m^3 $f_b = 22$ MPa	N/D	M8	2,0	2,0
				M10	2,0	2,0
				M12	2,0	2,0
Hollow clay brick POROTON– Type 2 according to EN 771-1 – LD		$p \geq 650$ kg/m^3 $f_b = 8$ MPa	16 x 130	M8	1,5	1,5
				M10	1,5	1,5
				M12	2,0	2,0
Autoclaved aerated concrete blocks according to EN 771 – 4		$p \geq 350$ kg/m^3 $f_b = 3$ MPa	N/D	M8	0,9	0,9
				M10	1,2	1,2
				M12	1,2	1,2

1) To obtain the design load capacity, the characteristic values should be divided by the safety factor $\gamma_M = 2,5$ (according to ETA)

Edge distances and spacings					
Characteristic anchor spacing	S_{cr}	[mm]	20 x d	L_{unit}	20 x d
Minimum anchor spacing	S_{min}		50	100	50
Characteristic edge distance	C_{cr}		10 x d	0,5 x L_{unit}	10 x d
Minimum edge distance	C_{min}		50	100	50

Spacings, edge distances and member thicknesses											
Anchor size			**M8**	**M10**	**M12**	**M8**	**M10**	**M12**	**M8**	**M10**	**M12**
Nominal drilling diameter	d_0	[mm]	10	12	14	16			10	12	14
Sleeve size	d_s x l_s		N/D			16 x 130			N/D		
Clearance hole in the fixture	d_{fx}		9	12	14	9	12	14	9	12	14
Embedment depth	h_{ef}		80			130			80		
Drill hole depth	h_1		85			135			85		
Torque moment	T_{inst}	[Nm]	4	6	8	4	6	6	2	3	5

Usage[1] chemical anchors using threaded rods in solid materials [ml]			
Block type			
Drill hole diameter:	**85 mm**	**Sleeve 16x130**	**85 mm**
M8	2,40	21,46	2,40
M10	2,94		2,94
M12	3,47		3,47

The table shows the estimated consumption of chemical anchors. Actual usage can be diffrent and depending on the precision of the connection.

1) This table shows the theoretical amount of resin [ml] needed to make the connection. Take into account the loss of resin during assembly. The values in the table should be increased by:
Approximately 100% for inexperienced users
Approximately 50% for regular users
Approximately 20% for very experienced users
Does not apply to sleeve anchors - the volumes given are actual volumes.
To determine the approximate number of connections that can be made from one cartridge, the values in the table should be divided by the volume of the cartridge, taking into account the loss of resin respectively.
Example:
By mounting M12 rods using AT-HP380 anchor (380ml) in concrete for optimal anchorage depth (8d). assuming 50% loss of resin during assembly.
Estimated resin usage per connection after installation loss: 3.92 ml + 0.50 x 3.92 ml = 5.88 ml / one connection
Estimated number of connections from one cartridge : 380 ml / 5.88 ml ≈ 64 connections

AT-HP High Performance Resin

ETA 14/0383

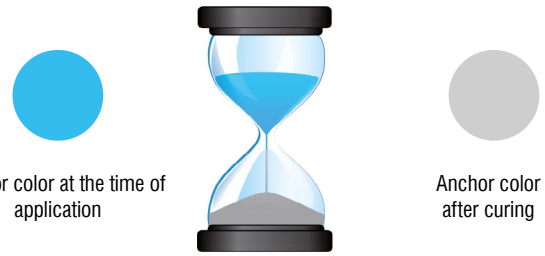
Curing schedule AT-HP Blue

Curing schedule AT-HP (Blue version)			
Chemical anchor temperature	Temperature of Anchorage Base	Working Time [1]	Curing Time [2]
+5°C	- 5°C ÷ -1°C	15 min	9h
+5°C	0°C ÷ 4°C	12 min	4h
+5°C	+5°C ÷ +9°C	9 min	1h 30 min
+10°C	+10°C ÷ +19°C	4 min	1h
+20°C	+20°C ÷ +29°C	1 min	30 min
+30°C	+30°C i wyższa	<1 min	20 min

Curing schedule AT-HP (Winter version)			
Chemical anchor temperature	Temperature of Anchorage Base	Working Time [1]	Curing Time [2]
0°C	- 15°C ÷ -11°C	30 min	14h
0°C	-10°C ÷ -6°C	10 min	8h
0°C	-5°C ÷ -1°C	7 min	4h
0°C	0°C ÷ +4°C	5 min	2,5h
+5°C	+5°C ÷ +9°C	3 min	1,5h
+10°C	+10°C ÷ +19°C	2,5 min	1h
+20°C	+20°C i wyższa	<2,5 min	50 min

[1] Working time is the maximum time that may elapse from resin injection until the insertion of the rod into the hole. Assembling the bar after exceeding the working time can destroy the already formed bonds, so that the anchorage will not reach the full load capacity.
[2] Curing time is the time after which anchorage obtains the declared load. After the curing time has elapsed, he connection can be loaded.

Curing schedule AT-HP (blue)



AT-HP Blue anchor curing time is determined by the color change. The connection bonds at the given temperature when the color of the mixture changes from blue to gray. It is not necessary to measure the ambient temperature and to read the binding time from the table.

Evaluation of the connection on the basis of color change is only possible at temperatures ≥5 ° C. If it is not possible to determine the curing connection based on a visual assessment of the color change from blue to gray, refer to the AT-HP Blue curing table.

SET-XP Pure Epoxy Resin

CE ETA 11/0360

SET-XP is an epoxy based resin suitable for use in cracked or non-cracked concrete. It is also rated for use in seismic conditions.
Heavy structural fixings into cracked or non-cracked concrete

- Oversized holes
- Hot weather fixing
- Seismic conditions

Performance SET-XP + threaded rod LMAS carbon steel, grade 5.8, zinc plated

		Thread size	M12		M16		M20		M24		M27	
Effective embedment depth h_{ef}	[-]		$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$
	[mm]		70	240	80	320	90	400	100	480	110	540
Design tension loads for single anchors with no edge distances or spacings non-cracked concrete												
N_{Rd}	Non-cracked concrete[3]	C20/25	[kN]	14,1	28,0	17,2	52,7	20,5	82,0	24,0	118,0	27,7	152,6
		C30/37		17,2		19,1		25,0		29,3		31,1	
		C40/50		19,9		19,1		26,9		32,3		31,1	
		C50/60		21,4		19,1		26,9		32,3		31,1	
Design shear load for single anchors with no edge distances or spacings on cracked concrete												
V_{Rd}	Non-cracked concrete[3])	C20/25	[kN]	16,8		31,2		48,8		70,4		77,7	92,0
		C30/37											
		C40/50										87,0	
		C50/60											
Design tension loads for single anchors with no edge distances or spacings cracked concrete												
N_{Rd}	Cracked concrete[3]	C20/25	[kN]	7,5	25,8	8,6	34,5	8,1	35,9	10,8	51,7	13,3	65,4
		C30/37											
		C40/50											
		C50/60											
Design shear load for single anchors with no edge distances or spacings cracked concrete												
V_{Rd}	Cracked concrete[3]	C20/25	[kN]	16,8		24,1	31,2	22,6	48,8	30,1	70,4	37,3	92,0
		C30/37											
		C40/50											
		C50/60											

Design bending moments						
M_{Rd}	[Nm]	52,8	132,8	260,0	448,8	665,6

SET-XP Pure Epoxy Resin

CE ETA 11/0360

SIMPSON Strong-Tie®

Performance SET-XP + threaded rod LMAS stainless steel

			Thread size	M12		M16		M20		M24		M27	
Effective embedment depth h_{ef}			[-]	$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$	$h_{ef,min}$	$h_{ef,max}$
			[mm]	70	240	80	320	90	400	100	480	110	540
Design tension loads for single anchors with no edge distances or spacings non-cracked concrete													
N_{Rd} A4	Non-cracked concrete[3]	C20/25	[kN]	14,1	31,6	17,2	58,8	20,5	92,0	24,0	132,1	27,7	80,4
		C30/37		17,2		19,1		25,0		29,3		31,1	
		C40/50		19,9		19,1		26,9		32,3		31,1	
		C50/60		21,4		19,1		26,9		32,3		31,1	
Design shear load for single anchors with no edge distances or spacings on cracked concrete													
N_{Rd} A4	Non-cracked concrete[3]	C20/25	[kN]	19,2		35,3		55,1		67,3	79,5	48,3	
		C30/37								79,5			
		C40/50											
		C50/60											
Design tension loads for single anchors with no edge distances or spacings cracked concrete													
N_{Rd} A4	Cracked concrete[3]	C20/25	[kN]	7,5	25,8	8,6	34,5	8,1	35,9	10,8	51,7	13,3	65,4
		C30/37											
		C40/50											
		C50/60											
Design shear load for single anchors with no edge distances or spacings cracked concrete													
N_{Rd} A4	Cracked concrete[3]	C20/25	[kN]	19,2		24,1	35,3	22,6	55,1	30,1	79,5	37,3	
		C30/37											
		C40/50											
		C50/60											

Design bending moments						
M_{Rd}	[Nm]	59,0	149,4	291,0	503,8	349,6

TECHNICAL DATA SET-XP threaded rod			Spacings, edge distances and member thicknesses									
Thread size			M12		M16		M20		M24		M27	
Effective embedment depth	h_{ef}	[mm]	70	240	80	320	90	400	100	480	110	540
Characteristic anchor spacing	$S_{cr,N}$		210	720	240	960	270	1200	300	1440	330	1620
Minimum anchor spacing	S_{min}		45		60		70		80		90	
Characteristic edge distance	$C_{cr,N}$		105	360	120	480	135	600	150	720	165	810
Minimum edge distance	C_{min}		80		100		115		135		155	
Minimum member thickness	h_{min}		100	270	116	356	138	448	156	536	170	600

TECHNICAL DATA SET-XP threaded rod			Spacings, edge distances and member thicknesses									
Thread size			M12		M16		M20		M24		M27	
Drill hole diameter	d_0	[mm]	14		18		24		28		30	
Drill hole diameter	$h_1 \geq$		70	240	80	320	90	400	100	480	110	540
Clearance hole in the fixture	d_f		14		18		24		28		30	
Wrench size	sw		19		24		30		36		41	
Moment dokr. - Klucz dynamomet.	T_{inst}	[Nm]	40		60		80		100		120	

Curing schedule SET-XP		
Temperature of Anchorage Base	Working Time 6)	Curing Time 7)
≥10°C	60 min	72 h
≥21°C	45 min	24 h
≥32°C	25 min	24 h
≥43°C	12 min	24 h

1) The design loads have been calculated using the partial safety factors for resistances stated in the ETA. The design loads are valid for unreinforced concrete and reinforced concrete with a rebar spacing s ≥ 15 cm and reinforced concrete with a rebar spacing s ≥ 10 cm if the rebar is 10 mm or smaller.
2) The design shear loads are based on a single anchor without influencing concrete edges. For shear loads applied close to an edge (c ≤ 10 hef and 60d) concrete edge failure must be checked per ETAG 001, Annex C, design method A.
3) Concrete is considered non-cracked when the tensile stress within the concrete is $\sigma_L + \sigma_R \leq 0$. In the absence of detailed verification $\sigma_R = 3$ N/mm² can be assumed (σ_L equals the tensile stress within the concrete as a result of external loads, forces on anchors included).
4) For combined tension and shear loads or anchor groups and/or in case of edge influence, a calculation per TR 029 shall be performed. For details see ETA For combined load design using Anchor Designer software is recomended.
5) Temperature range I: -40°C to +43°C (max long term temperature: +24°C; max short term temperature: 43°C).
6) For installation in wet concrete the curing times shall be doubled (installation in water-filled drill holes is not allowed).

Threaded Rod LMAS - carbon steel, grade 5.8, zinc plated

EZG 5 µm

Type	Model No.	Thread Size	Depth of Drilled Hole	Max. Fixture Thickness	ø Fixture Hole	Eff. Embedment Depth	Length	Weight	Qty
			$d_0 \times h_1$	t_{fix}	d_f	h_{ef}	L		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	g/100pcs.	pcs.
M8 x 95	LMAS0810064020	M8	10 x 64	20	9	64	95	3,0	10
M10 x 120	LMAS1012080025	M10	12 x 80	25	12	80	120	7,0	10
M10 x 155	LMAS1012080060	M10	12 x 80	60	12	80	155	9,0	10
M12 x 150	LMAS1214096035	M12	14 x 96	35	14	96	150	13,5	10
M12 x 185	LMAS1214096070	M12	14 x 100	70	14	96	185	16,0	10
M16 x 170	LMAS1618128020	M16	18 x 128	20	18	128	170	27,0	10

Threaded Rod LMAS - A4-70 stainless steel

A4

Type	Model No.	Thread Size	Depth of Drilled Hole	Max. Fixture Thickness	ø Fixture Hole	Eff. Embedment Depth	Length	Weight	Qty
			$d_0 \times h_1$	t_{fix}	d_f	h_{ef}	L		
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	g/100pcs.	pcs.
M8 x 95 A4	LMAS0810064020 A4	M8	10 x 64	20	9	64	95	3,0	10
M10 x 120 A4	LMAS1012080025 A4	M10	12 x 80	25	12	80	120	7,0	10
M10 x 155 A4	LMAS1012080060 A4	M10	12 x 80	60	12	80	155	9,0	10
M12 x 150 A4	LMAS1214096035 A4	M12	14 x 96	35	14	96	150	13,5	10
M12 x 185 A4	LMAS1214096070 A4	M12	14 x 100	70	14	96	185	16,0	10
M16 x 170 A4	LMAS1618128020 A4	M16	18 x 128	20	18	128	170	27,0	10

VAC VAS High Performance Capsule Resin

CE ETA 13/0937

VAC

VAS

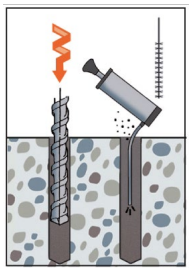
VAC is vinylester anchor without styrene. Resin suitable for high performance fixing applications of threaded rods into concrete. Easy to dispense and fast curing, specifically designed for structural fixings and very technical construction sites. The capsule contains the exact amount of resin and hardener, making it a very productive product.
The VAS threaded rod is a component of the high load anchoring system for use with a VAC capsule anchor.

AD

NEW

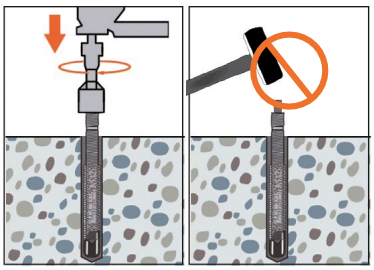
Model No.		Threaded rod type	Art. No zinc plated threaded rod	Art. No A4 stainless steel threaded rod	Ø Depth of Drilled Hole $d_0 \times h_1$ [mm]	Max. Fixture Thickness t_{fix} [mm]	Ø Fixture Hole d_f [mm]	Eff. Embedment Depth h_{ef} [mm]
VAC8	+	M8 x 110	VAS08110	VAS08110A4	10 x 85	10	9	80
VAC10		M10 x 130	VAS10130	VAS10130A4	12 x 95	15	12	90
		M10 x 190	VAS10190	-	12 x 95	75	12	90
VAC12		M12 x 160	VAS12160	VAS12160A4	14 x 115	20	14	110
		M12 x 190	VAS12190	-	14 x 115	50	14	110
		M12 x 220	VAS12220	VAS12220A4	14 x 115	80	14	110
		M12 x 300	VAS12300	-	14 x 115	160	14	110
VAC16		M16 x 190	VAS16190	VAS16190A4	18 x 130	30	18	125
		M16 x 220	VAS16220	-	18 x 130	60	18	125
		M16 x 300	VAS16300	-	18 x 130	140	18	125
		M16 x 380	VAS16380	-	18 x 130	220	18	125
VAC20		M20 x 260	VAS20260	VAS20260A4	24 x 175	45	22	170
VAC24		M24 x 300	VAS24300	-	28 x 215	35	26	210
VAC30		M30 x 380	VAS30380	-	35 x 275	75	32	270

VAC and VAS Installation

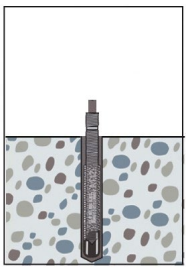


1. Drill hole and clean - 4 x blow, 4 x brush, 4 x blow

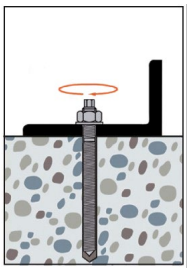
2. Insert anchor through the fixture



3. Place anchor VAS rod / rotating with hammer drill. NOTE: Do not use a hammer during installation.



4. Leave the rod in the hole until the time of curing



5. Apply recommended installation torque with a calibrated torque wrench.

VAC VAS High Performance Capsule Resin CE ETA 13/0937

Performance VAC + threaded rod VAS carbon steel, grade 5.8, zinc plated

		Thread size	VAC8		VAC10		VAC12		VAC16		VAC20		VAC24		VAC30	
Use category*		[-]	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Effective embedment depth h_{ef}		[mm]	90		90		110		125		170		210		270	
Design tension loads for single anchors with no edge distances or spacings non-cracked concrete N_{Rd}																
N_{Rd}	Non-cracked concrete[3]	C20/25	[kN]	12,0	12,0	18,8	16,2	27,6	23,7	38,4	32,9	59,3	50,9	79,2	67,9	120,2	103,0
		C30/37				19,3	16,8	28,0	24,6	39,9	34,2	61,7	52,9				
		C40/50					17,3		25,4	41,1	35,2	63,5	54,4				
		C50/60					17,6		25,8	41,9	35,9	64,7	55,4				
Design shear load for single anchors with no edge distances or spacings non-cracked concrete V_{Rd}																
V_{Rd}	Non-cracked concrete[3]	C20/25	[kN]	7,2	7,2	11,2	11,2	16,8	16,8	31,2	31,2	48,8	48,8	70,4	70,4	112,0	112,0
		C30/37															
		C40/50															
		C50/60															
Design bending moments																
M_{Rd}		[Nm]	15,2	15,2	29,6	29,6	52,0	52,0	132,8	132,8	259,2	259,2	448,8	448,8	899,2	899,2

* 1- dry or wet concrete, 2 - flooded holes with exception of seewater

Performance VAC + threaded rod VAS stainless steel

		Thread size	VAC8		VAC10		VAC12		VAC16		VAC20		VAC24		VAC30	
Use category*		[-]	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Effective embedment depth h_{ef}		[mm]	80		90		110		125		170		210		270	
Design tension loads for single anchors with no edge distances or spacings non-cracked concrete N_{Rd}																
N_{Rd} A4	Non-cracked concrete[3]	C20/25	[kN]	13,9	12,4	18,8	16,2	27,6	23,7	38,4	32,9	59,3	50,9	79,2	67,9	120,2	103,0
		C30/37			12,9	19,6	16,8	28,8	24,6	39,9	34,2	61,7	52,9				
		C40/50			13,3	20,2	17,3	29,6	25,4	41,1	35,2	63,5	54,4				
		C50/60			13,6	20,5	17,6	30,1	25,8	41,9	35,9	64,7	55,4				
Design shear load for single anchors with no edge distances or spacings non-cracked concrete V_{Rd}																
V_{Rd} A4	Non-cracked concrete[3]	C20/25	[kN]	8,3	8,3	12,8	12,8	18,6	18,6	35,3	35,3	55,1	55,1	79,5	79,5	125,6	125,6
		C30/37															
		C40/50															
		C50/60															
Design bending moments																
M_{Rd}		[Nm]	16,7	16,7	33,3	33,3	59,0	59,0	149,4	149,4	291,0	291,0	503,8	503,8	1009	1009

* 1- dry or wet concrete, 2 - flooded holes with exception of seewater

VAC VAS High Performance Capsule Resin CE ETA 13/0937

Spacing, edge distance, concrete tickness									
Thread size			VAC8	VAC10	VAC12	VAC16	VAC20	VAC24	VAC30
Effective embedment depth	h_{ef}	[mm]	80	90	110	125	170	210	270
Characteristic anchor spacing	$S_{cr,N}$		240	270	330	375	510	630	675
Minimum anchor spacing	S_{min}		40	45	55	63	85	105	135
Characteristic edge distance	$C_{cr,N}$		120	135	165	190	255	315	340
Minimum edge distance	C_{min}		40	45	55	63	85	105	135
Minimum member thickness	h_{min}		120	130	140	180	230	270	340

Installation data									
Thread size			VAC8	VAC10	VAC12	VAC16	VAC20	VAC24	VAC30
Drill hole diameter	d_0	[mm]	10	12	14	18	24	28	35
Drill hole diameter	$h_1 \geq$		85	95	115	130	175	215	275
Clearance hole in the fixture	d_f		9	12	14	18	22	26	32
Wrench size	sw		13	17	19	24	30	36	46
Torque moment	T_{inst}	[Nm]	10	20	40	80	120	180	300

Simpson Strong-Tie Metal connectors and Anchorage system

Accessories

Dust pump

Model No	Description	Qty.	Qty. in a box
PUMP	Dust pumps are «a must» for proper hole cleaning	1	4

Brusches

Model No	Description	Qty.	Qty. in a box
BR Ø17 i Ø30	Brushes Ø17 to Ø30	1 KPL	15
ETB 6	Brushes SET-XP / Ø6	1	24
ETB 8	Brushes SET-XP / Ø8	1	24
ETB 10	Brushes SET-XP / Ø10	1	24
ETB 12	Brushes SET-XP / Ø12	1	24

Accessories


DT300

Dispensing Tools

Model No	Description	Qty.	Qty. in a box
DT300	Extrusion tool 160, 280, 300ml	1	12
DT380	Extrusion tool 380ml	1	6
DT650	Extrusion tool 650ml	1	6


DT380


DT650

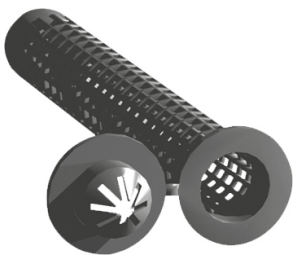

AT300

Dispensing Tools

Model No	Description	Qty.	Qty. in a box
AT300	Extrusion tool 280 , 300 ml	1	1

Mixing Nozzles

Model No	Description	Qty.	Qty. in a box
MN1	Mixing Nozzles Poly-GP and AT-HP	10	60
MN2	Mixing Nozzles do SET-XP	20	20
Extension			
MNE RP10	Extension 200 mm	10	130
MNE2	Extension 100 mm	1	-



Sleeves

Model No	Ø Hole	Qty.	Qty.	Qty. in a box
SH1250-RP10	12	50	10	160
SH16085-RP6	16	85	6	96
SH16130-RP6	16	130	6	96
SH20085-RP4	20	85	4	64

Fasteners

nails, screws, washers, bulldog

CNA Ring-shank Connector Nails

ETA 04/0013

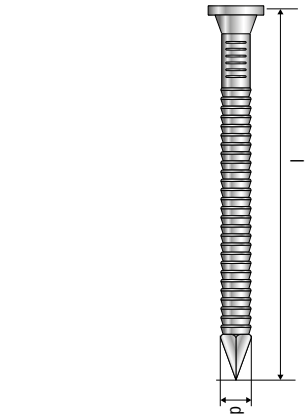
CNA nails have been specially developed for fixing Simpson Strong-Tie® timber connectors. The conical extension of the stem under the nail head guarantees that the nail fills the hole in the timber connector. Exact force transmission is therefore ensured. The CNA connector nails belong to the Simpson Strong-Tie timber connectors.
Important all static values given in this catalogue are based on the values of Simpson Strong-Tie® timber connectors with CNA nails. Valid only for Simpson Strong-Tie® products when used together.

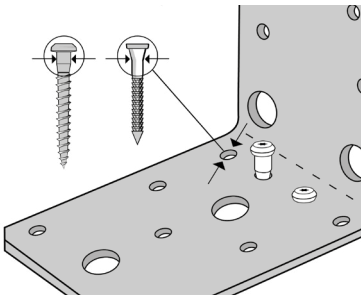
Material:
Electro-galvanized steel Fe/Zn12C (12 μm)

EZG 12 μm | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]		Characteristic capacity [kN]	
	ø	L	$R_{ax,k}$ tension	$R_{lat,k}$ shear
Nails CNA zinc plated				
CNA 3,1x40	3,1	40	0,57	1,41
CNA 3,1x60	3,1	60	0,95	1,64
CNA 3,4x60	3,4	60	0,92	1,47
CNA 3,7x50	3,7	50	0,91	1,98
CNA 4,0x35	4,0	35	0,61	1,68
CNA 4,0x40	4,0	40	0,74	1,83
CNA 4,0x50	4,0	50	0,98	2,22
CNA 4,0x60	4,0	60	1,23	2,36
CNA 4,0x75	4,0	75	1,45	2,50
CNA 4,0x100	4,0	100	1,43	2,48
Nails CNA stainless steel 1.4401				
CNA 4,0x40S	4,0	40	0,74	1,83
CNA 4,0x50S	4,0	50	0,98	2,22
CNA 4,0x60S	4,0	60	1,23	2,36
CNA collated nails zinc plated				
CNA4,0x35PC34	4,0	35	0,61	1,68
CNA4,0x40PC34	4,0	40	0,74	1,83
CNA4,0x50PC34	4,0	50	0,98	2,22
CNA4,0x60PC34	4,0	60	1,23	2,36





CNA nails lengths 35, 40, 50, 60 are available in collated version for the nails gun.

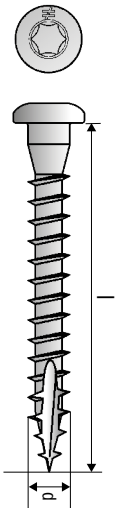
CSA Connector Screws

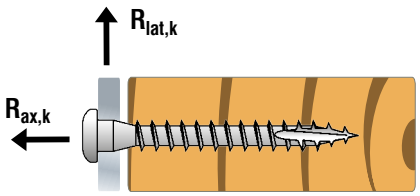
ETA 04/0013

CSA connector screws are used for fixing timber connectors. CSA screws have a special cutting thread no pre-drilling is necessary. The cylindrical part under the screw head provides an exact and stable connection between the CSA screw and the timber connector. Simpson Strong-Tie® timber connectors are demountable by screw fastening.
These have the same shear values and higher extract values than the comparable CNA4,0×ℓ connector nails. A CNA4,0×ℓ nail can therefore be replaced by a CSA screw.

Material:
Electro-galvanized steel Fe/Zn12C (12 μm)

EZG 12 μm | CL.2 | CS | DWG





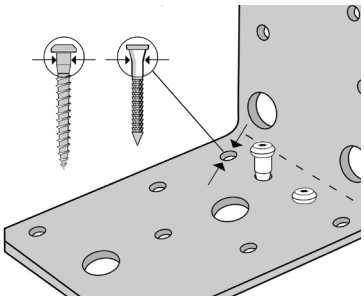
Available Sizes

Model No.	Dimensions [mm]		Characteristic capacity [kN]	
	Ø	L	$R_{ax,k}$ tension	$R_{lat,k}$ shear
Screws CSA zink plated				
CSA 4,0x30	4,0	30	1,28	1,36
CSA 5,0x25	5,0	25	1,38	1,49
CSA 5,0x35	5,0	35	2,11	1,99
CSA 5,0x40	5,0	40	2,47	2,25
CSA 5,0x50	5,0	50	3,20	2,63
CSA 5,0x80	5,0	80	5,38	3,50
Screws CSA stainless steel 1.4401				
CSA 5,0x25S	5,0	25	1,38	1,49
CSA 5,0x35S	5,0	35	2,11	1,99
CSA 5,0x40S	5,0	40	2,47	2,25
CSA collated screws zinc plated				
CSA5,0X50T	5,0	50	3,20	2,63

The standard connectors specified to achieve the declared load capacity of the connector are CNA nails. It is acceptable to replace CNA nails with CSA connector screws without having to make additional calculations if the change is made in accordance with the table below.

CNA	CSA
CNA 3,1x40	CSA 4,0 x 30
CNA 4,0x35	CSA 5,0 x 35
CNA 4,0x40	
CNA 4,0x50	CSA 5,0 x 40
CNA 4,0x60	CSA 5,0 x 50
CNA 4,0x75	
CNA 4,0x100	

The diameter of the screws directly under the head is widened to Ø5. Screws completely fill the hole, leaving no gaps. This improves the work of the connection and minimizes the displacement that occurs when the load is applied.



N Squate twist and smooth round nails

CE DoP - h13/0012

The N twisted nails are used for fixing I-beam joist hangers to timber. These nails can not be used for connectors with a steel thickness of more than 2 mm.

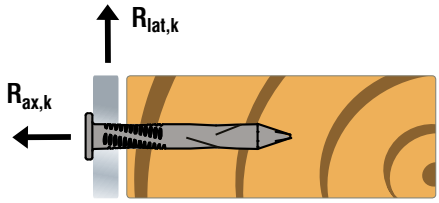
Material:
Sherardized steel

SHR 15 µm | EZG | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]		Characteristic capacity [kN]	
	ø	L	$R_{ax,k}$ tension	$R_{lat,k}$ shear
N3.75x30*	3,75	30	0,24	0,97
N3.75x75	3,75	75	0,68	1,42

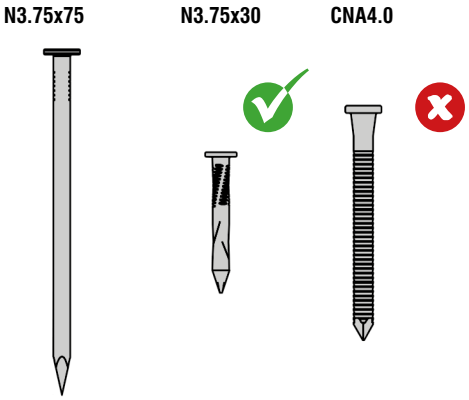
* Sherardized steel



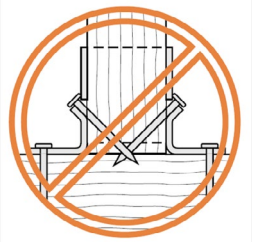
Special nails type N dedicated to I-beam

Contrary to the basic product range where CNA4.0 connector nails are used, N3.75x30 square twisted nails and round N3.75x75 nails are used in I-beam. The use of these nails guarantees the correct execution of the connections and ensures that the declared capacity of the connection is maintained.

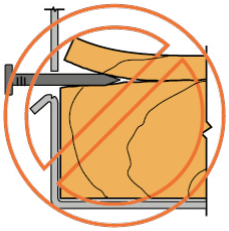
Please pay special attention to the additional information and notes in the product description. One of the more common mistakes made is the selection of incorrect nails. Do not use CNA4.0 ring nails, besides for a few exceptions.



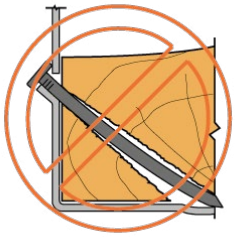
Installation errors



Used incorrect fasteners.



Perpendicular nailing to the belt of an I-beam may cause cleavage (delamination) of the lower belt.



Too long nails fixed to the I-beam belt.

STD Steel Dowels

DoP - h13/0012

The STD dowels can be used in timber connections including steel plates with holes and are available in different diameters and lengths indicated by d (diameter) x l (length). The 8 mm diameter and 12 mm diameter are available with electro-galvanised or hot-dip galvanized coatings.

Material:
Electro-galvanized steel Fe/Zn12/A and Pre galvanized mild steel (45 μm)

YZG | CL.2 | HDG 50 μm | CL.3 | CS | DWG

Available Sizes

Model No.	Model No.	Dimensions [mm]	
		Ø	L
STD8x45	STD8x45G*	8,0	45
STD8x60	-	8,0	60
STD8x65	STD8x65G*	8,0	65
STD8x70	-	8,0	70
STD8x80	STD8x80G*	8,0	80
STD8x90	STD8x90G*	8,0	90
STD8x100	STD8x100G*	8,0	100
STD8x115	STD8x115G*	8,0	115
STD8x120	STD8x120G*	8,0	120
STD8x140	STD8x140G*	8,0	140
STD8x160	-	8,0	160
STD12x60	-	12,0	60

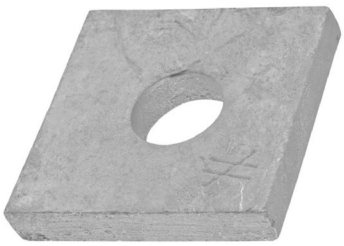
* Hot-dip galvanized steel dowel

Available Sizes

Model No.	Model No.	Dimensions [mm]	
		Ø	L
STD12x65	STD12x65G*	12,0	65
STD12x80	STD12x80G*	12,0	80
STD12x90	STD12x90G*	12,0	90
STD12x100	STD12x100G*	12,0	100
STD12x110	-	12,0	110
STD12x115	STD12x115G*	12,0	115
STD12x120	STD12x120G*	12,0	120
STD12x140	STD12x140G*	12,0	140
STD12x160	-	12,0	160
STD12x180	-	12,0	180
STD12x200	-	12,0	200

Simpson Strong-Tie Metal connectors and Anchorage system

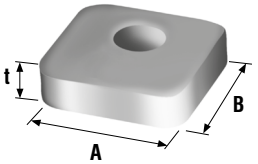
US Washers



US washers are to be placed between the timber connector and the bolt head in order to improve reinforcement of timber connectors and to achieve higher capacity. US washer are available in several sizes.

Material:
Pre galvanized mild steel (55 μm) S235JR

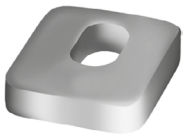
HDG 50 μm | CL.3



US40/40/10G-B

Available Sizes

Model No.	Dimensions [mm]			
	A	B	t	Ø
US40/40/10G-B	40	40	10	13.5
US40/50/10G-B	40	50	10	13.5 x 25
US50/50/8G-B	50	50	8	18
US60/60/6G-B	60	60	6	14



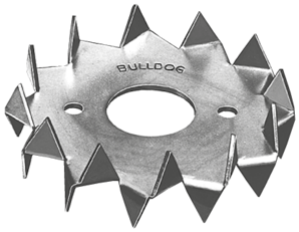
US40/50/10G-B

US50/50/8G-B

US60/60/6G-B

C1-C3-C5 Toothed Plate Timber Connector

CE DoP - h10/0007



Bulldog timber connectors can be used for frame corners, collar beams, purlins and cross timber joints. Two-sided BULLDOG timber connectors to be used on timber to timber connections only.The bolts must fit tightly to the inner diameter of the connector.

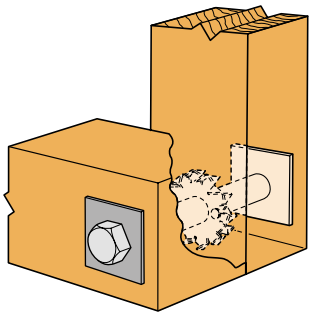
Material:
Steel type HC340IA following EN 10268. galvanized according to NF EN ISO 1461. Ø62 and Ø75 C1 mm models are available in AVZ (pre-galvanized) Finish Z275

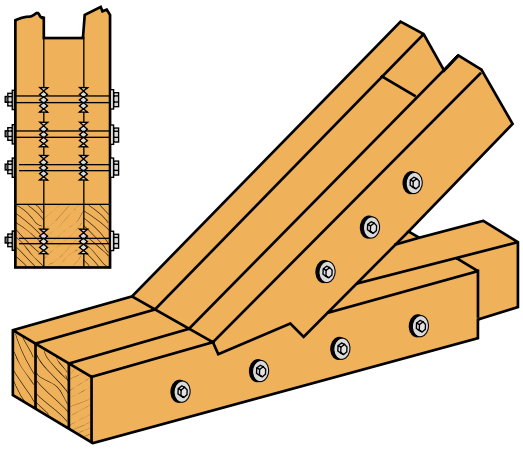
EZG | CL.2 | HDG 50 µm | CL.3 | DWG

Available Sizes

Model No.	Dimensions [mm]					
	d_c	d	d_2	t	h	h_e
C1-50*	50	17	-	1,0	12	6,0
C1-62*	62	21	-	1,2	16	7,4
C1-75*	75	26	-	1,25	19,5	9,13
C1-50G	50	17	-	1,0	12	6,0
C1-62G	62	21	-	1,2	16	7,4
C1-75G	75	26	-	1,25	19,5	9,13
C1-95G	95	33	-	1,35	24	11,33
C1-117G	117	48	-	1,5	30	14,25
C3-73/130G	130	26; 16	73	1,5	28	13,25
C5-100G	100	40	-	1,35	16	7,32
C5-130G	130	52	-	1,35	20	9,25

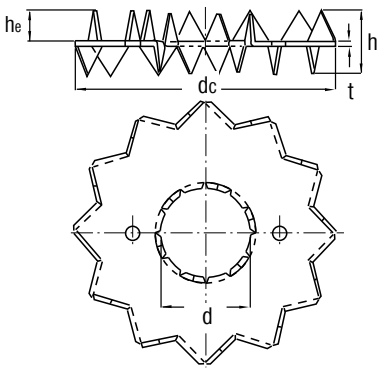
* electro-galvanized steel



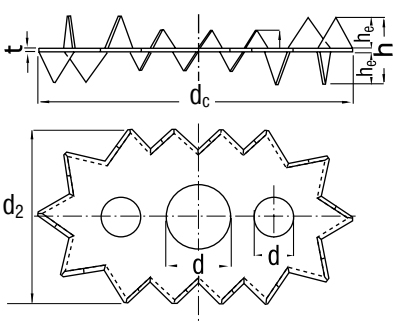


NOTE:
The load capacity on the Bulldog rings must be determined in accordance with Eurocode 5, paragraph 8.10, for more information on page 49 of the catalogue.

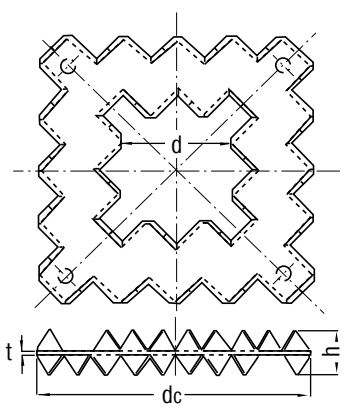
C1



C3



C5



C2-C4 Toothed Plate Timber Connector

CE DoP - h10/0007

Bulldog timber connectors can be used for frame corners, collar beams, purlins and cross timber joints. One-sided versions are used for timber-steel and timber-timber connections. The bolts must fit tightly to the inner diameter of the connector.

Material:
Steel type HC340lA following EN 10268. galvanized according to NF EN ISO 1461. Ø62 and Ø75 C1 mm models are available in AVZ (pre-galvanized) Finish Z275

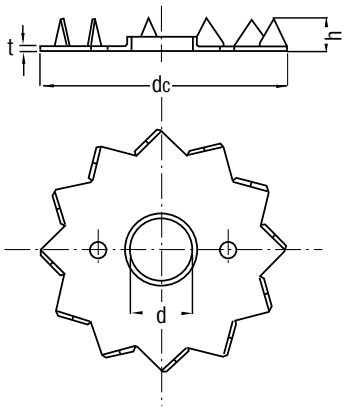
HDG 50 µm | CL.3 | DWG

NOTE:
The load capacity on the Bulldog rings must be determined in accordance with Eurocode 5, paragraph 8.10, for more information on page 49 of the catalogue.

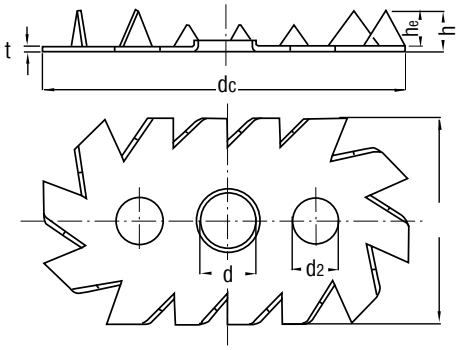
Available Sizes

Model No.	Dimensions [mm]					
	d_c	d	d_2	t	h	h_e
C2-50M10G	50	M10	-	1,0	6,6	5,6
C2-50M12G	50	M12	-	1,0	6,6	5,6
C2-50M16G	50	M16	-	1,0	6,6	5,6
C2-50M20G	50	M20	-	1,0	6,6	5,6
C2-62M12G	62	M12	-	1,2	8,7	7,5
C2-62M16G	62	M16	-	1,2	8,7	7,5
C2-62M20G	62	M20	-	1,2	8,7	7,5
C2-75M12G	75	M12	-	1,25	10,4	9,15
C2-75M16G	75	M16	-	1,25	10,4	9,15
C2-75M20G	75	M20	-	1,25	10,4	9,15
C2-75M22G	75	M22	-	1,25	10,4	9,15
C2-75M24G	95	M24	-	1,25	10,4	9,15
C2-95M16G	95	M16	-	1,35	12,7	11,35
C2-95M20G	95	M20	-	1,35	12,7	11,35
C2-95M22G	95	M22	-	1,35	12,7	11,35
C2-95M24G	95	M24	-	1,35	12,7	11,35
C2-117M16G	117	M16	-	1,5	16	14,5
C2-117M20G	117	M20	-	1,5	16	14,5
C2-117M22G	117	M22	-	1,5	16	14,5
C2-117M24G	117	M24	-	1,5	16	14,5
C2-117M26G	117	M26	-	1,5	16	14,5
C4-73/130M20G	130	M20	73	1,5	14,75	13,3
C4-73/130M24G	130	M24	73	1,5	14,75	13,3

C2



C4



C10-C11 Toothed Plate Timber Connector

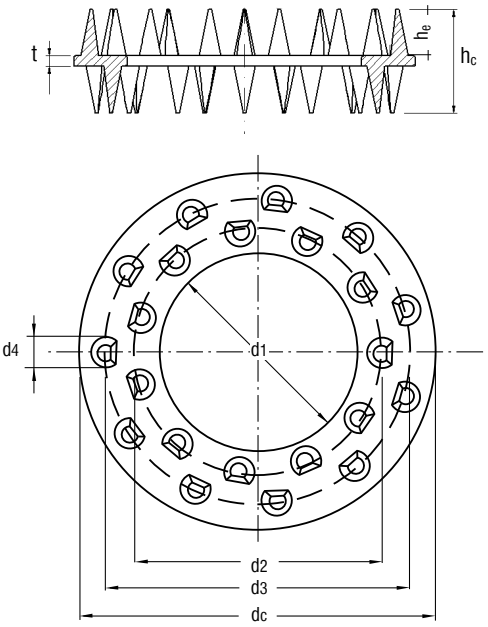
CE DoP - h13/0020

Geka rings are used to increase the load capacity of the bolt connection. They allow you to design a connection with fewer screws and keep the required distance between the screws and the edge of the timber. In the case of one-sided rings, bolt must be adapted to the ring opening.

Material:
Cast iron malleable EN-GJMB-350-10 (MATERIAL PL-JM1130) according to EN 1562

Geka two side - Available Sizes

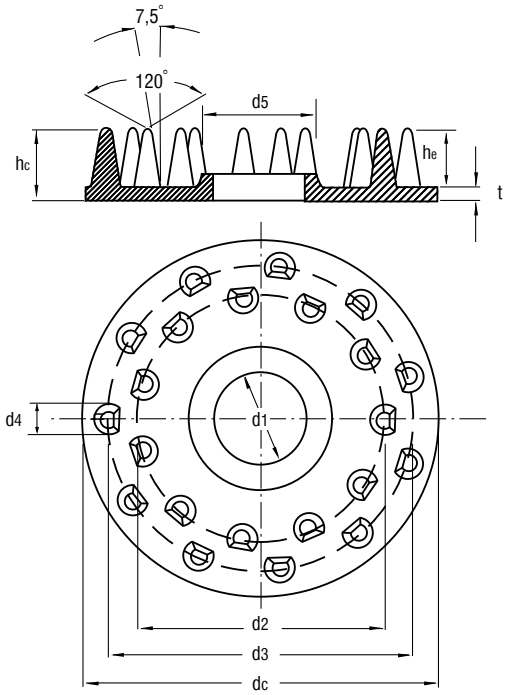
Model No.	Dimensions [mm]							
	d_c	d_1	d_2	d_3	d_4	h_c	h_e	t
C10-50	50	30,5	41	-	6	27	12	3,0
C10-65	65	35,5	48	58	6	27	12	3,0
C10-80	80	49,5	60	70	6	27	12	3,0
C10-95	95	65,5	76	88	6	27	12	3,0
C10-115	115	85,5	95	108	6	27	12	3,0



NOTE:
The load capacity on the Geka rings must be determined in accordance with Eurocode 5, paragraph 8.10, for more information on page 49 of the catalogue.

Geka one side - Available Sizes

Model No.	Dimensions [mm]								
	d_c	d_1	d_2	d_3	d_4	d_5	h_c	h_e	t
C11-50M12	50	M12	40	-	6	17	15	12	3,0
C11-65M16	65	M16	46	56	6	21	15	12	3,0
C11-80M20	80	M20	57	69	6	20,5	15	12	3,0
C11-95M24	95	M24	64	84	6	30,5	15	12	3,0
C11-115M24	115	M24	84	106	6	30,5	15	12	3,0



Characteristic capacity for Toothed-plate connectors (Bulldog, Geka)

The characteristic load-carrying capacity of connections made using toothed-plate connectors should be taken as the summation of the characteristic load-carrying capacity of the connectors themselves and the connecting bolts according to 8.5 EN 1995-1-1 (Eurocode 5).

The characteristic load-carrying capacity Fv,Rk per toothed-plate connector for connectors of type C according to EN 912 (single-sided: type C2, C4, C7, C9, C11; double sided: type C1, C3, C5, C6, C8, C10) and EN 14545 should be taken as:

$F_{v,Rk} = 18 k_1 k_2 k_3 d_c^{1,5}$ for types C1 to C9

$F_{v,Rk} = 25 k_1 k_2 k_3 d_c^{1,5}$ for types C10 to C11

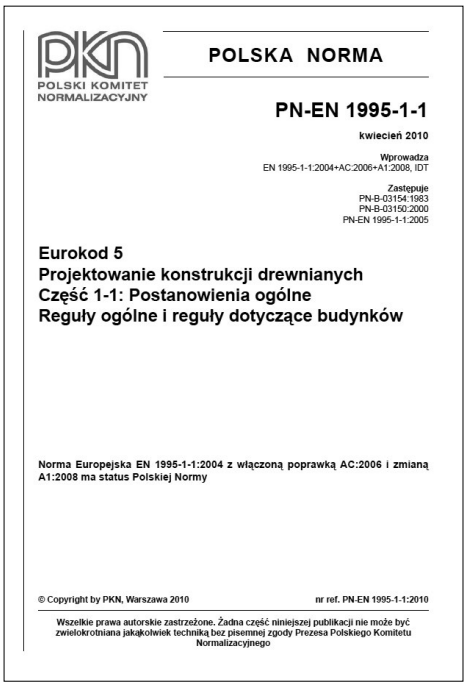
where:

$F_{v,Rk}$ - is the characteristic load-carrying capacity per toothed-plate connector, in N

k_i - are modification factors, with i = 1 to 3, defined below

d_c - the toothed-plate connector diameter for types C1, C2, C6, C7, C10 and C11, in mm
- the toothed-plate connector side length for types C5, C8 and C9, in mm
- the square root of the product of both side lengths for types C3 and C4, in mm

The minimum thickness of the outer timber members should be 2,25he, and of the inner timber member should be 3,75he, where he is the embedment depth - Eurocode 5 p.8.9 (2)



POLSKA NORMA

POLSKI KOMITET NORMALIZACYJNY

PN-EN 1995-1-1

kwiecień 2010

Wprowadza
EN 1995-1-1:2004+AC:2006+A1:2008, IDT

Zastępuje
PN-B-03154:1983
PN-B-03150:2000
PN-EN 1995-1-1:2005

Eurokod 5
Projektowanie konstrukcji drewnianych
Część 1-1: Postanowienia ogólne
Reguły ogólne i reguły dotyczące budynków

Norma Europejska EN 1995-1-1:2004 z włączoną poprawką AC:2006 i zmianą A1:2008 ma status Polskiej Normy

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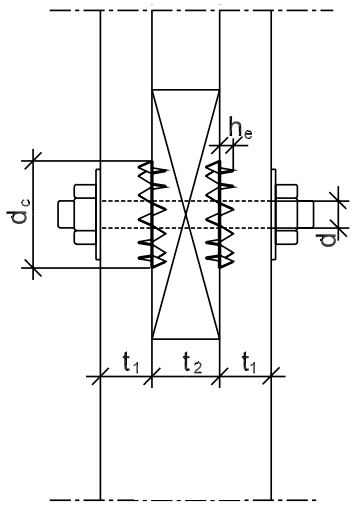
The factor k_1 should be taken as:

$$k_1 = \min \begin{cases} 1 \\ \dfrac{t_1}{3h_e} \\ \dfrac{t_2}{5h_e} \end{cases}$$

where:
t_1 – is the side member thickness
t_2 – is the middle member thickness
h_e – is the tooth penetration depth

The factor k_2 should be taken as:

C1 to C5 (Bulldog)	(C10 and C11 Geka)
$k_2 = \min \begin{cases} 1 \\ \dfrac{a_{3,t}}{1{,}5\, d_c} \end{cases}$ where:	$k_2 = \min \begin{cases} 1 \\ \dfrac{a_{3,t}}{2\, d_c} \end{cases}$ where:
$a_{3,t} = \max \begin{cases} 1{,}1\, d_c \\ 7d \\ 80\ \text{mm} \end{cases}$	$a_{3,t} = \max \begin{cases} 1{,}5\, d_c \\ 7d \\ 80\ \text{mm} \end{cases}$



where:
d – is the bolt diameter, in mm
d_c – is explained above

The factor k_3 should be taken as:

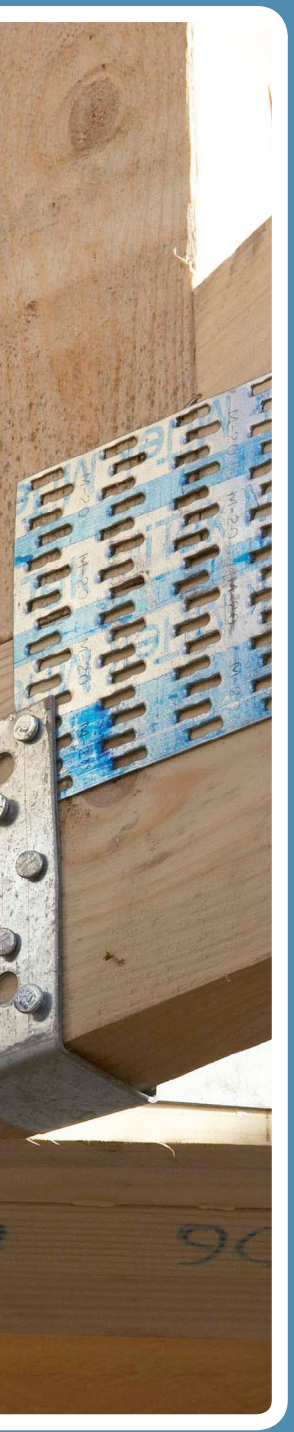
$$k_3 = \min \begin{cases} 1{,}5 \\ \dfrac{\rho_k}{350} \end{cases}$$

gdzie:

ρ_k - is the characteristic density of the timber, in kg/m3.

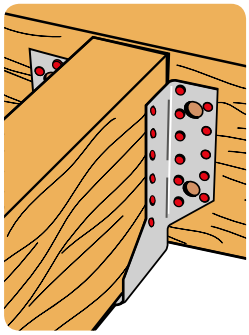
Minimum spacing and edge and end distances for toothed-plate connector types are stated in Eurocode 5 table 8.8 (types C1 to C9) and table 8.9 (types C10 and C11)

Joist Hangers

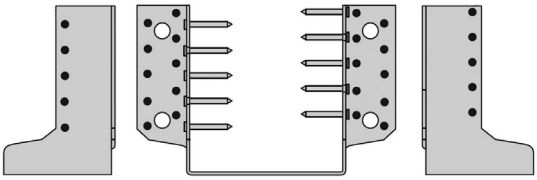


TECHNICAL INFORMATION joist hangers

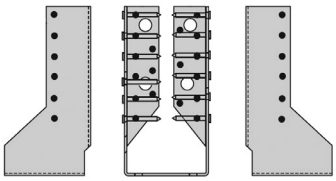
FULL NAILING



Nails placed in all holes guarantees full capacity. If the designer does not specify otherwise, always use full nailing.

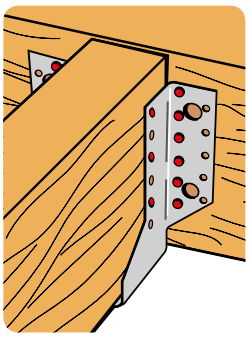


Nailing pattern for joist hangers with external flanges

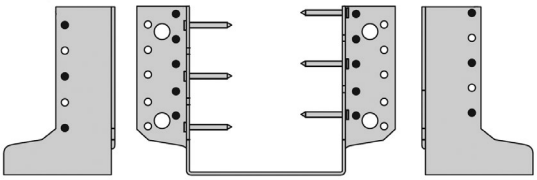


Nailing pattern for joist hangers with internal flanges

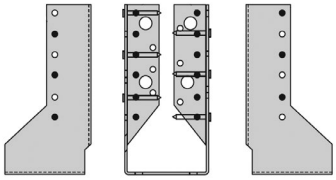
PARTIAL NAILING



Partial nailing can be used only if the designer clearly marked it in the specification. Number of nails in the secondary beam: Every second hole and the top and bottom holes of the hanger should always be nailed. (Unless otherwise specified) The number of nails in the main beam should be used for all holes near the bend of the joist hanger flange. Partial nailing is used in situations where it is not necessary to achieve a full load carrying capacity. Thanks to this type of installation we can reduce the number of nails in connection and thus reduce its cost as well as accelerate the assembly of the joist hangers.

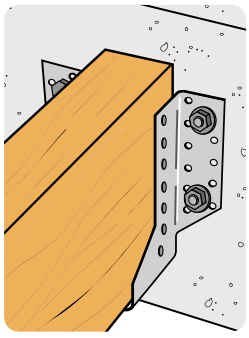


Nailing pattern for joist hangers with external flanges

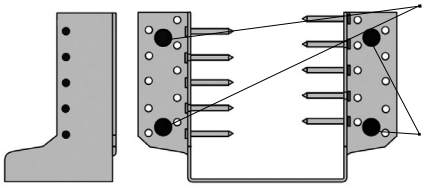


Nailing pattern for joist hangers with internal flanges

ANCHORING

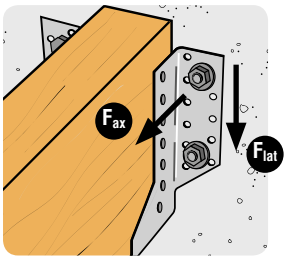


When using Simpson Strong-Tie connectors in combination with reinforced concrete or steel, use anchor / bolts with suitable tensile strength F_{ax} and shear F_{lat}



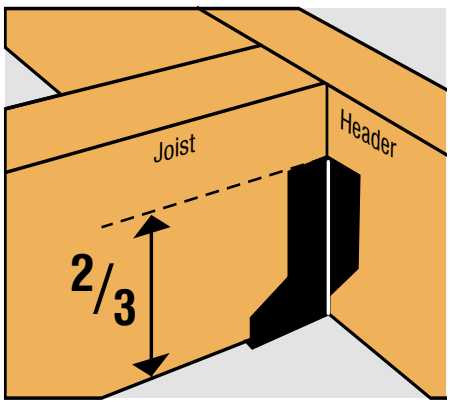
: The diameter of the anchor depends on the diameter of the hole in the connector

: The anchors have to be arranged symmetrically relative to the vertical axis of the hanger



Nailing and anchor pattern for joist hangers with external flanges

BEAM PROTECTION FROM ROTATION



In addition to checking the ultimate limit state, the joist must be prevent against rotation on the support. To determine the required beam hanger, make sure that the sides in the beam hanger include at least 2/3 the height of the joist. It is acceptable to ignore this rule if the joist is secured against rotation in other way.

Example:

Beams with a cross section of 60 x 220mm, the minimum height of the joist hanger should be:

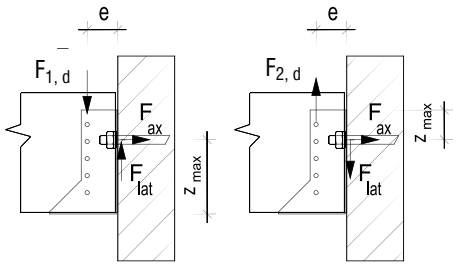
- 2/3 x 220 mm = 146, 66 mm.

The hangers that we can apply are: BSN60 / 160 and higher

TO PREVENT THE BEAM AGAINST ROTATION IN THE SUPPORT, THE HEIGHT OF THE JOIST HANGER SHOULD HAVE BEEN MINIMUM 2/3 OF THE JOIST

TECHNICAL INFORMATION joist hangers

Connecting hangers with concrete or steel elements using anchors and bolts.
Loads in axis of symmetry for joist hanger:



Loads on the anchors from $F_{1,d}$ or $F_{2,d}$ loads can be calculated as follows:

$$F_{bolt,\,lat,\,d} = \frac{F_{1,d}}{n_{ef}} \qquad F_{bolt,\,ax,\,d} = \frac{F_{1,d} \times e}{2 \times z_{max}}$$

where:

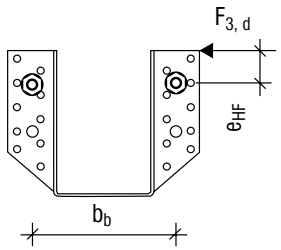
$F_{bolt,\,lat,\,d}$ anchor tension load

$F_{bolt,\,ax,\,d}$ anchor shear load

Loads on the anchors from $F_{3,d}$ load can be calculated as follows:

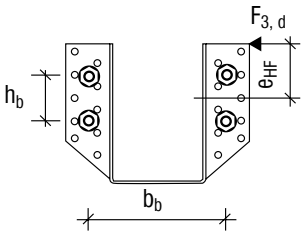
For two anchors:

$$F_{bolt,\,lat,\,d} = \sqrt{\left(\frac{F_{3,d}}{2}\right)^2 + \left(\frac{F_{3,d} \times e_{H,F}}{b_b}\right)^2}$$



For four anchors:

$$F_{bolt,\,lat,\,d} = \frac{(F_{3,\,d} - 0{,}5 \times n_N \times R_{ax,N,d}) \times (e_{H,\,F} + 0{,}5 \times h_b)}{h_b}$$



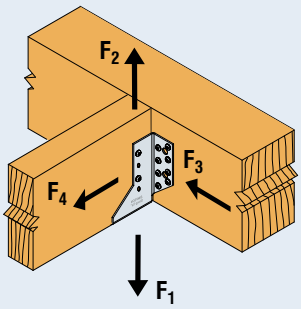
n_N - total number of nails in both sides of the joist

$R_{ax,N,d}$ - axial design capacity of the joist nails

Calculation examples of selected models.

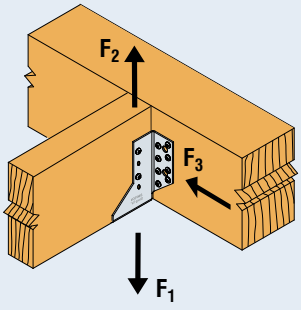
Hanger **BSNN 100 x 140**, full nailing,
Biaxial load [K] = short term load $\Rightarrow k_{mod} = 0{,}8$; $\gamma_M = 1{,}3$
Load $F_{1,d} = 12.3$ kN; $F_{3,\,d} = 4.1$ kN; nails CNA 4.0 x 50
$R_{1,d}$ = table value x $k_{mod} / \gamma_M = 27.1 \times 0.8 / 1.3 = 16{,}7$ kN
$R_{3,d}$ = table value x $k_{mod} / \gamma_M = 10.3 \times 0.8 / 1.3 = 6{,}3$ kN

Ultimate limit state: $\left(\frac{12{,}3}{16{,}7}\right)^2 + \left(\frac{4{,}1}{6{,}3}\right)^2 = 0{,}9^7 \leq 1 \Rightarrow$ ok

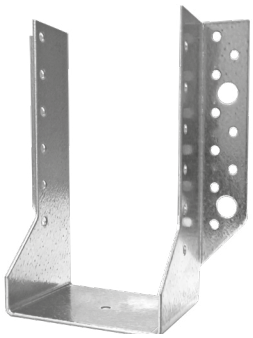
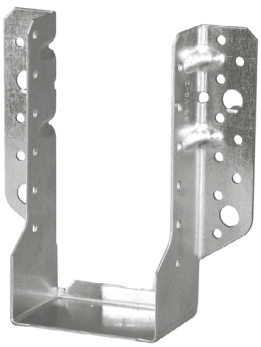
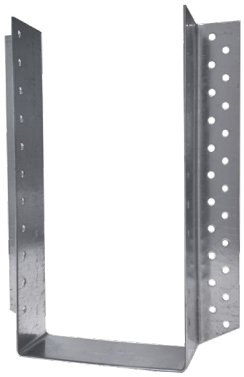
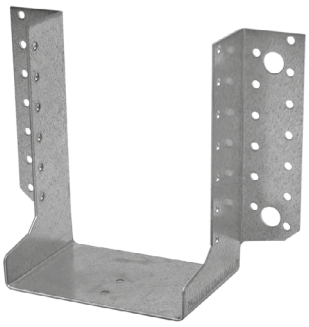


Hanger **SDED440/30 + SDEG440/30** full nailing,
Biaxial load [K] short term load $\Rightarrow k_{mod} = 0{,}8$ $\gamma_M = 1{,}3$
Load $F_{1,\,d} = 15{,}2$ kN; $F_{3,\,d} = 5.3$ kN
$R_{1,\,d}$ = table value x $k_{mod} / \gamma_M = 33{,}2 \times 0{,}8 / 1{,}3 = 20{,}4$ kN
$R_{3,\,d}$ = table value x $k_{mod} / \gamma_M = 14{,}0 \times 0{,}8 / 1{,}3 = 8{,}6$ kN

Ultimate limit state: $\left(\frac{15{,}2}{20{,}4}\right)^2 + \left(\frac{5{,}3}{8{,}6}\right)^2 = 0{,}93 < 1 \Rightarrow$ ok



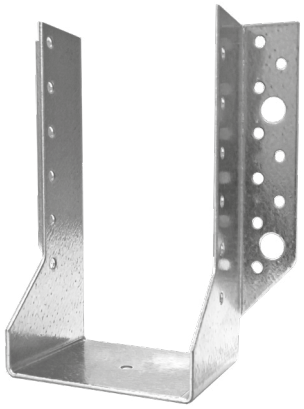
Joist Hangers

Face Fix Hangers **BSNN**	Face Fix Hangers **SBE**	Large Face Fix Hangers **BSD**	Fire resistance Face Fix Hangers **GSE**
			
Standard ≠ 2,0	**Economic ≠ 1,5**	**Special ≠ 2,0**	**Fire resistance ≠ 4,0**
Width range: **40 mm ÷ 140 mm**	**Width range:** **40 mm ÷ 100 mm**	**Width range:** **100 mm ÷ 200 mm**	**Width range:** **100 mm ÷ 200 mm**
Performance: **F_1 8,2 kN ÷ 39,9 kN**	**Performance:** **F_1 9,2 kN ÷ 18,9 kN**	**Performance:** **F_1 31,7 kN ÷ 70,9 kN**	**Performance:** **F_1 19,1 kN ÷ 94,5 kN**
Full nailing **Partial nailing** **Anchoring**	**Full nailing** **Partial nailing** **Anchoring**	**Full nailing** **Partial nailing** **Anchoring**	**Full nailing**
Standard joist hangers with a width of ≤140mm. Used for timber-timber, timber-concrete connection. They allow the use of full and partial nailing. Made of 2.0mm thick steel.	Economical joist hanger width ≤100mm. Used for timber-timber, timber-concrete connection. They allow the use of full and partial nailing. They require fewer nails than BSNN hangers. They are made of 1.5mm thick steel. Reinforced with additional ribs. Equipped with two mounting prongs for easy assembly.	Joist hanger of large dimensions, width 100mm ≤ A ≤ 200mm. Used for timber-timber connection. They allow the use of full and partial nailing. Custom-made holes with diameter up to Ø13 allow for their application in combination with timber-concrete. Made of 2.0mm thick steel.	Joist hanger for connections with fire resistance R30. Specially designed and tested, with tested fire resistance R30. Require longer CNA4.0x75 nails and full nailing.

BSNN Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie®



BSNN beam hangers are an optimized version of the classic BSN beam hanger with a new hole layout and a modified shape. Used for timber-timber and timber-concrete connection.

Fixing:

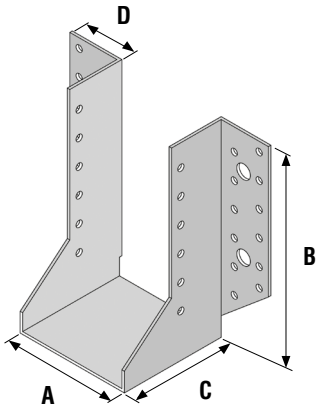
- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

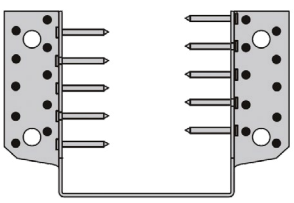
NEW

Zn 20 μm | CL.2 | CS | DWG



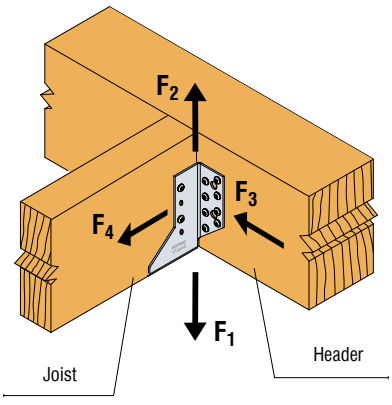
Beam to Beam connection (full nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSNN40/95	40	95	60	27	2,0	8 - CNA4,0x40	6 - CNA4,0x40	8,9	4,3	3,4	4,4
BSNN40/110	40	110	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	13,7	4,7	5,4	5,9
BSNN40/140	40	140	60	27	2,0	16 - CNA4,0x40	10 - CNA4,0x40	20,3	5,9	6,8	7,4
BSNN45/93	45	92,5	60	27	2,0	8 - CNA4,0x40	6 - CNA4,0x40	8,4	4,7	3,4	4,4
BSNN45/108	45	107,5	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	13,4	5,2	5,4	5,9
BSNN45/138	45	137,5	60	27	2,0	16 - CNA4,0x40	10 - CNA4,0x40	19,9	6,6	6,8	7,4
BSNN45/168	45	167,5	60	27	2,0	18 - CNA4,0x40	12 - CNA4,0x40	25,3	7,4	8,0	8,8
BSNN45/198	45	197,5	60	27	2,0	22 - CNA4,0x40	14 - CNA4,0x40	29,4	8,2	9,6	10,3
BSNN48/91	48	91	60	27	2,0	8 - CNA4,0x40	6 - CNA4,0x40	8,3	5,0	3,4	4,4
BSNN48/136	48	136	60	27	2,0	16 - CNA4,0x40	10 - CNA4,0x40	19,6	7,0	6,8	7,4
BSNN48/166	48	166	60	27	2,0	18 - CNA4,0x40	12 - CNA4,0x40	25,2	7,9	8,0	8,8
BSNN48/226	48	226	60	27	2,0	26 - CNA4,0x40	16 - CNA4,0x40	33,0	9,4	11,1	11,8
BSNN51/90	51	89,5	60	27	2,0	8 - CNA4,0x40	6 - CNA4,0x40	8,2	5,2	3,4	4,4
BSNN51/105	51	104,5	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	12,9	5,8	5,4	5,9
BSNN51/135	51	134,5	60	27	2,0	16 - CNA4,0x40	10 - CNA4,0x40	19,4	7,4	6,8	7,4
BSNN51/164	51	164,5	60	27	2,0	18 - CNA4,0x40	12 - CNA4,0x40	25,0	8,3	8,0	8,8
BSNN51/195	51	194,5	60	27	2,0	22 - CNA4,0x40	14 - CNA4,0x40	29,4	9,2	9,6	10,3
BSNN60/100	60	100	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	12,1	6,6	5,4	5,9
BSNN60/130	60	130	60	27	2,0	16 - CNA4,0x40	10 - CNA4,0x40	18,6	8,5	6,8	7,4
BSNN60/160	60	160	60	27	2,0	18 - CNA4,0x40	12 - CNA4,0x40	24,4	9,7	8,0	8,8
BSNN60/190	60	190	60	27	2,0	22 - CNA4,0x40	14 - CNA4,0x40	29,4	10,7	9,6	10,3
BSNN60/220	60	220	60	27	2,0	26 - CNA4,0x40	16 - CNA4,0x40	33,0	11,6	11,1	11,8
BSNN64/98	64	98	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	15,2	7,0	6,8	7,8
BSNN64/128	64	128	60	27	2,0	16 - CNA4,0x50	10 - CNA4,0x50	23,4	9,0	8,6	9,8
BSNN66/217	66	217	60	27	2,0	26 - CNA4,0x50	16 - CNA4,0x50	39,9	12,7	14,2	15,7
BSNN70/125	70	125	60	27	2,0	16 - CNA4,0x50	10 - CNA4,0x50	22,8	9,7	8,6	9,8
BSNN70/155	70	155	60	27	2,0	18 - CNA4,0x50	12 - CNA4,0x50	30,0	11,1	10,3	11,8
BSNN73/124	73	123,5	60	27	2,0	16 - CNA4,0x50	10 - CNA4,0x50	22,4	10,1	8,6	9,8
BSNN73/154	73	153,5	60	27	2,0	18 - CNA4,0x50	12 - CNA4,0x50	29,7	11,5	10,3	11,8
BSNN73/184	73	183,5	60	27	2,0	22 - CNA4,0x50	14 - CNA4,0x50	35,5	12,7	12,3	13,7



Full nailing

Load scheme beam to beam



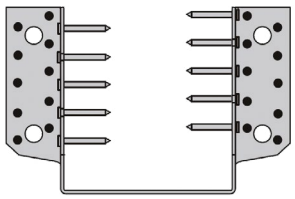
BSNN Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie

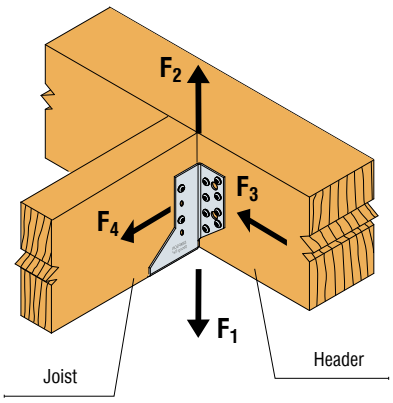
Beam to Beam connection (full nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSNN76/122	76	122	60	27	2,0	16 - CNA4,0x50	10 - CNA4,0x50	22,1	10,4	8,6	9,8
BSNN76/152	76	152	60	27	2,0	18 - CNA4,0x50	12 - CNA4,0x50	29,4	11,9	10,3	11,8
BSNN76/182	76	182	60	27	2,0	22 - CNA4,0x50	14 - CNA4,0x50	35,5	13,2	12,3	13,7
BSNN80/120	80	120	60	27	2,0	16 - CNA4,0x50	10 - CNA4,0x50	21,6	10,8	8,6	9,8
BSNN80/150	80	150	60	27	2,0	18 - CNA4,0x50	12 - CNA4,0x50	29,1	12,4	10,3	11,8
BSNN80/180	80	180	60	27	2,0	22 - CNA4,0x50	14 - CNA4,0x50	35,5	13,8	12,3	13,7
BSNN80/210	80	210	60	27	2,0	26 - CNA4,0x50	16 - CNA4,0x50	39,9	15,1	14,2	15,7
BSNN90/145	90	145	60	27	2,0	18 - CNA4,0x50	12 - CNA4,0x50	28,1	13,7	10,3	11,8
BSNN90/205	90	205	60	27	2,0	26 - CNA4,0x50	16 - CNA4,0x50	39,9	16,7	14,2	15,7
BSNN98/141	98	141	60	27	2,0	18 - CNA4,0x50	12 - CNA4,0x50	27,3	14,6	10,3	11,8
BSNN100/140	100	140	60	27	2,0	18 - CNA4,0x50	12 - CNA4,0x50	27,1	14,9	10,3	11,8
BSNN100/170	100	170	60	27	2,0	22 - CNA4,0x50	14 - CNA4,0x50	35,5	16,7	12,3	13,7
BSNN100/200	100	200	60	27	2,0	26 - CNA4,0x50	16 - CNA4,0x50	39,9	18,3	14,2	15,7
BSNN115/163	115	162,5	60	27	2,0	22 - CNA4,0x50	14 - CNA4,0x50	34,9	18,7	12,3	13,7
BSNN115/193	115	192,5	60	27	2,0	26 - CNA4,0x50	16 - CNA4,0x50	39,9	20,6	14,2	15,7
BSNN120/160	120	160	60	27	2,0	22 - CNA4,0x50	14 - CNA4,0x50	34,4	19,3	12,3	13,7
BSNN120/190	120	190	60	27	2,0	26 - CNA4,0x50	16 - CNA4,0x50	39,9	21,4	14,2	15,7
BSNN140/150	140	150	60	27	2,0	22 - CNA4,0x50	14 - CNA4,0x50	32,0	21,7	11,8	13,7
BSNN140/180	140	180	60	27	2,0	26 - CNA4,0x50	16 - CNA4,0x50	37,7	24,1	13,7	15,7



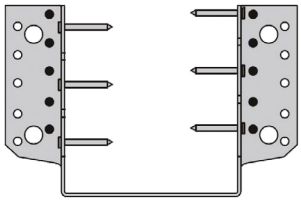
Full nailing

Load scheme beam to beam



Beam to Beam connection (partial nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSNN40/95	40	95	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	7,7	4,3	1,0	3,1
BSNN40/110	40	110	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	9,2	4,7	5,9	3,1
BSNN40/140	40	140	60	27	2,0	10 - CNA4,0x40	5 - CNA4,0x40	12,8	5,9	4,3	6,2
BSNN45/93	45	92,5	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	7,4	4,5	1,0	3,1
BSNN45/108	45	107,5	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	9,2	5,2	1,5	3,1
BSNN45/138	45	137,5	60	27	2,0	10 - CNA4,0x40	5 - CNA4,0x40	12,8	6,6	2,1	6,2
BSNN45/168	45	167,5	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	14,7	7,4	2,5	8,8
BSNN45/198	45	197,5	60	27	2,0	14 - CNA4,0x40	8 - CNA4,0x40	18,4	8,2	3	10,3
BSNN48/91	48	91	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	7,3	4,5	1,0	3,1
BSNN48/136	48	136	60	27	2,0	10 - CNA4,0x40	5 - CNA4,0x40	12,8	7,0	2,1	6,2
BSNN48/166	48	166	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	14,7	7,9	2,5	8,8
BSNN48/226	48	226	60	27	2,0	16 - CNA4,0x40	8 - CNA4,0x40	18,4	9,4	3,4	11,8
BSNN51/90	51	89,5	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	7,2	4,5	1,0	3,1
BSNN51/105	51	104,5	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	9,2	5,5	1,5	3,1
BSNN51/135	51	134,5	60	27	2,0	10 - CNA4,0x40	5 - CNA4,0x40	12,8	7,4	2,1	6,2
BSNN51/164	51	164,5	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	14,7	8,3	2,5	8,8
BSNN51/195	51	194,5	60	27	2,0	14 - CNA4,0x40	8 - CNA4,0x40	18,4	9,2	3,0	10,3
BSNN60/100	60	100	60	27	2,0	6 - CNA4,0x40	3 - CNA4,0x40	8,9	5,5	1,5	3,1
BSNN60/130	60	130	60	27	2,0	10 - CNA4,0x40	5 - CNA4,0x40	12,6	8,5	2,1	6,2
BSNN60/160	60	160	60	27	2,0	12 - CNA4,0x40	6 - CNA4,0x40	14,7	9,7	2,5	8,8
BSNN60/190	60	190	60	27	2,0	14 - CNA4,0x40	8 - CNA4,0x40	18,4	10,7	3,0	10,3



Partial nailing

BSNN Face Fix Hangers

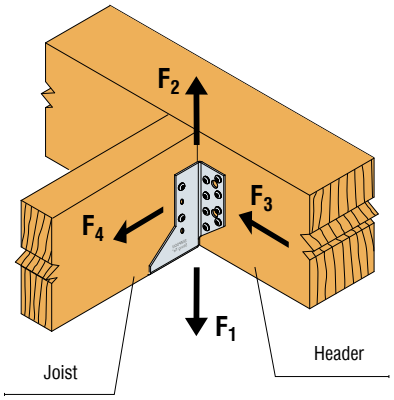
CE ETA 06/0270

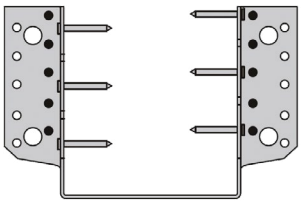
SIMPSON Strong-Tie®

Beam to Beam connection (partial nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSNN60/220	60	220	60	27	2,0	16 - CNA4,0x40	8 - CNA4,0x40	18,4	11,6	3,4	11,8
BSNN64/98	64	98	60	27	2,0	6 - CNA4,0x50	3 - CNA4,0x50	11,1	6,6	1,8	3,8
BSNN64/128	64	128	60	27	2,0	10 - CNA4,0x50	5 - CNA4,0x50	15,5	9,0	2,5	7,5
BSNN66/217	66	217	60	27	2,0	16 - CNA4,0x50	8 - CNA4,0x50	22,2	12,7	4,2	15,1
BSNN70/125	70	125	60	27	2,0	10 - CNA4,0x50	5 - CNA4,0x50	15,4	9,7	2,5	7,5
BSNN70/155	70	155	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	17,7	11,1	3,1	11,3
BSNN73/124	73	123,5	60	27	2,0	10 - CNA4,0x50	5 - CNA4,0x50	15,2	10,1	2,5	7,5
BSNN73/154	73	153,5	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	17,7	11,5	3,1	11,3
BSNN73/184	73	183,5	60	27	2,0	14 - CNA4,0x50	8 - CNA4,0x50	22,2	12,7	3,6	13,7
BSNN76/122	76	122	60	27	2,0	10 - CNA4,0x50	5 - CNA4,0x50	15	10,4	2,5	7,5
BSNN76/152	76	152	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	17,7	11,9	3,1	11,3
BSNN76/182	76	182	60	27	2,0	14 - CNA4,0x50	8 - CNA4,0x50	22,2	13,2	3,6	13,7
BSNN80/120	80	120	60	27	2,0	10 - CNA4,0x50	5 - CNA4,0x50	14,7	10,8	2,5	7,5
BSNN80/150	80	150	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	17,7	12,4	3,1	11,3
BSNN80/180	80	180	60	27	2,0	14 - CNA4,0x50	8 - CNA4,0x50	22,2	13,8	3,6	13,7
BSNN80/210	80	210	60	27	2,0	16 - CNA4,0x50	8 - CNA4,0x50	22,2	15,1	4,2	15,1
BSNN90/145	90	145	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	17,7	13,3	3,1	11,3
BSNN90/205	90	205	60	27	2,0	16 - CNA4,0x50	8 - CNA4,0x50	22,2	16,7	4,2	15,1
BSNN98/141	98	141	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	17,7	13,3	3,1	11,3
BSNN100/140	100	140	60	27	2,0	12 - CNA4,0x50	6 - CNA4,0x50	17,7	13,3	3,1	11,3
BSNN100/170	100	170	60	27	2,0	14 - CNA4,0x50	8 - CNA4,0x50	22,2	16,7	3,6	13,7
BSNN100/200	100	200	60	27	2,0	16 - CNA4,0x50	8 - CNA4,0x50	22,2	17,7	4,2	15,1
BSNN115/163	115	162,5	60	27	2,0	14 - CNA4,0x50	8 - CNA4,0x50	22,2	17,7	3,6	13,7
BSNN115/193	115	192,5	60	27	2,0	16 - CNA4,0x50	8 - CNA4,0x50	22,2	17,7	4,2	15,1
BSNN120/160	120	160	60	27	2,0	14 - CNA4,0x50	8 - CNA4,0x50	22,2	17,7	3,6	13,7
BSNN120/190	120	190	60	27	2,0	16 - CNA4,0x50	8 - CNA4,0x50	22,2	17,7	4,2	15,1
BSNN140/150	140	150	60	27	2,0	14 - CNA4,0x50	8 - CNA4,0x50	21,4	17,7	3,6	13,7
BSNN140/180	140	180	60	27	2,0	16 - CNA4,0x50	8 - CNA4,0x50	22,2	17,7	4,2	15,1

Load scheme beam to beam



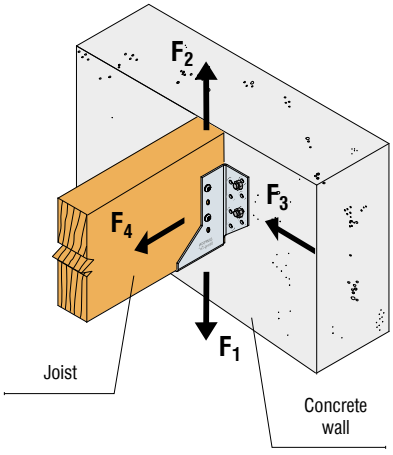


Partial nailing

Beam to Concrete wall connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSNN40/95	40	95	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	4,3	9,8	5,0
BSNN40/110	40	110	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	4,7	9,8	5,0
BSNN40/140	40	140	60	27	2,0	2-WA10x78	10 - CNA4,0x40	14,2	5,9	8,9	5,0
BSNN45/93	45	92,5	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	4,7	11,0	5,0
BSNN45/108	45	107,5	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	5,2	11,0	5,0
BSNN45/138	45	137,5	60	27	2,0	2-WA10x78	10 - CNA4,0x40	14,2	6,6	10	5,0
BSNN45/168	45	167,5	60	27	2,0	4-WA10x78	12 - CNA4,0x40	22,7	7,4	8,6	10,0
BSNN45/198	45	197,5	60	27	2,0	4-WA10x78	14 - CNA4,0x40	22,7	8,2	8,9	10
BSNN48/91	48	91	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	5,0	11,7	5,0
BSNN48/136	48	136	60	27	2,0	2-WA10x78	10 - CNA4,0x40	14,2	7,0	10,6	5,0
BSNN48/166	48	166	60	27	2,0	4-WA10x78	12 - CNA4,0x40	22,7	7,9	8,6	10,0
BSNN48/226	48	226	60	27	2,0	4-WA10x78	16 - CNA4,0x40	22,7	9,4	10,2	10,0

Load scheme beam to concrete wall



BSNN Face Fix Hangers

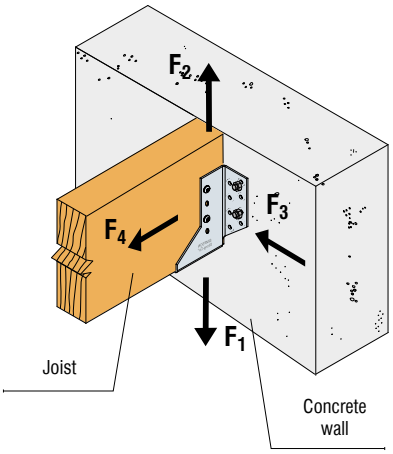
CE ETA 06/0270

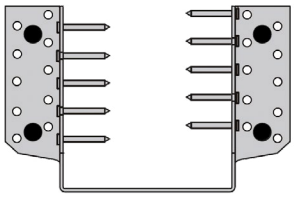
SIMPSON Strong-Tie

Beam to Concrete wall connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSNN51/90	51	89,5	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	5,2	12,4	5,0
BSNN51/105	51	104,5	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	5,8	12,4	5,0
BSNN51/135	51	134,5	60	27	2,0	2-WA10x78	10 - CNA4,0x40	14,2	7,4	11,3	5,0
BSNN51/164	51	164,5	60	27	2,0	4-WA10x78	12 - CNA4,0x40	22,7	8,3	8,6	10,0
BSNN51/195	51	194,5	60	27	2,0	4-WA10x78	14 - CNA4,0x40	22,7	9,2	9,0	10,0
BSNN60/100	60	100	60	27	2,0	2-WA10x78	6 - CNA4,0x40	14,2	6,6	14,6	5,0
BSNN60/130	60	130	60	27	2,0	2-WA10x78	10 - CNA4,0x40	14,2	8,5	13,3	5,0
BSNN60/160	60	160	60	27	2,0	4-WA10x78	12 - CNA4,0x40	22,7	9,7	8,7	10,0
BSNN60/190	60	190	60	27	2,0	4-WA10x78	14 - CNA4,0x40	22,7	10,7	9,0	10,0
BSNN60/220	60	220	60	27	2,0	4-WA10x78	16 - CNA4,0x40	22,7	11,6	10,3	10,0
BSNN64/98	64	98	60	27	2,0	2-WA10x78	6 - CNA4,0x50	14,2	7,0	18,9	5,0
BSNN64/128	64	128	60	27	2,0	2-WA10x78	10 - CNA4,0x50	14,2	9,0	17,2	5,0
BSNN66/217	66	217	60	27	2,0	4-WA10x78	16 - CNA4,0x50	22,7	12,7	12,2	10,0
BSNN70/125	70	125	60	27	2,0	2-WA10x78	10 - CNA4,0x50	14,2	9,7	18,8	5,0
BSNN70/155	70	155	60	27	2,0	4-WA10x78	12 - CNA4,0x50	22,7	11,1	10,2	10,0
BSNN73/124	73	123,5	60	27	2,0	2-WA10x78	10 - CNA4,0x50	14,2	10,1	19,6	5,0
BSNN73/154	73	153,5	60	27	2,0	4-WA10x78	12 - CNA4,0x50	22,7	11,5	10,2	10,0
BSNN73/184	73	183,5	60	27	2,0	4-WA10x78	14 - CNA4,0x50	22,7	12,7	10,8	10,0
BSNN76/122	76	122	60	27	2,0	2-WA10x78	10 - CNA4,0x50	14,2	10,4	20,5	5,0
BSNN76/152	76	152	60	27	2,0	4-WA10x78	12 - CNA4,0x50	22,7	11,9	10,2	10,0
BSNN76/182	76	182	60	27	2,0	4-WA10x78	14 - CNA4,0x50	22,7	13,2	10,8	10,0
BSNN80/120	80	120	60	27	2,0	2-WA10x78	10 - CNA4,0x50	14,2	10,8	21,5	5,0
BSNN80/150	80	150	60	27	2,0	4-WA10x78	12 - CNA4,0x50	22,7	12,4	10,2	10,0
BSNN80/180	80	180	60	27	2,0	4-WA10x78	14 - CNA4,0x50	22,7	13,8	10,8	10,0
BSNN80/210	80	210	60	27	2,0	4-WA10x78	16 - CNA4,0x50	22,7	15,1	12,3	10,0
BSNN90/145	90	145	60	27	2,0	4-WA10x78	12 - CNA4,0x50	22,7	13,7	10,3	10,0
BSNN90/205	90	205	60	27	2,0	4-WA10x78	16 - CNA4,0x50	22,7	16,7	12,4	10,0
BSNN98/141	98	141	60	27	2,0	4-WA10x78	12 - CNA4,0x50	22,7	14,6	10,4	10,0
BSNN100/140	100	140	60	27	2,0	4-WA10x78	12 - CNA4,0x50	22,7	14,9	10,4	10,0
BSNN100/170	100	170	60	27	2,0	4-WA10x78	14 - CNA4,0x50	22,7	16,7	10,9	10,0
BSNN100/200	100	200	60	27	2,0	4-WA10x78	16 - CNA4,0x50	22,7	18,3	12,4	10,0
BSNN115/163	115	162,5	60	27	2,0	4-WA10x78	14 - CNA4,0x50	22,7	18,7	11,1	10,0
BSNN115/193	115	192,5	60	27	2,0	4-WA10x78	16 - CNA4,0x50	22,7	20,6	12,5	10,0
BSNN120/160	120	160	60	27	2,0	4-WA10x78	14 - CNA4,0x50	22,7	19,3	11,1	10,0
BSNN120/190	120	190	60	27	2,0	4-WA10x78	16 - CNA4,0x50	22,7	21,4	12,5	10,0
BSNN140/150	140	150	60	27	2,0	4-WA10x78	14 - CNA4,0x50	22,7	21,7	10,7	10,0
BSNN140/180	140	180	60	27	2,0	4-WA10x78	16 - CNA4,0x50	22,7	22,7	12,2	10,0

Load scheme
beam to concrete wall



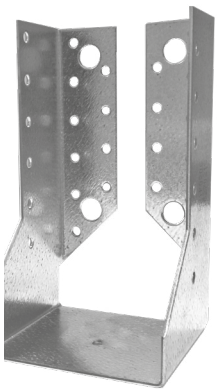


Anchoring

BSIN Internal Flange Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie®



BSIN is an optimized version of the BSI beam hanger with internal flange with a new hole layout and a modified shape. BSIN joist hangers are used for connections where the main and secondary members are in the same level. Bolt holes in the flanges can be used for connections of timber beams to concrete or masonry. Another popular application for this connector is beam to column connection.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

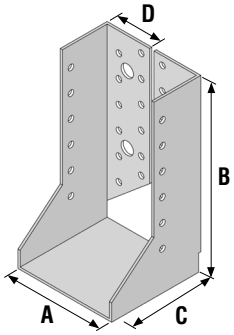
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

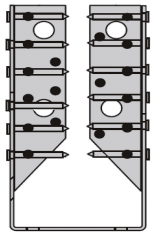
NEW

Zn 20 μm | CL.2 | CS | DWG

Beam to Beam connection (full nailing)

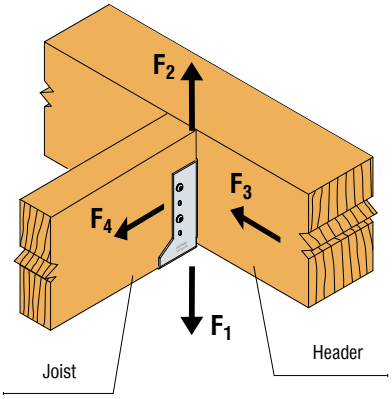
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSIN040/105	40	105	76	17,5	2,0	6 - CNA4,0x40	6 - CNA4,0x40	5,3	3,4	0,7	2,2
BSIN045/078	45	77,5	76	17,5	2,0	4 - CNA4,0x40	4 - CNA4,0x40	3,2	1,8	0,4	1,5
BSIN045/127	45	127,5	84	18,5	2,0	8 - CNA4,0x40	8 - CNA4,0x40	9,1	5,3	1,4	2,9
BSIN048/126	48	126	84	18,5	2,0	8 - CNA4,0x40	8 - CNA4,0x40	9,0	5,3	1,4	2,9
BSIN048/166	48	166	84	18,5	2,0	10 - CNA4,0x40	10 - CNA4,0x40	13,2	7,6	1,7	3,7
BSIN051/100	51	99,5	76	17,5	2,0	6 - CNA4,0x50	6 - CNA4,0x50	6,3	4,5	0,9	2,9
BSIN060/095	60	95	76	17,5	2,0	6 - CNA4,0x50	6 - CNA4,0x50	5,8	4,5	0,9	2,9
BSIN060/160	60	160	84	18,5	2,0	10 - CNA4,0x50	10 - CNA4,0x50	16,2	10	2,1	4,9
BSIN064/093	64	93	76	34	2,0	10 - CNA4,0x50	6 - CNA4,0x50	11,6	6,6	1,6	4,9
BSIN064/118	64	118	76	34	2,0	16 - CNA4,0x50	9 - CNA4,0x50	19,4	14,2	3,4	7,8
BSIN076/112	76	112	76	34	2,0	16 - CNA4,0x50	9 - CNA4,0x50	17,8	14,2	3,4	7,8
BSIN080/110	80	110	76	34	2,0	16 - CNA4,0x50	9 - CNA4,0x50	17,3	14,2	3,4	7,8
BSIN080/130	80	130	76	34	2,0	16 - CNA4,0x50	10 - CNA4,0x50	22,1	13,8	2,9	7,8
BSIN080/150	80	150	76	34	2,0	20 - CNA4,0x50	12 - CNA4,0x50	31,0	19,3	4,3	9,8
BSIN080/180	80	180	76	34	2,0	26 - CNA4,0x50	15 - CNA4,0x50	37,7	29,6	6,0	12,7
BSIN080/210	80	210	76	34	2,0	32 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	8,1	15,7
BSIN090/145	90	145	76	34	2,0	20 - CNA4,0x50	12 - CNA4,0x50	30,0	19,3	4,4	9,8
BSIN098/141	98	141	84	41,5	2,0	20 - CNA4,0x50	10 - CNA4,0x50	26,6	20,7	4,2	9,8
BSIN100/100	100	100	84	41,5	2,0	16 - CNA4,0x50	8 - CNA4,0x50	15,3	14,6	3,5	7,8
BSIN100/140	100	140	76	34	2,0	20 - CNA4,0x50	12 - CNA4,0x50	28,9	19,3	4,4	9,8
BSIN100/170	100	170	76	41,5	2,0	26 - CNA4,0x50	15 - CNA4,0x50	37,7	29,6	6,0	12,7
BSIN100/200	100	200	76	34	2,0	32 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	8,2	15,7
BSIN115/163	115	162,5	84	41,5	2,0	26 - CNA4,0x50	13 - CNA4,0x50	33,2	28,8	6,3	12,7
BSIN115/193	115	192,5	84	41,5	2,0	32 - CNA4,0x50	16 - CNA4,0x50	39,9	35,5	8,5	15,7
BSIN120/160	120	160	76	34	2,0	26 - CNA4,0x50	15 - CNA4,0x50	35,4	29,6	6,0	12,7
BSIN120/190	120	190	76	34	2,0	32 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	8,3	15,7
BSIN140/120	140	120	84	41,5	2,0	20 - CNA4,0x50	10 - CNA4,0x50	21,4	20,7	4,2	9,8
BSIN140/180	140	180	84	41,5	2,0	32 - CNA4,0x50	16 - CNA4,0x50	39,9	35,5	8,5	15,7





Full nailing

Load scheme beam to beam



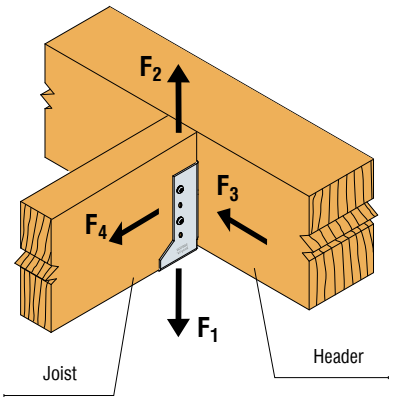
BSIN Internal Flange Face Fix Hangers

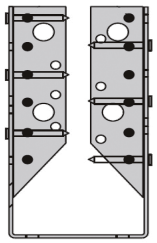
CE ETA 06/0270

Beam to Beam connection (partial nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
BSIN040/105	40	105	76	17,5	2,0	-	-	-	-	-	-
BSIN045/078	45	77,5	76	17,5	2,0	-	-	-	-	-	-
BSIN045/127	45	127,5	84	18,5	2,0	-	-	-	-	-	-
BSIN048/126	48	126	84	18,5	2,0	-	-	-	-	-	-
BSIN048/166	48	166	84	18,5	2,0	-	-	-	-	-	-
BSIN051/100	51	99,5	76	17,5	2,0	-	-	-	-	-	-
BSIN060/095	60	95	76	17,5	2,0	-	-	-	-	-	-
BSIN060/160	60	160	84	18,5	2,0	-	-	-	-	-	-
BSIN064/093	64	93	76	34	2,0	6	4	8,4	4,2	1,1	2,9
BSIN064/118	64	118	76	34	2,0	10	5	13,7	10,0	2,8	4,9
BSIN076/112	76	112	76	34	2,0	10	5	12,8	10,0	2,8	4,9
BSIN080/110	80	110	76	34	2,0	10	5	12,5	10,0	2,9	4,9
BSIN080/130	80	130	76	34	2,0	10	6	15,0	10,0	2,4	4,9
BSIN080/150	80	150	76	34	2,0	12	6	17,7	13,3	3,2	5,9
BSIN080/180	80	180	76	34	2,0	14	8	22,2	16,6	3,7	6,9
BSIN080/210	80	210	76	34	2,0	18	10	26,6	22,2	5,5	8,8
BSIN090/145	90	145	76	34	2,0	12	6	17,7	13,3	3,2	5,9
BSIN098/141	98	141	84	41,5	2,0	10	6	15,0	10,0	2,2	4,9
BSIN100/100	100	100	84	41,5	2,0	8	4	9,5	7,1	1,8	3,9
BSIN100/140	100	140	76	34	2,0	12	6	17,7	13,3	3,2	5,9
BSIN100/170	100	170	76	41,5	2,0	14	8	22,2	16,6	3,7	6,9
BSIN100/200	100	200	76	34	2,0	18	10	26,6	22,2	5,6	8,8
BSIN115/163	115	162,5	84	41,5	2,0	12	8	18,5	16,7	2,7	5,9
BSIN115/193	115	192,5	84	41,5	2,0	16	8	22,2	17,7	4,4	7,8
BSIN120/160	120	160	76	34	2,0	14	8	21,6	16,6	3,8	6,9
BSIN120/190	120	190	76	34	2,0	18	10	26,6	22,2	5,6	8,8
BSIN140/120	140	120	84	41,5	2,0	10	6	12,4	10,0	2,2	4,9
BSIN140/180	140	180	84	41,5	2,0	16	8	22,2	17,7	4,4	7,8

Load scheme beam to beam



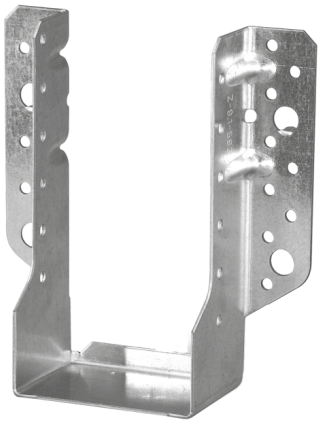


Partial nailing

SBE Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie®



SBE is a joist hanger fitted with 12 mm bolt holes and reinforcement ribs for extra rigidity, which provides great support and ease of installation. Speed-prong holds the hanger in position to allow easier attachment. The installer no longer has to hold hanger, joist and nails with one hand and swing the hammer with the other. This joist hanger can be used in following applications: timber, concrete, glue laminated timber, steel. Areas of applications: Joists, purlins, rafter ends, smooth beams and cladding upright

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

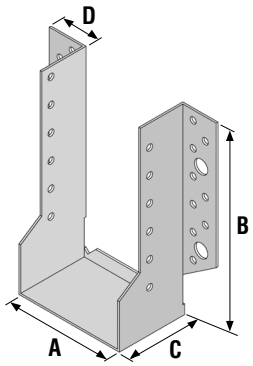
Material:

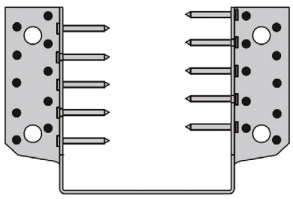
Pre galvanized mild steel Sendzimir method S320GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Beam to Beam connection (full nailing)

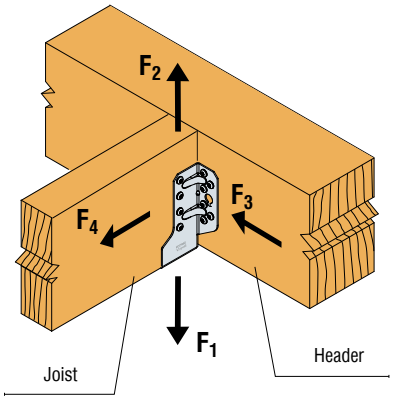
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
SBE40/95	40	95	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	11,2	4,7	5,4	5,8
SBE40/110	40	110	55	30	1,5	12 - CNA4,0x40	8 - CNA4,0x40	13,2	5,2	6,3	5,8
SBE40/140	40	140	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	18,3	6,0	7,6	7,3
SBE45/93	45	93	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	10,8	5,2	5,4	5,8
SBE45/138	45	138	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	18,0	6,7	7,6	7,3
SBE45/168	45	168	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	25,0	7,5	8,6	8,8
SBE48/91	48	91	55	30	1,5	12 - CNA4,0x40	8 - CNA4,0x40	10,5	5,5	5,4	5,8
SBE48/136	48	136	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	17,8	7,1	7,6	7,3
SBE48/166	48	166	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	24,9	7,9	8,6	8,8
SBE51/135	51	135	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	17,6	7,4	7,6	7,3
SBE60/100	60	100	55	30	1,5	12 - CNA4,0x40	8 - CNA4,0x40	11,6	7,3	6,3	5,8
SBE60/130	60	130	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	17,0	8,6	7,6	7,3
SBE60/160	60	160	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	24,1	9,7	8,6	8,8
SBE64/98	64	98	55	30	1,5	12 - CNA4,0x40	8 - CNA4,0x40	11,2	7,7	6,3	5,8
SBE64/128	64	128	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	16,7	9,1	7,6	7,3
SBE70/125	70	125	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	16,3	9,8	7,6	7,3
SBE70/155	70	155	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	23,4	11,1	8,6	8,8
SBE73/154	73	154	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	23,2	11,5	8,6	8,8
SBE76/122	76	122	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	15,8	10,5	7,6	7,3
SBE76/152	76	152	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	22,9	11,9	8,6	8,8
SBE80/120	80	120	55	30	1,5	14 - CNA4,0x40	10 - CNA4,0x40	15,4	10,9	7,6	7,3
SBE80/150	80	150	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	22,6	12,5	8,6	8,8
SBE90/145	90	145	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	21,8	13,7	8,6	8,8
SBE98/141	98	141	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	21,1	14,7	8,6	8,8
SBE100/140	100	140	55	30	1,5	18 - CNA4,0x40	12 - CNA4,0x40	20,9	15	8,6	8,8





Full nailing

Load scheme beam to beam



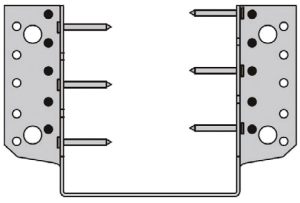
SBE Face Fix Hangers

CE ETA 06/0270

Beam to Beam connection (partial nailing)

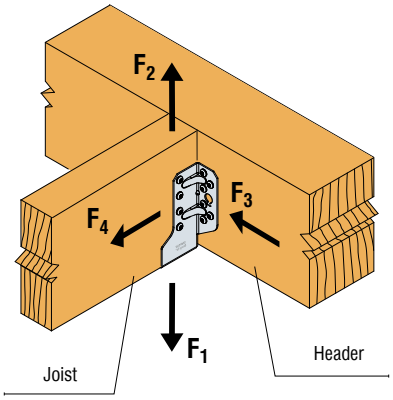
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
SBE40/95	40	95	55	30	1,5	6 - CNA4,0x40	4 - CNA4,0x40	7,9	4,7	2,1	5,8
SBE40/110	40	110	55	30	1,5	8 - CNA4,0x40	4 - CNA4,0x40	9,4	5,2	2,3	5,8
SBE40/140	40	140	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	13,1	6,0	2,7	7,3
SBE45/93	45	93	55	30	1,5	6 - CNA4,0x40	4 - CNA4,0x40	7,6	5,2	2,1	5,8
SBE45/138	45	138	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	12,9	6,7	2,7	7,3
SBE45/168	45	168	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	7,5	3,2	8,8
SBE48/91	48	91	55	30	1,5	6 - CNA4,0x40	4 - CNA4,0x40	7,4	5,5	2,1	5,8
SBE48/136	48	136	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	12,8	7,1	2,7	7,3
SBE48/166	48	166	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	7,9	3,2	8,8
SBE51/135	51	135	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	12,6	7,4	2,7	7,3
SBE60/100	60	100	55	30	1,5	8 - CNA4,0x40	4 - CNA4,0x40	8,4	6,7	2,3	5,8
SBE60/130	60	130	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	12,2	8,6	2,7	7,3
SBE60/160	60	160	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	9,7	3,2	8,8
SBE64/98	64	98	55	30	1,5	8 - CNA4,0x40	4 - CNA4,0x40	8,2	6,7	2,3	5,8
SBE64/128	64	128	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	12	9,1	2,7	7,3
SBE70/125	70	125	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	11,7	9,5	2,7	7,3
SBE70/155	70	155	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	11	3,2	8,8
SBE73/154	73	154	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	11	3,2	8,8
SBE76/122	76	122	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	11,3	9,5	2,7	7,3
SBE76/152	76	152	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	11	3,2	8,8
SBE80/120	80	120	55	30	1,5	10 - CNA4,0x40	6 - CNA4,0x40	11,1	9,5	2,7	7,3
SBE80/150	80	150	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	11,0	3,2	8,8
SBE90/145	90	145	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,7	11,0	3,2	8,8
SBE98/141	98	141	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,5	11,0	3,2	8,8
SBE100/140	100	140	55	30	1,5	12 - CNA4,0x40	6 - CNA4,0x40	14,4	11,0	3,2	8,8

Values $R_{2,k}$ are true at the height of the header larger by at least 20 mm from the joist.



Partial nailing

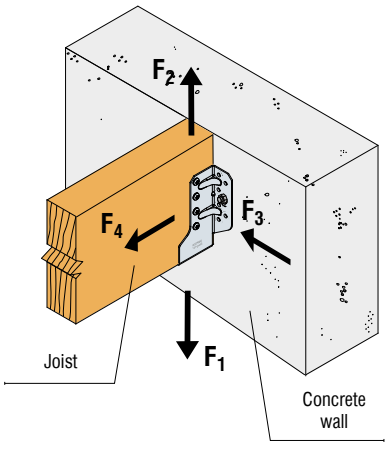
Load scheme beam to beam



Beam to Concrete wall connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
SBE40/95	40	95	55	30	1,5	2-WA M10-78/5	6-CNA4,0x35	13,4	10,1	7,1	5,0
SBE40/110	40	110	55	30	1,5	2-WA M10-78/5	8-CNA4,0x35	14,2	13,4	8,9	5,0
SBE40/140	40	140	55	30	1,5	2-WA M10-78/5	10-CNA4,0x35	14,2	16,8	8,4	5,0
SBE45/93	45	93	55	30	1,5	2-WA M10-78/5	6-CNA4,0x35	13,4	10,1	7,9	5,0
SBE45/108	45	108	55	30	1,5	2-WA M10-78/5	8-CNA4,0x35	14,2	13,4	10,1	5,0
SBE45/138	45	138	55	30	1,5	2-WA M10-78/5	10-CNA4,0x35	14,2	16,8	9,4	5,0
SBE45/168	45	168	55	30	1,5	4-WA M10-78/5	12-CNA4,0x35	22,7	20,1	12,7	10,0
SBE48/91	48	91	55	30	1,5	2-WA M10-78/5	6-CNA4,0x35	13,4	10,1	8,5	5,0
SBE48/136	48	136	55	30	1,5	2-WA M10-78/5	10-CNA4,0x35	14,2	16,8	10,1	5,0
SBE48/166	48	166	55	30	1,5	4-WA M10-78/5	12-CNA4,0x35	22,7	20,1	12,7	10,0
SBE51/90	51	90	55	30	1,5	2-WA M10-78/5	6-CNA4,0x50	14,2	13,3	11,9	5,0
SBE51/135	51	135	55	30	1,5	2-WA M10-78/5	8-CNA4,0x50	14,2	17,7	15,1	5,0

Load scheme beam to concrete wall



SBE Face Fix Hangers

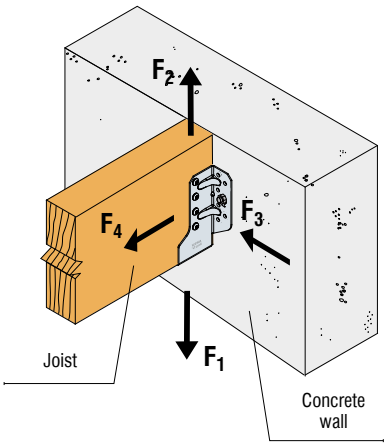
CE ETA 06/0270

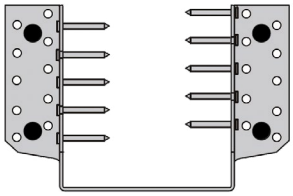
SIMPSON Strong-Tie®

Beam to Concrete wall connection

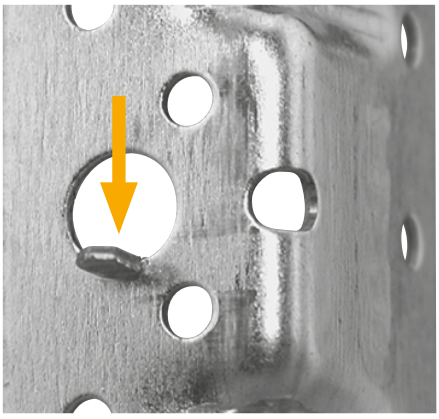
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
SBE60/100	60	100	55	30	1,5	2-WA M10-78/5	10-CNA4,0x50	14,2	22,2	14,1	5,0
SBE60/130	60	130	55	30	1,5	2-WA M10-78/5	6-CNA4,0x50	14,2	13,3	14	5,0
SBE60/160	60	160	55	30	1,5	2-WA M10-78/5	8-CNA4,0x50	14,2	17,7	17,7	5,0
SBE64/98	64	98	55	30	1,5	2-WA M10-78/5	10-CNA4,0x50	14,2	22,2	16,6	5,0
SBE64/128	64	128	55	30	1,5	2-WA M10-78/5	6-CNA4,0x50	14,2	13,3	14,9	5,0
SBE70/125	70	125	55	30	1,5	2-WA M10-78/5	8-CNA4,0x50	14,2	17,7	18,9	5,0
SBE70/155	70	155	55	30	1,5	2-WA M10-78/5	10-CNA4,0x50	14,2	22,2	12,8	5,0
SBE73/154	73	154	55	30	1,5	2-WA M10-78/5	10-CNA4,0x50	14,2	22,2	13,8	5,0
SBE76/122	76	122	55	30	1,5	4-WA M10-78/5	12-CNA4,0x50	22,7	26,6	14,9	10,0
SBE76/152	76	152	55	30	1,5	4-WA M10-78/5	12-CNA4,0x50	22,7	26,6	14,9	10,0
SBE80/120	80	120	55	30	1,5	2-WA M10-78/5	10-CNA4,0x50	14,2	22,2	14,4	5,0
SBE80/150	80	150	55	30	1,5	4-WA M10-78/5	12-CNA4,0x50	22,7	26,6	14,9	10,0
SBE90/145	90	145	55	30	1,5	2-WA M10-78/5	10-CNA4,0x50	14,2	22,2	14,7	5,0
SBE98/141	98	141	55	30	1,5	4-WA M10-78/5	12-CNA4,0x50	22,7	26,6	14,9	10,0
SBE100/140	100	140	55	30	1,5	4-WA M10-78/5	12-CNA4,0x50	22,7	26,6	14,9	10,0

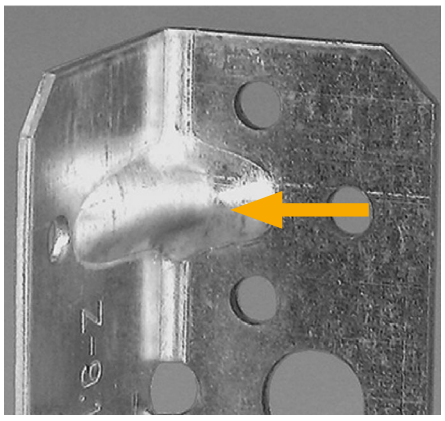
Load scheme
beam to concrete wall





Anchoring





NOTE

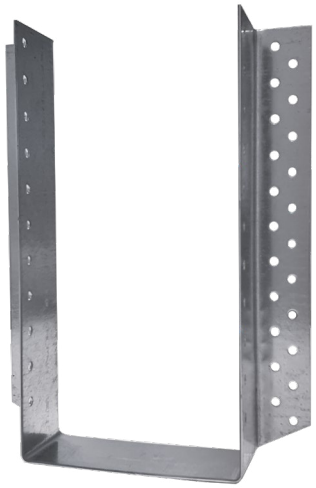
Optimized SBE hanger construction for faster mounting and cheaper connection.

- 20% less nails than the standard BSNN beam hanger.
- „Speed nail" for easy assembly for joining timber elements.
- Reduces thickness without significant loss of strength.
- A higher grade of steel S350GD
- Double reinforcements on both sides of the hanger.

BSD Large Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie®



BSD beam hangers are designed for larger cross-sections. Allows connection of elements with a width of 100-200mm. They are mainly used in glued laminated construction. The standard product allows timber-to-timber to be assembled using CNA nails or CSA connector screws. Technical approval allows additional holes for Ø13 to be used for bolts or anchors to enable the combination of timber-steel or timber-concrete.

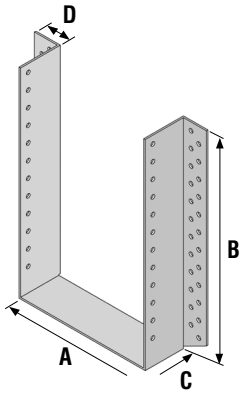
Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

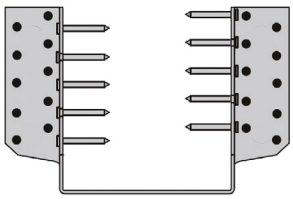
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



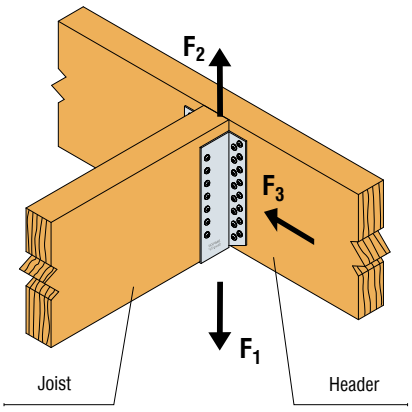
Beam to Beam connection (full nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
BSD100/240	100	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	13,7
BSD120/240	120	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	15,2
BSD120/300	120	300	52	32	2,0	56 - CNA4,0x50	28 - CNA4,0x50	66,5	62,0	17,4
BSD120/320	120	520	52	32	2,0	60 - CNA4,0x50	30 - CNA4,0x50	70,9	66,5	18,0
BSD140/200	140	200	52	32	2,0	36 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	14,2
BSD140/220	140	220	52	32	2,0	40 - CNA4,0x50	20 - CNA4,0x50	48,8	44,3	15,3
BSD140/240	140	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	16,3
BSD140/260	140	260	52	32	2,0	48 - CNA4,0x50	24 - CNA4,0x50	57,6	53,2	17,3
BSD140/300	140	300	52	32	2,0	56 - CNA4,0x50	28 - CNA4,0x50	66,5	62,0	19,0
BSD140/320	140	320	52	32	2,0	60 - CNA4,0x50	30 - CNA4,0x50	70,9	66,5	19,7
BSD160/160	160	160	52	32	2,0	28 - CNA4,0x50	14 - CNA4,0x50	31,7	31,0	12,0
BSD160/200	160	200	52	32	2,0	36 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	13,4
BSD160/240	160	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	17,2
BSD160/260	160	260	52	32	2,0	48 - CNA4,0x50	24 - CNA4,0x50	57,6	53,2	18,3
BSD160/280	160	280	52	32	2,0	52 - CNA4,0x50	26 - CNA4,0x50	62,0	57,6	19,3
BSD160/300	160	300	52	32	2,0	56 - CNA4,0x50	28 - CNA4,0x50	66,5	62,0	20,2
BSD160/320	160	320	52	32	2,0	60 - CNA4,0x50	30 - CNA4,0x50	70,9	66,5	21,1
BSD180/180	180	180	52	32	2,0	52 - CNA4,0x50	16 - CNA4,0x50	39,3	35,5	13,8
BSD180/220	180	220	52	32	2,0	40 - CNA4,0x50	20 - CNA4,0x50	48,8	44,3	16,6
BSD180/280	180	280	52	32	2,0	52 - CNA4,0x50	26 - CNA4,0x50	62,0	57,6	20,2
BSD180/320	180	320	52	32	2,0	60 - CNA4,0x50	30 - CNA4,0x50	70,9	66,5	22,3
BSD200/200	200	200	52	32	2,0	36 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	15,6
BSD200/240	200	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	18,5



Full nailing

Load scheme beam to beam



BSD Large Face Fix Hangers

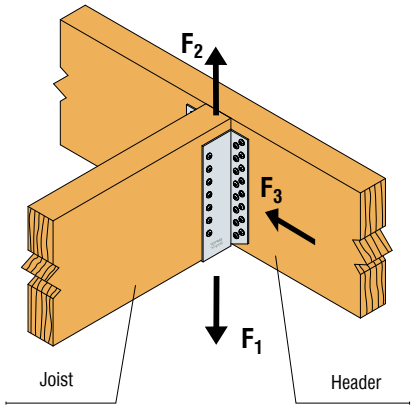
CE ETA 06/0270

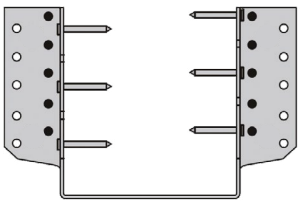
SIMPSON Strong-Tie®

Beam to Beam connection (partial nailing)

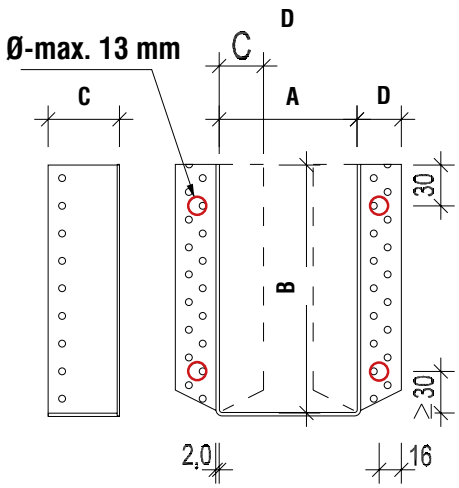
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
BSD100/240	100	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	7,6
BSD120/240	120	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	9,8
BSD120/300	120	300	52	32	2,0	28 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	11,1
BSD120/320	120	320	52	32	2,0	30 - CNA4,0x50	16 - CNA4,0x50	39,9	35,5	12,2
BSD140/200	140	200	52	32	2,0	18 - CNA4,0x50	10 - CNA4,0x50	24,0	22,2	8,7
BSD140/220	140	220	52	32	2,0	20 - CNA4,0x50	10 - CNA4,0x50	26,6	22,2	8,7
BSD140/240	140	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,2
BSD140/260	140	260	52	32	2,0	24 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,2
BSD140/300	140	300	52	32	2,0	28 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	11,6
BSD140/320	140	320	52	32	2,0	30 - CNA4,0x50	16 - CNA4,0x50	39,9	35,5	12,9
BSD160/160	160	160	52	32	2,0	14 - CNA4,0x50	8 - CNA4,0x50	16,2	15,8	7,3
BSD160/200	160	200	52	32	2,0	18 - CNA4,0x50	10 - CNA4,0x50	24,0	22,2	8,9
BSD160/240	160	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,5
BSD160/260	160	260	52	32	2,0	24 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,5
BSD160/280	160	280	52	32	2,0	26 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	12,0
BSD160/300	160	300	52	32	2,0	28 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	12,0
BSD160/320	160	320	52	32	2,0	30 - CNA4,0x50	16 - CNA4,0x50	39,9	35,5	13,4
BSD180/180	180	180	52	32	2,0	16 - CNA4,0x50	8 - CNA4,0x50	20,3	17,7	7,4
BSD180/220	180	220	52	32	2,0	20 - CNA4,0x50	10 - CNA4,0x50	26,6	22,2	9,1
BSD180/280	180	280	52	32	2,0	26 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	12,3
BSD180/320	180	320	52	32	2,0	30 - CNA4,0x50	16 - CNA4,0x50	39,9	35,3	13,8
BSD200/200	200	200	52	32	2,0	18 - CNA4,0x50	10 - CNA4,0x50	24,0	22,2	9,2
BSD200/240	200	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,9

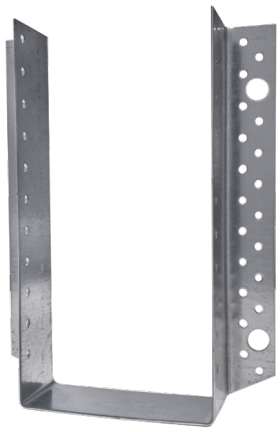
Load scheme beam to beam





Partial nailing





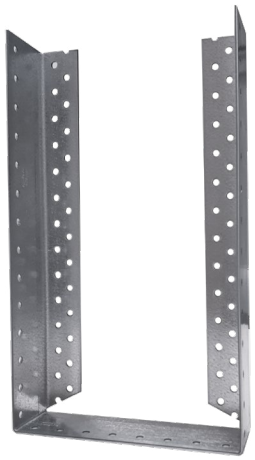
NOTE

Optional bolt holes up to Ø13 are possible for bolts. It is allowed to remove all the Ø5 mm holes on the header flanges when bolt holes are added. More holes up to Ø13 are allowed between the 2 holes shown on each flange; the 16 mm edge distance can not be changed.

BSDI Internal flange Large Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie®



BSDI beam hanger is designed for larger sections. Allows connection of elements with a width of 100-200mm. The main application is with glued timber constructions. The standard product allows timber-to-timber to be assembled using CNA nails or CSA connector screws.

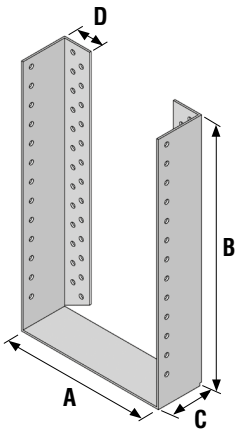
Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

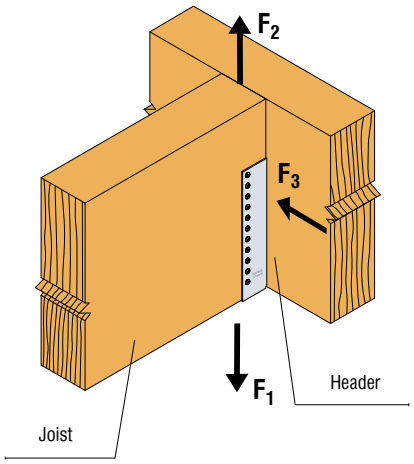
Zn 20 μm | CL.2 | CS | DWG



Beam to Beam connection (full nailing)

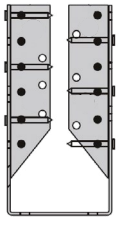
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
BSDI120/240	120	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	15,2
BSDI140/200	140	200	52	32	2,0	36 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	14,2
BSDI140/240	140	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	16,3
BSDI140/260	140	260	52	32	2,0	48 - CNA4,0x50	24 - CNA4,0x50	57,6	53,2	17,3
BSDI140/300	140	300	52	32	2,0	56 - CNA4,0x50	28 - CNA4,0x50	66,5	62,0	19,0
BSDI160/160	160	160	52	32	2,0	28 - CNA4,0x50	14 - CNA4,0x50	31,7	31,0	12,0
BSDI160/200	160	200	52	32	2,0	36 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	14,8
BSDI160/260	160	260	52	32	2,0	48 - CNA4,0x50	24 - CNA4,0x50	57,6	53,2	18,3
BSDI160/280	160	280	52	32	2,0	52 - CNA4,0x50	26 - CNA4,0x50	62,0	57,6	19,3
BSDI160/300	160	300	52	32	2,0	56 - CNA4,0x50	28 - CNA4,0x50	66,5	62,0	20,2
BSDI180/220	180	220	52	32	2,0	40 - CNA4,0x50	20 - CNA4,0x50	48,8	44,3	16,6
BSDI200/200	200	200	52	32	2,0	36 - CNA4,0x50	18 - CNA4,0x50	44,3	39,9	15,6
BSDI200/240	200	240	52	32	2,0	44 - CNA4,0x50	22 - CNA4,0x50	53,2	48,8	18,5

Load scheme beam to beam



Beam to Beam connection (partial nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
BSDI120/240	120	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	9,8
BSDI140/200	140	200	52	32	2,0	18 - CNA4,0x50	10 - CNA4,0x50	24,0	22,2	8,7
BSDI140/240	140	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,2
BSDI140/260	140	260	52	32	2,0	24 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,2
BSDI140/300	140	300	52	32	2,0	28 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	11,6
BSDI160/160	160	160	52	32	2,0	14 - CNA4,0x50	8 - CNA4,0x50	16,2	15,8	7,3
BSDI160/200	160	200	52	32	2,0	18 - CNA4,0x50	10 - CNA4,0x50	24,0	22,2	8,9
BSDI160/260	160	260	52	32	2,0	24 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,5
BSDI160/280	160	280	52	32	2,0	26 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	12,0
BSDI160/300	160	300	52	32	2,0	28 - CNA4,0x50	14 - CNA4,0x50	35,5	31,0	12,0
BSDI180/220	180	220	52	32	2,0	20 - CNA4,0x50	10 - CNA4,0x50	26,6	22,2	9,1
BSDI200/200	200	200	52	32	2,0	18 - CNA4,0x50	10 - CNA4,0x50	24,0	22,2	9,2
BSDI200/240	200	240	52	32	2,0	22 - CNA4,0x50	12 - CNA4,0x50	31,0	26,6	10,9

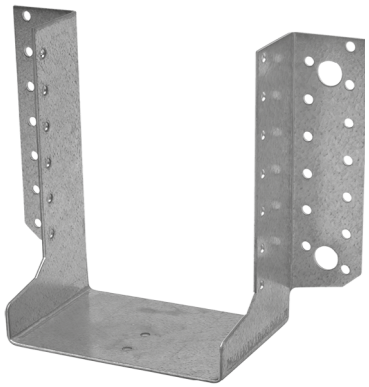


Partial nailing

GSE Fire Resistance Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie



GSE beam hangers are unique connectors that we can offer. This are the only connectors available on the market that have been tested FIRE RESISTANCE R30. GSE hangers are used in structures where fire resistance is required.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x 75 mm

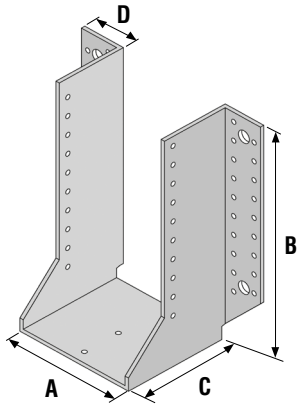
Material:

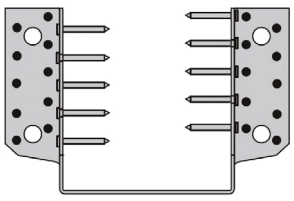
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG | R30

Beam to Beam connection (full nailing)

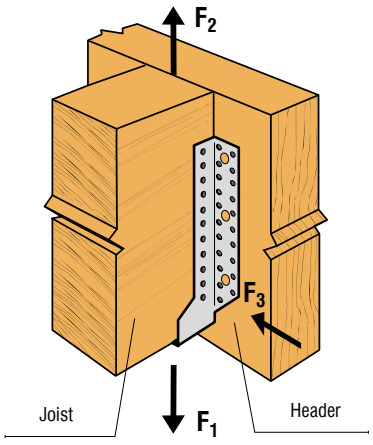
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
GSE380/100/4	100	140	110	45,5	4,0	16 - CNA4,0x75	8 - CNA4,0x75	21,0	10,0	8,9
GSE440/100/4	100	170	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	30,3	17,1	12,7
GSE500/100/4	100	200	110	45,5	4,0	28 - CNA4,0x75	14 - CNA4,0x75	36,0	25,5	13,9
GSE540/100/4	100	220	110	45,5	4,0	32 - CNA4,0x75	16 - CNA4,0x75	40,5	31,8	15,3
GSE600/100/4	100	250	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	17,8
GSE660/100/4	100	280	110	45,5	4,0	44 - CNA4,0x75	22 - CNA4,0x75	54,0	44,0	18,3
GSE720/100/4	100	310	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	20,2
GSE780/100/4	100	340	110	45,5	4,0	56 - CNA4,0x75	28 - CNA4,0x75	67,5	56,0	20,3
GSE840/100/4	100	370	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	21,7
GSE900/100/4	100	400	110	45,5	4,0	68 - CNA4,0x75	36 - CNA4,0x75	85,5	72,0	22,9
GSE960/100/4	100	430	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	22,7
GSE1020/100/4	100	460	110	45,5	4,0	80 - CNA4,0x75	40 - CNA4,0x75	94,5	80,0	22,5
GSE380/120/4	120	130	110	45,5	4,0	16 - CNA4,0x75	8 - CNA4,0x75	19,1	10,0	9,5
GSE440/120/4	120	160	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	28,0	17,1	13,7
GSE500/120/4	120	190	110	45,5	4,0	28 - CNA4,0x75	14 - CNA4,0x75	36,0	25,5	15,2
GSE540/120/4	120	210	110	45,5	4,0	32 - CNA4,0x75	16 - CNA4,0x75	40,5	31,8	16,8
GSE600/120/4	120	240	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	19,8
GSE660/120/4	120	270	110	45,5	4,0	44 - CNA4,0x75	22 - CNA4,0x75	54,0	44,0	20,5
GSE720/120/4	120	300	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	22,8
GSE780/120/4	120	330	110	45,5	4,0	56 - CNA4,0x75	28 - CNA4,0x75	67,5	56,0	23,1
GSE840/120/4	120	360	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	24,9
GSE900/120/4	120	390	110	45,5	4,0	68 - CNA4,0x75	36 - CNA4,0x75	85,5	72,0	26,3
GSE960/120/4	120	420	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	26,2
GSE1020/120/4	120	450	110	45,5	4,0	80 - CNA4,0x75	40 - CNA4,0x75	94,5	80,0	26,1
GSE500/140/4	140	180	110	45,5	4,0	28 - CNA4,0x75	14 - CNA4,0x75	35,8	25,5	16,2
GSE540/140/4	140	200	110	45,5	4,0	32 - CNA4,0x75	16 - CNA4,0x75	40,5	31,8	18,0
GSE600/140/4	140	230	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	21,4
GSE660/140/4	140	260	110	45,5	4,0	44 - CNA4,0x75	22 - CNA4,0x75	54,0	44,0	22,3
GSE720/140/4	140	290	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	25,0





Full nailing

Load scheme beam to beam



GSE Fire Resistance Face Fix Hangers

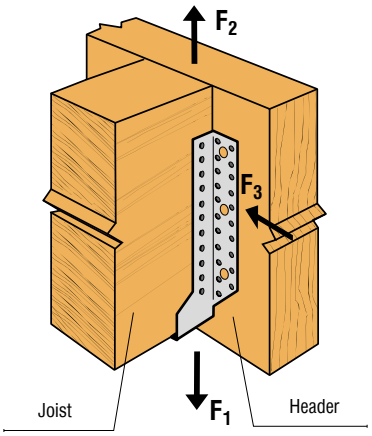
CE ETA 06/0270

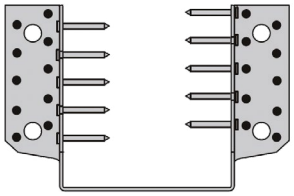
SIMPSON Strong-Tie®

Beam to Beam connection (full nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
GSE780/140/4	140	320	110	45,5	4,0	56 - CNA4,0x75	28 - CNA4,0x75	67,5	56,0	25,5
GSE840/140/4	140	350	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	27,6
GSE900/140/4	140	380	110	45,5	4,0	68 - CNA4,0x75	36 - CNA4,0x75	85,5	72,0	29,4
GSE960/140/4	140	410	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	29,4
GSE1020/140/4	140	440	110	45,5	4,0	80 - CNA4,0x75	40 - CNA4,0x75	94,5	80,0	29,4
GSE500/160/4	160	170	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	30,3	17,1	15,0
GSE540/160/4	160	190	110	45,5	4,0	26 - CNA4,0x75	14 - CNA4,0x75	36,0	22,6	17,1
GSE600/160/4	160	220	110	45,5	4,0	32 - CNA4,0x75	18 - CNA4,0x75	45,0	31,8	21,2
GSE660/160/4	160	250	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	22,6
GSE720/160/4	160	280	110	45,5	4,0	44 - CNA4,0x75	24 - CNA4,0x75	58,5	48,0	26,0
GSE780/160/4	160	310	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	26,8
GSE840/160/4	160	340	110	45,5	4,0	56 - CNA4,0x75	30 - CNA4,0x75	72,0	60,0	29,5
GSE900/160/4	160	370	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	30,0
GSE960/160/4	160	400	110	45,5	4,0	68 - CNA4,0x75	34 - CNA4,0x75	81,0	68,0	30,3
GSE1020/160/4	160	430	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	32,3
GSE500/180/4	180	160	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	28,0	17,1	15,4
GSE540/180/4	180	180	110	45,5	4,0	26 - CNA4,0x75	14 - CNA4,0x75	34,7	22,6	17,7
GSE600/180/4	180	210	110	45,5	4,0	32 - CNA4,0x75	18 - CNA4,0x75	45,0	31,8	22,0
GSE660/180/4	180	240	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	23,6
GSE720/180/4	180	270	110	45,5	4,0	44 - CNA4,0x75	24 - CNA4,0x75	58,5	48,0	27,3
GSE780/180/4	180	300	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	28,4
GSE840/180/4	180	330	110	45,5	4,0	56 - CNA4,0x75	30 - CNA4,0x75	72,0	60,0	31,3
GSE900/180/4	180	360	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	32,0
GSE960/180/4	180	390	110	45,5	4,0	68 - CNA4,0x75	34 - CNA4,0x75	81,0	68,0	32,5
GSE1020/180/4	180	420	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	34,7
GSE500/200/4	200	150	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	25,5	17,1	15,7
GSE540/200/4	200	170	110	45,5	4,0	26 - CNA4,0x75	14 - CNA4,0x75	32,1	22,6	18,1
GSE600/200/4	200	200	110	45,5	4,0	32 - CNA4,0x75	18 - CNA4,0x75	42,8	31,8	22,7
GSE660/200/4	200	230	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	24,4
GSE720/200/4	200	260	110	45,5	4,0	44 - CNA4,0x75	24 - CNA4,0x75	58,5	48,0	28,3
GSE780/200/4	200	290	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	29,6
GSE840/200/4	200	320	110	45,5	4,0	56 - CNA4,0x75	30 - CNA4,0x75	72,0	60,0	32,9
GSE900/200/4	200	350	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	33,7
GSE960/200/4	200	380	110	45,5	4,0	68 - CNA4,0x75	34 - CNA4,0x75	81,0	68,0	34,4
GSE1020/200/4	200	410	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	36,9

Load scheme beam to beam





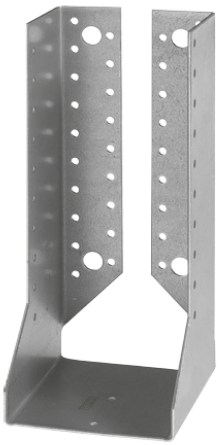
Full nailing

To achieve fire resistance R30 is required to use nails CNA4,0x75 and full nailing

GSI Internal Fire Resistance Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie



GSI beam hangers are unique connectors that we can offer. This are the only connectors available on the market that have been tested FIRE RESISTANCE R30. GSI hangers are used in structures where fire resistance is required.

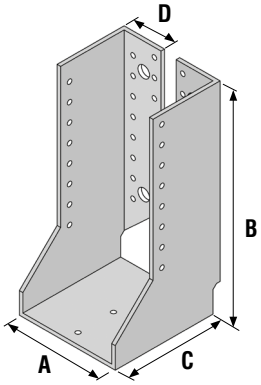
Fixing:

- For fastening to timber – przy pomocy gwoździ pierścieniowych CNA4,0 x 75 mm

Material:

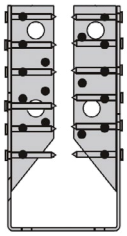
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG | R30



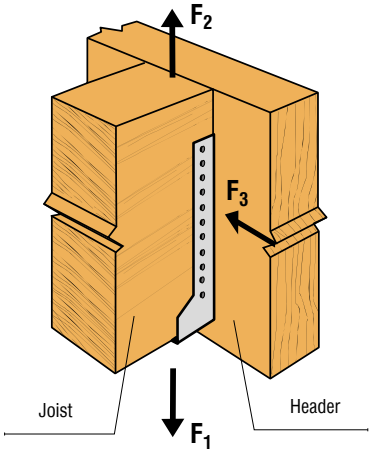
Beam to Beam connection (full nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
GSI380/100/4	100	140	110	44	4,0	16 - CNA4,0x75	8 - CNA4,0x75	21,0	10,0	8,9
GSI440/100/4	100	170	110	44	4,0	22 - CNA4,0x75	12 - CNA4,0x75	30,3	17,1	12,7
GSI500/100/4	100	200	110	44	4,0	28 - CNA4,0x75	14 - CNA4,0x75	36,0	25,5	13,9
GSI540/100/4	100	220	110	44	4,0	32 - CNA4,0x75	16 - CNA4,0x75	40,5	31,8	15,3
GSI600/100/4	100	250	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	17,8
GSI660/100/4	100	280	110	45,5	4,0	44 - CNA4,0x75	22 - CNA4,0x75	54,0	44,0	18,3
GSI720/100/4	100	310	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	20,2
GSI780/100/4	100	340	110	45,5	4,0	56 - CNA4,0x75	28 - CNA4,0x75	67,5	56,0	20,3
GSI840/100/4	100	370	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	21,7
GSI900/100/4	100	400	110	45,5	4,0	68 - CNA4,0x75	36 - CNA4,0x75	85,5	72,0	22,9
GSI960/100/4	100	430	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	22,7
GSI1020/100/4	100	460	110	45,5	4,0	80 - CNA4,0x75	40 - CNA4,0x75	94,5	80,0	22,5
GSI380/120/4	120	130	110	45,5	4,0	16 - CNA4,0x75	8 - CNA4,0x75	19,1	10,0	9,5
GSI440/120/4	120	160	160	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	28,0	17,1	13,7
GSI500/120/4	120	190	190	45,5	4,0	28 - CNA4,0x75	14 - CNA4,0x75	36,0	25,5	15,2
GSI540/120/4	120	210	110	45,5	4,0	32 - CNA4,0x75	16 - CNA4,0x75	40,5	31,8	16,8
GSI600/120/4	120	240	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	19,8
GSI660/120/4	120	270	110	45,5	4,0	44 - CNA4,0x75	22 - CNA4,0x75	54,0	44,0	20,5
GSI720/120/4	120	300	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	22,8
GSI780/120/4	120	330	110	45,5	4,0	56 - CNA4,0x75	28 - CNA4,0x75	67,5	56,0	23,1
GSI840/120/4	120	360	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	24,9
GSI900/120/4	120	390	110	45,5	4,0	68 - CNA4,0x75	36 - CNA4,0x75	85,5	72,0	26,3
GSI960/120/4	120	420	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	26,2
GSI1020/120/4	120	450	110	45,5	4,0	80 - CNA4,0x75	40 - CNA4,0x75	94,5	80,0	26,1
GSI500/140/4	140	180	110	45,5	4,0	28 - CNA4,0x75	14 - CNA4,0x75	35,8	25,5	16,2
GSI540/140/4	140	200	110	45,5	4,0	32 - CNA4,0x75	16 - CNA4,0x75	40,5	31,8	18,0
GSI600/140/4	140	230	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	21,4
GSI660/140/4	140	260	110	45,5	4,0	44 - CNA4,0x75	22 - CNA4,0x75	54,0	44,0	22,3
GSI720/140/4	140	290	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	25,0
GSI780/140/4	140	320	110	45,5	4,0	56 - CNA4,0x75	28 - CNA4,0x75	67,5	56,0	25,5



Full nailing

Load scheme beam to beam



GSI Internal Fire Resistance Face Fix Hangers

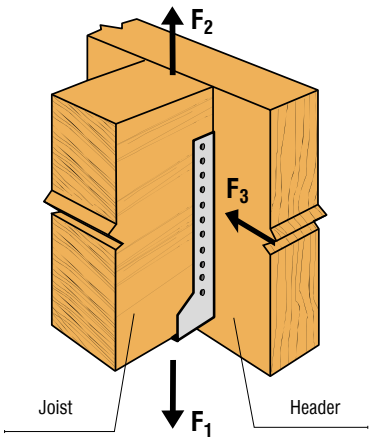
CE ETA 06/0270

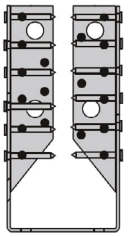
SIMPSON Strong-Tie®

Beam to Beam connection (full nailing)

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]		
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
GSI840/140/4	140	350	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	27,6
GSI900/140/4	140	380	110	45,5	4,0	68 - CNA4,0x75	36 - CNA4,0x75	85,5	72,0	29,4
GSI960/140/4	140	410	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	29,4
GSI1020/140/4	140	440	110	45,5	4,0	80 - CNA4,0x75	40 - CNA4,0x75	94,5	80,0	29,4
GSI500/160/4	160	170	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	30,3	17,1	15,0
GSI540/160/4	160	190	110	45,5	4,0	26 - CNA4,0x75	14 - CNA4,0x75	36,0	22,6	17,1
GSI600/160/4	160	220	110	45,5	4,0	32 - CNA4,0x75	18 - CNA4,0x75	45,0	31,8	21,2
GSI660/160/4	160	250	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	22,6
GSI720/160/4	160	280	110	45,5	4,0	44 - CNA4,0x75	24 - CNA4,0x75	58,5	48,0	26,0
GSI780/160/4	160	310	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	26,8
GSI840/160/4	160	340	110	45,5	4,0	56 - CNA4,0x75	30 - CNA4,0x75	72,0	60,0	29,5
GSI900/160/4	160	370	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	30,0
GSI960/160/4	160	400	110	45,5	4,0	68 - CNA4,0x75	34 - CNA4,0x75	81,0	68,0	30,3
GSI1020/160/4	160	430	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	32,3
GSI500/180/4	180	160	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	28,0	17,1	15,4
GSI540/180/4	180	180	110	45,5	4,0	26 - CNA4,0x75	14 - CNA4,0x75	34,7	22,6	17,7
GSI600/180/4	180	210	110	45,5	4,0	32 - CNA4,0x75	18 - CNA4,0x75	45,0	31,8	22,0
GSI660/180/4	180	240	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	23,6
GSI720/180/4	180	270	110	45,5	4,0	44 - CNA4,0x75	24 - CNA4,0x75	58,5	48,0	27,3
GSI780/180/4	180	300	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	28,4
GSI840/180/4	180	330	110	45,5	4,0	56 - CNA4,0x75	30 - CNA4,0x75	72,0	60,0	31,3
GSI900/180/4	180	360	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	32,0
GSI960/180/4	180	390	110	45,5	4,0	68 - CNA4,0x75	34 - CNA4,0x75	81,0	68,0	32,5
GSI1020/180/4	180	420	110	45,5	4,0	74 - CNA4,0x75	38 - CNA4,0x75	90,0	76,0	34,7
GSI500/200/4	200	150	110	45,5	4,0	22 - CNA4,0x75	12 - CNA4,0x75	25,5	17,1	15,7
GSI540/200/4	200	170	110	45,5	4,0	26 - CNA4,0x75	14 - CNA4,0x75	32,1	22,6	18,1
GSI600/200/4	200	200	110	45,5	4,0	32 - CNA4,0x75	18 - CNA4,0x75	42,8	31,8	22,7
GSI660/200/4	200	230	110	45,5	4,0	38 - CNA4,0x75	20 - CNA4,0x75	49,5	40,0	24,4
GSI720/200/4	200	260	110	45,5	4,0	44 - CNA4,0x75	24 - CNA4,0x75	58,5	48,0	28,3
GSI780/200/4	200	290	110	45,5	4,0	50 - CNA4,0x75	26 - CNA4,0x75	63,0	52,0	29,6
GSI840/200/4	200	320	110	45,5	4,0	56 - CNA4,0x75	30 - CNA4,0x75	72,0	60,0	32,9
GSI900/200/4	200	350	110	45,5	4,0	62 - CNA4,0x75	32 - CNA4,0x75	76,5	64,0	33,7
GSI960/200/4	200	380	110	45,5	4,0	68 - CNA4,0x75	34 - CNA4,0x75	81,0	68,0	34,4

Load scheme beam to beam





Full nailing

To achieve fire resistance R30 is required to use nails CNA4,0x75 and full nailing

GBE Large Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie®

The GBE joist hanger has been specially developed to connect large sections of the beam made of glued laminated timber. The installation of the joist hanger is maximally simplified due to the use of anchor bolts Ø16 or metric M16 fixed through. Possible fixing for timber or concrete.

Fixing:

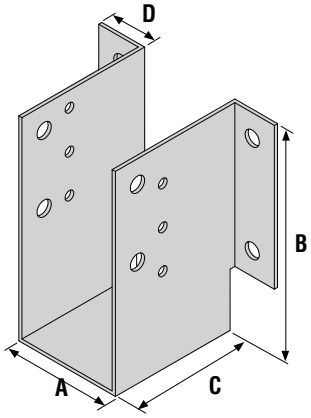
- For fastening to timber – use bolts Ø16 class 4.6
- For fastening to concrete – use WA mechanical anchor WA M16/20

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

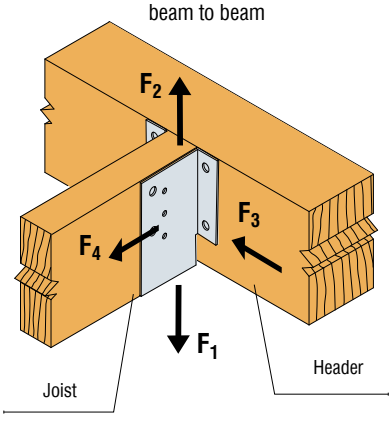
NEW

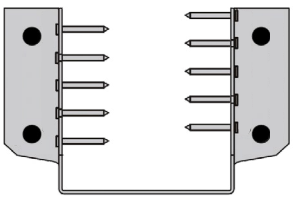


Beam to Beam connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
								Bolt Ø16 class 4.6			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
GBE600/100/4	100	250	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/100/4	100	325	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	38,2	30,8	12,9	36,3
GBE900/100/4	100	400	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	69,6	45,4	12,9	47,0
GBE1050/100/4	100	475	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	69,6	53,7	12,9	57,7
GBE1200/100/4	100	550	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	92,8	72,8	12,9	68,4
GBE600/120/4	120	240	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/120/4	120	315	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	38,2	30,8	12,9	36,3
GBE900/120/4	120	390	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	69,6	45,4	12,9	47,0
GBE1050/120/4	120	465	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	69,6	53,7	12,9	57,7
GBE1200/120/4	120	540	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	92,8	72,8	12,9	68,4
GBE600/140/4	140	230	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/140/4	140	305	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	38,2	30,8	12,9	36,3
GBE900/140/4	140	380	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	69,6	45,4	12,9	47,0
GBE1050/140/4	140	455	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	69,6	53,7	12,9	57,7
GBE1200/140/4	140	530	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	92,8	72,8	12,9	68,4
GBE1350/140/4	140	605	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	92,8	79,4	12,9	79,1
GBE1500/140/4	140	680	145	54	4,0	10-Ø18	10-Ø18; 24-Ø11	116	101,1	12,9	89,9
GBE600/160/4	160	220	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/160/4	160	295	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	38,2	30,8	12,9	36,3
GBE900/160/4	160	370	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	69,6	45,4	12,9	47,0
GBE1050/160/4	160	445	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	69,6	53,7	12,9	57,7
GBE1200/160/4	160	520	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	92,8	72,8	12,9	68,4
GBE1350/160/4	160	595	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	92,8	79,4	12,9	79,1
GBE1500/160/4	160	670	145	54	4,0	10-Ø18	10-Ø18; 24-Ø11	116	101,1	12,9	89,9
GBE600/180/4	180	210	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/180/4	180	285	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	38,2	30,8	12,9	36,3
GBE900/180/4	180	360	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	69,6	45,4	12,9	47,0
GBE1050/180/4	180	435	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	69,6	53,7	12,9	57,7
GBE1200/180/4	180	510	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	92,8	72,8	12,9	68,4
GBE1350/180/4	180	585	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	92,8	79,4	12,9	79,1

Load scheme beam to beam





Fixing bolts Ø16

GBE Large Face Fix Hangers

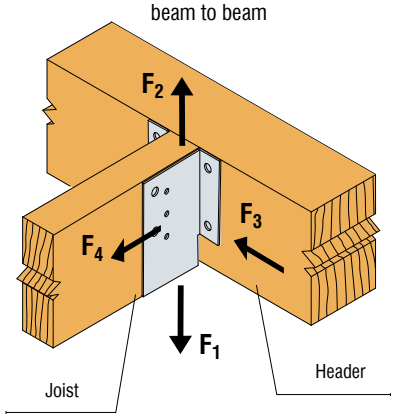
CE ETA 06/0270

SIMPSON Strong-Tie®

Beam to Beam connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
								Bolt Ø16 class 4.6			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
GBE1500/180/4	180	660	145	54	4	10-Ø18	10-Ø18; 24-Ø11	116,0	101,1	12,9	89,9
GBE600/200/4	200	200	145	54	4	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/200/4	200	275	145	54	4	4-Ø18	4-Ø18; 8-Ø11	38,2	30,8	12,9	36,3
GBE900/200/4	200	350	145	54	4	6-Ø18	6-Ø18; 12-Ø11	69,6	45,4	12,9	47,0
GBE1050/200/4	200	425	145	54	4	6-Ø18	6-Ø18; 14-Ø11	69,6	53,7	12,9	57,7
GBE1200/200/4	200	500	145	54	4	8-Ø18	8-Ø18; 18-Ø11	92,8	72,8	12,9	68,4
GBE1350/200/4	200	575	145	54	4	8-Ø18	8-Ø18; 20-Ø11	92,8	79,4	12,9	79,1
GBE1500/200/4	200	650	145	54	4	10-Ø18	10-Ø18; 24-Ø11	116,0	101,1	12,9	89,9
GBE600/220/4	220	190	145	54	4	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/220/4	220	265	145	54	4	4-Ø18	4-Ø18; 8-Ø11	38,2	30,8	12,9	36,3
GBE900/220/4	220	340	145	54	4	6-Ø18	6-Ø18; 12-Ø11	69,6	45,4	12,9	47,0
GBE1050/220/4	220	415	145	54	4	6-Ø18	6-Ø18; 14-Ø11	69,6	53,7	12,9	57,7
GBE1200/220/4	220	490	145	54	4	8-Ø18	8-Ø18; 18-Ø11	92,8	72,8	12,9	68,4
GBE1350/220/4	220	565	145	54	4	8-Ø18	8-Ø18; 20-Ø11	92,8	79,4	12,9	79,1
GBE1500/220/4	220	640	145	54	4	10-Ø18	10-Ø18; 24-Ø11	116,0	101,1	12,9	89,9

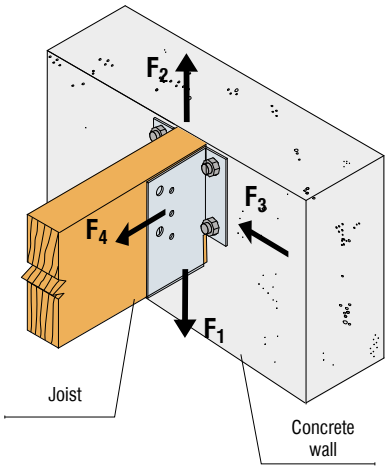
Load scheme beam to beam

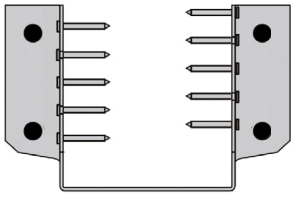


Beam to Concrete wall connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
								Bolt Ø16 class 4.6			
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
GBE600/100/4	100	250	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/100/4	100	325	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	58,0	30,8	12,9	36,3
GBE900/100/4	100	400	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	76,9	45,4	12,9	47,0
GBE1050/100/4	100	475	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	85,2	53,7	12,9	57,7
GBE1200/100/4	100	550	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	104,3	72,8	12,9	68,4
GBE600/120/4	120	240	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/120/4	120	315	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	58,0	30,8	12,9	36,3
GBE900/120/4	120	390	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	76,9	45,4	12,9	47,0
GBE1050/120/4	120	465	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	85,2	53,7	12,9	57,7
GBE1200/120/4	120	540	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	104,3	72,8	12,9	68,4
GBE600/140/4	140	230	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/140/4	140	305	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	58,0	30,8	12,9	36,3
GBE900/140/4	140	380	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	76,9	45,4	12,9	47,0
GBE1050/140/4	140	455	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	85,2	53,7	12,9	57,7
GBE1200/140/4	140	530	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	104,3	72,8	12,9	68,4
GBE1350/140/4	140	605	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	110,9	79,4	12,9	79,1
GBE1500/140/4	140	680	145	54	4,0	10-Ø18	10-Ø18; 24-Ø11	132,6	101,1	12,9	89,9
GBE600/160/4	160	220	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/160/4	160	295	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	58,0	30,8	12,9	36,3
GBE900/160/4	160	370	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	76,9	45,4	12,9	47,0
GBE1050/160/4	160	445	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	85,2	53,7	12,9	57,7
GBE1200/160/4	160	520	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	104,3	72,8	12,9	68,4
GBE1350/160/4	160	595	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	110,9	79,4	12,9	79,1

Load scheme beam to concrete





Anchoring

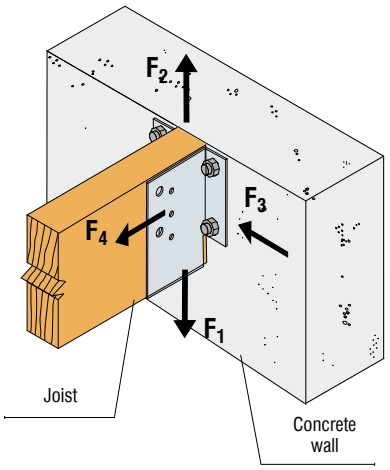
GBE Large Face Fix Hangers

ETA 06/0270

Beam to Concrete wall connection

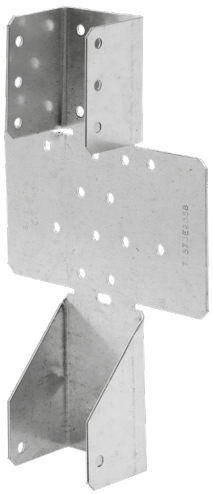
Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]			
	A	B	C	D	t	Header	Joist	Bolt Ø16 class 4.6			
								$R_{1,k}$	$R_{2,k}$	$R_{3,k}$	$R_{4,k}$
GBE1500/160/4	160	670	145	54	4,0	10-Ø18	10-Ø18; 24-Ø11	132,6	101,1	12,9	89,9
GBE600/180/4	180	210	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/180/4	180	285	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	58,0	30,8	12,9	36,3
GBE900/180/4	180	360	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	76,9	45,4	12,9	47,0
GBE1050/180/4	180	435	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	85,2	53,7	12,9	57,7
GBE1200/180/4	180	510	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	104,3	72,8	12,9	68,4
GBE1350/180/4	180	585	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	110,9	79,4	12,9	79,1
GBE1500/180/4	180	660	145	54	4,0	10-Ø18	10-Ø18; 24-Ø11	132,6	101,1	12,9	89,9
GBE600/200/4	200	200	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/200/4	200	275	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	58,0	30,8	12,9	36,3
GBE900/200/4	200	350	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	76,9	45,4	12,9	47,0
GBE1050/200/4	200	425	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	85,2	53,7	12,9	57,7
GBE1200/200/4	200	500	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	104,3	72,8	12,9	68,4
GBE1350/200/4	200	575	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	110,9	79,4	12,9	79,1
GBE1500/200/4	200	650	145	54	4,0	10-Ø18	10-Ø18; 24-Ø11	132,6	101,1	12,9	89,9
GBE600/220/4	220	190	145	54	4,0	4-Ø18	4-Ø18; 6-Ø11	34,5	19,3	12,9	25,6
GBE750/220/4	220	265	145	54	4,0	4-Ø18	4-Ø18; 8-Ø11	58,0	30,8	12,9	36,3
GBE900/220/4	220	340	145	54	4,0	6-Ø18	6-Ø18; 12-Ø11	76,9	45,4	12,9	47,0
GBE1050/220/4	220	415	145	54	4,0	6-Ø18	6-Ø18; 14-Ø11	85,2	53,7	12,9	57,7
GBE1200/220/4	220	490	145	54	4,0	8-Ø18	8-Ø18; 18-Ø11	104,3	72,8	12,9	68,4
GBE1350/220/4	220	565	145	54	4,0	8-Ø18	8-Ø18; 20-Ø11	110,9	79,4	12,9	79,1
GBE1500/220/4	220	640	145	54	4,0	10-Ø18	10-Ø18; 24-Ø11	132,6	101,1	12,9	89,9

Load scheme beam to concrete



SPR Timber Joist Hangers Slope Adjustable

ETA 08/0053



SPR allows the fastening of rafters on timber.
The slope is adjusted on site for slopes up to 45° downward or upward. This adjustment should be done only once in the required slope direction.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

NEW

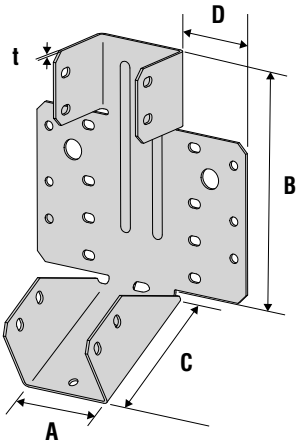
SPR Timber Joist Hangers Slope Adjustable

CE ETA 08/0053

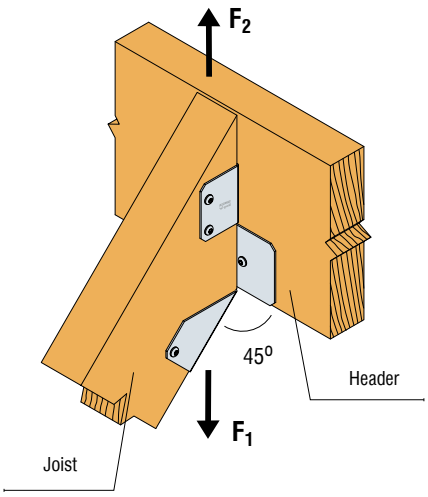
SIMPSON Strong-Tie®

Beam to Beam connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]	
	A	B	C	D	t	Header	Joist	$R_{1,k}$	$R_{2,k}$
SPR60/120	60	120	75	43	1.5	14 x CNA4,0x40	6 x CNA4,0x40	6,4	3,3
SPR60/140	60	140	75	43	1.5	18 x CNA4,0x40	8 x CNA4,0x40	7,6	4,5
SPR60/160	60	160	75	43	1.5	20 x CNA4,0x40	10 x CNA4,0x40	10,3	7,2
SPR60/180	60	180	75	43	1.5	22 x CNA4,0x40	12 x CNA4,0x40	13,3	10,2
SPR60/200	60	200	75	43	1.5	24 x CNA4,0x40	14 x CNA4,0x40	16,4	13,3
SPR60/240	60	240	75	43	1.5	28 x CNA4,0x40	18 x CNA4,0x40	23,1	20,0
SPR60/260	60	260	75	43	1.5	30 x CNA4,0x40	20 x CNA4,0x40	26,6	23,5
SPR60/280	60	280	75	43	1.5	32 x CNA4,0x40	22 x CNA4,0x40	29,9	26,8
SPR60/300	60	300	75	43	1.5	34 x CNA4,0x40	24 x CNA4,0x40	33,2	30,1
SPR60/320	60	320	75	43	1.5	36 x CNA4,0x40	26 x CNA4,0x40	36,5	33,4
SPR60/340	60	340	75	43	1.5	38 x CNA4,0x40	28 x CNA4,0x40	40,3	37,2
SPR60/360	60	360	75	43	1.5	40 x CNA4,0x40	30 x CNA4,0x40	43,9	40,8
SPR80/120	80	120	75	43	1.5	14 x CNA4,0x40	6 x CNA4,0x40	7,4	3,3
SPR80/140	80	140	75	43	1.5	18 x CNA4,0x40	8 x CNA4,0x40	8,6	4,5
SPR80/160	80	160	75	43	1.5	20 x CNA4,0x40	10 x CNA4,0x40	11,3	7,2
SPR80/180	80	180	75	43	1.5	22 x CNA4,0x40	12 x CNA4,0x40	14,3	10,2
SPR80/200	80	200	75	43	1.5	24 x CNA4,0x40	14 x CNA4,0x40	17,4	13,3
SPR80/240	80	240	75	43	1.5	28 x CNA4,0x40	18 x CNA4,0x40	24,1	20,0
SPR80/260	80	260	75	43	1.5	30 x CNA4,0x40	20 x CNA4,0x40	27,6	23,5
SPR80/280	80	280	75	43	1.5	32 x CNA4,0x40	22 x CNA4,0x40	30,9	26,8
SPR80/300	80	300	75	43	1.5	34 x CNA4,0x40	24 x CNA4,0x40	34,2	30,1
SPR80/320	80	320	75	43	1.5	36 x CNA4,0x40	26 x CNA4,0x40	37,5	33,4
SPR80/340	80	340	75	43	1.5	38 x CNA4,0x40	28 x CNA4,0x40	41,3	37,2
SPR80/360	80	360	75	43	1.5	40 x CNA4,0x40	30 x CNA4,0x40	44,9	40,8
SPR100/140	100	140	75	43	1.5	18 x CNA4,0x40	8 x CNA4,0x40	9,7	4,5
SPR100/160	100	160	75	43	1.5	20 x CNA4,0x40	10 x CNA4,0x40	12,4	7,2
SPR100/180	100	180	75	43	1.5	22 x CNA4,0x40	12 x CNA4,0x40	15,4	10,2
SPR100/200	100	200	75	43	1.5	24 x CNA4,0x40	14 x CNA4,0x40	18,5	13,3
SPR100/240	100	240	75	43	1.5	28 x CNA4,0x40	18 x CNA4,0x40	25,2	20,0
SPR100/260	100	260	75	43	1.5	30 x CNA4,0x40	20 x CNA4,0x40	28,7	23,5
SPR100/280	100	280	75	43	1.5	32 x CNA4,0x40	22 x CNA4,0x40	32,0	26,8
SPR100/300	100	300	75	43	1.5	34 x CNA4,0x40	24 x CNA4,0x40	35,3	30,1
SPR100/320	100	320	75	43	1.5	36 x CNA4,0x40	26 x CNA4,0x40	38,6	33,4
SPR100/340	100	340	75	43	1.5	38 x CNA4,0x40	28 x CNA4,0x40	42,4	37,2
SPR120/140	120	140	75	43	1.5	18 x CNA4,0x40	8 x CNA4,0x40	9,7	4,5
SPR120/160	120	160	75	43	1.5	20 x CNA4,0x40	10 x CNA4,0x40	12,4	7,2
SPR120/180	120	180	75	43	1.5	22 x CNA4,0x40	12 x CNA4,0x40	15,4	10,2
SPR120/200	120	200	75	43	1.5	24 x CNA4,0x40	14 x CNA4,0x40	18,5	13,3
SPR120/240	120	240	75	43	1.5	28 x CNA4,0x40	18 x CNA4,0x40	25,2	20,0
SPR120/260	120	260	75	43	1.5	30 x CNA4,0x40	20 x CNA4,0x40	28,7	23,5
SPR120/280	120	280	75	43	1.5	32 x CNA4,0x40	22 x CNA4,0x40	32,0	26,8
SPR120/300	120	300	75	43	1.5	34 x CNA4,0x40	24 x CNA4,0x40	35,3	30,1
SPR120/320	120	320	75	43	1.5	36 x CNA4,0x40	26 x CNA4,0x40	38,6	33,4
SPR120/340	120	340	75	43	1.5	38 x CNA4,0x40	28 x CNA4,0x40	42,4	37,2



Load scheme
beam to beam



ETC Truss Hangers

CE ETA 06/0270

These truss hangers are usually used in farmhouses. They enable ridge assembling of the trusses and hip rafter. The models differ depending on the type of application.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

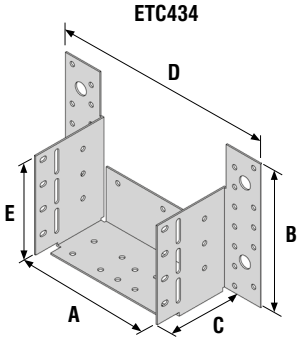
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Beam to Beam connection

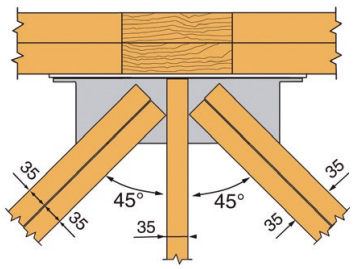
Model No.	Dimensions [mm]						Holes for anchors	Fixing		Characteristic capacity [kN]
	A	B	C	D	E	t		Header	Joist	$R_{1,k}$
ETC434	140	147	80	225	104	1,5	4 - Ø13	27-CNA4,0x35	6 - CNA4,0x35	11,9
ETC485R	195	147	110	279	90	2,0	4 - Ø13	24-CNA4,0x35	10 - CNA4,0x35	22,4
ETC502	206	145	98	290	89	2,0	4 - Ø13	24-CNA4,0x35	6 - CNA4,0x35	23,2
ETC835	355	240	110	481	143	3,0	4 - Ø13	44-CNA4,0x35	28 - CNA4,0x35	29,1

ETC434

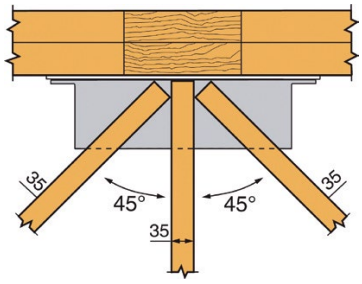


Supporting three trusses on an ETC835 hanger in the hip roof

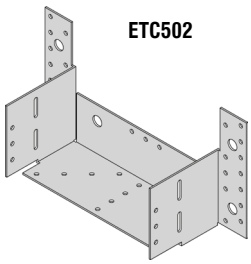
ETC835
Single jack and two double hips



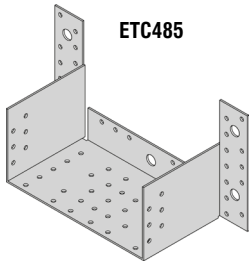
ETC835
Single jack and two single hips



ETC502

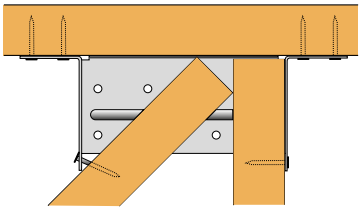


ETC485

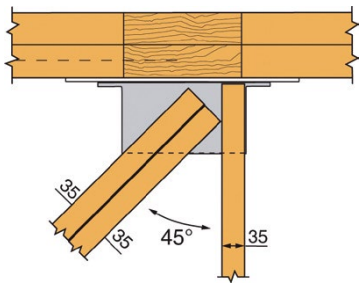


The connection lower truss to the corner and the jack rafter in the hip roof

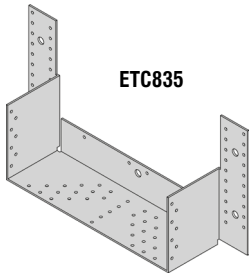
ETC434
Single jack and single hip



ETC434
Single jack and double hip

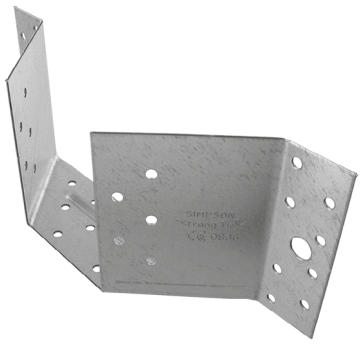


ETC835



ET Skewed (45º) Hangers

CE ETA 06/0270



The ET is a one piece non-welded joist hanger for supporting skewed timber joists from timber members. This range is tested and standardized with a 45° skew angle left or right.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

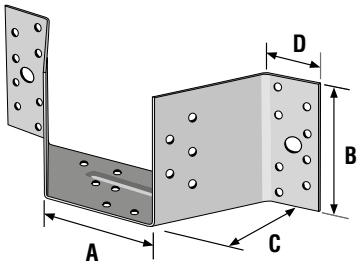
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

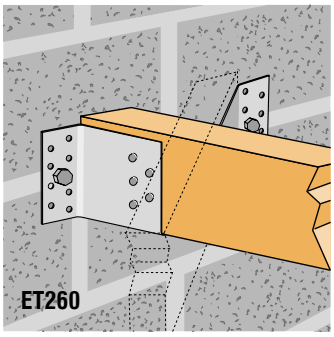
Beam to Beam connection

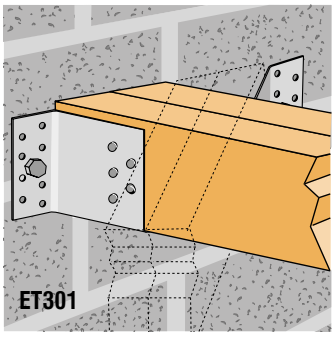
Model No.	Dimensions [mm]					Holes for anchors	Fixing		Characteristic capacity [kN]
	A	B	C	D	t		Header	Joist	$R_{1,k}$
ET260*	66,5	96	55	34	1,5	2 - Ø11	16 - CNA4,0x35	10 - CNA4,0x35	10,5
ET301*	107,5	96	55	34	1,5	2 - Ø11	16 - CNA4,0x35	16 - CNA4,0x35	11,2

*Beam width for hanger: ET260 maximum width 47 mm
ET301 maximum width of 72 mm

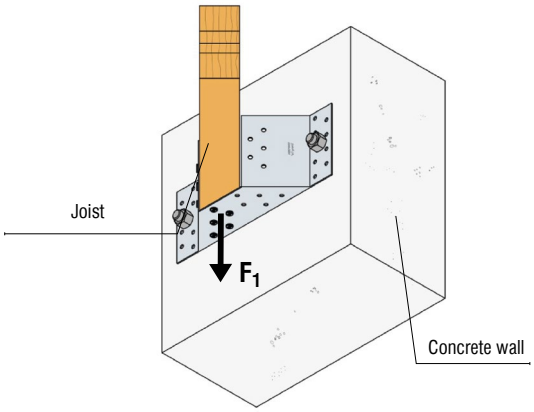


ET260 / ET301 Beam to Concrete connection



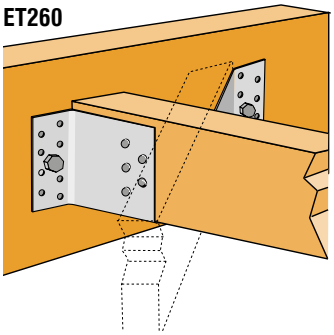


Load scheme
beam to concrete wall

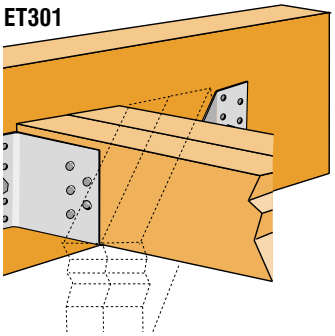


ET260 / ET301 Beam to Beam connection

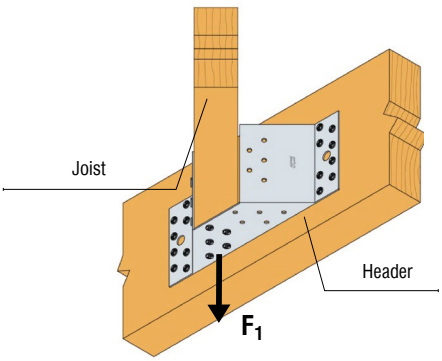
ET260



ET301



Load scheme
beam to beam



SDED / SDEG Adjustable Face Fix Hangers

CE ETA 06/0270

SIMPSON Strong-Tie®

The SDED/G is a two piece, width adjustable face fix hanger for solid joists. The two separate components of SDED/G give the possibility to adjust it to suit a range of joist widths. Each SDED/G is supplied as a pair.

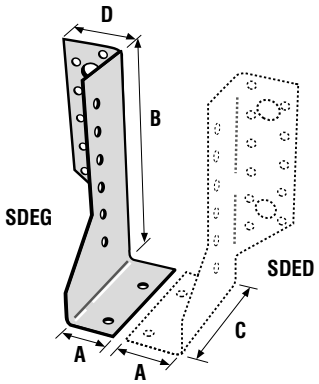
Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

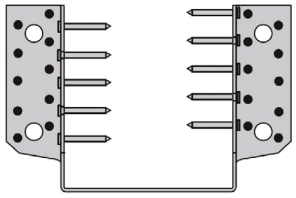
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



Beam to Beam connection

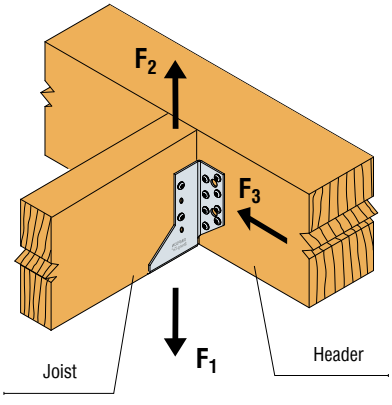
Model No.	Dimensions [mm]					Holes for anchors	Fixing		Characteristic capacity [kN]		
	A	B	C	D	t		Header	Joist	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
SDED300/30	30	118	84	41,5	2,0	2 - Ø13	18 - CNA4,0x50	10 - CNA4,0x50	20,30	17,6	14,6
SDEG300/30						2 - Ø13	18 - CNA4,0x50	10 - CNA4,0x50			
SDED340/30		138				2 - Ø13	22 - CNA4,0x50	12 - CNA4,0x50	26,6	24,0	15,8
SDEG340/30						2 - Ø13	22 - CNA4,0x50	12 - CNA4,0x50			
SDED380/30		158				2 - Ø13	22 - CNA4,0x50	12 - CNA4,0x50	26,6	24,0	13,9
SDEG380/30						2 - Ø13	22 - CNA4,0x50	12 - CNA4,0x50			
SDED440/30		188				2 - Ø13	28 - CNA4,0x50	15 - CNA4,0x50	33,2	33,2	14,0
SDEG440/30						2 - Ø13	28 - CNA4,0x50	15 - CNA4,0x50			

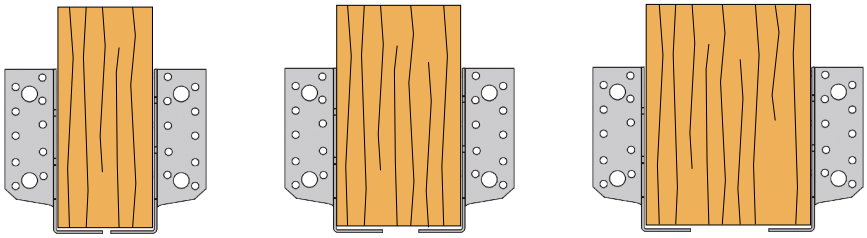


Full nailing

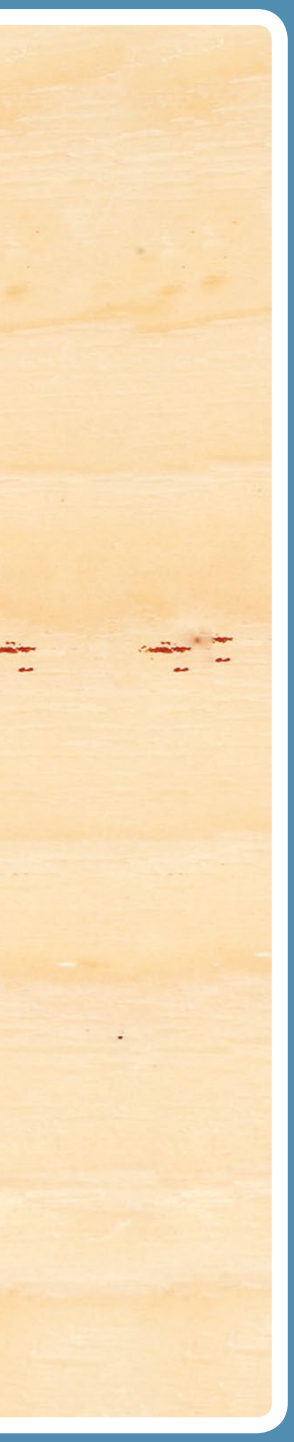
The advantage of a two piece joist hanger is the underside of the secondary beam.
Where we deal with unusual timber sections and we can not use the standard hanger we can use width adjustable face fix hanger.

Load scheme beam to beam



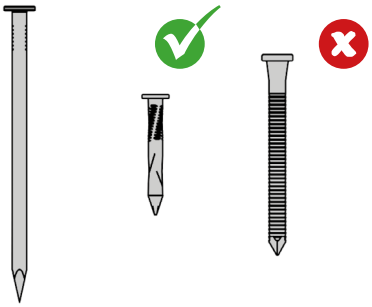


I - beam Connectors

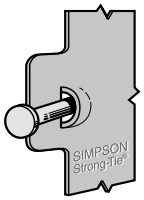


TECHNICAL INFORMATION I-beam connectors

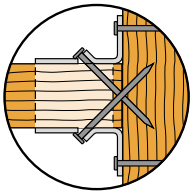
Connectors dedicated for I-beams are unique and special products.
The users have to pay special attention for notes and additional information included in the chapter. One of the most common misinstallation is improper fasteners selection. For standard solid connectors standard fasteners are 4,0 CNA nails. For I-beam products N3.75x30 square twisted and N3.75x75 smooth round nails have to be used. Usage of correct fasteners ensures proper installation and achieve published capacity. 4,0 CNA connector nails, unless noted otherwise, should not be used with the I-beam connectors to avoid I-beam flanges splitting.



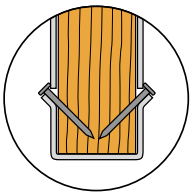
Correct connection of connectors to the I-beam



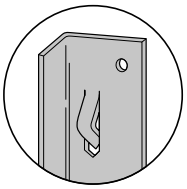
Dome Nailing
This feature guides the nail into the joist and header at a 45° angle.
US Patent: 5,603,580.



Double Shear Nailing
The nail is installed into the joist and header, distributing the loadthrough two points on each joist nail for greater strength.

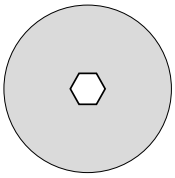


Positive Angle Nailing
Provided when timber splitting may occur and to reduce installation time.

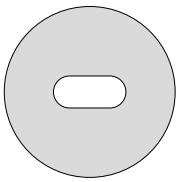


Speed Prongs
Used to temporarily position and secure the connector for easier and faster installation.

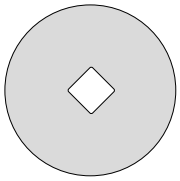
Types of nail holes in I-beams



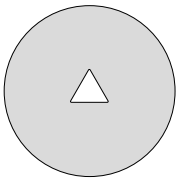
Hexagonal Hole:
For use with SDS structural screws



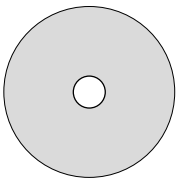
Obround Hole:
Provide easier nailing access in tight locations. Fasteners installed at any angle



Diamond Hole:
Optional holes to temporarily secure connectors to the member during installation

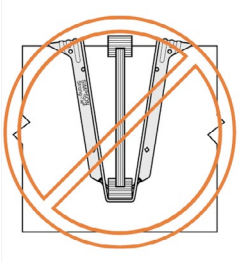


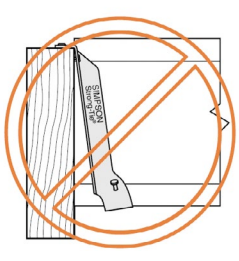
Triangle Hole:
Sometimes provided in addition to round holes. Fill triangular holes when specified

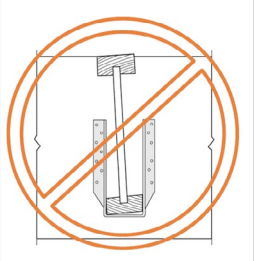


Round Hole:
To fasten a connector. Always fill and make sure to use the correct nail.

Installation errors - incorrect connection

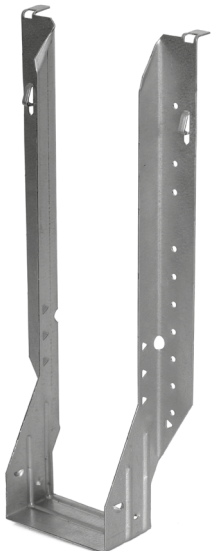






IUSE Face Fix I-Joist Hanger

CE ETA 17/0554



The IUSE is a one piece Face Fix hanger for supporting I-beams from timber members and incorporates the "strong grip", which secures the I-beam without the need for any fasteners where no uplift is required. The top flanges of the I-beam are laterally restrained by the sides of the hanger eliminating the need for web stiffeners. The hanger has optional triangular holes for additional uplift capacity, which do require web stiffeners that must be fitted in accordance with the I-beam manufacturers details. Value engineered for maximum performance, including an offset seat allowing improved joist bearing positioning. Value engineered for maximum performance. The offset seat feature allows better joist bearing positioning. With positive angle nailing slotted hole material is not removed, but issued to channel and confine the path of the nail to the optimum angle. Minimizes splitting of the flanges while permitting time saving nailing from a better angle. These models will normally accommodate a skew of up to 5°

Fixing:

- For fastening to timber – use connector nails N3.75x30 or N3.75x75

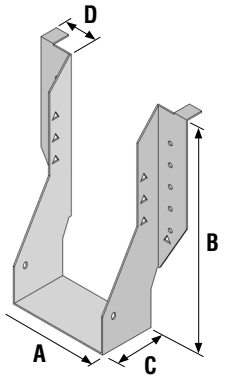
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

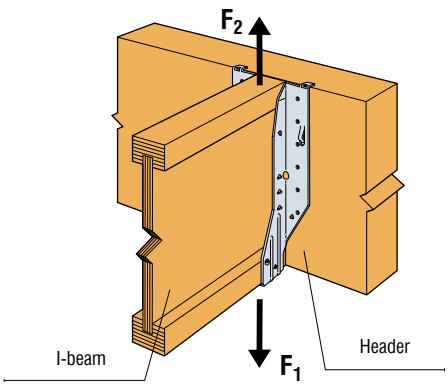
Zn 20 μm | CL.2 | CS | DWG

Available Sizes / Beam to Beam connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]*	
								Header	
						Header	Joist	I-beam or Solid section C16	LVL
	A	B	C	D	t			$R_{1,k}$	$R_{1,k}$
IUSE199/48	48	199	51	29,5	1,2	10-N3.75x30	2-N3.75x30	7,54	13,50
						10-N3.75x75		13,10	17,80
IUSE219/48	48	219	51	29,5	1,2	12-N3.75x30	2-N3.75x30	9,99	16,20
						12-N3.75x75		15,72	21,36
IUSE239/48	48	239	51	29,5	1,2	14-N3.75x30	2-N3.75x30	12,57	18,90
						14-N3.75x75		18,34	24,92
IUSE299/48	48	299	51	29,5	1,2	16-N3.75x30	2-N3.75x30	14,40	21,60
						16-N3.75x75		20,96	28,48
IUSE359/48	48	359	51	29,5	1,2	20-N3.75x30	2-N3.75x30	16,20	24,30
						20-N3.75x75		23,58	32,04
IUSE399/48	48	399	51	29,5	1,2	22-N3.75x30	2-N3.75x30	16,20	24,30
						22-N3.75x75		23,58	32,04
IUSE199/61	61	199	51	29,5	1,2	10-N3.75x30	2-N3.75x30	7,54	13,50
						10-N3.75x75		13,10	17,80
IUSE219/61	61	219	51	29,5	1,2	12-N3.75x30	2-N3.75x30	9,99	16,20
						12-N3.75x75		15,72	21,36
IUSE239/61	61	239	51	29,5	1,2	14-N3.75x30	2-N3.75x30	12,57	18,90
						14-N3.75x75		18,34	24,92
IUSE299/61	61	299	51	29,5	1,2	16-N3.75x30	2-N3.75x30	14,40	21,60
						16-N3.75x75		20,96	28,48



Load scheme
I-beam / beam



* Capacity $R_{2,k}$ = 1.8 kN for each dimension. The resistance to tearing can be increased by filling the secondary beam to the full cross section and inserting additional nails into the triangular holes in the side plates of the hanger. The load-bearing capacity of the jack is increased by 1.8 kN with each additional nailed pair of nails. Up to 3 pairs of nails.

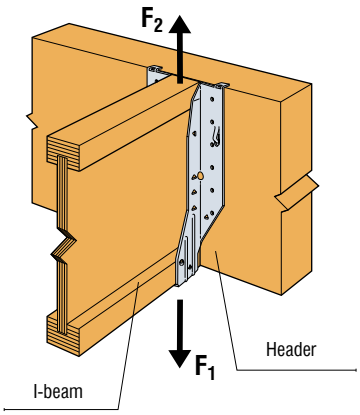
IUSE Face Fix I-Joist Hanger

CE ETA 17/0554

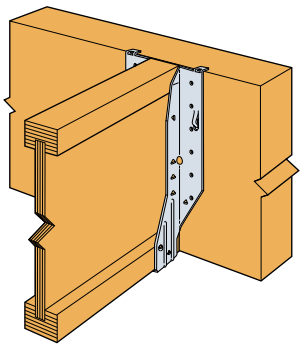
Available Sizes / Beam to Beam connection

Model No.	Dimensions [mm]					Fixing		Characteristic capacity [kN]*	
								Header	
						Header	Joist	I-beam or Solid C16	LVL
	A	B	C	D	t			$R_{1,k}$	$R_{1,k}$
IUSE359/61	61	359	51	29,5	1,2	20-N3.75x30	2-N3.75x30	16,20	24,30
						20-N3.75x75		23,58	32,04
IUSE399/61	61	399	51	29,5	1,2	22-N3.75x30	2-N3.75x30	16,20	24,30
						22-N3.75x75		23,58	32,04
IUSE405/61	61	405	51	29,5	1,2	22-N3.75x30	2-N3.75x30	16,20	24,30
						22-N3.75x75		23,58	32,04
IUSE199/63	63	199	51	29,5	1,2	10-N3.75x30	2-N3.75x30	7,54	13,50
						10-N3.75x75		13,10	17,80
IUSE219/63	63	219	51	29,5	1,2	12-N3.75x30	2-N3.75x30	9,99	16,20
						12-N3.75x75		15,72	21,36
IUSE239/63	63	239	51	29,5	1,2	14-N3.75x30	2-N3.75x30	12,57	18,90
						14-N3.75x75		18,34	24,92
IUSE299/63	63	299	51	29,5	1,2	16-N3.75x30	2-N3.75x30	14,40	21,60
						16-N3.75x75		20,96	28,48
IUSE359/63	63	359	51	29,5	1,2	20-N3.75x30	2-N3.75x30	16,20	24,30
						20-N3.75x75		23,58	32,04
IUSE399/63	63	399	51	29,5	1,2	22-N3.75x30	2-N3.75x30	16,20	24,30
						22-N3.75x75		23,58	32,04
IUSE199/92	92	199	51	29,5	1,2	10-N3.75x30	2-N3.75x30	7,54	13,50
						10-N3.75x75		13,10	17,80
IUSE219/92	92	219	51	29,5	1,2	12-N3.75x30	2-N3.75x30	9,99	16,20
						12-N3.75x75		15,72	21,36
IUSE224/92	92	224	51	29,5	1,2	12-N3.75x30	2-N3.75x30	9,99	16,20
						12-N3.75x75		15,72	21,36
IUSE239/92	92	239	51	29,5	1,2	14-N3.75x30	2-N3.75x30	12,57	18,90
						14-N3.75x75		18,34	24,92
IUSE254/92	92	254	51	29,5	1,2	14-N3.75x30	2-N3.75x30	12,57	18,90
						14-N3.75x75		18,34	24,92
IUSE299/92	92	299	51	29,5	1,2	16-N3.75x30	2-N3.75x30	14,40	21,60
						16-N3.75x75		20,96	28,48
IUSE349/92	92	349	51	29,5	1,2	20-N3.75x30	2-N3.75x30	16,20	24,30
						20-N3.75x75		23,58	32,04
IUSE355/92	92	355	51	29,5	1,2	20-N3.75x30	2-N3.75x30	16,20	24,30
						20-N3.75x75		23,58	32,04
IUSE359/92	92	359	51	29,5	1,2	20-N3.75x30	2-N3.75x30	16,20	24,30
						20-N3.75x75		23,58	32,04
IUSE399/92	92	399	51	29,5	1,2	22-N3.75x30	2-N3.75x30	16,20	24,30
						22-N3.75x75		23,58	32,04

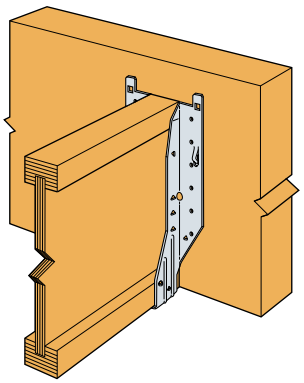
Load scheme
I-beam / beam



Top fix connection



Face fix connection



ITSE Top Fix I-Joist Hangers

CE ETA 17/0554

SIMPSON Strong-Tie®

The ITSE is a one piece Top Fix hanger for supporting I-Beams from timber members and incorporates the "strong grip", which secures the I-Beam without the need for any fasteners where no uplift is required. The top flanges of the I-Beam are laterally restrained by the sides of the hanger eliminating the need for web stiffeners. The hanger has optional triangular holes for additional uplift capacity, which do require web stiffeners that must be fitted in accordance with the I-Beam manufacturers details. Value engineered for maximum performance, including an offset seat allowing improved joist bearing positioning. Value engineered for maximum performance. The offset seat feature allows better joist bearing positioning. Joist top fl anges are laterally restrained by the side of the hanger, eliminating the need for web stiffeners. With Positive angle nailing the slotted hole material is not removed, but issued to channel and confi ne the path of the nail to the optimum angle. Minimizes splitting of the fl anges while permitting time-saving nailing from a better angle. These models will normally accommodate a skew of up to 5°.

Fixing:

- For fastening to timber – use connector nails N3.75x30 or N3.75x75

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

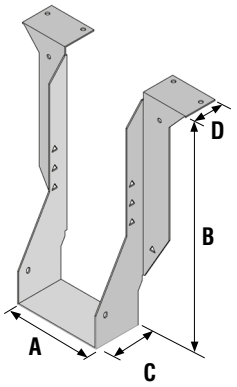
Zn 20 μm | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]				
	A	B	C	D	t
ITSE 199/48	48	199	54	34	1,2
ITSE 219/48	48	219	54	34	1,2
ITSE 239/48	48	239	54	34	1,2
ITSE 299/48	48	299	54	34	1,2
ITSE 359/48	48	359	54	34	1,2
ITSE 399/48	48	399	54	34	1,2
ITSE 199/63	63	199	54	34	1,2
ITSE 219/63	63	219	54	34	1,2
ITSE 239/63	63	239	54	34	1,2

Available Sizes

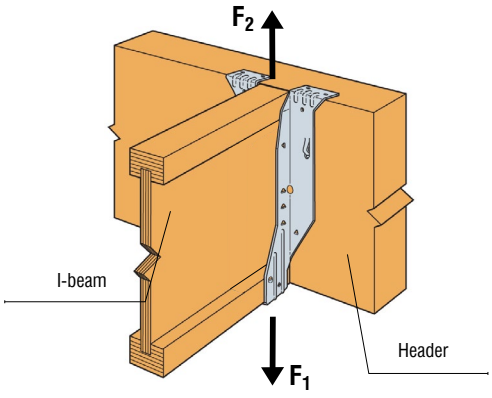
Model No.	Dimensions [mm]				
	A	B	C	D	t
ITSE 299/63	63	299	54	34	1,2
ITSE 359/63	63	359	54	34	1,2
ITSE 399/63	63	399	54	34	1,2
ITSE 199/92	92	199	54	34	1,2
ITSE 219/92	92	219	54	34	1,2
ITSE 239/92	92	239	54	34	1,2
ITSE 299/92	92	299	54	34	1,2
ITSE 359/92	92	359	54	34	1,2
ITSE 399/92	92	399	54	34	1,2



I-beam to Solid beam connection

Model No.	Fixing			Characteristic capacity [kN]	
	Header		Joist	$R_{1,k}$	$R_{2,k}$
	Top	Face			
ITSE 199/48	4-N3.75x75	2-N3.75x75	2-N3.75x30	8,1	1,8

Load scheme
I-beam / beam

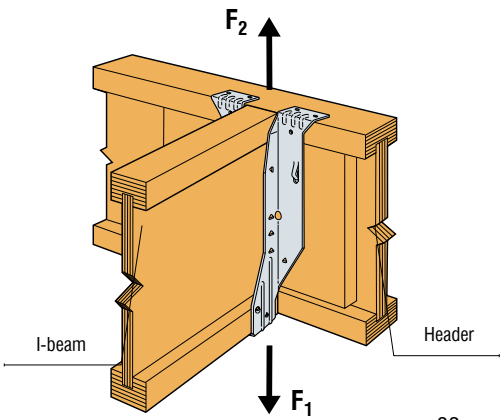


I-beam to I-beam connection

Model No.	Fixing			Characteristic capacity [kN]	
	Header		Joist	$R_{1,k}$	$R_{2,k}$
	Top	Face			
ITSE 199/48	4-N3.75x30	2-N3.75x30	2-N3.75x30	8,52	1,8

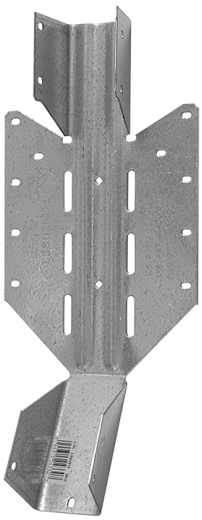
* Combined I-beam to I-beam. The main beam must be filled to full cross section.
As recommended by the I-beam manufacturer.

Load scheme
I-beam / I-beam



LSSUI Light slope and skew adjustable hangers

CE ETA 08/0053



With these site adjustable hangers, you can always have the right hanger available for those special rush projects. This versatile range of products attaches joists/rafters to timber supports at any slope, up or down or at any skew, left or right up to and including 45°. All models are slope and skew adjustable on site, excluding the ISU3510-2, ISU4.12.

Fixing:

- For fastening to timber – use connector nails N3.75x30 or N3.75x75

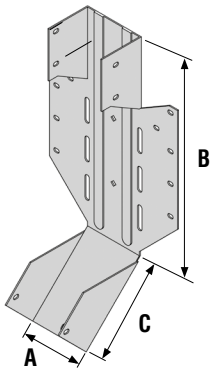
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes / I-beam to Beam connection

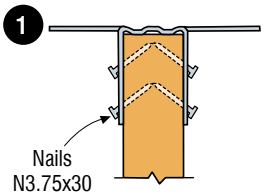
Model No.	Dimensions [mm]				Fixing		Characteristic capacity [kN] I-joist[1] or Solid section timber class C24	
	A	B	C	t	Ridge[2]	Rafter	$R_{1,k}$	$R_{2,k}$
Sloped Hangers Only								
LSSUI25	45	216	90	1,2	10 – N3.75x75	7 -N3.75x30	7,26	2,38
LSSUI35	60	216	90	1,2	10 – N3.75x75	7 -N3.75x30	9,93	3,98
LSSU410	90	216	90	1,5	18 – N3,75x75	12 -N3.75x30	12,45	4,78
Skewed Hangers or Sloped and Skewed								
LSSUI25	45	216	90	1,2	9 – N3,75x75	7 -N3,75x30	8,10	2,38
LSSUI35	60	216	90	1,2	9 – N3,75x75	7 -N3,75x30	8,10	3,98
LSSU410	90	216	90	1,5	14 – N3,75x75	12 -N3,75x30	7,12	4,78



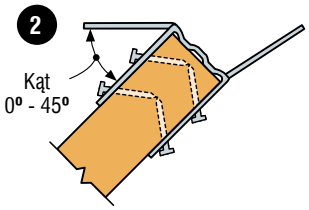
[1] The I-beam must be filled to full cross-section. The load bearing capacity is for I-beam beams with C24 timber flanges

[2] N3.75x75 nails can be replaced with CNA4.0x100 connector nails

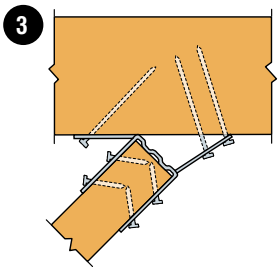
LSSUI Installation



Nail hanger to slope-cut carried member, installing seat nail first. No bevel necessary for skewed installation.

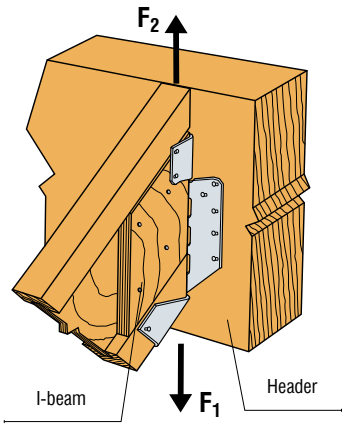


Skew flange to form acute angle. Bend other flange back along centerline of slots. Bend once only.



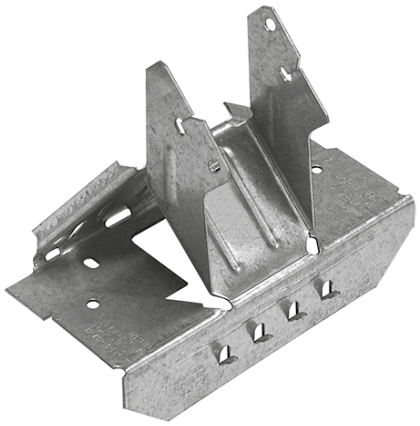
Secure hanger to the carrying member, acute angle side first. Install nails at an angle.

Load scheme
I-beam / beam



VPA Variable Pitch Connector

CE ETA 08/0053



The VPA is adjustable to slopes between 15° and 45° with a special interlock design indicating when the maximum pitch is reached. This product complements the versatile LSSU. Designed for use with double 38 mm top plates with a 50 mm seat, which allows sufficient bearing area for most rafters. No notching is required when using the VPA. This connector reduces the need for beveled plates and toe nailing. It has positive angle nailing (PAN) to speed up installation and to minimize timber splitting.

Fixing:

- For fastening to timber – use connector nails N3.75x30 or N3.75x75

Material:

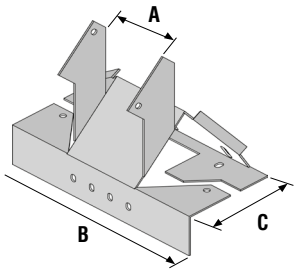
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes / Rafter to Purlin connection

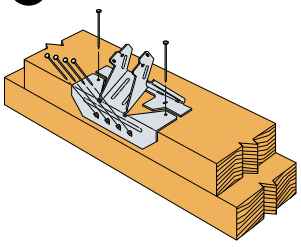
Model No.	Dimensions [mm]				Fixing		Characteristic capacity [kN]					
							Solid section timber class C24			I-beam with solid flanges C24		
	A	B	C	t	Purlin/Top plate	Rafter	$R_{1,k}$	$R_{2,k}$	$R_{3/4,k}$	$R_{1,k}$	$R_{2,k}$	$R_{3/4,k}$
VPA25	46	133	56	1.2	8 – N3.75x75	2 – N3.75x30	5,6	1,4	0,95	5,6	1,4	0,69
VPA35	60	154	56	1.2	9 – N3.75x75	2 –N3.75x30	5,6	1,4	0,95	5,6	1,4	0,69
VPA4	90	183	57	1.2	11 – N3.75x75	2 –N3.75x30	7,84	1,4	0,95	7,84	1,4	0,69

* N3.75x75 nails used into purlin / top plate can be replaced with CNA4.0x60 nails



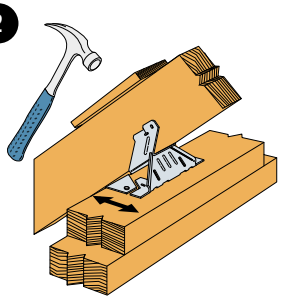
VPA Installation

1



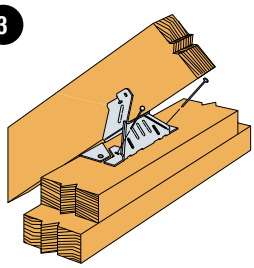
Install top nails and face PAN nails in the “A” flange to outside wall top plate.

2



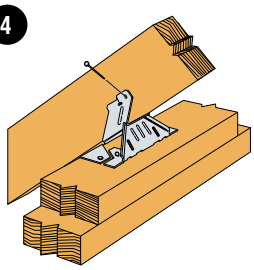
Seat rafter with a hammer, adjusting the “B” flange to the required pitch.

3



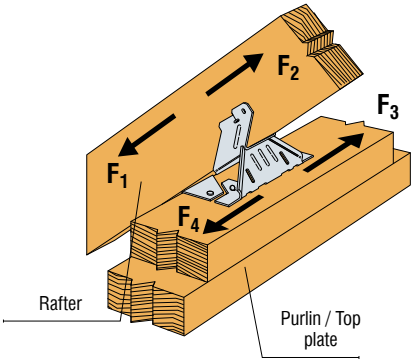
Install “B” flange nails in the obround nails holes, locking the pitch.

4



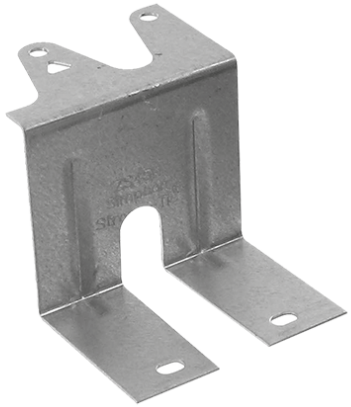
Install rafter PAN nails.

Load scheme rafter / purlin



ZS Slotted Z-Clip

CE ETA 17/0554



The ZS clip allows I-joists or solid sawn timber to be used as noggins between joists to support floor decks or partitions. Fully interlocking top flange works on all I-joist header widths to prevent overlapping of opposing clips. slotted bottom flange allows I-joist or solid sawn timber to be used as noggings. Triangular nail hole for use with 50 mm wide headers, which also ensures that nails can be staggered when ZS clips are interlocked embossed bottom flange provides greatly enhanced resistance to bending oblong nail holes in the bottom flange ensure easier angled nailing.

Fixing:

- For fastening to timber – use connector nails N3.75x30

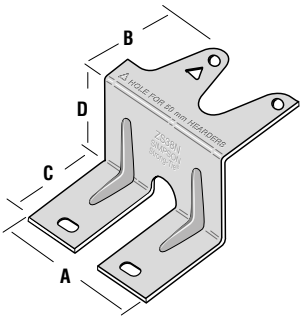
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

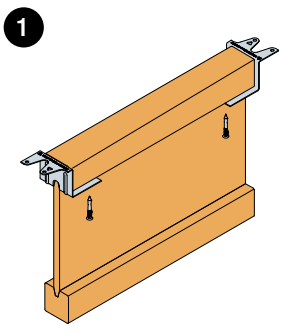
Zn 20 μm | CL.2 | CS | DWG

Available Sizes

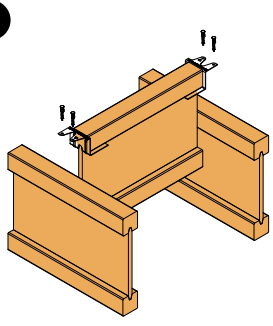
Model No.	Dimensions [mm]					Fixing	Characteristic capacity $R_{1,k}$ [kN]	
	A	B	C	D	t		Solid section timber class C24	I-beam
ZS35N	52	31	49	35	0,9	4 – N3.75x30	1,8	1,9
ZS38N	52	31	46	38	0,9	4 – N3.75x30		
ZS45N	52	31	39	45	0,9	4 – N3.75x30		
ZS47N	52	31	37	47	0,9	4 – N3.75x30		



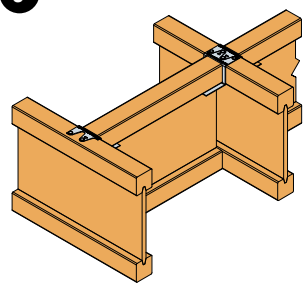
ZS Installation



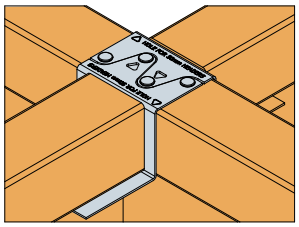
Prepare the necessary number of clips and nails.



Cut the I-beam to the required size. Secure the clip to the I-beam with the longer arm from the bottom of the beam using N3.75x30 nails



Insert the beam between the I-beams and nailed to the top belt with nails N3.75x30



MJC Multiple Joist Connector

CE ETA 07/0317

The multi joist connector (MJC) allows two I-joists or two metal web joists to be fixed together to act as a single unit, transferring the incoming load from the loaded ply to the unloaded ply. The MJC is an improved solution to the traditional filler block detail, which historically has been time consuming to fit and difficult to check if fitted or if fitted correctly. It's simple and effective design allows one size of product to be used on any joist size – regardless of height or width

Fixing:

- For fastening to timber – use connector nails N3.75x30

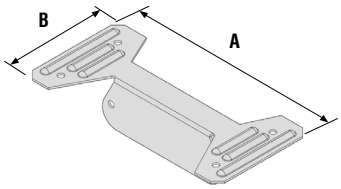
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes / Multiple joist connection

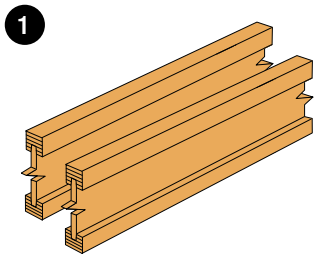
Model No.	Dimensions [mm]			Fixing	Ilość MJC[2]	Characteristic capacity $R_{1,k}$ [kN][1]		
	A	B	t			LVL Flanges	**Solid Flanges** 45mm	Metal Web joist
MJC	135	65	2,0	4 x N3.75x30	4	16,46	9,10	9,12
					8	24,69	13,65	13,68



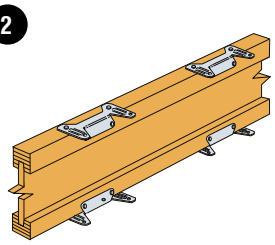
[1] Characteristic capacity refers to the maximum concentrated load that can be applied when the MJC's are installed either side of the incoming load.

[2] Number of MJC's equally spaced about the incoming load.

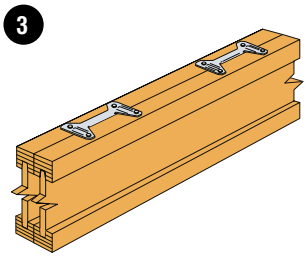
MJC Installation



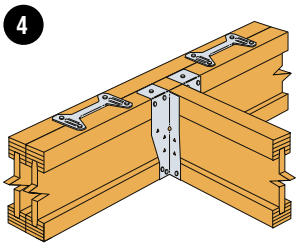
Prepare the required number of clips and nails for mounting the beams.



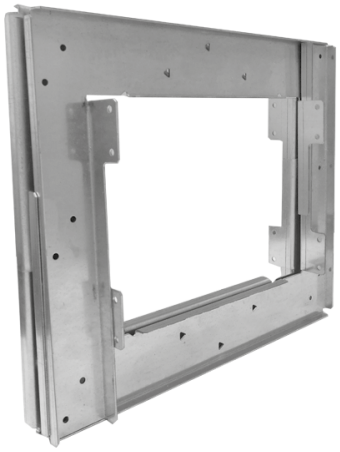
Position the MJC's onto the 1st joist - ensuring that they are centred about the incoming load at 400 c/c (may be adjusted within 10mm each way). Please note that the connectors can be installed in any orientation. Secure each MJC with 4no. N3.75 x 30mm nails, to the top and bottom joist flanges as shown.



Position 2nd joist ensuring ends are flush and joists are parallel.
Secure the joist using N3.75 x 30mm ensuring all round nail holes are filled into the top and bottom joist flanges.



IHS I-Beam Hole Support



The IHS is designed to strengthen I-joists when holes are required to be cut in locations not normally permitted. allows holes to be cut 50 mm from bearing point, which allows services to run close to external walls. Variable hole sizes from 150 mm to a maximum width of 250 mm. Supplied in two plates (per side of joist) which allows the IHS to be fitted, even when services are already in-situ. Helps to eliminate expensive and time consuming joist trimming for SVP (soil vent pipe) runs. Built-in noggin support feature.

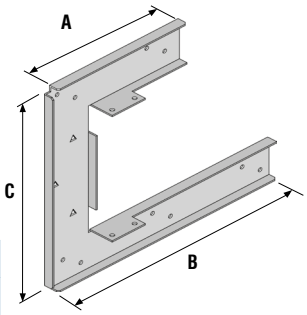
Fixing:

- For fastening to timber – use connector nails N3.75x30

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG



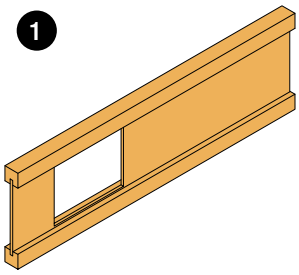
Available Sizes / Hole support connection

Width	Height	Nr Art.	Dimensions [mm]				Maximum allowable hole size with IHS (H x L) [mm]	Fixing		Characteristic capacity [1] shear capacity at location of IHS $V_{k,hole}$ [kN]	
			A	B	C	t		Hole size IHS			
								150 mm	250 mm	Single beam	Double beam
45	220	IHS220	148,5	248,5	220	2,0	130 x 250	24 pcs. N3.75x30	32 pcs. N3.75x30	5,93	8,30
	240	IHS240			240	2,0	150 x 250			6,38	8,93
	300	IHS300			300	2,0	200 x 250			7,68	10,75
	350/360	IHS350/360			350	2,0	250 x 250			10,0	*
60	220	IHS220			220	2,0	130 x 250			5,88	8,23
	240	IHS240			240	2,0	150 x 220			6,32	8,85
	300	IHS300			300	2,0	200 x 250			7,59	10,62
	350/360	IHS350/360			350	2,0	250 x 250			10,0	*
90	220	IHS220			220	2,0	130 x 250			5,83	8,16
	240	IHS240			240	2,0	150 x 250			6,26	8,76
	300	IHS300			300	2,0	200 x 250			7,49	10,48
	350/360	IHS350/360			350	2,0	250 x 250			10,0	*

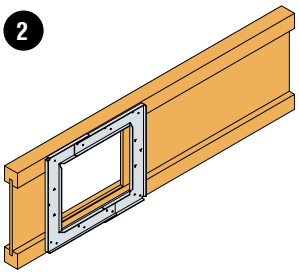
[1] Capacity concerns Steico beams SJL45, SJL60 i SJL90

* More information on IHS350 / 360 can be obtained by contacting Simpson Strong-Tie technical support

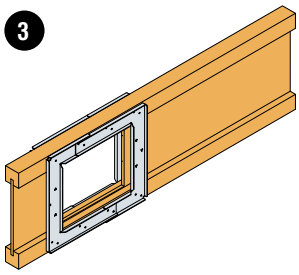
IHS Installation



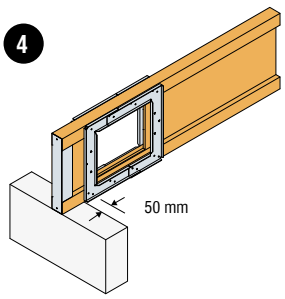
Prepare the I-beam with a cut-out hole (round or rectangular).
Select the correct beam fill according to the dimensions in the table above.



Fit the selected IHS connector and fasten with N3.75x30 nails



Do the same thing on the other side of the I-beam



Fixing the reinforced beam should have a clearance of 50 mm

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- Installation Videos
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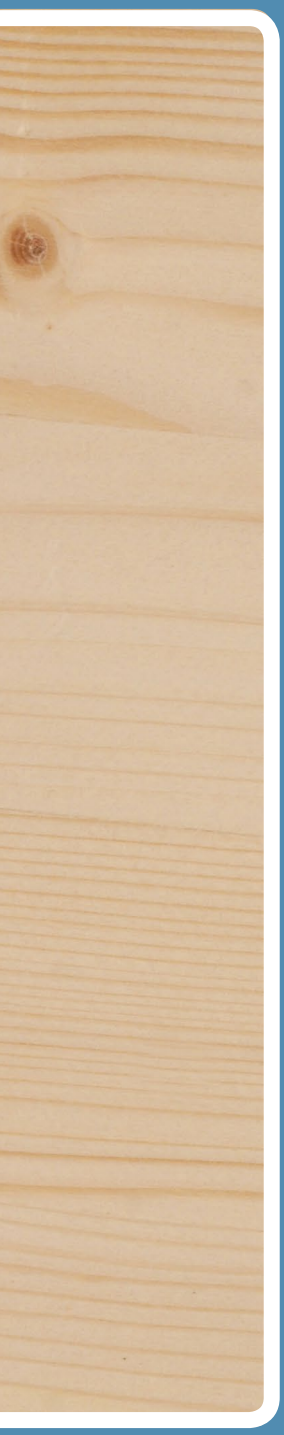
CS AD SW

Technical Support

Still have questions or need expert technical advice?
Contact your local technical suport team:

22 865 22 00
poland@strongtie.com

Concealed Beam Hangers



BTN / BT4 / BTALU Concealed Beam Hanger

CE ETA 07/0245

SIMPSON Strong-Tie®

The BTN/ BT4/ BT-ALU concealed hangers are a solution to connecting timber members together without seeing the connector. It is designed to be fixed to the header timber and then fully inserted into a slot in the in-coming beam and held in place with dowels. The joist can be sloped up to 45°. The chosen connector must be app. 40 mm smaller than the height of the joist. BTN90 and BT4-90 can be used for a joist height of 100 mm.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm and steel dowels STD8 lub STD12

Material:

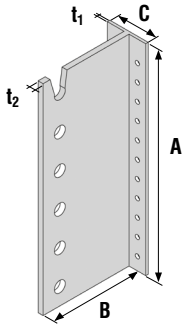
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | ALU | CL.3 | CS | DWG | R30

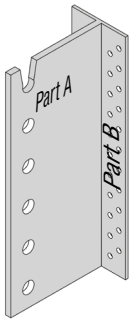
Available Sizes

Model No.	Dimensions [mm]					Holes	
	A	B	C	t_1	t_2	Part A	Part B
BTN90	90	103	46	3,0	6,0	4-Ø8	8-Ø5
BTN120	120	103	46	3,0	6,0	3-Ø12	10-Ø5
BTN160	160	103	46	3,0	6,0	4-Ø12	14-Ø5
BTN200	200	103	46	3,0	6,0	5-Ø12	18-Ø5
BTN240	240	103	46	3,0	6,0	6-Ø12	22-Ø5
BT4-90	90	103	62	3,0	6,0	4-Ø8	16-Ø5
BT4-120	120	103	62	3,0	6,0	3-Ø12	20-Ø5
BT4-160	160	103	62	3,0	6,0	4-Ø12	28-Ø5
BT4-200	200	103	62	3,0	6,0	5-Ø12	36-Ø5
BT4-240	240	103	62	3,0	6,0	6-Ø12	44-Ø5
BTALU 90*	90	103	62	6,0	6,0	-	16-Ø5
BTALU 120*	120	103	62	6,0	6,0	-	20-Ø5
BTALU 160*	160	103	62	6,0	6,0	-	28-Ø5
BTALU 200*	200	103	62	6,0	6,0	-	36-Ø5
BTALU 240*	240	103	62	6,0	6,0	-	44-Ø5

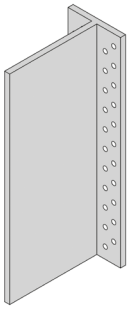
* Type BTALU connectors are produces without holes for the dowels, these holes should be made before or during installation by the user, the holes can be made also with other diameters (Ø of steel dowel :7, 8 and 10 mm)



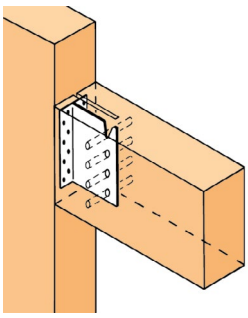
BTN



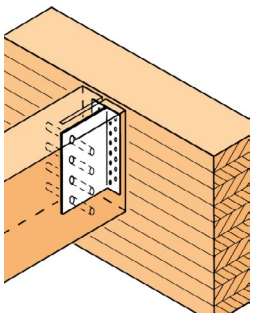
BT-4



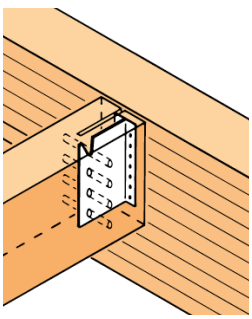
BTALU



Beam to column connection
BT4



Beam to beam connection
BTALU



Beam to beam connection
BTN

BTN / BT4 / BTALU Concealed Beam Hanger

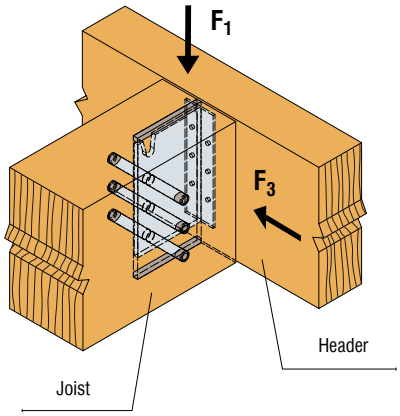
CE ETA 07/0245

SIMPSON Strong-Tie

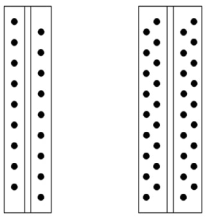
Beam to Beam connection (full nailing) $R_{1,k}$

Model No.	Fixing		Characteristic capacity $R_{1,k}$ [kN]					
	Nails	Dowels	b - Width of supported beam (STD lenght) [mm]					
	n_b	SD	60	80	100	120	140	160
BTN90	8 - CNA4,0x60	4 - STD8	8,3	9,2	10,3	11,0	11,0	11,0
BTN120	10 - CNA4,0x60	3 - STD12	14,4	15,2	16,2	17,6	18,9	20,1
BTN160	14 - CNA4,0x60	4 - STD12	23,1	24,3	25,8	27,6	29,5	31,3
BTN200	18 - CNA4,0x60	5 - STD12	32,5	34,2	36,1	38,4	40,6	42,3
BTN240	22 - CNA4,0x60	6 - STD12	42,3	44,5	46,8	49,4	51,6	52,0
BT4-90	16 - CNA4,0x60	4 - STD8	10,8	11,8	12,9	13,7	13,7	13,7
BT4-120	20 - CNA4,0x60	3 - STD12	18,7	19,7	20,8	22,2	23,7	25,3
BT4-160	28 - CNA4,0x60	4 - STD12	30,2	31,8	33,5	35,6	37,9	40,4
BT4-200	36 - CNA4,0x60	5 - STD12	42,7	44,9	47,2	50,2	53,4	56,8
BT4-240	44 - CNA4,0x60	6 - STD12	55,5	58,4	61,4	65,2	69,5	73,9
BTALU 90	16 - CNA4,0x60	4 - STD8	10,8	11,8	12,9	13,7	13,7	13,7
BTALU 120	20 - CNA4,0x60	3 - STD12	18,7	19,7	20,8	22,2	23,7	25,3
BTALU 160	28 - CNA4,0x60	4 - STD12	30,2	31,8	33,5	35,6	37,9	40,4
BTALU 200	36 - CNA4,0x60	5 - STD12	42,7	44,9	47,2	50,2	53,4	56,8
BTALU 240	44 - CNA4,0x60	6 - STD12	55,5	58,4	61,4	65,2	69,5	73,9

Load scheme beam to beam

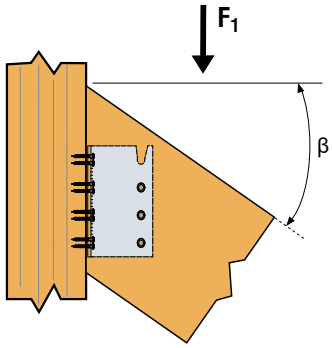


full nailing beam to beam connection



For sloping connections (> 0°), use a reduction factor:

Slope - β	0°	15°	30°	45°
Reduction factor - k_β	1	0,95	0,9	0,85



Beam to Beam connection (full nailing) $R_{3,k}$ without reinforcement screws

Model No.	Fixing		Min. joist height [mm]	Characteristic capacity $R_{3,k}$ [kN]					
	Nails	Dowels		b - Width of supported beam (STD lenght) [mm]					
	n_b	SD		60	80	100	120	140	160
BTN90	8 - CNA4,0x60	4 - STD8	100	1,5	1,9	2,3	2,7	3,1	3,6
BTN120	10 - CNA4,0x60	3 - STD12	160	2,2	2,9	3,5	4,2	4,8	5,4
BTN160	14 - CNA4,0x60	4 - STD12	200	2,9	3,6	4,4	5,3	6,2	6,9
BTN200	18 - CNA4,0x60	5 - STD12	240	3,5	4,4	5,4	6,4	7,4	8,4
BTN240	22 - CNA4,0x60	6 - STD12	280	4,2	5,3	6,4	7,4	8,6	9,8
BT4-90	16 - CNA4,0x60	4 - STD8	100	1,5	1,9	2,3	2,7	3,1	3,6
BT4-120	20 - CNA4,0x60	3 - STD12	160	2,2	2,9	3,5	4,2	4,8	5,6
BT4-160	28 - CNA4,0x60	4 - STD12	200	2,9	3,6	4,4	5,3	6,2	7,0
BT4-200	36 - CNA4,0x60	5 - STD12	240	3,5	4,4	5,4	6,4	7,4	8,4
BT4-240	44 - CNA4,0x60	6 - STD12	280	4,2	5,3	6,4	7,4	8,6	9,8
BTALU 90	16 - CNA4,0x60	4 - STD8	100	1,5	1,9	2,3	2,7	3,1	3,6
BTALU 120	20 - CNA4,0x60	3 - STD12	160	2,2	2,9	3,5	4,2	4,8	5,6
BTALU 160	28 - CNA4,0x60	4 - STD12	200	2,9	3,6	4,4	5,3	6,2	7,0
BTALU 200	36 - CNA4,0x60	5 - STD12	240	3,5	4,4	5,4	6,4	7,4	8,4
BTALU 240	44 - CNA4,0x60	6 - STD12	280	4,2	5,3	6,4	7,4	8,6	9,8

BTN / BT4 / BTALU Concealed Beam Hanger

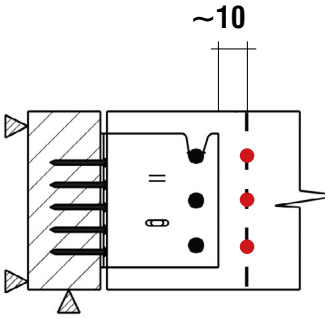
CE ETA 07/0245

SIMPSON Strong-Tie

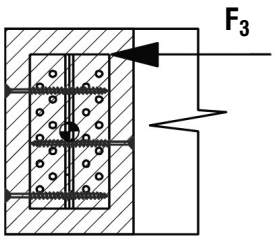
Beam to Beam connection (full nailing) $R_{3,k}$ with reinforcement screws

Model No.	Fixing		Min. joist height [mm]	Characteristic capacity $R_{3,k}$ [kN]					
	Nails	Dowels		b - Width of supported beam (STD lenght) [mm]					
	n_b	SD		60	80	100	120	140	160
BTN90	8 - CNA4,0x60	4 - STD8	100	1,9	3,7	4,7	5,8	6,8	7,3
BTN120	10 - CNA4,0x60	3 - STD12	160	2,2	3,1	4,8	6,2	6,2	6,2
BTN160	14 - CNA4,0x60	4 - STD12	200	2,9	4,7	7,3	8,4	8,4	8,4
BTN200	18 - CNA4,0x60	5 - STD12	240	3,5	5,0	8,1	10,6	10,6	10,6
BTN240	22 - CNA4,0x60	6 - STD12	280	4,2	5,4	8,6	12,4	12,9	12,9
BT4-90	16 - CNA4,0x60	4 - STD8	100	1,9	3,7	4,7	5,8	6,8	7,8
BT4-120	20 - CNA4,0x60	3 - STD12	160	2,2	3,1	4,8	6,6	8,3	10,1
BT4-160	28 - CNA4,0x60	4 - STD12	200	2,9	4,7	7,3	9,9	12,5	15,1
BT4-200	36 - CNA4,0x60	5 - STD12	240	3,5	5,0	8,1	13,0	16,7	20,2
BT4-240	44 - CNA4,0x60	6 - STD12	280	4,2	5,4	8,6	13,7	20,2	23,5
BTALU 90	16 - CNA4,0x60	4 - STD8	100	1,9	3,7	4,7	5,8	6,8	7,8
BTALU 120	20 - CNA4,0x60	3 - STD12	160	2,2	3,1	4,8	6,6	8,3	10,1
BTALU 160	28 - CNA4,0x60	4 - STD12	200	2,9	4,7	7,3	9,9	12,5	15,1
BTALU 200	36 - CNA4,0x60	5 - STD12	240	3,5	5,0	8,1	13,0	16,7	20,2
BTALU 240	44 - CNA4,0x60	6 - STD12	280	4,2	5,4	8,6	13,7	20,2	23,5

Screws: 6,0 x L (length L=b-20mm), (for timber with b=60mm use screws 5,0x50. number of screws = number of steel dowels



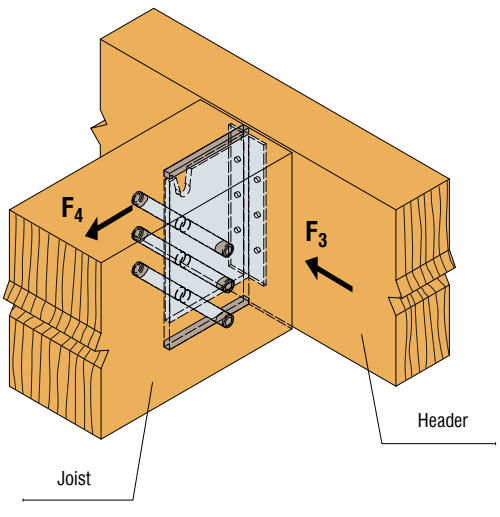
Arrangement of reinforcement screws



Beam to Beam connection $R_{4,k}$

Model No.	Min. joist height [mm]	Characteristic capacity [kN]
BTN90-B lub BT4-90	100	9,5
BTN120-B lub BT4-120	160	12,2
BTN160-B lub BT4-160	200	16,7
BTN200-B lub BT4-200	240	21,2
BTN240-B lub BT4-240	280	25,8
BTALU 90	100	9,5
BTALU 120	160	12,3
BTALU 160	200	17,2
BTALU 200	240	22,1
BTALU 240	280	27,0

Load scheme beam to beam



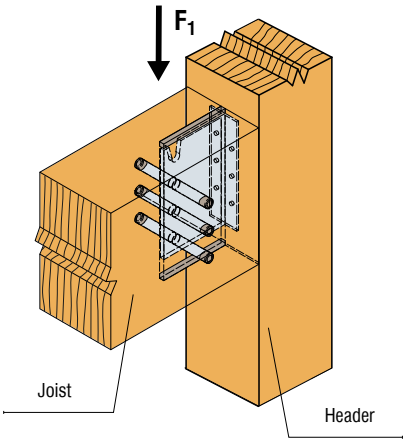
BTN / BT4 / BTALU Concealed Beam Hanger

CE ETA 07/0245

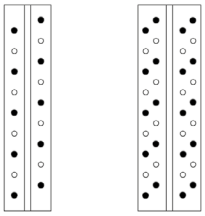
Beam to Column connection (partial nailing) $R_{1,k}$

Model No.	Fixing		Characteristic capacity $R_{1,k}$ [kN]					
	Ilość gwoździ	Dowels	b - Width of supported beam (STD lenght) [mm]					
	n_b	SD	60	80	100	120	140	160
BTN120	6 - CNA4,0x60	3 - STD12	12,4	13,0	13,8	14,2	14,2	14,2
BTN160	8 - CNA4,0x60	4 - STD12	18,0	18,9	18,9	18,9	18,9	18,9
BTN200	10 - CNA4,0x60	5 - STD12	22,4	23,6	23,6	23,6	23,6	23,6
BTN240	12 - CNA4,0x60	6 - STD12	27,0	28,4	28,4	28,4	28,4	28,4
BT4-120	12 - CNA4,0x60	3 - STD12	15,7	16,5	17,5	18,8	20,2	21,6
BT4-160	16 - CNA4,0x60	4 - STD12	24,5	25,8	27,3	29,2	31,2	33,2
BT4-200	20 - CNA4,0x60	5 - STD12	34,1	35,9	37,9	40,3	42,8	45,1
BT4-240	24 - CNA4,0x60	6 - STD12	44,1	46,4	48,8	51,7	54,5	56,5
BTALU 120	12 - CNA4,0x60	3 - STD12	15,7	16,5	17,5	18,8	20,2	21,6
BTALU 160	16 - CNA4,0x60	4 - STD12	24,5	25,8	27,3	29,2	31,2	33,2
BTALU 200	20 - CNA4,0x60	5 - STD12	34,1	35,9	37,9	40,3	42,8	45,1
BTALU 240	24 - CNA4,0x60	6 - STD12	44,1	46,4	48,8	51,7	54,5	56,5

Load scheme beam to post



partial nailing beam to column connection



BTC Concealed Beam Hanger

CE ETA 07/0245

The BTC concealed hangers are a solution to connecting timber members together without seeing the connector. It is designed to be fixed to the header timber and then fully inserted into a slot in the in-coming beam and held in place with dowels. The joist can be sloped up to 45°. The chosen connector must be app. 40 mm smaller than the height of the joist. BTN90 and BT4-90 can be used for a joist height of 100 mm.

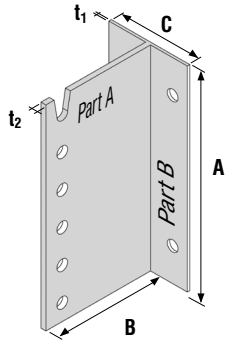
Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm and steel dowels STD8 lub STD12
- For fastening to concrete - useWA M12-104/5 mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG | R30



Available Sizes

Model No.	Dimensions [mm]					Holes	
	A	B	C	t_1	t_2	Part A	Part B
BTC120	120	128	96	3,0	6,0	3-Ø12	2-Ø14
BTC160	160	128	96	3,0	6,0	4-Ø12	4-Ø14
BTC200	200	128	96	3,0	6,0	5-Ø12	4-Ø14
BTC240	240	128	96	3,0	6,0	6-Ø12	4-Ø14

BTC Concealed Beam Hanger

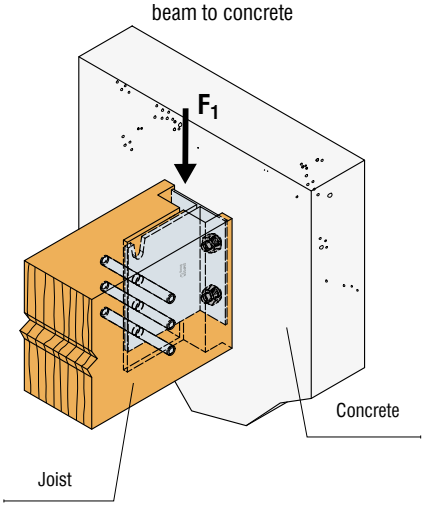
CE ETA 07/0245

SIMPSON Strong-Tie®

Beam to Concrete connection (anchoring) $R_{1,k}$

Model No.	Fixing		Characteristic capacity $R_{1,k}$ [kN]				
	Nails	Dowels	b - Width of supported beam (STD lenght) [mm]				
	n_b	SD	60	80	100	120	140
BTC120	2-WA-M12	3-STD12	11,5	12,7	14,2	15,8	17,2
BTC160	4-WA-M12	4-STD12	18,5	20,4	22,8	25,3	27,8
BTC200	4-WA-M12	5-STD12	26,7	29,4	32,7	36,4	40,3
BTC240	4-WA-M12	6-STD12	35,8	39,4	43,8	48,6	53,8

Load scheme
beam to concrete



The anchors group must be able to resist the min:

$$R_{bolt,\,lat,\,d} \geq \frac{F_{1,d}}{n}$$

For the top anchor additional:
where:

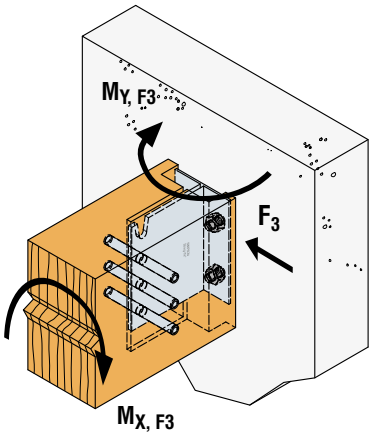
$$R_{bolt,\,ax,\,d} \geq \frac{F_{1,\,d}\,x\,14{,}4mm}{d}$$

$R_{bolt,lat,d}$ - design capacity of one anchor for shear load
$R_{bolt,ax,d}$ - design capacity of one anchor for tension load
d - height of the BTC [mm] - 10mm
n - number of anchors

Beam to Concrete connection (anchoring) $R_{3,k}$

Model No.	Fixing		Characteristic capacity $R_{3,k}$ [kN]					
	Nails	Dowels	Min. joist height [mm]	b - Width of supported beam (STD lenght) [mm]				
	n_b	SD		80	100	120	140	160
BTC120	2-WA-M12	3-STD12	160	2,9	3,5	4	4,5	5,2
BTC160	4-WA-M12	4-STD12	200	3,9	4,4	5	5,9	6,5
BTC200	4-WA-M12	5-STD12	240	4,9	5,5	6,3	7,2	7,8
BTC240	4-WA-M12	6-STD12	280	5,7	6,6	7,5	8,4	9,1

Load scheme
beam to concrete

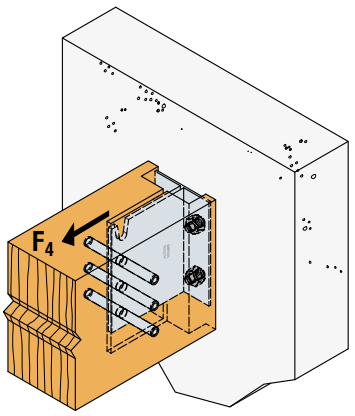


The anchors group must be able to resist the min: $F_{3,d}$ [kN]
$M_{y,F3,d} = F_{3,d}$ x 40mm [Nm]
$M_{x,F3,d} = F_{3,d}$ x (A/2) [Nm]
gdzie:
A - BTC height [mm]

Beam to Concrete connection (anchoring) $R_{4,k}$

Model No.	Fixing		Characteristic capacity $R_{4,k}$ [kN]
	Nails	Dowels	
	n_b	SD	
BTC120	2-WA-M12	3-STD12	$6,7/k_{mod}$
BTC160	4-WA-M12	3-STD12	$13,4/k_{mod}$
BTC200	4-WA-M12	3-STD12	$13,4/k_{mod}$
BTC240	4-WA-M12	3-STD12	$13,4/k_{mod}$

Load scheme
beam to concrete



The anchors group must be able to resist the min:

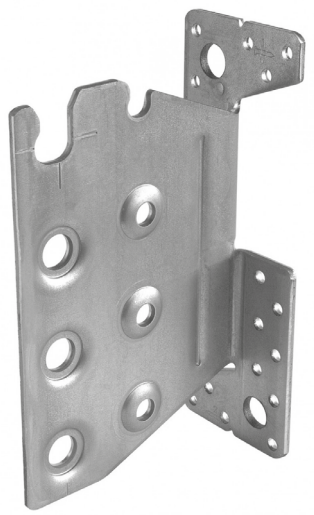
$$R_{bolt,\,ax,\,d} \geq \frac{F_{4,d}\,x\,1{,}44}{b}$$

$R_{bolt,ax,d}$ - the axial design capacity of each anchors
nb - number of anchors
$F_{4,d}$ - design axial load

TUB / TUBS Concealed Beam Hanger

CE ETA 07/0245

SIMPSON Strong-Tie



These concealed hangers ensure a completely invisible assembly. The slot in the head facilitates on-site installation. TUBSL or TUBSR, factory bent, are suitable for skewed applications.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm and steel dowels STD8 lub STD12
- For fastening to concrete - useWA M12-104/5 mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

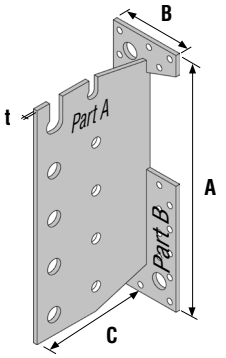
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

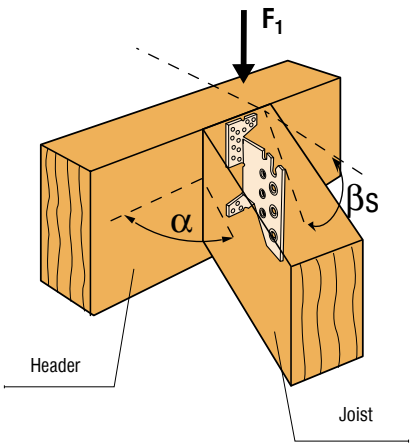
Zn 20 μm | CL.2 | CS | DWG | R30

Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t_1	Part A	Part B
TUB16	134	60	108	3,5	2-Ø8,5; 2-Ø12,5	16-Ø5; 2-Ø13
TUB20	174	60	108	3,5	3-Ø8,5; 3-Ø12,5	20-Ø5; 2-Ø13
TUB24	214	60	108	3,5	4-Ø8,5; 4-Ø12,5	24-Ø5; 2-Ø13
TUB28	254	60	108	3,5	5-Ø8,5; 5-Ø12,5	28-Ø5; 2-Ø13
TUBS16	134	60	108	3,5	2-Ø8,5; 2-Ø12,5	16-Ø5; 2-Ø13
TUBS20	174	60	108	3,5	3-Ø8,5; 3-Ø12,5	20-Ø5; 2-Ø13
TUBS24	214	60	108	3,5	4-Ø8,5; 4-Ø12,5	24-Ø5; 2-Ø13
TUBS28	254	60	108	3,5	5-Ø8,5; 5-Ø12,5	28-Ø5; 2-Ø13



Load scheme beam to beam



Beam to Beam connection (full nailing) $R_{1,k}$

Characteristic capacity - $R_{1,k}$ [kN] nails CNA 4.0 x 50																			
Beam size		Width of support beam [mm]																	
		60	80	100	120	140	160	60	80	100	120	140	160	60	80	100	120	140	160
Model	Skew α	Slope β = 0°						Slope β = 15°						Slope β = 45°					
TUB16	90°	16,7	17,3	18,3	19,7	21,1	22,6	16,1	16,6	17,4	18,6	19,9	21,3	15,1	15,5	16,2	17,0	18,0	19,1
TUB20		25,6	26,5	28,1	30,0	32,2	34,4	24,7	25,4	26,7	28,4	30,3	32,3	23,3	24,0	24,9	26,2	27,7	29,3
TUB24		35,3	36,5	38,5	41,1	43,9	46,8	34,1	35,0	36,7	38,9	41,4	44,1	32,3	33,4	34,6	36,4	38,4	40,5
TUB28		45,5	46,9	49,4	52,6	55,9	59,1	44,1	45,0	47,2	49,9	53,0	56,1	41,9	43,3	44,9	47,1	49,6	52,2
TUBS16	45°	15,4	15,9	16,8	17,9	19,1	20,3	14,9	15,3	16,1	17,0	18,1	19,2	14,1	14,4	14,9	15,6	16,5	17,4
TUBS20		23,6	24,4	25,7	27,3	29,1	30,9	22,9	23,4	24,6	26,0	27,6	29,3	21,6	22,2	23,0	24,1	25,3	26,7
TUBS24		32,7	33,7	35,5	37,6	40,0	42,3	31,7	32,4	33,9	35,8	37,9	40,1	30,0	30,9	31,9	33,4	35,1	36,9
TUBS28		42,3	43,5	45,7	48,4	51,2	53,8	41,0	41,9	43,8	46,2	48,8	51,4	39,0	40,2	41,6	43,4	45,5	47,7

TUB / TUBS Concealed Beam Hanger

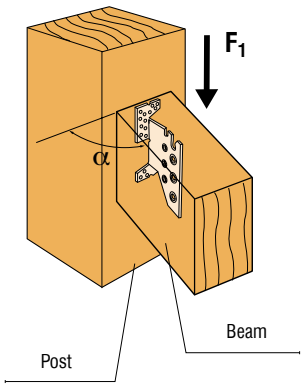
CE ETA 07/0245

SIMPSON Strong-Tie®

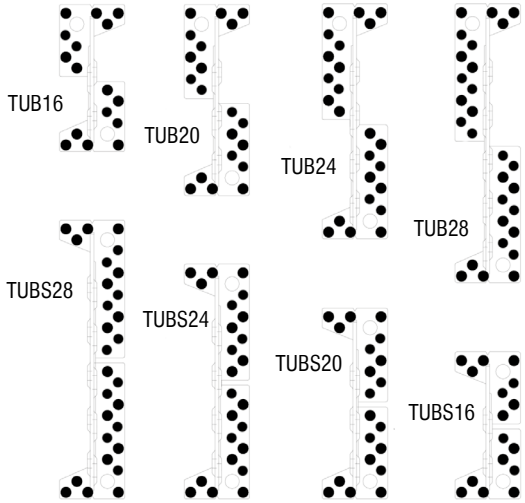
Beam to Post connection (full nailing) $R_{1,k}$

Characteristic capacity - $R_{1,k}$ [kN] nails CNA 4.0 x 50																			
Beam size		Width of support beam [mm]																	
		60	80	100	120	140	160	60	80	100	120	140	160	60	80	100	120	140	160
Model	Skew α	Slope β = 0°						Slope β = 15°						Slope β = 45°					
TUB16	90°	15,2	15,8	16,8	18,1	19,4	20,8	14,6	15,1	16,0	17,1	18,3	19,6	13,7	14,0	14,7	15,5	16,4	17,5
TUB20		21,6	22,3	23,6	25,1	26,4	26,6	20,8	21,4	22,6	24,0	25,4	26,5	19,5	20,0	20,9	22,0	23,2	24,5
TUB24		30,4	31,4	33,0	34,8	35,5	35,5	29,3	30,1	31,6	33,4	35,0	35,5	27,6	28,4	29,5	31,0	32,6	34,1
TUB28		35,3	35,5	35,5	35,5	35,5	35,5	34,6	35,1	35,5	35,5	35,5	35,5	33,0	33,8	34,7	35,5	35,5	35,5
TUBS16	45°	13,9	14,4	15,2	16,2	17,3	18,4	13,5	13,9	14,6	15,5	16,5	17,5	12,7	13,0	13,5	14,2	14,9	15,8
TUBS20		19,7	20,3	21,4	22,3	22,3	22,3	19,1	19,6	20,5	21,7	22,3	22,3	18,1	18,5	19,1	20,0	21,0	22,0
TUBS24		27,6	28,5	29,9	30,3	30,3	30,3	26,8	27,5	28,7	30,3	30,3	30,3	25,3	26,0	26,9	28,1	29,5	30,3
TUBS28		31,9	31,9	31,9	31,9	31,9	31,9	31,9	31,9	31,9	31,9	31,9	31,9	30,5	31,2	31,9	31,9	31,9	31,9

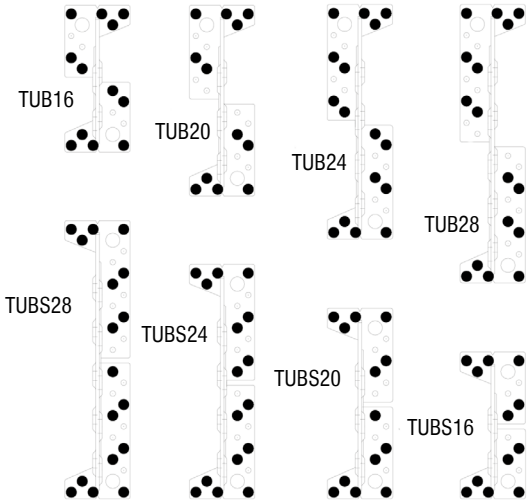
Load scheme beam to post

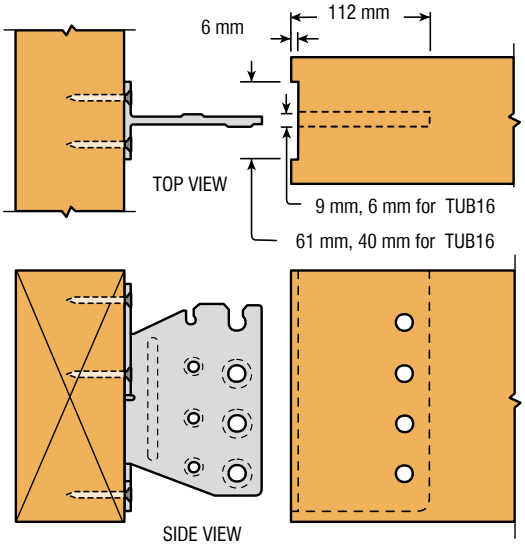


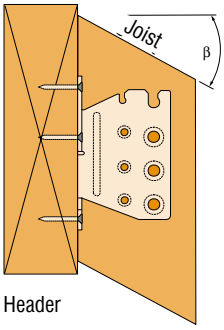
FULL NAILING PATTERN
Beam to Beam connection

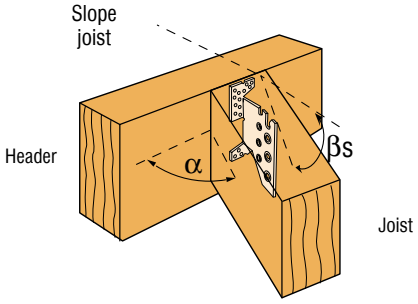


PARTIAL NAILING PATTERN
Beam to Post connection





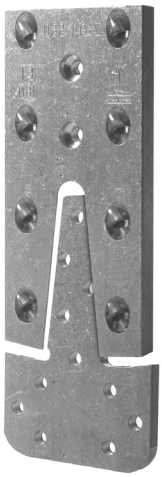




ETB Concealed Beam Hanger

CE ETA 07/0245

SIMPSON Strong-Tie®



The ETB concealed connector is a solution to connecting timber members together without seeing the connector. The ETB concealed connector comes in two parts. The first is pocketed in the header timber and fixed with nails, while the second part is fitted to the end of the beam with screws. The joist can be sloped up to 90° in the vertical level and skewed between 15° and 165° in the horizontal level.

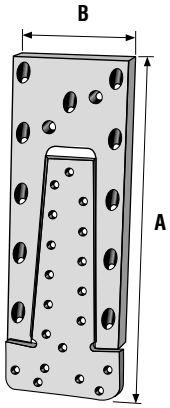
Fixing:

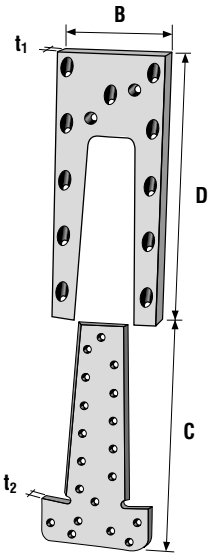
- For fastening to timber – use connector nails CNA4,0 x ℓ mm or screws 5,0x80

Material:

Aluminium EN-WA 6082 T-6

ALU | CL.3 | CS | DWG





Available Sizes

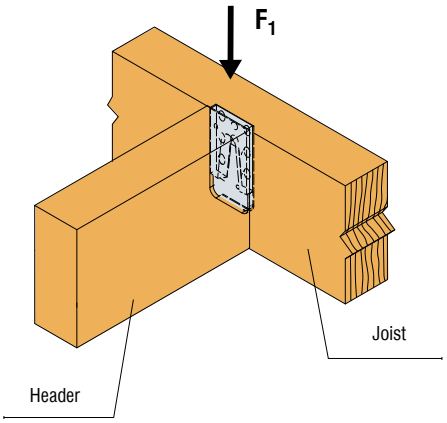
Model No.	Dimensions [mm]						Holes	
	A	B	C	D	t_1	t_2	Part A	Part B
ETB90	90	60	58	69	10	6	6-Ø5	4-Ø5,4
ETB120	121	60	85	95	10	6	9-Ø5	6-Ø5,4
ETB160	166	60	95	130	10	6	11-Ø5	8-Ø5,4
ETB190	195	75	138	165	10	6	19-Ø5	11-Ø5,4
ETB230	230	75	138	200	10	6	19-Ø5	14-Ø5,4

Beam to Beam and Beam to Post connection

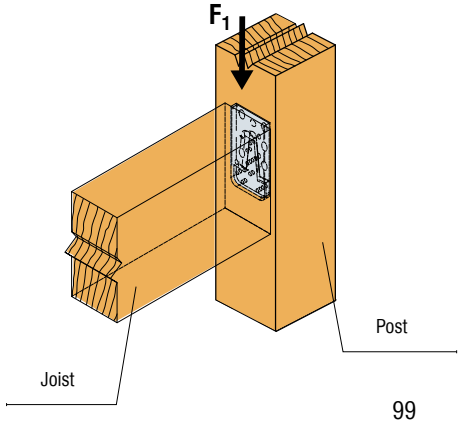
Model No.	Beam		Fixing - Fasteners		Characteristic capacity [kN] $R_{1,k}$ per connection	
	Min. width [mm]	Min.height [mm]	Nails CNA 4,0x60	Screws 5,0 x 80	beam to beam connection	beam to post connection
ETB90	70	110	6 pcs.	4 pcs.	9,6	9,6
ETB120	70	145	9	6	13,8	13,8
ETB160	70	180	11	8	17,8	17,8
ETB190	90	215	19 (12)[1]	11 (9)[1]	23,8	19,8
ETB230	90	250	19 (12)[1]	14 (10)[1]	29,5	21,8

[1] Reduced amount when connecting to post

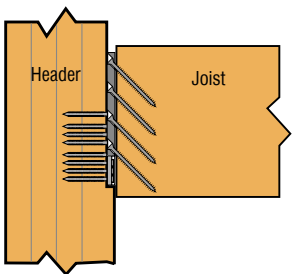
Load scheme beam to beam



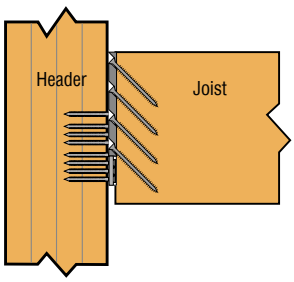
Load scheme beam to post



Fully concealed connection



Standard connection



ETS Concealed Beam Hanger

CE ETA 07/0245

The ETS concealed connector is a solution for connecting timber members together with out seeing the connector. The ETS concealed connector is supplied in two parts, which provide an aesthetically attractive connection for exposed beams and recommended only for internal dry environments.
The use of the installation guide is recommended for a quick and easy installation.
Both connectors should only be used for connecting timber to timber including solid timber, composite timber and glulam.

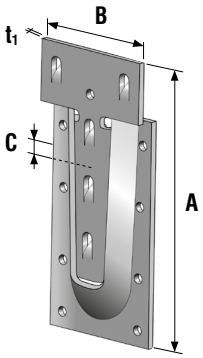
Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



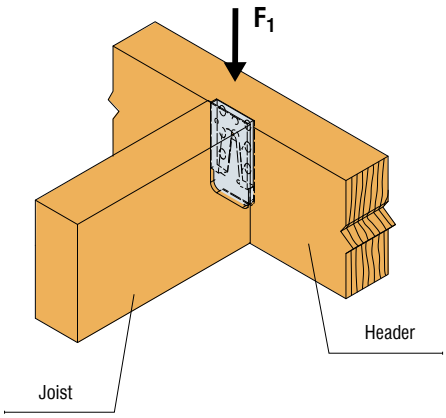
Load scheme
beam to beam

Available Sizes

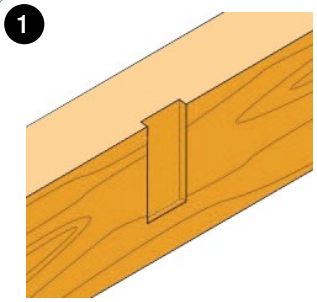
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part A	Part B
ETS100	100	65	12	3,0	1-Ø5; 3-Ø5	4-Ø5,0
ETS140	140	65	12	3,0	1-Ø5; 5-Ø5	8-Ø5,0
ETS180	180	75	12	3,0	1-Ø5; 7-Ø5	10-Ø5,0

Beam to Beam connection

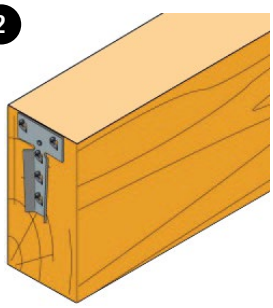
Model No.	Fixing -Fasteners		Characteristic capacity [kN]
	Part A	Part B	$R_{1,k}$
ETS100	3 x 5,0x80 1 x CSA5,0x40	4 x CSA 5,0x40	8,5
ETS140	5 x 5,0x80 1 x CSA5,0x40	8 x CSA 5,0x40	13,8
ETS180	7 x 5,0x80 1 x CSA5,0x40	10 x CSA 5,0x40	18,7



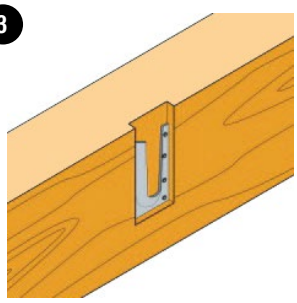
ETS Installation



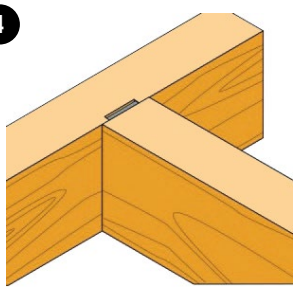
Using the TPS template, make a hole in the main beam to a depth of 12 mm.



Secure the upper part to the secondary beam with a CSA 5.0x40 screw for positioning and screw in the remaining 5.0x80 screws



Fasten the lower part of the hanger in the milled slot using CSA5,0x40 screws



Insert the secondary beam so that you connect Part A with Part B creating an invisible connection.

Connector Selector
software for metal connectors

Connector Selector software:

The Simpson Strong-Tie European Connector Selector is a program that rapidly selects all the connector options for your particular application in whichever country of Europe you are operating. It also includes a wide range of fasteners that are suitable for use in structural connections.
Main Features and Benefits:

- Solutions for a wide range of connectors including key structural products such as Joist and Roof Connectors, Postbases, Angle Brackets and Fasteners
- Available in 6 languages
- Select products for use in up to 30 countries
- Easy graphical user input format
- User friendly with printable design and sales output options
- Capacities are Eurocode 5 compliant (where applicable)
- All products contained in the software are CE marked, with ETA data included (where applicable)
- Connector installation tips and advice provided

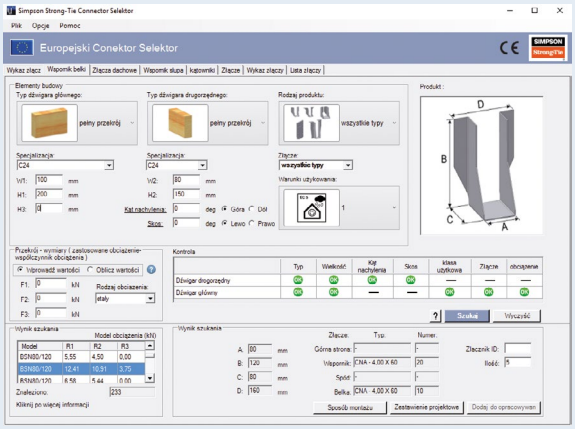
You can download the software to your PC or MAC using the buttons below, or use the online version on this page.

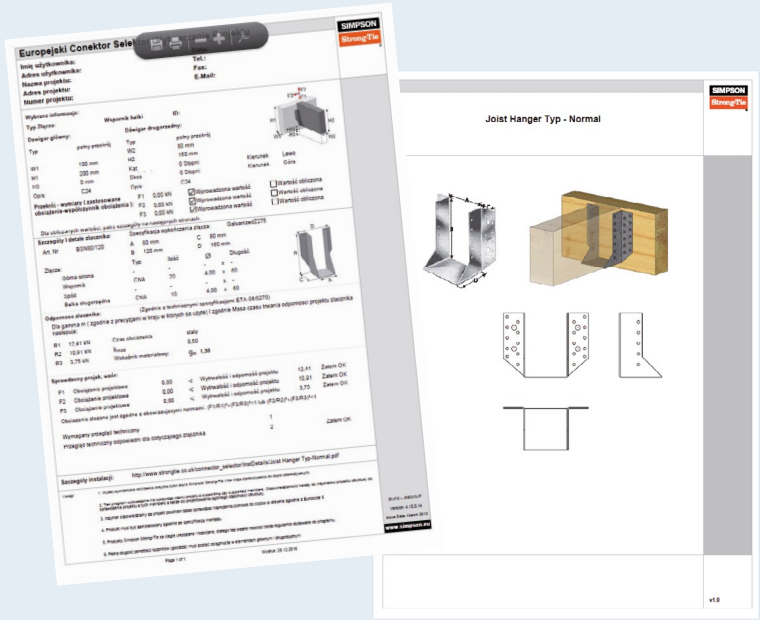
Easy data entry and design

One of the main benefits of Connector Selector is the ease of use. The initial data panel is very easy to use and user friendly. By entering initial data, the designer specifies the following data:

- Base material (timber class),
- Dimension sections,
- Service class,
- Connection geometry
- load.

The entered data will allow you to find the correct connector. From the list of proposed solutions the designer selects the right product meeting the criteria.



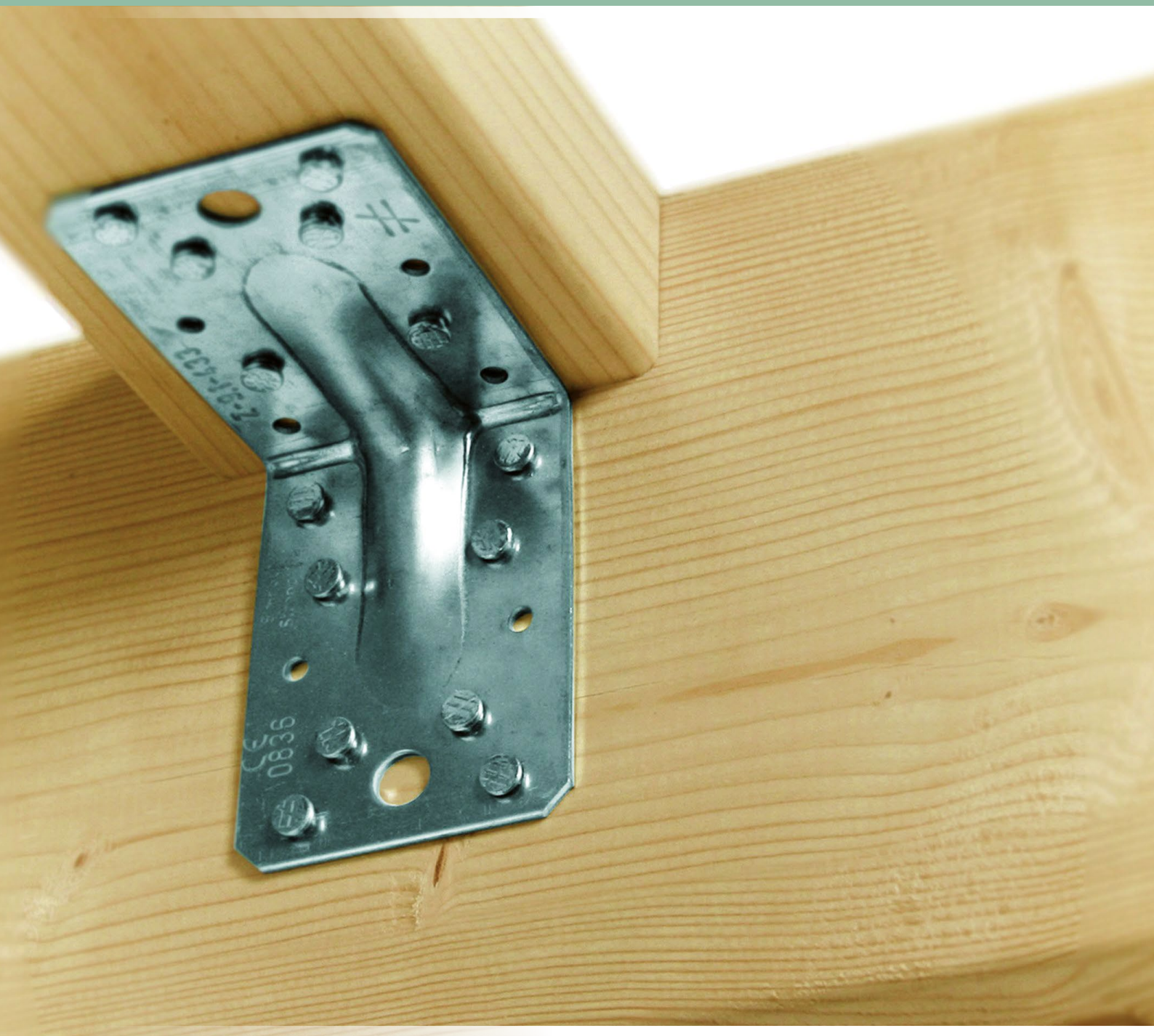


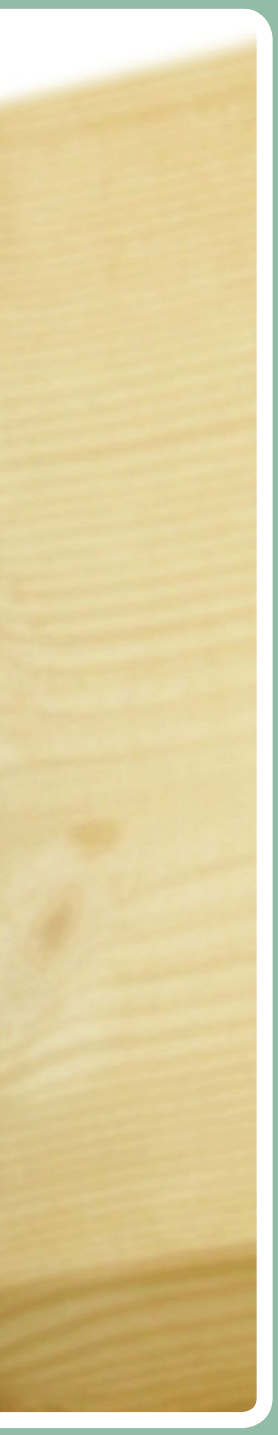
Documentation

The Connector Selector, after analysis, generates computational documentation and product specifications.
The documentation contains the data entered by the designer, checking the ultimate limit state, as well as the information necessary for proper installation.

Angle brackets

reinforced angle brackets, nail plate angle brackets



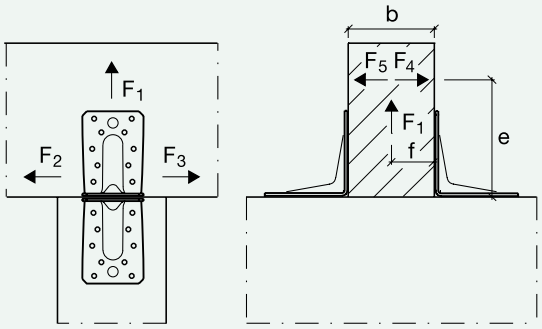


TECHNICAL INFORMATION angle brackets

Application

The angle brackets are used to connect timber elements to other timber elements or rigid support (Concrete or Steel). They are polyvalent and can be used for multiple applications

Forces direction



2 angle brackets per connection

The angle brackets must be placed at each side of the connection, opposite to each other.

F_1 Lifting force acting along the central axis of the joint

F_2 and F_3 Lifting force acting along the central axis of the joint

F_4 and F_5 Lateral force acting in the beam direction along the central axis of the joint but elevated above the beam

1 angle bracket per connection

F_1 Lifting force acting in the central axis of the angle bracket but in a distance from the vertical flange of the angle bracket. If the purlin is prevented from rotation the load-carrying capacity will be half that of a connection with 2 angle brackets

F_2 and F_3 Lateral force acting in the joint between the purlin and the beam in the purlin direction, the purlin have to be prevented from twisting

F_4 Lateral force acting in the beam direction perpendicular to the vertical flange elevated e above the beam directed towards the angle brackets vertical flange

F_5 Lateral force acting in the beam direction perpendicular to the vertical flange elevated above the beam directed away from the angle brackets vertical flange

Basis of Design

In the tables are modified characteristic capacities $R_{i,k.}$

The design capacities are obtained according to the following formula:

$$R_{i,d} = \frac{R_{i,k} \times k_{mod}}{\gamma_M}$$

Calculation of combined loads

In case of a combination of loads, the condition below must be checked:

$$\left(\frac{F_{1,d}}{R_{1,d}}\right)^2 + \left(\frac{F_{2/3}}{R_{2/3}}\right)^2 \leq 1$$

$$\frac{F_{1,d}}{R_{1,d}} + \frac{F_{4/5}}{R_{4/5}} \leq 1$$

F_1 combined with F_2 or F_3 and F_4 or F_5

$$\sqrt{\left(\frac{F_{1,d}}{R_{1,d}} + \frac{F_{4/5}}{R_{4/5}}\right)^2 + \left(\frac{F_{2/3}}{R_{2/3}}\right)^2} \leq 1$$

BASIC SERIES OF REINFORCED ANGLE BRACKET

ABR Classic	ABR Strong	ACR Economic
		
ABR105 ≠ 3,0 mm	**ABR10525 ≠ 2,5 mm**	**ACR105 ≠ 2,0 / 1,5 / 1,2 mm**
		
ABR90 ≠ 2,5 mm	**ABR9020 ≠ 2,0 mm**	**ACR90 ≠ 2,0 / 1,5 / 1,2 mm**
		
ABR70 ≠ 2,0 mm	**ABR7015 ≠ 1,5 mm**	**ACR70 ≠ 1,5 / 1,2 / 1,0 mm**
Classic version of popular angular connectors with reinforcement. High standards of production and high quality of steel, steel sheet thickness of 2.00 ÷ 3.00 mm have been preserved. The multifuncional use of the ABR connector is the most powerful asset of this product. Used for connections that have to carry large forces. They are used in timber to timber and timber to concrete connections.	The new ABR angle brackets are the result of years of hard work and experience from R & D engineers as well as the results of many tests carried in the Simpson Strong-Tie laboratory. The improved and patented reinforcements including the anchor hole and the improved nail hole design make the new ABR angles even more effective than their predecessors. The use of better grade steel (S350) has reduced the effect of sheet thickness reduction and allowed higher load capacity than the well-known ABR Classic series.	The economical version of the classic angle brackets with ribs. Angle brackets are available in versions made of thinner sheets than the classic ABR series. The optimum nail holes arrangement allowed only a slight reduction in the load capacity of the ACR brackets. Series designed for secondary connections or if no connection capacity is required and no need for ABR Classic or ABR Strong.

ABR Classic Reinforced Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie

Heavy angles for general connection of timber at 90° angles. These angle brackets are used for structural connections between timber beams or timber beams and concrete. Reinforced ribs add extra rigidity. Typical application includes fixing trusses, purlins and posts. Materials include solid timber, composite timber and laminated timber.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

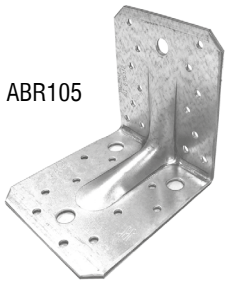
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

ABR70

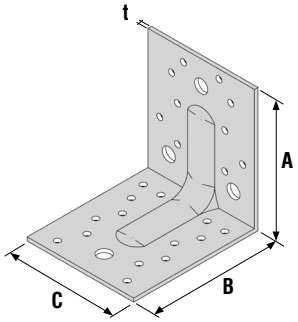
ABR90

ABR105

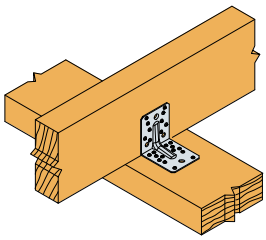


Available Sizes

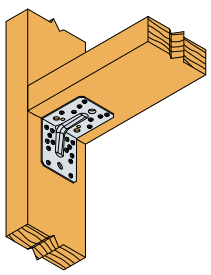
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ABR70	70	70	55	2,0	6-Ø5 1-Ø8,5	6-Ø5 1-Ø8,5
ABR90	90	90	65	2,5	10-Ø5 1-Ø11	10-Ø5 1-Ø11
ABR105	105	105	95	3,0	10-Ø5 3-Ø11	14-Ø5 1-Ø11



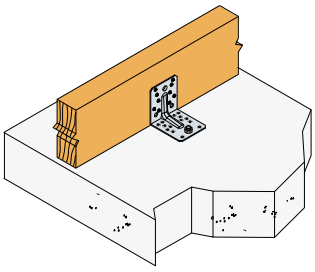
Installation type



Beam to Beam connection



Beam to Post connection



Beam to Concrete connection

ABR Classic Reinforced Angle Brackets

CE ETA 06/0106

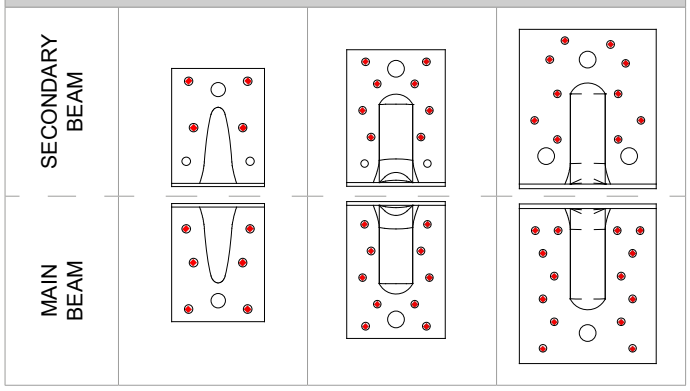
SIMPSON Strong-Tie

Beam to Beam connection (full nailing)

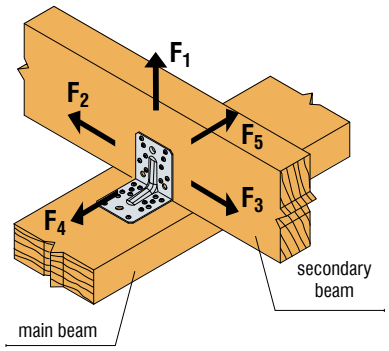
Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABR70	4 pcs.	6 pcs.	CNA4,0x40	5,3	5,0	$3,5/k_{mod}^{0,4}$
ABR90	8 pcs.	10 pcs.	CNA4,0x40	7,9	9,2	$9,2/k_{mod}^{0,75}$
			CNA4,0x60	13,3	11,8	$10,4/k_{mod}^{0,75}$
ABR105	10 pcs.	14 pcs.	CNA4,0x40	10,7	14,5	$13,9/k_{mod}^{0,3}$
			CNA4,0x60	17,8	20,2	$16,4/k_{mod}^{0,75}$

* b=80 i e=120 (more details in ETA)

NSTALLATION PATTERN - FULL NAILING
Beam to Beam connection



Load scheme
beam to beam
2 brackets per connection

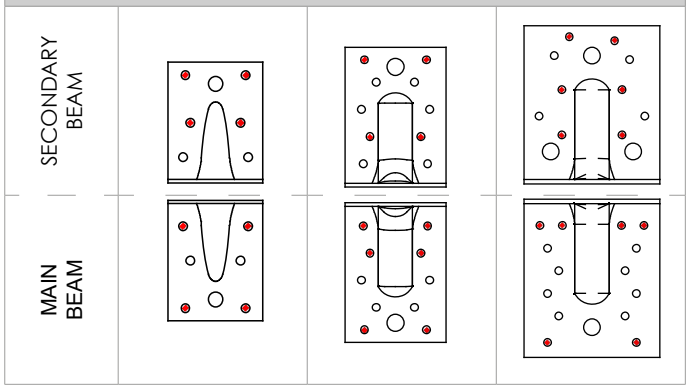


Beam to Beam connection (partial nailing)

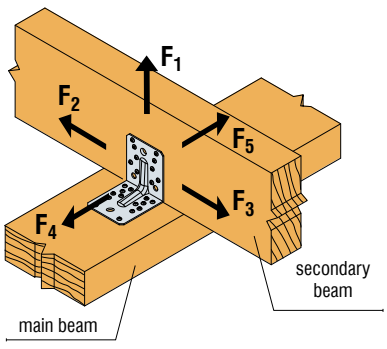
Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2,k}$	$R_{4/5,k}$*
ABR70	4 pcs.	4 pcs.	CNA4,0x40	3,0	4,8	$2,3/k_{mod}^{0,75}$
ABR90	4 pcs.	6 pcs.	CNA4,0x40	5,3	5,7	$7,4/k_{mod}^{0,25}$
			CNA4,0x60	8,8	7,3	$10,5/k_{mod}^{0,25}$
ABR105	6 pcs.	6 pcs.	CNA4,0x40	5,9	7,7	$8,9/k_{mod}^{0,5}$
			CNA4,0x60	9,8	11,6	$12,8/k_{mod}^{0,3}$

* b=80 i e=120 (more details in ETA)

NAILING PATTERN - PARTIAL NAILING
Beam to Beam connection



Load scheme
beam to beam
2 brackets per connection



ABR Classic Reinforced Angle Brackets

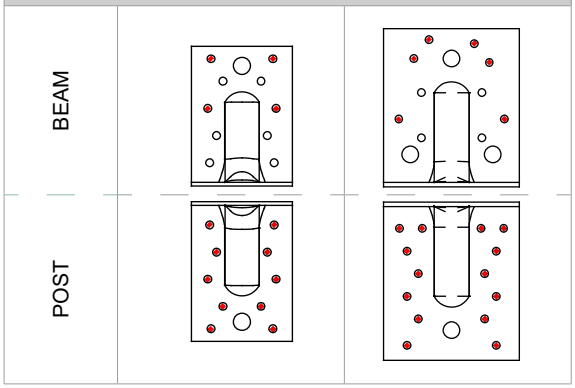
CE ETA 06/0106

SIMPSON Strong-Tie®

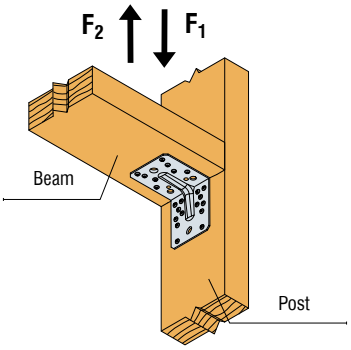
Beam to Post connection

Model No	Fixing - Fasteners			Characteristic capacity [kN] (1 bracket per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2,k}$
ABR90	4 pcs.	10 pcs.	CNA4,0x40	9,0	1,4
			CNA4,0x60	11,0	2,4
ABR105	6 pcs.	14 pcs.	CNA4,0x40	16,0	1,4
			CNA4,0x60	17,0	2,4

NAILING PATTERN
Beam to Post connection



Load scheme
beam to beam
1 bracket per connection

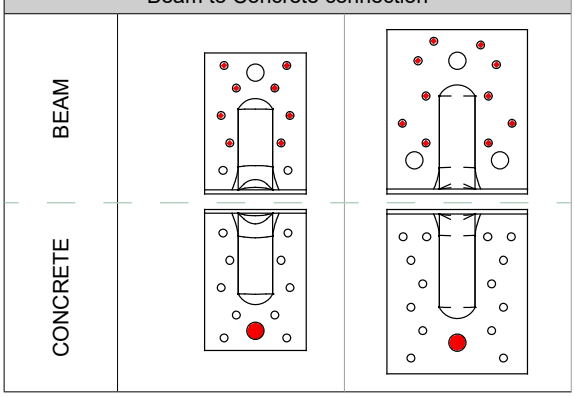


Beam to Concrete connection

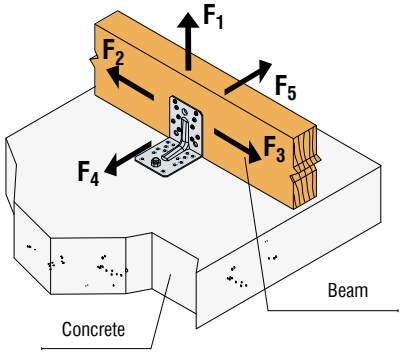
Model No	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABR90	8 x CNA4,0x40	1 x WA-M10	min { 3,7 ; 3,2 / k_{mod} }	1,96	2,20
	8 x CNA4,0x60		min { 6,14 ; 3,2 / k_{mod} }	3,2	2,2
ABR105	10 x CNA4,0x40	1 x WA-M10	min { 4,88 ; 7,7 / k_{mod} }	2,68	4,58
	10 x CNA4,0x60		min { 8,08 ; 7,7 / k_{mod} }	4,37	4,58

e=120 mm; has been incorporated into the pullout strength of the anchor: N = $F_{4/5}$ x e/b

NAILING PATTERN
Beam to Concrete connection

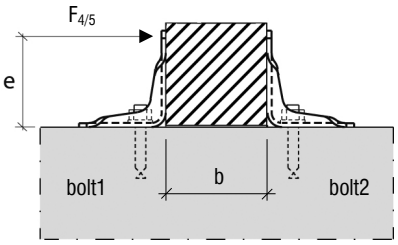


Load scheme
beam to concrete
2 brackets per connection



Modification factor

2 angle brackets per connection with anchor					
Factor	Type	for F_1	for $F_{2/3}$	for $F_{4/5,\ bolt1}$	for $F_{4/5,\ bolt1}$
k_{ax}	ABR90	0,50	-	e / b	0,13
	ABR105	0,50	-	0,5	0,10
k_{lat}	ABR90	-	0,50	-	1,0
	ABR105	-	0,50	-	1,0



For each anchor check the load -carrying capacity:

$V_{Rd} \geq k_{lat} \times F_{i,d}$; $N_{Rd} \geq k_{ax} \times F_{i,d}$; also for combinations load

Example 1

Purlin 100x200mm fixed to the beam, connectors: 2 pieces ABR70

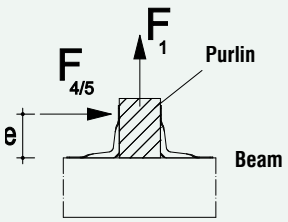
Full nailing CNA 4, 0 x 40

Load: $F_{1d} = 2,1$ kN; $F_{4/5d} = 0,7$ kN; e= 120mm, Service class-2, [K] – medium term load $\Rightarrow k_{mod} = 0,8$

Table value

$R_{1,d} = 5,3 \times 0,8 / 1,3 = 3,3$ kN

$R_{5,d} = (3,5 / 0,8^{0,4}) \times 0,8 / 1,3 = 2,4$ kN



Ultimate limit state: $\frac{2,1}{3,3} + \frac{0,7}{2,4} = 0,93 < 1 \Rightarrow$ ok

Example 2

Purlin 80x160mm fixed to beam, connector: 1 pieces ABR90

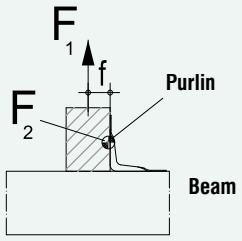
Full nailing CNA 4,0 x 60, f = 35mm, purlin is twisted.

Load: $F_{1,d} = 0,9$ kN; $F_{2,d} = 1,1$ kN, Service class-2, [K] – medium term load $\Rightarrow k_{mod} = 0,8$

Table value from B8 ETA 06/0106.

$R_{1,d} = 145 / (35 + 60) / 1,3 = 1,2$ kN

$R_{2,d} = 2,9 \times 0,8 / 1,3 = 1,8$ kN



Ultimate limit state: $\left(\frac{0,9}{1,2}\right)^2 + \left(\frac{1,1}{1,8}\right)^2 = 0,94 < 1,0 \Rightarrow$ ok

Example 3

Beam 100x200mm fixed to beam, connectors: 2 pieces ABR105

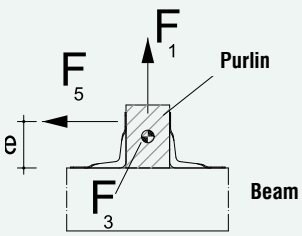
Full nailing CNA 4,0 x 60, e = 120mm

Load: $F_{1,d} = 5,5$ kN; $F_{3,d} = 4,2$ kN; $F_{5,d} = 3,8$ kN, Service class-2, [K] – medium term load $\Rightarrow k_{mod} = 0,9$

$R_{1,d} = 17,8 \times 0,9 / 1,3 = 12,3$ kN

$R_{3,d} = 20,2 \times 0,9 / 1,3 = 14,0$ kN

$R_{5,d} = (16,4 / 0,9^{0,75}) \times 0,9 / 1,3 = 12,3$ kN

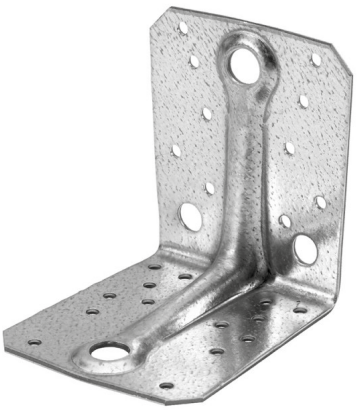


Note: The width of the fixing beam deviates from the boundary values given in the table.
Because the deviation is safe, you can simplify the values in the table.

Ultimate limit state: $\sqrt{\left(\frac{5,5}{12,3} + \frac{3,8}{12,3}\right)^2 + \left(\frac{4,2}{14,0}\right)^2} = 0,81 < 1,0 \Rightarrow$ ok

ABR Strong Reinforced Angle Brackets

CE ETA 06/0106



Heavy angles for general connection of timber at 90° angles. These angle brackets are used for structural connections between timber beams or timber beams and concrete. Reinforced ribs add extra rigidity. Typical application includes fixing trusses, purlins and posts. Materials include solid timber, composite timber and laminated timber.

Fixing:

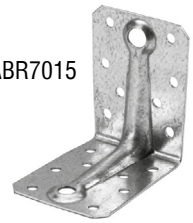
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD / S350GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

ABR7015

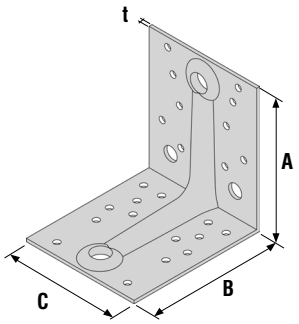


ABR9020

ABR10525

Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ABR7015	70	70	55	1,5	8-Ø5 1-Ø9	8-Ø5 1-Ø7
ABR9020	90	90	65	2,0	10-Ø5 1-Ø13	10-Ø5 1-Ø11
ABR10525	105	105	95	2,5	10-Ø5 2-Ø11 i 1-Ø14	14-Ø5 1-Ø11

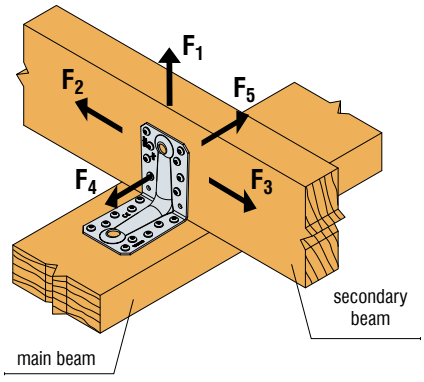


Beam to Beam connection (full nailing)

Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABR7015	6 pcs.	8 pcs.	CNA4,0x35	5,2	6,7	$4,2/k_{mod}^{0,3}$
			CNA4,0x60	6,1	7,3	$4,8/k_{mod}^{0,3}$
ABR9020	8 pcs.	10 pcs.	CNA4,0x35	9,7	9,4	$4,6/k_{mod}^{0,7}$
			CNA4,0x60	14,9	13,0	$5,8/k_{mod}^{0,6}$
ABR10525	10 pcs.	14 pcs.	CNA4,0x35	12,7	10,7	$10,6/k_{mod}^{0,2}$
			CNA4,0x60	29,5	19,7	$13,1/k_{mod}^{0,8}$

* b=80 i e=120 (more details in ETA)

Load scheme
beam to beam
2 brackets per connection



ABR Strong Reinforced Angle Brackets

CE ETA 06/0106

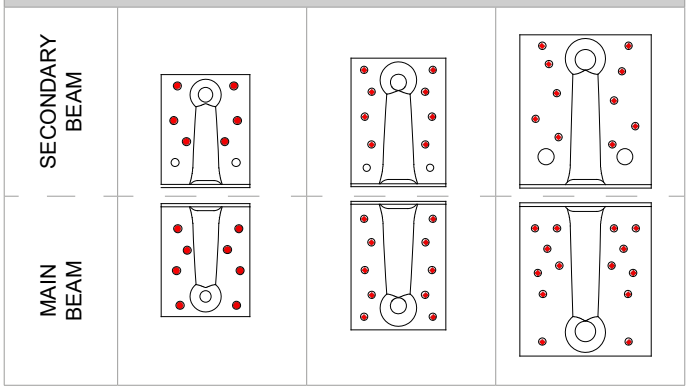
SIMPSON Strong-Tie®

Beam to Beam connection (partial nailing)

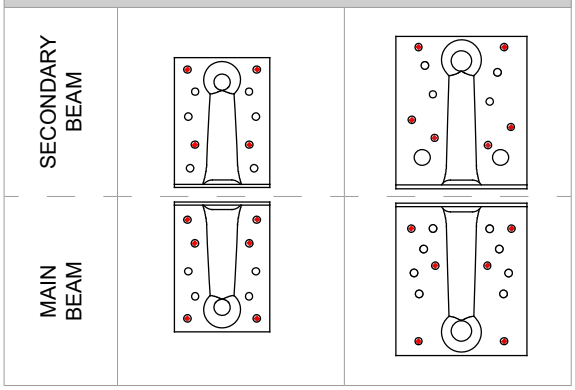
Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABR9020	4 pcs.	6 pcs.	CNA4,0x35	4,9	5,9	$4,6/k_{mod}^{0,7}$
			CNA4,0x60	9,8	8,1	$5,8/k_{mod}^{0,6}$
ABR10525	6 pcs.	6 pcs.	CNA4,0x35	4,8	9,7	-
			CNA4,0x60	9,5	14,3	-

* b=80 i e=120 (more details in ETA)

NAILING PATTERN - FULL NAILING
Beam to Beam connection



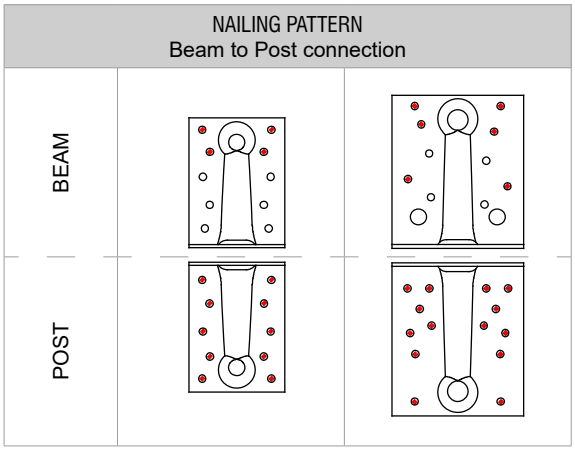
NAILING PATTERN - PARTIAL NAILING
Beam to Beam connection



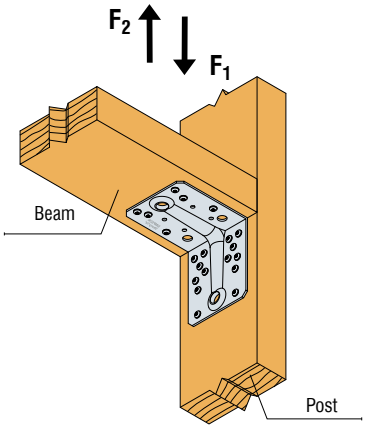
Beam to Post connection

Model No	Fixing - Fasteners			Characteristic capacity [kN] (1 bracket per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2,k}$
ABR9020	4 pcs.	10 pcs.	CNA4,0x35	7,7	1,5
			CNA4,0x60	10,4	2,5
ABR10525	6 szt	14 pcs.	CNA4,0x35	13,7	1,5
			CNA4,0x60	18,3	2,5

NAILING PATTERN
Beam to Post connection



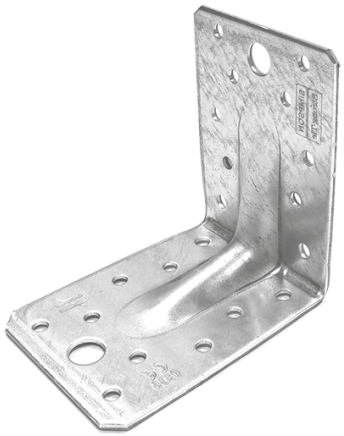
Load scheme
beam / post
1 bracket per connection



ACR Economic Reinforced Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®



ACR angle brackets are lighter and have different material thicknesses. ACR brackets are used for structural connections of a timber at 90° angles. These brackets are fitted with a reinforcement rib for extra rigidity. Typical applications include fixing trusses, purlins and posts. Material includes solid timber, composite timber and laminated timber.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

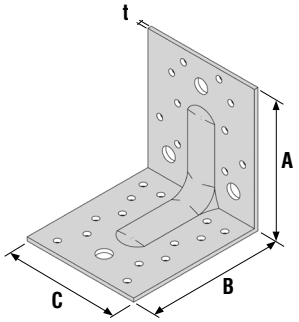
ACR7010
ACR7012
ACR7015

ACR9012
ACR9015
ACR9020

ACR10512
ACR10515
ACR10520

Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ACR7010	70	70	55	1,0	6-Ø5 1-Ø9	6-Ø5 1-Ø9
ACR7012	70	70	55	1,2	6-Ø5 1-Ø9	6-Ø5 1-Ø9
ACR7015	70	70	55	1,5	6-Ø5 1-Ø9	6-Ø5 1-Ø9
ACR9012	90	90	65	1,2	10-Ø5 1-Ø11	10-Ø5 1-Ø11
ACR9015	90	90	65	1,5	10-Ø5 1-Ø11	10-Ø5 1-Ø11
ACR9020	90	90	65	2,0	10-Ø5 1-Ø11	10-Ø5 1-Ø11
ACR10512	105	105	95	1,2	10-Ø5 3-Ø11	14-Ø5 1-Ø11
ACR10515	105	105	95	1,5	10-Ø5 3-Ø11	14-Ø5 1-Ø11
ACR10520	105	105	95	2,0	10-Ø5 3-Ø11	14-Ø5 1-Ø11



ACR Economic Reinforced Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

ACR70... Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
ACR7010	6 pcs.	6 pcs.	CNA4,0x35	2,2	-
ACR7012	6 pcs.	6 pcs.	CNA4,0x35	3,2	-
ACR7015	6 pcs.	6 pcs.	CNA4,0x40	5,3	5,0

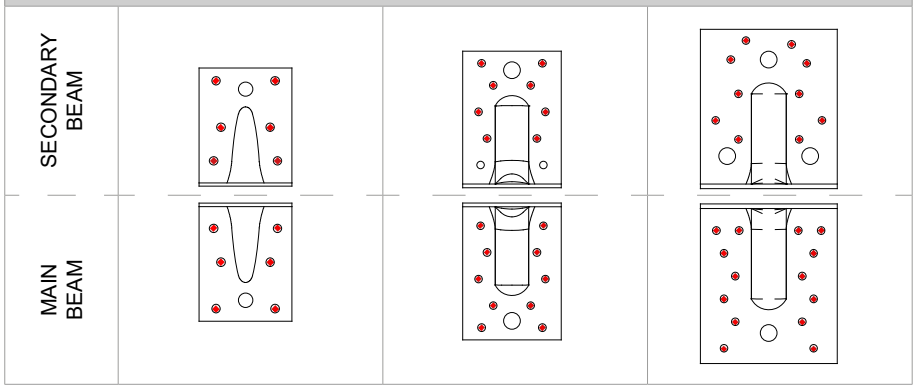
ACR90... Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
ACR9012	8 pcs.	10 pcs.	CNA4,0x35	7,9	-
ACR9015	8 pcs.	10 pcs.	CNA4,0x35	8,9	-
ACR9020	8 pcs.	10 pcs.	CNA4,0x40	8,0	9,3

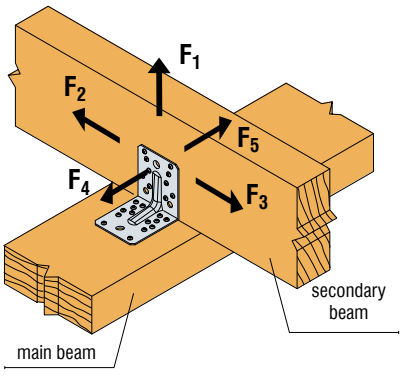
ACR105... Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
ACR10512	10 pcs.	14 pcs.	CNA4,0x35	10,9	-
ACR10515	10 pcs.	14 pcs.	CNA4,0x35	13,0	-
ACR10520	10 pcs.	14 pcs.	CNA4,0x40	10,8	14,5

NAILING PATTERN
Beam to Beam connection



Load scheme
beam to beam
2 brackets per connection



ACRL Reinforced Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie

ACRL angle bracket is used to create a sliding connection support whilst maintaining the static performance during construction. The M10 bolt in the obround hole allows for horizontal displacement. This product is dedicated to prefabricated roof trusses with a static beam design that is freely supported. A great advantage of the angle bracket is the possibility of using to a timber wallplate or concrete ring (Holes Ø11)

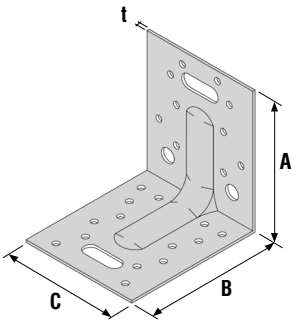
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG



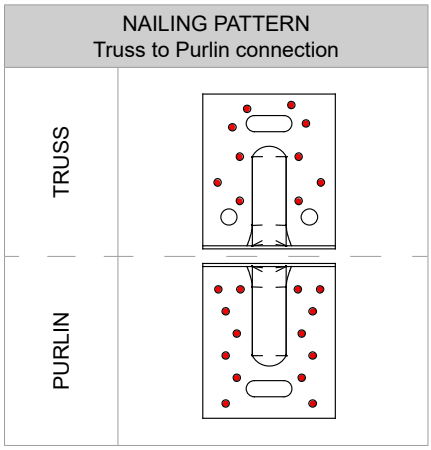
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ACRL10520	105	105	95	2,0	10-Ø5 1-Ø11x31; 2-Ø11	14-Ø5 1-Ø11x31

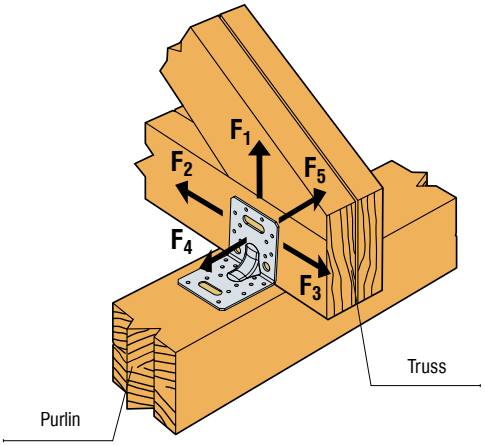
Truss to Purlin connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$
ACRL10520	10 pcs.	14 pcs.	CNA4,0x40	10,8	14,5	$\min \begin{cases} \frac{12{,}7b}{k_{mod}^{0,7}} + 565 / k_{mod} \\ e - 10{,}7 \\ 14{,}1 / k_{mod}^{0,25} \end{cases}$
			CNA4,0x60	17,9	20,3	$\min \begin{cases} \frac{15{,}6b}{k_{mod}^{0,6}} + 565 / k_{mod} \\ e - 10{,}7 \\ 21{,}2 / k_{mod}^{0,15} \end{cases}$

NAILING PATTERN
Truss to Purlin connection



Load scheme
truss / purlin
2 brackets per connection



ACRL Reinforced Angle Brackets

CE ETA 06/0106

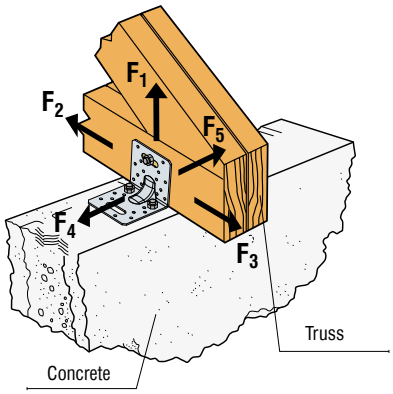
SIMPSON Strong-Tie

Truss to Concrete connection

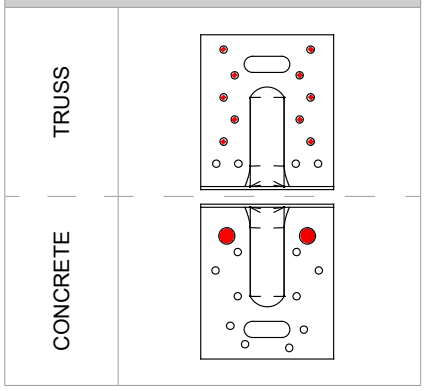
Model No.	Fixing		Fasteners	Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B		$R_{1,k}$	$R_{2/3,k}$*
ACRL10520	10 x CNA4,0x40	2 WA-M10	Schemat 1	27,6	11,7
	10 x CNA4,0x40	2 WA-M10	Schemat 2	11,7	7,0
	1 x ŚRUBA M10	2 WA-M10	Schemat 3	7,5*	PRZESUW

* The bolt resistance must be calculated using the Eurocode 5 § 8.2.3 and consider only failure mode (j) and (k).

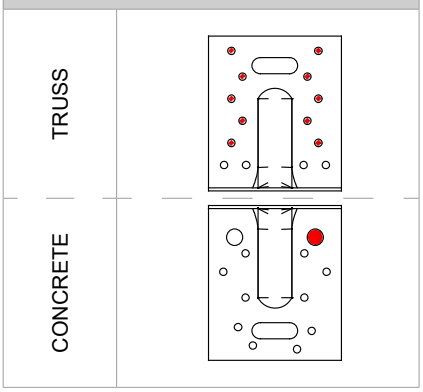
Load schema
truss / concrete
2 brackets per connection



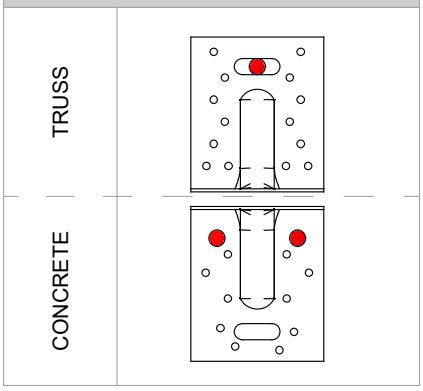
INSTALLATION-1
Truss to Concrete connection



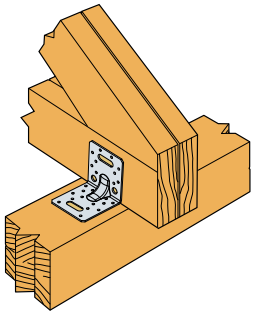
INSTALLATION-2
Truss to Concrete connection



INSTALLATION-3
Truss to Concrete connection

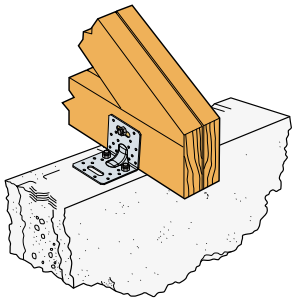


Truss to purlin connection
The ACRL10520 brackets are used to create the non-sliding joint and sliding joint in beam to beam connection. The method of support is determined by the designer of the roof structure. As a rule, one support is sliding and the other is non-sliding. The non-slidig support is obtained by nailing the truss with nails CNA4.0x40 according to the nailing pattern, to previously mounted angle brackets. The sliding support is obtained by mounting the truss to the angles with the M10 metric bolt. The bolt should be placed in the center of the oblong hole to allow the truss to move.



Truss to concrete connection
Angles ACRL 10520 are connectors for mounting prefabricated roof trusses directly into the concrete beam. Fixing the truss with CNA 4.0x40 nails is a non-slaiding support (figure on the left). The connection of the angle bracket to the concrete beam takes place using the mechanical anchor WA. Use of the M10 bolt (in the absence of nailing the truss) creates a sliding support.

NOTE: Make sure that the angle is turned with the right arm towards the support. Correct assembly is one that allows you to secure as close as possible to the truss. This rule applies to both timber and concrete beam installation. This ensures optimum performance



ABRL Reinforced Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

ABRL angle bracket is used to create a sliding connection support whilst maintaining the static performance during construction. The M13 bolt in the obround hole allows for horizontal displacement. This product is dedicated to prefabricated roof trusses with a static beam design that is freely supported. A great advantage of the angle bracket is the possibility of using to a timber wallplate or concrete ring (Holes Ø13)

- ABRL98 extends the line of sliding angles (ACRL10520, E5 / 2). Compared to the ACRL10520 angle, the following modifications have been made:increased steel thickness up to 3.0 mm.
- larger holes (Ø13) for anchors (M12)
- bigger and longer hole for adjusting the travel (13.5x40mm) for the through screw (M12)

Fixing:

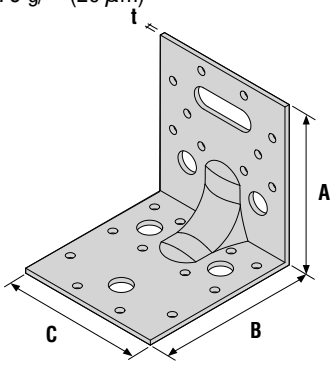
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

NEW

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



Available Sizes

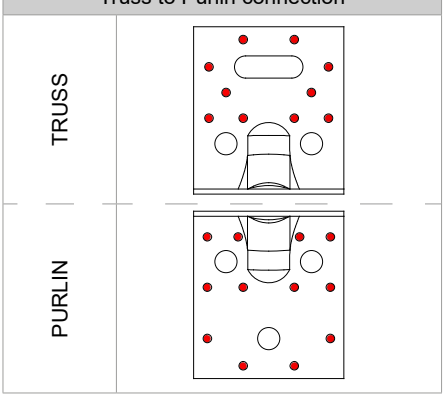
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ABRL98	98	98	88	3,0	10-Ø5 2-Ø13; 1-Ø13,5x40	12-Ø5 3-Ø13

Truss to Purlin connection (full nailing)

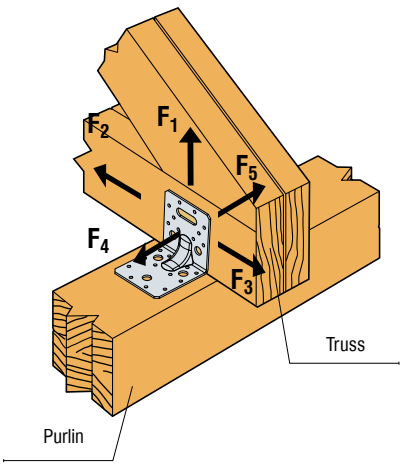
Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABRL98	10 pcs.	12 szt	CNA4,0x40	11,8	13,7	13,9
			CNA4,0x60	19,7	19,8	14,9

* b=60mm, e=100mm, (more details in ETA)

NAILING PATTERN - FULL NAILING
Truss to Purlin connection



Load scheme
truss to purlin
2 brackets per connection



ABRL Reinforced Angle Brackets

CE ETA 06/0106

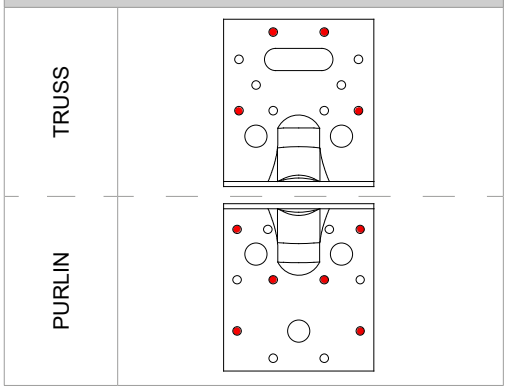
SIMPSON Strong-Tie®

Truss to Purlin connection (partial nailing)

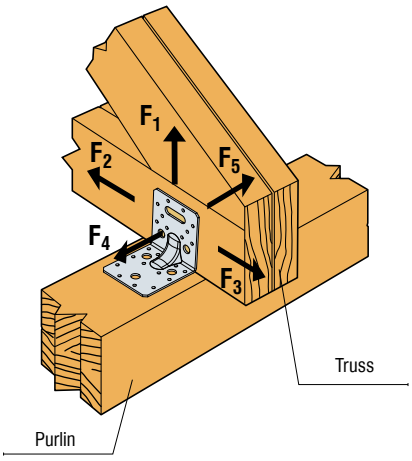
Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABRL98	4 pcs.	6 pcs.	CNA4,0x40	7,0	6,9	11,8
			CNA4,0x60	10,8	9,7	13,6

* b=60mm, e=100mm, (more details in ETA)

NAILING PATTERN - PARTIAL NAILING
Truss to Purlin connection



Load scheme
truss to purlin
2 brackets per connection

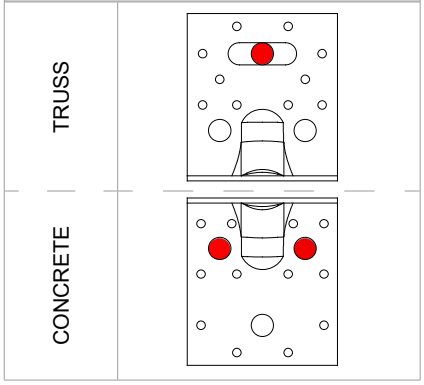


Truss to Concrete connection

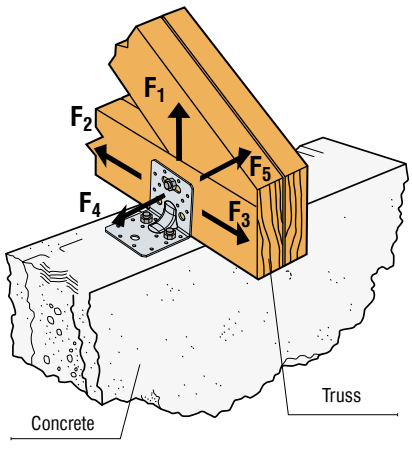
Model No.	Fixing		Characteristic capacity [kN] (2 brackets per connection)
	Part - A	Part - B	$R_{1,k}$
ABRL98	1 x Bolt M12	2 WA-M12**	17,3*

* k_{mod} = 1,0 for all load duration classes
** For each anchor, check: $R_{bolt,\,ax,\,d} \geq 0,5 \times F_{1,d}$

NAILING PATTERN
Truss to Concrete connection



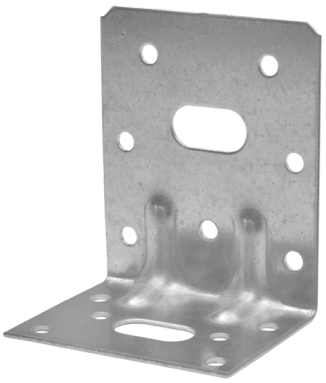
Load scheme
truss to concrete2 brackets per connection



E5/2 Reinforced Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®



E5 angle brackets are used for connecting timber at 90° angles. These angles are fitted with small reinforcement ribs. They can be used in connections between timber beams or between timber beams and concrete. Typical applications include timber frame houses. E5 angle brackets can be applied on solid timber, composite timber and laminated timber.

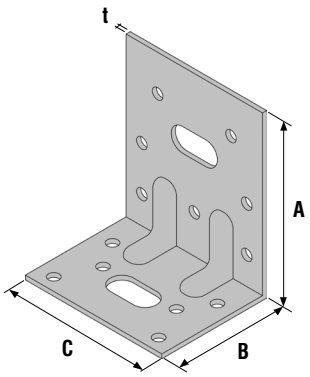
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



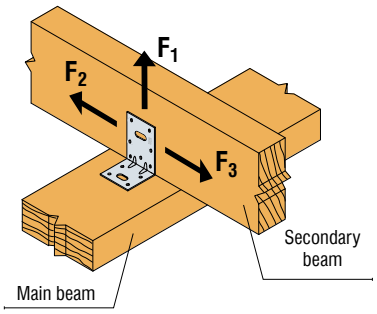
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
E5/2	75	65	48	2,0	7-Ø5 1-Ø11x22	6-Ø5 1-Ø11x22

Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E5/2	7-Ø5	6-Ø5	CNA4,0x40	7,1	9,8
			CNA4,0x60	10,7	13,8

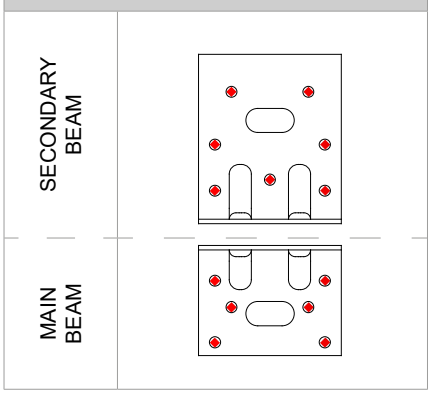
Load scheme
beam to beam
2 brackets per connection



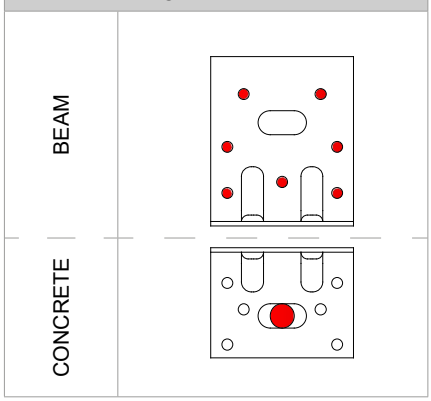
Beam to Concrete connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E5/2	7-Ø5	6-Ø5	CNA4,0x40	8,4	6,9
			CNA4,0x60	8,4	10,1

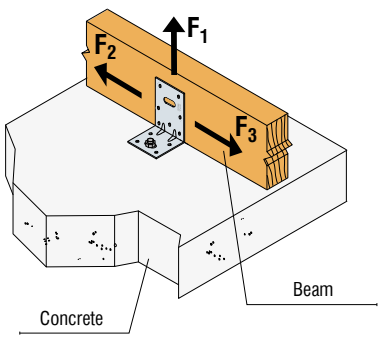
NAILING PATTERN
Beam to Beam connection



NAILING PATTERN
Beam to Concrete connection



Load scheme
beam to concrete
2 brackets per connection



AB Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

Angles for general connecting of timber at 90° angles. These angle brackets are used for structural connections between timber beams. Typical applications include fixing trusses and posts. Suitable support material includes solid timber, composite timber, laminated timber and trusses.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

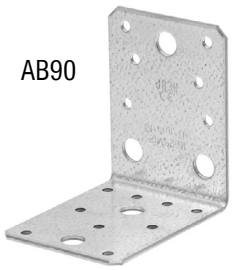
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

AB70

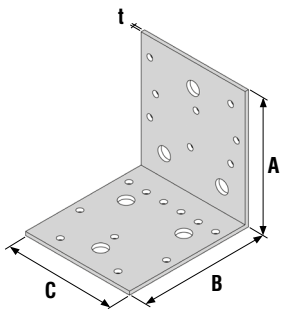
AB90



AB105

Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AB70	70	70	55	2,0	4-Ø5 2-Ø8,5	7-Ø5 1-Ø8,5
AB90	90	90	65	2,5	6-Ø5 3-Ø11	9-Ø5 2-Ø11
AB105	105	105	95	3,0	8-Ø5 3-Ø11	11-Ø5 3-Ø11

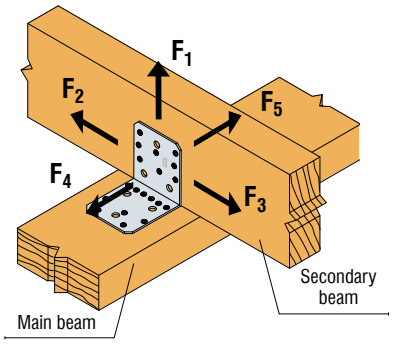


Beam to Beam connection (full nailing)

Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AB70	4 pcs.	7 pcs.	CNA4,0x40	$3,9/k_{mod}^{0,3}$	5,3	$1,6/k_{mod}^{0,3}$
AB90	6 pcs.	9 pcs.	CNA4,0x40	$5,1/k_{mod}^{0,3}$	7,1	$2,2/k_{mod}^{0,3}$
			CNA4,0x60	$\min\begin{cases}7,5/k_{mod}^{0,3}\\6,9/k_{mod}\end{cases}$	10,4	$\min\begin{cases}3,1/k_{mod}^{0,5}\\2,9/k_{mod}\end{cases}$
AB105	8 pcs.	11 pcs.	CNA4,0x40	$8,5/k_{mod}^{0,3}$	13,3	$3,8/k_{mod}^{0,3}$
			CNA4,0x60	$12,7/k_{mod}^{0,3}$	18,1	$5,4/k_{mod}^{0,3}$

* b=80 i e=120 (more details in ETA)

Load scheme
beam to beam
2 brackets per connection



AB Angle Brackets

CE ETA 06/0106

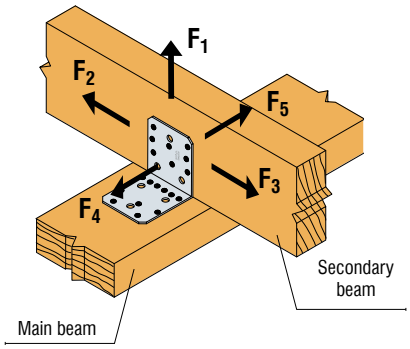
SIMPSON Strong-Tie®

Beam to Beam connection (partial nailing)

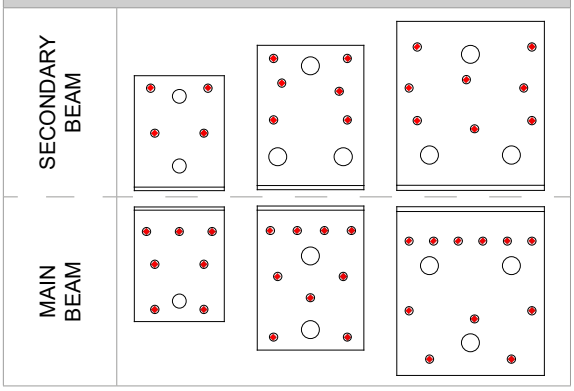
Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AB70	2 pcs.	3 pcs.	CNA4,0x40	$3,9/k_{mod}^{0,3}$	3,8	$1,6/k_{mod}^{0,3}$
AB90	4 pcs.	4 pcs.	CNA4,0x40	$3,1/k_{mod}^{0,3}$	5,5	$1,4/k_{mod}^{0,5}$
			CNA4,0x60	$4,4/k_{mod}^{0,3}$	7,3	$1,9/k_{mod}^{0,3}$
AB105	4 pcs.	5 pcs.	CNA4,0x40	8,8	4,0	$3,8/k_{mod}^{0,3}$
			CNA4,0x60	$12,7/k_{mod}^{0,3}$	7,5	$5,4/k_{mod}^{0,3}$

* b=80 i e=120 (more details in ETA)

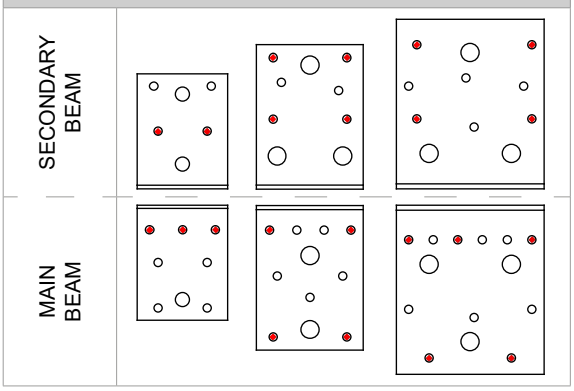
Load scheme
beam to beam
2 brackets per connection



NAILING PATTERN - FULL NAILING
Beam to Beam connection



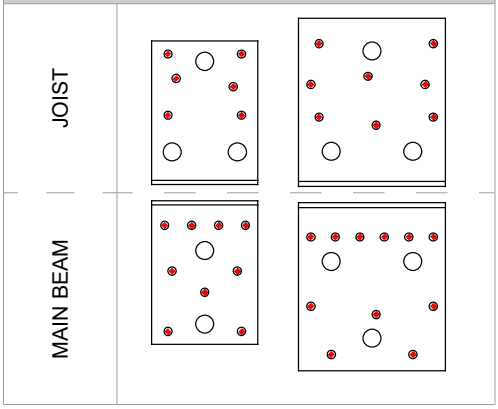
NAILING PATTERN - PARTIAL NAILING
Beam to Beam connection



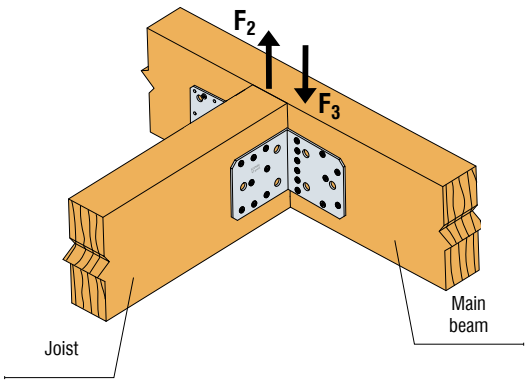
Beam to Beam connection (ceiling)

Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{2,k}$	$R_{3,k}$
AB90	6 pcs.	9 pcs.	CNA4,0x40	7,2	7,2
			CNA4,0x60	10,2	10,2
AB105	8 pcs.	11 pcs.	CNA4,0x40	13,3	13,3
			CNA4,0x60	18,1	18,1

NAILING PATTERN
Beam to Beam connection (ceiling)



Load scheme
beam to beam (ceiling)
2 brackets per connection



AB Angle Brackets

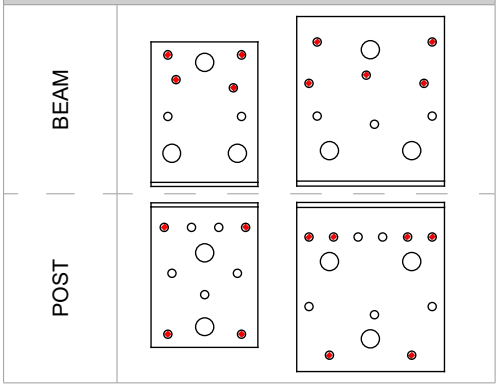
CE ETA 06/0106

SIMPSON Strong-Tie®

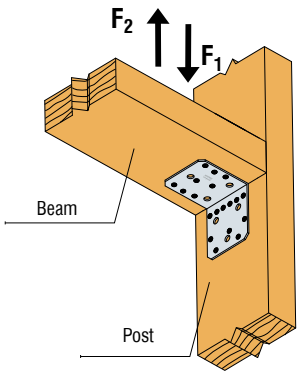
Beam to Post connection

Model No	Fixing - Fasteners			Characteristic capacity [kN] (1 bracket per connection)		
	Part - A	Part - B	Type	Flange turned upwards $R_{1,k}$	Flange turned downwards $R_{1,k}$	$R_{2,k}$
AB90	4 pcs.	4 pcs.	CNA4,0x40	$4,0/k_{mod}^{0,75}$	$5,2/k_{mod}^{0,5}$	$0,7/k_{mod}$
AB105	5 pcs.	6 pcs.	CNA4,0x40	$8,1/k_{mod}^{0,75}$	$\min \begin{cases} 10,0 \\ 9,8/k_{mod} \end{cases}$	$1,4/k_{mod}$
			CNA4,0x60		$9,4/k_{mod}^{0,6}$	

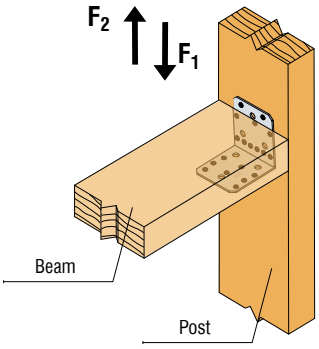
NAILING PATTERN
Beam to Post connetion



Load scheme
beam / post
Flange turned downwards



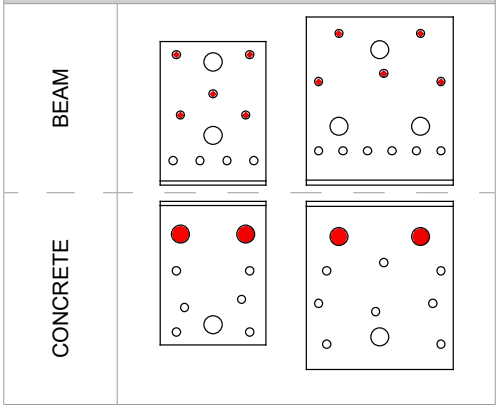
Load scheme
beam / post
Flange turned upwards



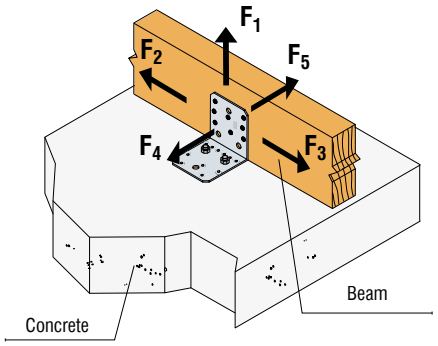
Beam to Concrete connection

Model No	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$
AB90	5 x CNA4,0x40	2 x WA-M10	$5,4/k_{mod}$	5,03	2,0
	5 x CNA4,0x60	2 x WA-M10	$5,4/k_{mod}$	6,66	2,0
AB105	5 x CNA4,0x40	2 x WA-M10	$\min \begin{cases} 13,76 \\ 11,30/k_{mod} \end{cases}$	5,18	4,5
	5 x CNA4,0x60	2 x WA-M10	$\min \begin{cases} 19,76 \\ 11,30/k_{mod} \end{cases}$	6,85	4,5

NAILING PATTERN
Beam to Concrete connection



Load scheme
beam to concrete
2 brackets per connection

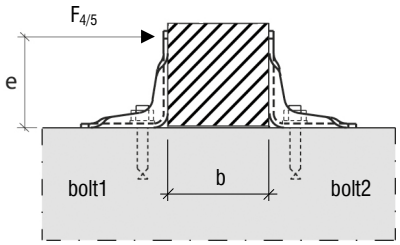


AB Angle Brackets

ETA 06/0106

Modification factor

2 angle brackets per connection with anchor					
Factor	Type	for F_1	for $F_{2/3}$	for $F_{4/5,\ bolt1}$	for $F_{4/5,\ bolt1}$
k_{ax}	AB90	0,77	-	1,53e / b	0,33
	AB105	0,79	-	1,58e / b	0,47
k_{lat}	ABR90	-	-	-	1,0
	ABR105	-	-	-	1,0

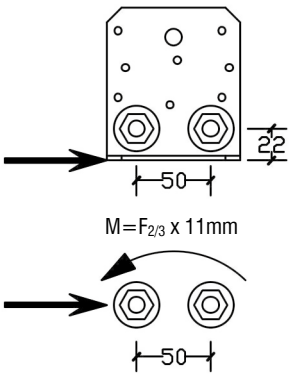


For each bolt group it s needed to check:

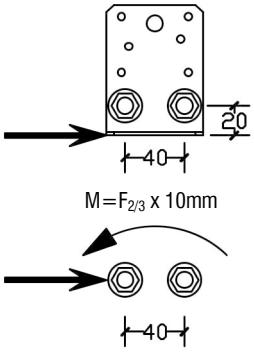
$V_{Rd} \geq k_{lat} \times F_{i,d}$; $N_{Rd} \geq k_{ax} \times F_{i,d}$; also for combinations load

The connection with the bolts has to be checked as following

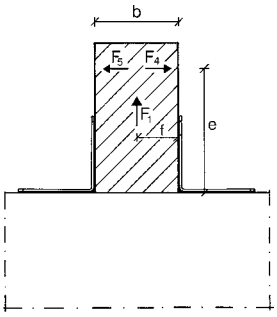
for AB105

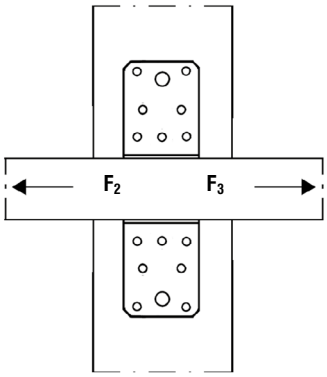


for AB90



Pattern connection beam to beam





Example:

Purlin 80x160mm fixed to beam, connectors: 2 pieces AB90

Full nailing CNA4, 0x60

Load: $F_{1,d}$ = (4,1 kN; $F_{2/3,d}$ = 3,4 kN, e = 120 mm,

Service class-2, [K] – medium term load $\Rightarrow k_{mod} = 0,8$

Table value

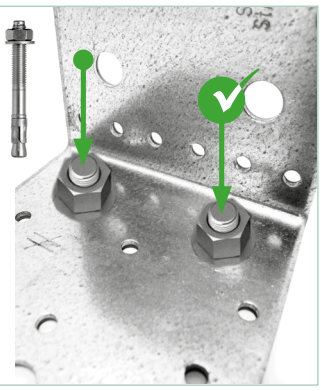
$$R_{1,d} = \min\begin{cases}(7,5 / 0,8^{0,3}) \times 0,8 / 1,3 \\ 6,9 / 0,8 / 1,3\end{cases} = \min\begin{cases}4,9\,kN \\ 6,6\,kN\end{cases} = 4,9kN$$

$R_{2/3,d}$ = 10,4 x 0,8 /1,3 = 6,4 kN

Ultimate limit state: $\left(\frac{4,1}{4,9}\right)^2 + \left(\frac{3,4}{6,4}\right)^2 = 0,98 < 1 \Rightarrow$ ok

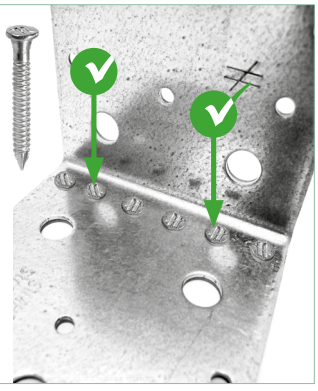
BEAM to CONCRETE CONNECTION

For proper connection of the timber element to concrete, fill holes the closest bend line of the angle bracket.



BEAM to BEAM CONNECTION

For connection two timber elements use AB105,and fill holes the closest bend line of the angle.



AE Angle Brackets

ETA 06/0106

AE 48, 76 and 116 have small rib reinforcements. These angle brackets are used for structural connections between timber beams. The brackets may also be used for connecting timber structures to concrete, light concrete and masonry. Can be used in many applications requiring 90° fixing.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

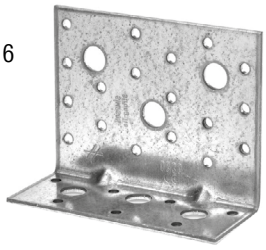
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

AE48

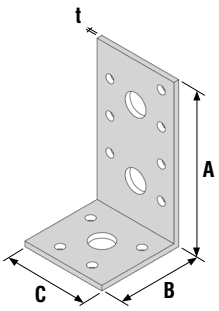
AE76

AE116



Available Sizes

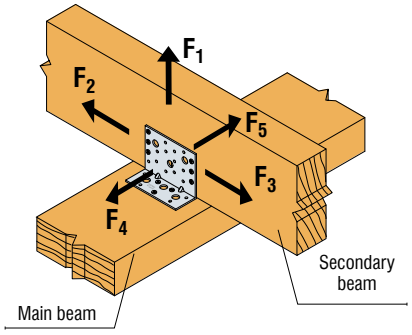
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AE48	90	48	48	3,0	7-Ø5 2-Ø13	4-Ø5 1-Ø13
AE76	90	48	76	3,0	12-Ø5 3-Ø13	4-Ø5 1-Ø13
AE116	90	48	116	3,0	17-Ø5 3-Ø13	7-Ø5 3-Ø13



Beam to Beam connection (full nailing)

Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AE48	6 - 7** pcs.	4 pcs.	CNA4,0x40	3,0	4,0	$1,3/k_{mod}^{0,25}$
			CNA4,0x60	4,9	6,0	$2,0/k_{mod}^{0,25}$
AE76	7 pcs.	7 pcs.	CNA4,0x40	5,9	11,8	$2,9/k_{mod}^{0,25}$
			CNA4,0x60	9,8	17,3	$4,2/k_{mod}^{0,25}$
AE116	12 - 14** pcs.	7 pcs.	CNA4,0x40	5,9	19,1	$3,2/k_{mod}^{0,25}$
			CNA4,0x60	9,8	26,5	$4,7/k_{mod}^{0,25}$

Load scheme
beam to beam
2 brackets per connection



* b = 80 i e = 120, for other values see ETA

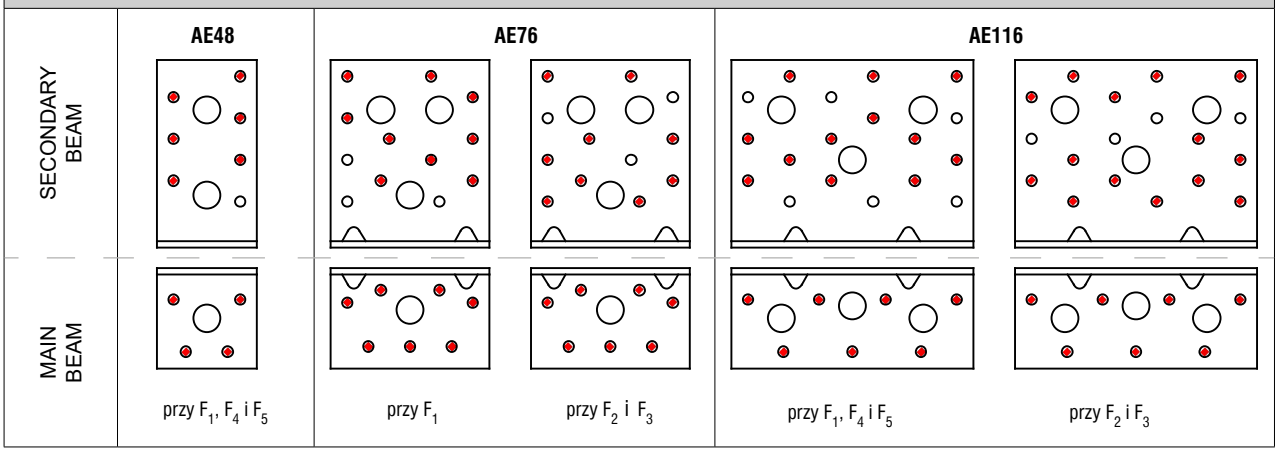
If the joined element is not twisted, you can accept half values from the connection table. (one angle bracket per connection) If the purlin is twisted and for other forces F_4 and F_5 are different distances b and e, further information can be obtained from the ETA.

AE Angle Brackets

ETA 06/0106

SIMPSON Strong-Tie®

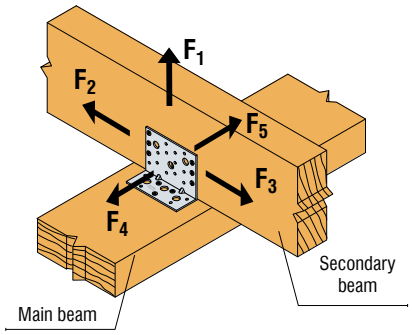
NAILING PATTERN FULL NAILING
Beam to Beam connection



Beam to Beam connection (partial nailing)

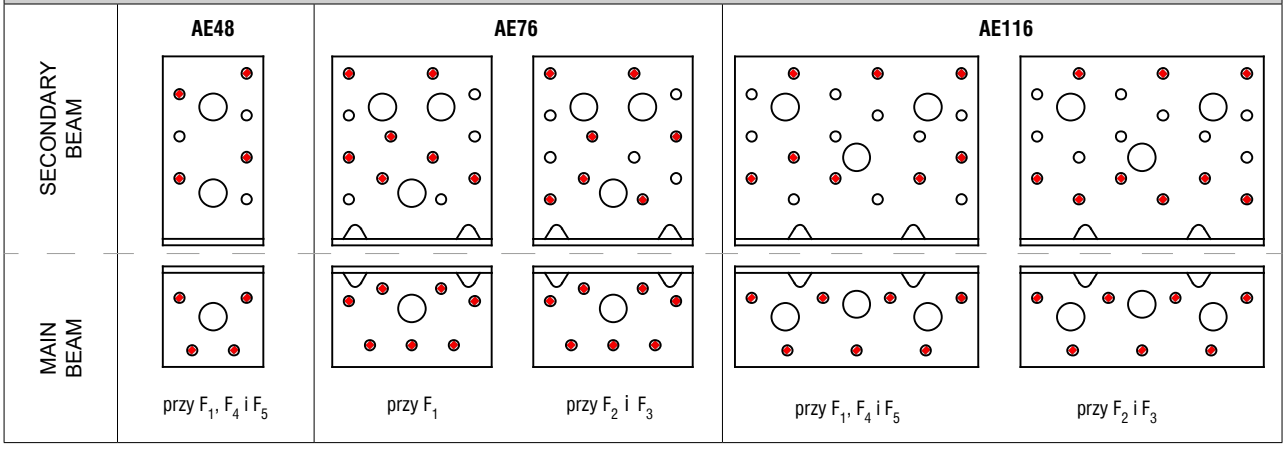
Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AE48	4 pcs.	4 pcs.	CNA4,0x40	3,0	4,0	$1,3/k_{mod}^{0,25}$
			CNA4,0x60	4,9	5,4	$2,0/k_{mod}^{0,25}$
AE76	7 pcs.	7 pcs.	CNA4,0x40	5,9	10,5	$2,9/k_{mod}^{0,25}$
			CNA4,0x60	9,8	15,3	$4,2/k_{mod}^{0,25}$
AE116	8 - 9** pcs.	7 pcs.	CNA4,0x40	5,9	16,6	$3,2/k_{mod}^{0,25}$
			CNA4,0x60	9,8	22,6	$4,7/k_{mod}^{0,25}$

Load scheme
beam to beam
2 brackets per connection



* b=80 i e=120 (for other values see ETA)
** See nailing pattern

NAILING PATTERN - PARTIAL NAILING
Beam to Beam connection



AE Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

Beam to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AE48	6-7* x CNA 4,0x40	1 x WA-M12	min: $\{14.9 ; 12.6/k_{mod}\}$	2,1	min: $\{4.9 ; 4.2/k_{mod}\}$
	6-7* x CNA 4,0x60	1 x WA-M12	$12.6/k_{mod}$	3,5	min: $\{4.9 ; 4.2/k_{mod}\}$
AE76	9 x CNA4,0x40	1 x WA-M12	min: $\{22.7 ; 16.8/k_{mod}\}$	7,5	$3.0/k_{mod}^{0.25}$
	9 x CNA 4,0x60	1 x WA-M12	$16.8/k_{mod}$	11,8	$4.5/k_{mod}^{0.25}$
AE116	11-14* x CNA 4,0x40	2 x WA-M12	25,1	25,5	$8.7/k_{mod}^{0.25}$
	11-14* x CNA 4,0x60	2 x WA-M12	min: $\{38.1 ; 28.1/k_{mod}\}$	28,4	$10.1/k_{mod}^{0.25}$

* b=80 i e=120 (for other values see ETA)

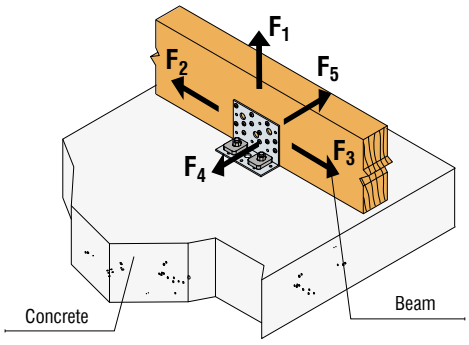
Modification factor

2 angle brackets per connection with anchor					
Factor	Type	for F_1	for $F_{2/3}$	for $F_{4/5,\ bolt1}$	for $F_{4/5,\ bolt1}$
k_{ax}	AE48	0,64	-	1,30e / (b + 7)	-
	AE76	0,54	-	1,08e / (b + 7)	-
	AE116	0,65	-	1,24e / (b + 7)	-
k_{lat}	Wszystkie z serii	-	0,50	-	1,0

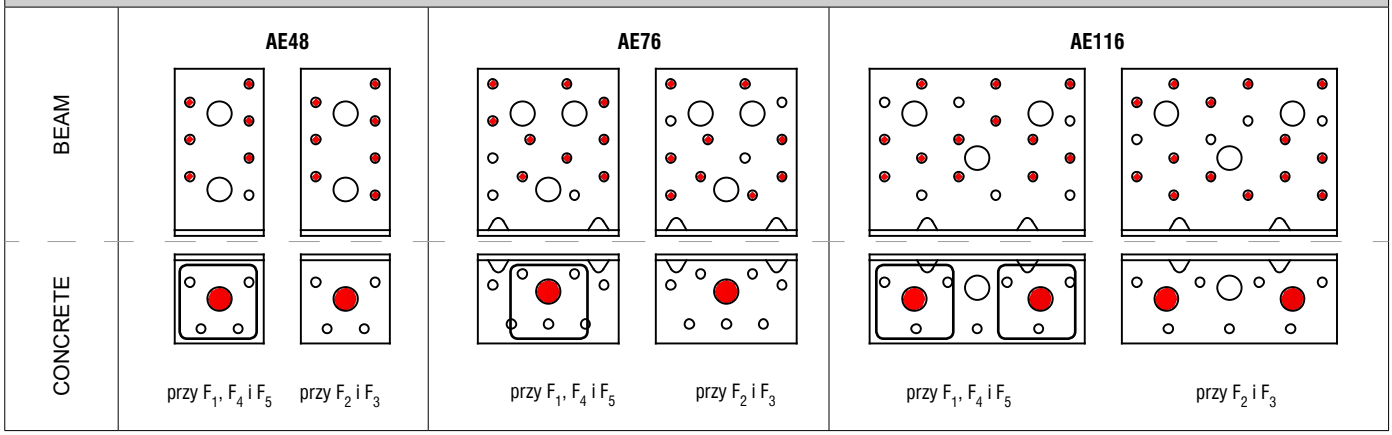
For each bolt group it s needed to check:

$V_{Rd} \geq k_{lat} \times F_{i,d}$; $N_{Rd} \geq k_{ax} \times F_{i,d}$; also for combinations load

Load scheme
beam to concrete
2 brackets per connection



NAILING PATTERN
Beam to Concrete connection

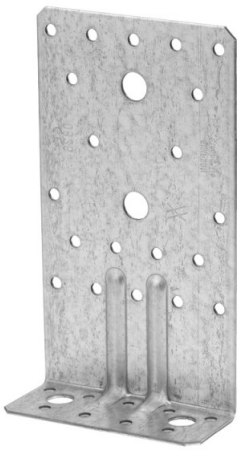


For the force F_1 or $F_{4/5,}$ you must use washers US40/40/10G or US40/50/10G under each anchor
For a force of $F_{2/3}$ no need for additional washers US.

ABR170 i ABR220 Large Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®



The ABR170 and ABR220 angle brackets series is an extension of the range of reinforced brackets. It is a perfect supplement to the range of ABR series angles. Thanks to its large dimensions, various perforations (also Holes for bolts and anchors), the use of these angles is very wide.

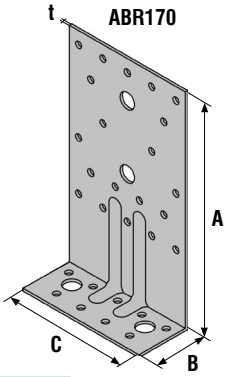
Fixing:

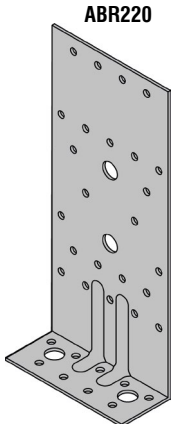
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG





Available Sizes

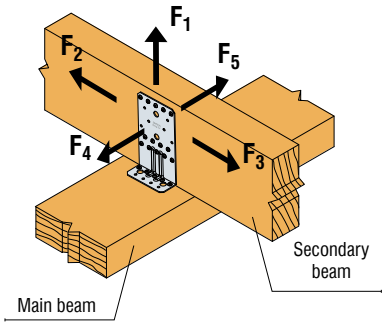
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ABR170	170	40	95	2,0	20-Ø5 2-Ø12	9-Ø5 2-Ø12
ABR220	220	40	95	2,0	24-Ø5 2-Ø12	9-Ø5 2-Ø12

Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABR170	14 pcs.	9 pcs.	CNA4,0x40	7,4	16,4	9,6 / $k_{mod}^{0,2}$
			CNA4,0x60	11,4 / $k_{mod}^{0,2}$	21,1	
ABR220	14 pcs.	9 pcs.	CNA4,0x40	7,4	16,4	9,6 / $k_{mod}^{0,2}$
			CNA4,0x60	11,4 / $k_{mod}^{0,2}$	21,1	

* sizes b=80 i e=120

Load scheme
beam to beam
2 brackets per connection

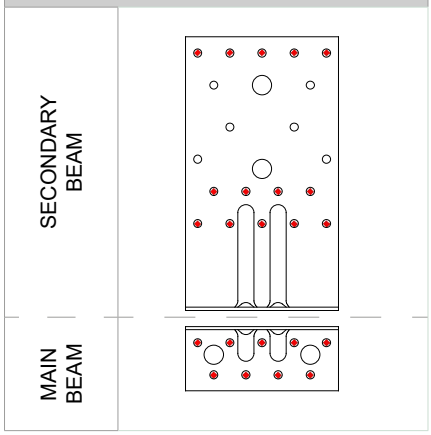


Beam to Concrete connection

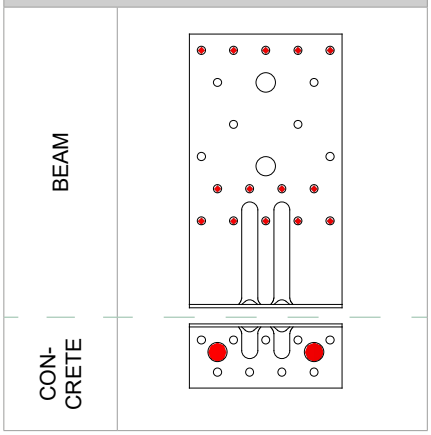
Model No.	Fixing - Fasteners		Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$
ABR170 ABR220	14 pcs. CNA4,0x50	2 pcs. WA-M10	min: {33,0; 25,2 / k_{mod}}	19,7	min { 9,15 + 80/e*k_{mod} ; 6,3 x b / e x k_{mod} }

* e ≥ 50 mm

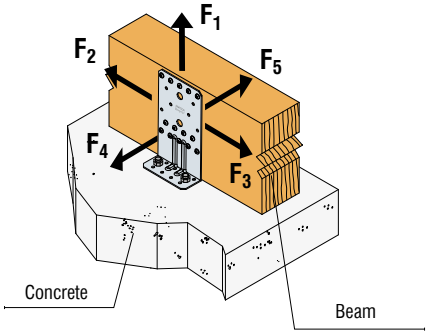
NAILING PATTERN
Beam to Beam connection



NAILING PATTERN
Beam to Concrete connection

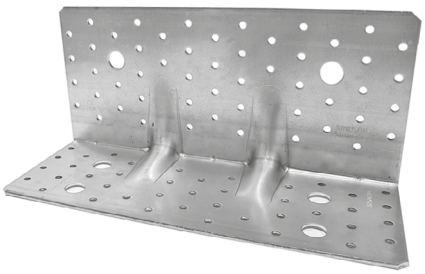


Load scheme
beam to concrete
2 brackets per connection



ABR255 Large Reinforced Angle Bracket

CE ETA 06/0106



Reinforced angle bracket ABR255 has been especially developed to fix CLT panels on timber or concrete support. Very versatile, it is particularly resistant to shear loads thanks to its optimized geometry

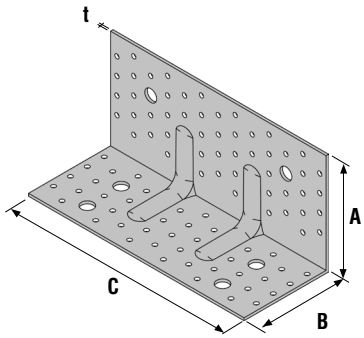
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

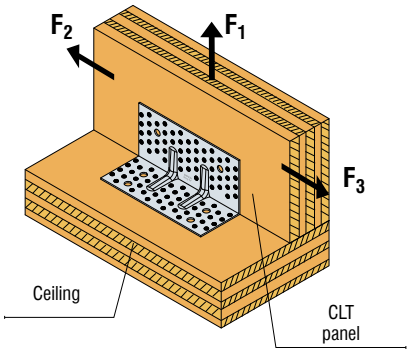
Zn 20 μm | CL.2 | CS | DWG



Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ABR255	120	40	95	3,0	52-Ø5 2-Ø14	41-Ø5 4-Ø14

Load scheme
CLT panel to ceiling
1 bracket per connection



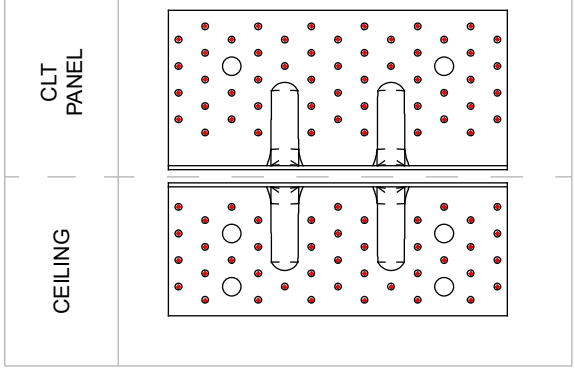
CLT panel to Ceiling (full nailing)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (1 bracket per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
ABR255	52 pcs.	41 pcs.	CNA4,0x50	18,8	45,9

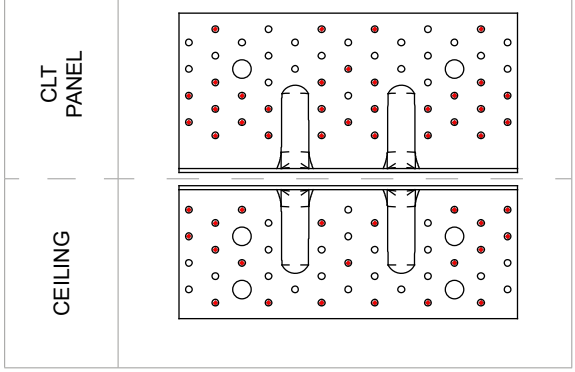
CLT panel to Ceiling (partial nailing)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (1 bracket per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
ABR255	30 pcs.	23 pcs.	CNA4,0x50	15,9	38,0

NAILING PATTERN - FULL NAILING
CLT panel to Ceiling connection



NAILING PATTERN - PARTIAL NAILING
CLT panel to Ceiling connection



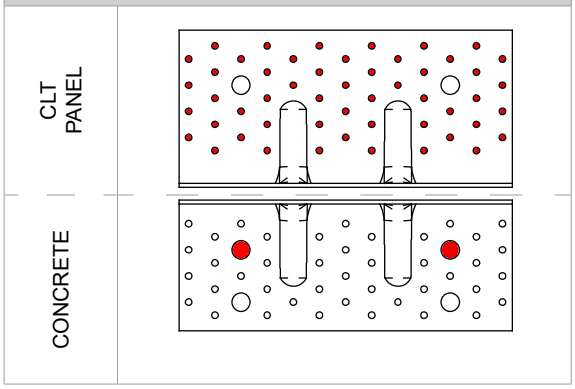
ABR255 Large Reinforced Angle Bracket

CE ETA 06/0106

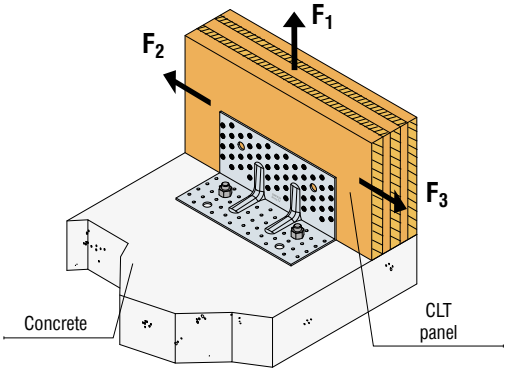
CLT panel to Concrete connection (full nailing)

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)	
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$
ABR255	52 x CNA4,0x50	2 x WA-M12	20,0	37,0

NAILING PATTERN - FULL NAILING
CLT panel to Concrete



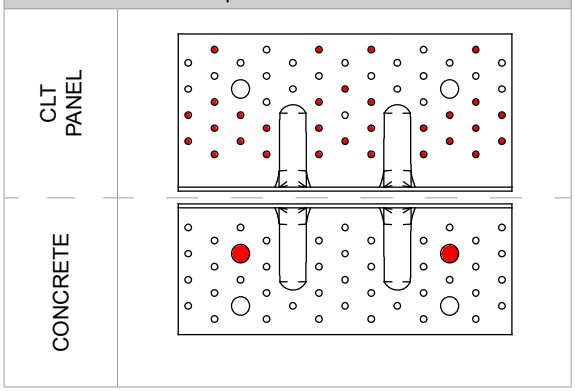
Load scheme
CLT panel to concrete
1 bracket per connection



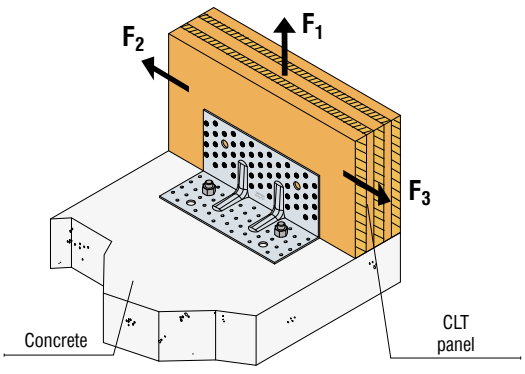
CLT panel to Concrete connection (partial nailing)

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)	
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$
ABR255	30 x CNA4,0x50	2 x WA-M12	20,0	28,3

NAILING PATTERN - PARTIAL NAILING
CLT panel to Concrete



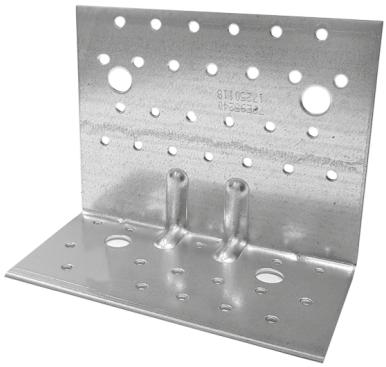
Load scheme
CLT panel to concrete
1 bracket per connection



AG922 Large Reinforced Angle Bracket

CE ETA 06/0106

SIMPSON Strong-Tie®



The largest angle bracket from the group of reinforced brackets, designed to carry very heavy loads. It can be used in timber-timber as well as timber-concrete connection. Thanks to its size and load capacity, it is used in buildings manufactured in CLT technology.

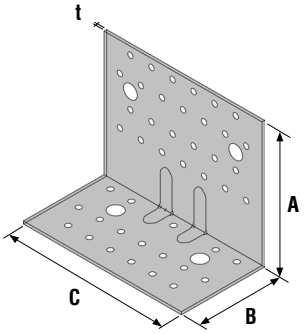
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

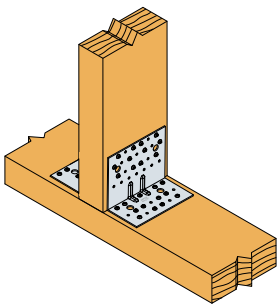
Zn 20 μm | CL.2 | CS | DWG



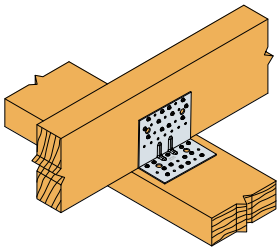
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AG922	121	79	150	2,5	26-Ø5 2-Ø13	18-Ø5 2-Ø13

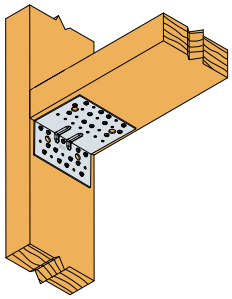
Examples of applications



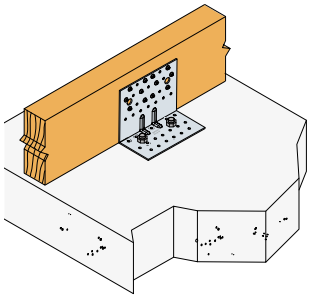
Post to Purlin connection



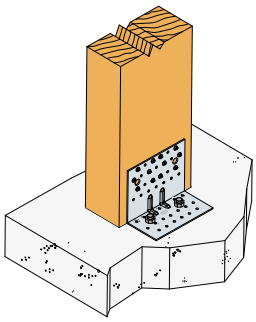
Beam to Beam connection



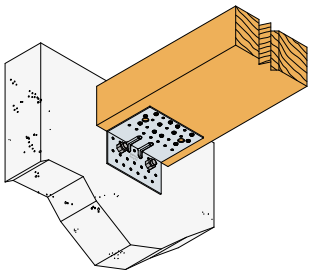
Beam to Post connection



Beam to Concrete connection



Post to Concrete connection



Beam to Concrete connection

AG922 Large Reinforced Angle Bracket

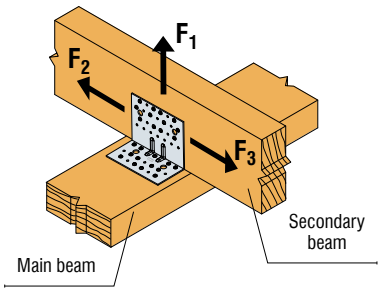
CE ETA 06/0106

SIMPSON Strong-Tie

Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
AG922	16 pcs.	13 pcs.	CNA4,0x50	18,5	29,5

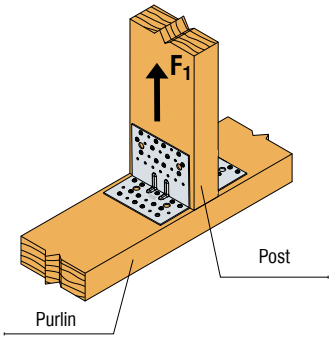
Load scheme
beam to beam
2 brackets per connection



Post to Purlin connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)
	Part - A	Part - B	Type	$R_{1,k}$
AG922	12 pcs.	13 pcs.	CNA4,0x50	19,5

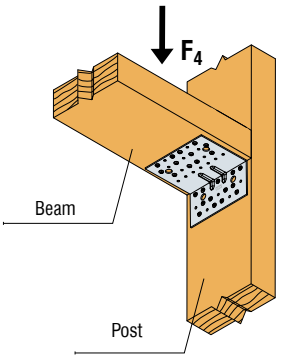
Load scheme
post to purlin
2 brackets per connection



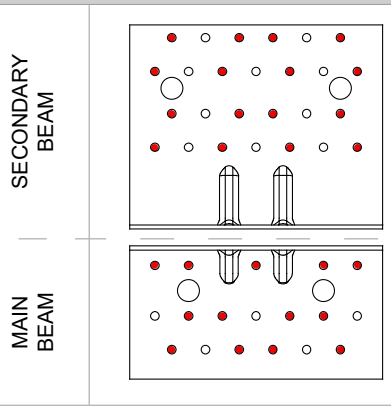
Beam to Post connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	Type	$R_{4,k}$
AG922	12 pcs.	13 pcs.	CNA4,0x50	22,6

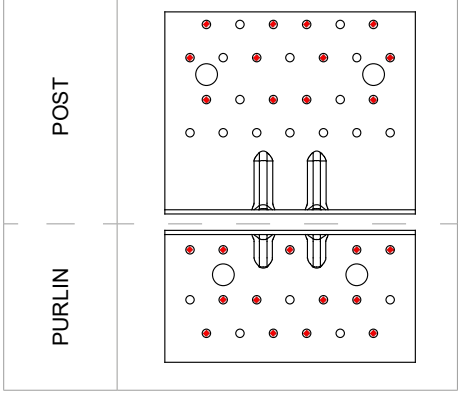
Load scheme
beam / post
1 bracket per connection



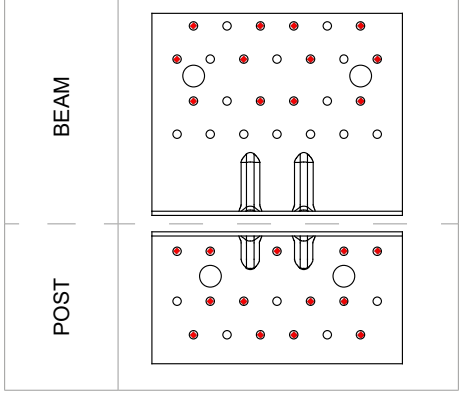
NAILING PATTERN
Beam to Beam connection



NAILING PATTERN
Post to Purlin connection



NAILING PATTERN
Beam to Post connection



AG922 Large Reinforced Angle Bracket

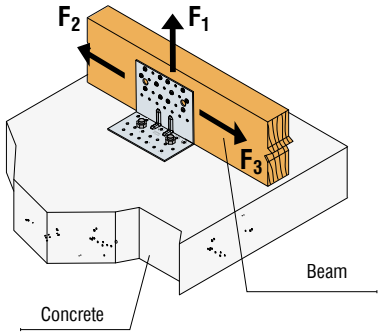
CE ETA 06/0106

SIMPSON Strong-Tie®

Beam to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$
AG922	16 x CNA4,0x50	2 x WA-M12	30,6	48,2

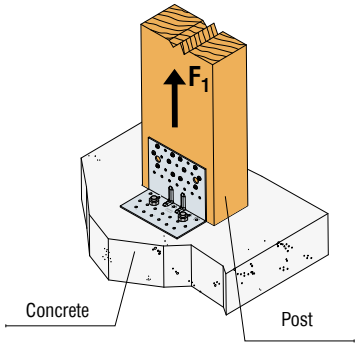
Load scheme
beam to concrete
2 brackets per connection



Post to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)
	Part - A	Part - B	$R_{1,k}$
AG922	16 x CNA4,0x50	2 x WA-M12	37,5

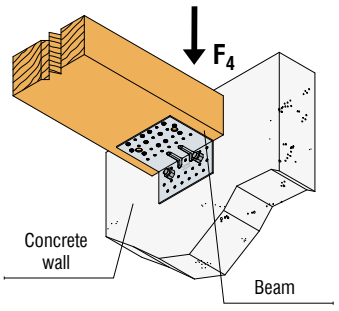
SLoad scheme
post to concrete
2 brackets per connection



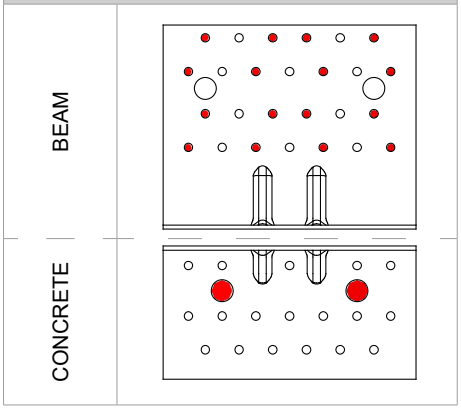
Beam to Concrete wall connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	$R_{4,k}$
AG922	12 x CNA4,0x50	2 x WA-M12	24,8

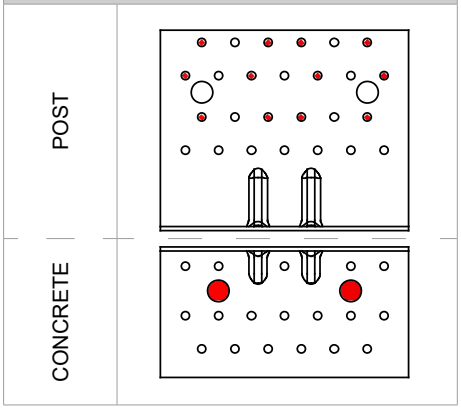
Load scheme
beam to concrete wall
1 bracket per connection



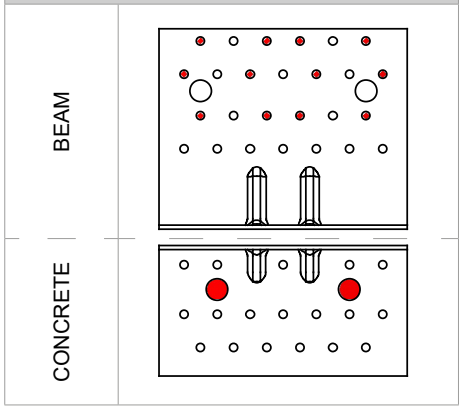
NAILING PATTERN
Beam to Concrete



NAILING PATTERN
Post to Concrete



NAILING PATTERN
Beam to Concrete



E9 i E9S Large Reinforced Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

Reinforced angle brackets are suitable for structural applications in framing and timber-frame houses.

Fixing:

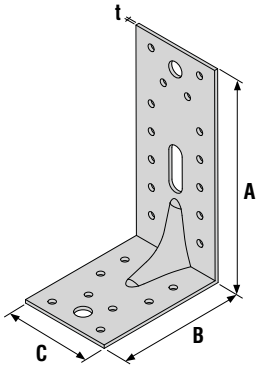
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

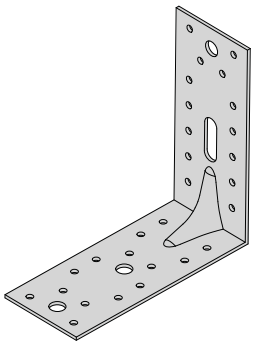
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

E9S/2.5



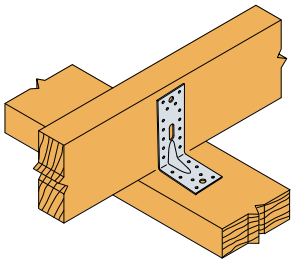
E9/2.5



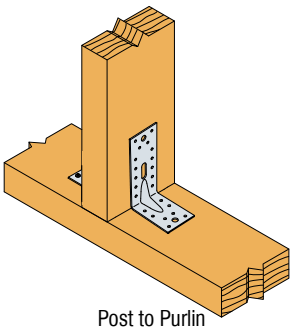
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
E9/2,5	150	150	65	2,5	14-Ø5 1-Ø11; 1-Ø11x34	14-Ø5 2-Ø11
E9S/2,5	150	90	65	2,5	14-Ø5 2-Ø11; 1-Ø11x34	8-Ø5 1-Ø11

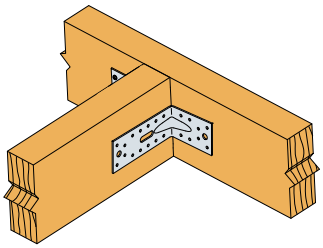
Examples of applications



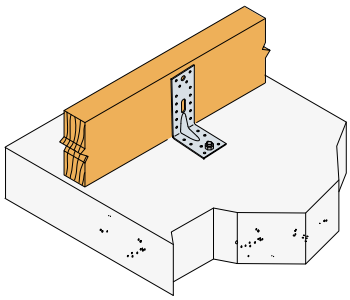
Beam to Beam connection



Post to Purlin connection

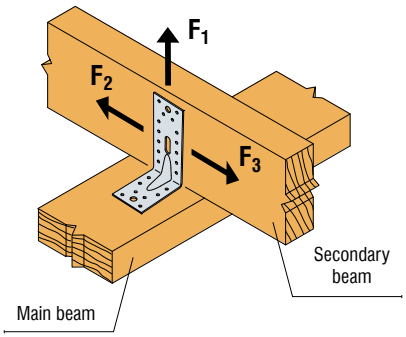


Beam to Beam (ceiling) connection



Beam to Concrete connection

Load scheme
beam to beam
2 brackets per connection



Beam to Beam connection (full nailing)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E9/2,5	12 pcs.	14 pcs.	CNA4,0x50	8,2	13,0
E9S/2,5	12 szt	8 szt	CNA4,0x50	8,0	11,8

E9 i E9S Large Reinforced Angle Brackets

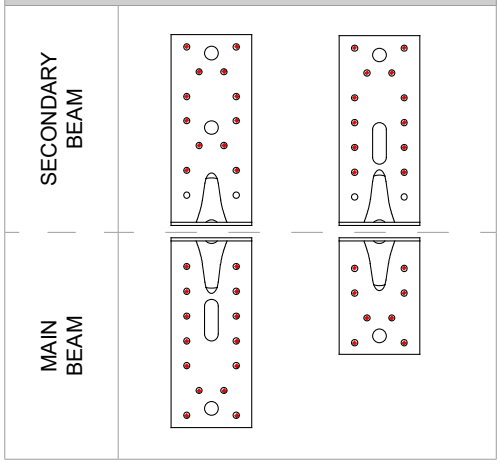
CE ETA 06/0106

SIMPSON Strong-Tie®

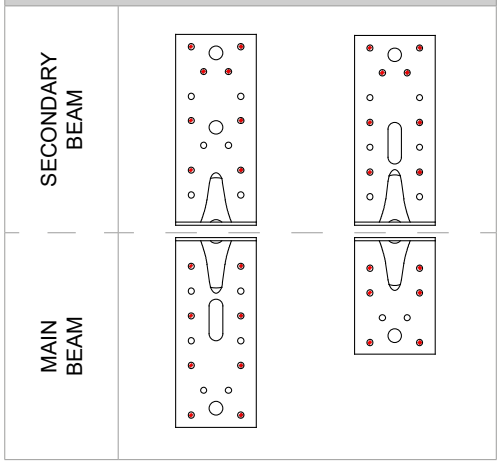
Beam to Beam connection (partial nailing)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E9/2,5	8 pcs.	8 pcs.	CNA4,0x50	3,5	8,8
E9S/2,5	8 szt	6 szt	CNA4,0x50	3,1	8,7

NAILING PATTERN - FULL NAILING
Beam to Beam connection



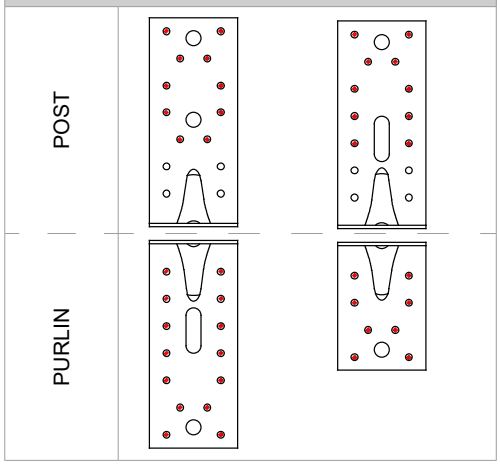
NAILING PATTERN - PARTIAL NAILING
Beam to Beam connection



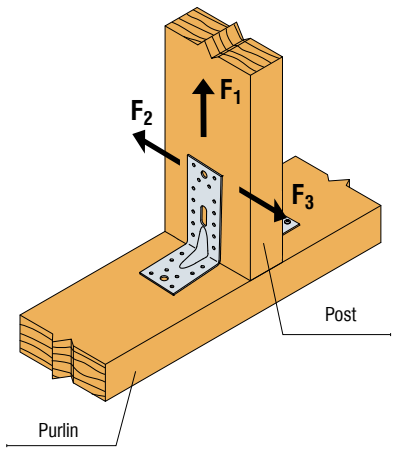
Post to Purlin connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E9/2,5	10 pcs.	14 pcs.	CNA4,0x50	5,3	8,5
E9S/2,5	10 szt	8 szt	CNA4,0x50	5,0	9,6

NAILING PATTERN
Post to Purlin connection



Load scheme
post to purlin
2 brackets per connection



E9 i E9S Large Reinforced Angle Brackets

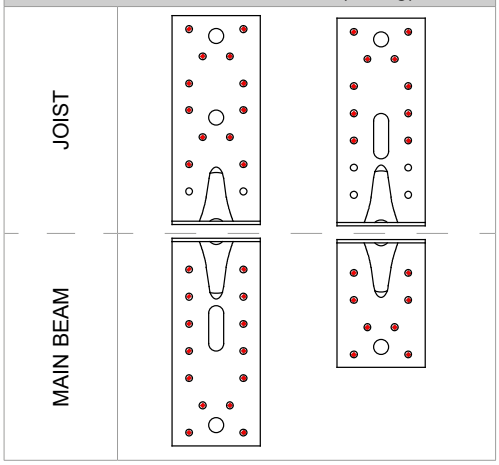
CE ETA 06/0106

SIMPSON Strong-Tie®

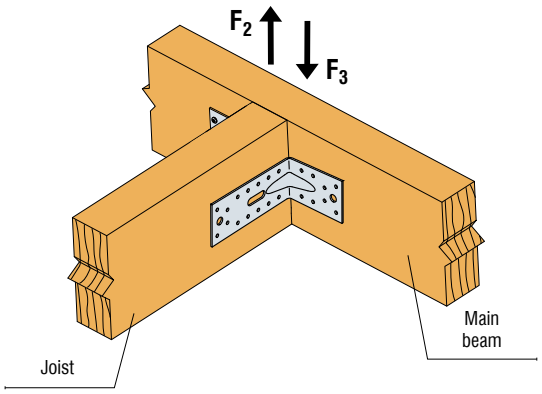
Beam to Beam connection (ceiling)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)
	Part - A	Part - B	Type	$R_{2/3,k}$
E9/2,5	12 pcs.	14 pcs.	CNA4,0x50	13,0
E9S/2,5	12 szt	8 szt	CNA4,0x50	8,7

NAILING PATTERN
Beam to Beam connection (ceiling)



Load scheme
beam to beam (ceiling)
2 brackets per connection

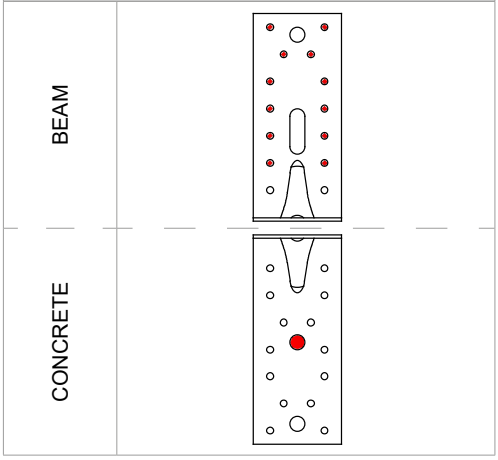


Beam to Concrete connection

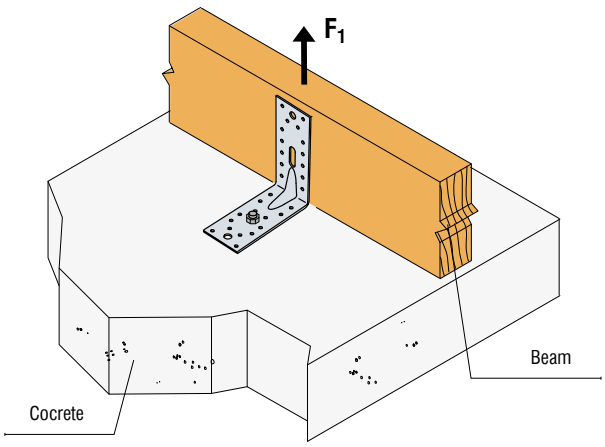
Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)
	Part - A	Part - B	$R_{1,k}$
E9/2,5	12 x CNA4,0x35	1 x WA-M10	6,0

Anchors have the minimum tension capacity $R = F_{1,d} \times 2,7$

NAILING PATTERN
Beam to Concrete connection



Load scheme
beam to concrete
2 brackets per connection



E20 Large Reinforced Angle Bracket

CE ETA 06/0106

SIMPSON Strong-Tie

These angle brackets are used for structural connections between timber beams. E20/3 is fitted with a reinforcement rib for extra rigidity. It can be used for building timber frames so as in constructions with large timber dimensions. E20/3 can also be used for assembling beams or columns to concrete.

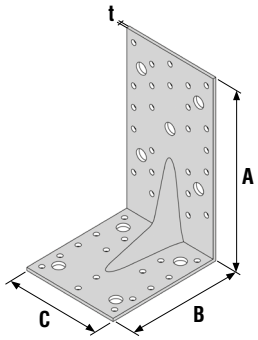
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG



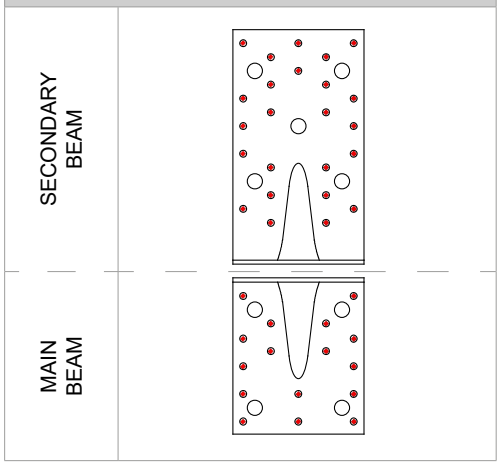
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
E20/3	170	113	95	3,0	24-Ø5 5-Ø11	16-Ø5 4-Ø11

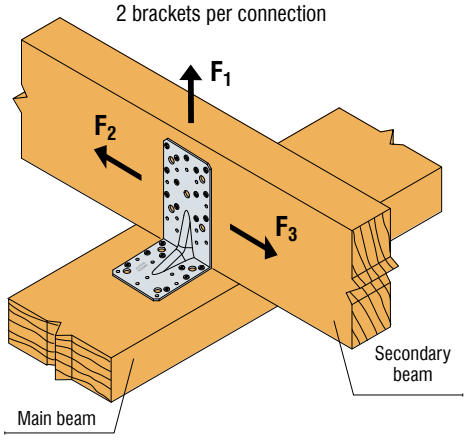
Beam to Beam connection (full nailing)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E20/3	24 pcs.	16 pcs.	CNA4,0x50	11,7	26,5

NAILING PATTERN - FULL NAILING
Beam to Beam connection



Load scheme
beam to beam
2 brackets per connection



E20 Large Reinforced Angle Bracket

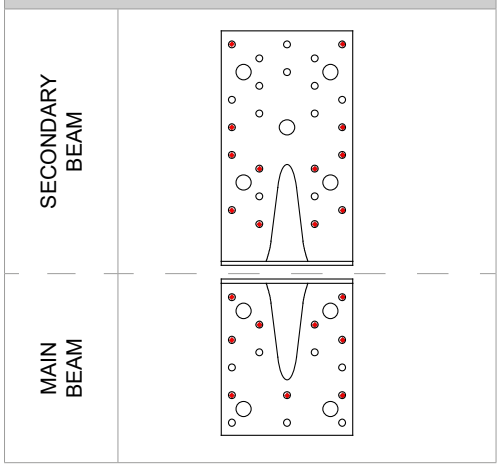
CE ETA 06/0106

SIMPSON Strong-Tie

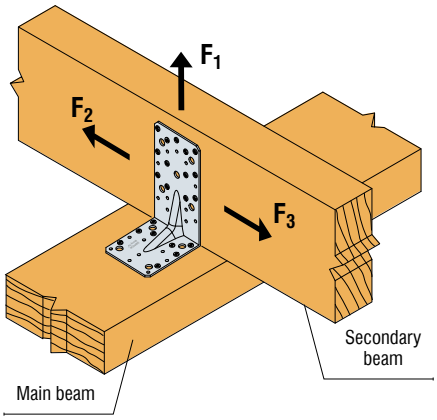
Beam to Beam connection (partial nailing)

Nr artykułu	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E20/3	12 pcs.	9 pcs.	CNA4,0x50	8,8	20,2

NAILING PATTERN - PARTIAL NAILING
Beam to Beam connection



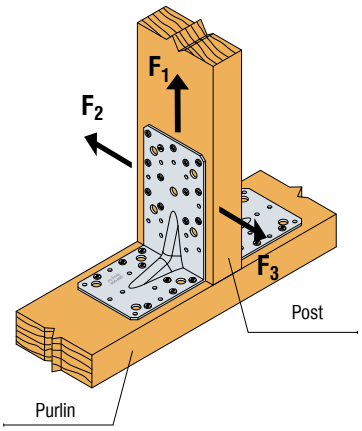
Load scheme
beam to beam
2 brackets per connection



Post to Purlin connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E20/3	13 pcs.	8 pcs.	CNA4,0x50	8,8	15,8

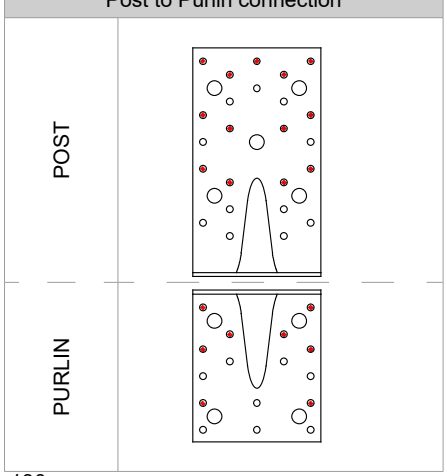
Load scheme
post to purlin
2 brackets per connection



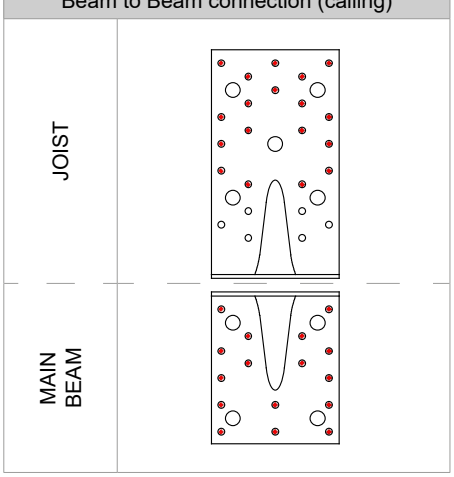
Beam to Beam connection (ceiling)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)
	Part - A	Part - B	Type	$R_{1,k}$
E20/3	18 pcs.	16 pcs.	CNA4,0x50	19,3

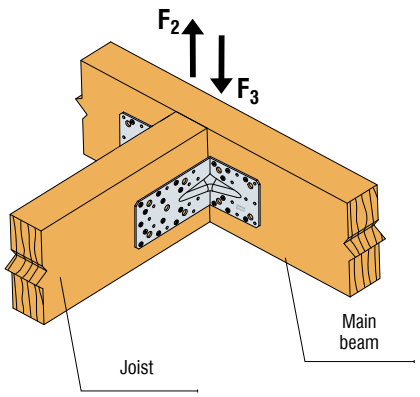
NAILING PATTERN
Post to Purlin connection



NAILING PATTERN
Beam to Beam connection (cailing)



Load scheme
beam to beam (strop)
2 brackets per connection



E20 Large Reinforced Angle Bracket

CE ETA 06/0106

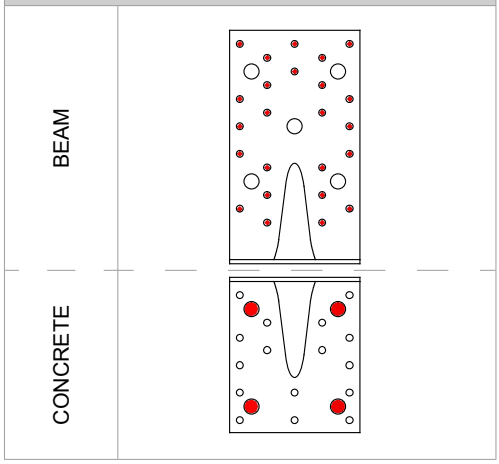
SIMPSON Strong-Tie®

Beam to Concrete connection

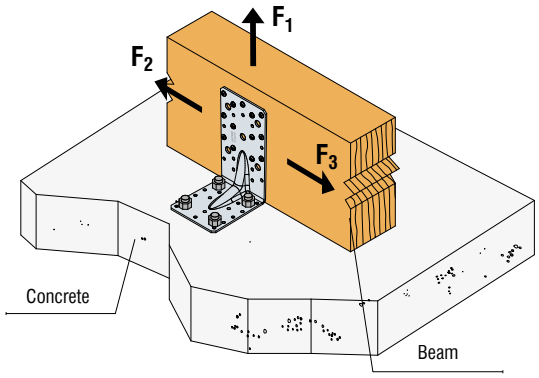
Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$
E20/3	24 x CNA4,0x50	4 x WA-M10	71,0	44,7

E20/3 see the notes under the postto concrete table

NAILING PATTERN
Beam to Concrete connection



Load scheme
beam to concrete
2 brackets per connection

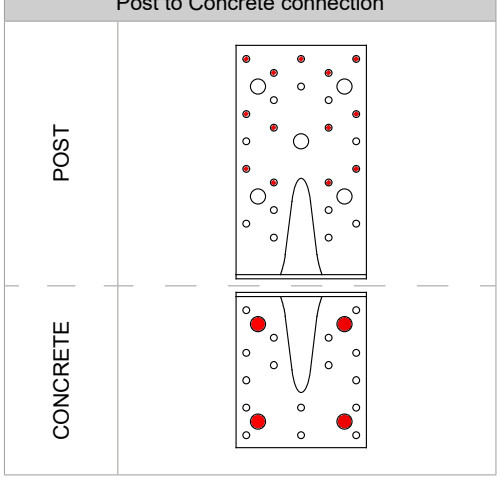


Post to Concrete connection

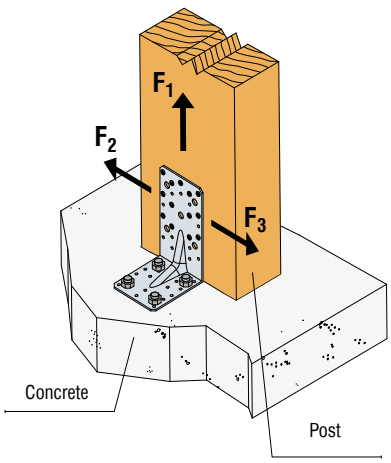
Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$
E20/3	13 x CNA4,0x50	4 x WA-M10	40,0	29,1

Force direction F_1: the two bolts in the first row, next to the bending line, shall have a capacity to sustain an axial force of 1,1 $\times F_{1,d}$.
Force direction F_2 : the bolt group shall have a capacity to sustain the followings: $F_{2,d}$; $M_{X,F2}=F_{2,d}\times 59mm$; $M_{Y,F2}=F_{2,d}\times 89mm$

NAILING PATTERN
Post to Concrete connection



Load scheme
post to concrete
2 brackets per connection



E19 Large Reinforced Angle Bracket

CE ETA 06/0106

The E19 angle bracket is an extension of the range of reinforced brackets. It is a perfect supplement to the range of ABR series angles. Thanks to its large dimensions, various perforations (also holes for bolts and anchors), the use of these angles is very wide.

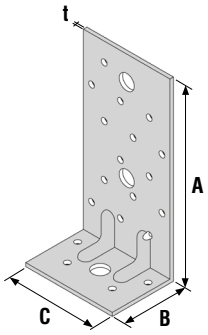
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



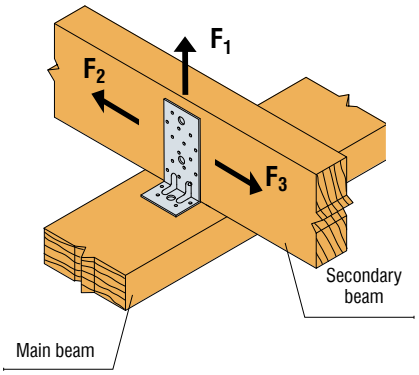
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
E19/3	150	50	75	3,0	15-Ø5 2-Ø13	4-Ø5 1-Ø13

Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E19/3	15 pcs.	4 pcs.	CNA4,0x50	6,7	10,7

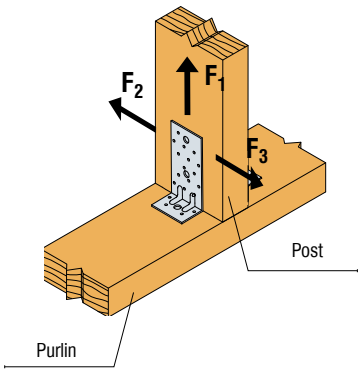
Load scheme
beam to beam
2 brackets per connection



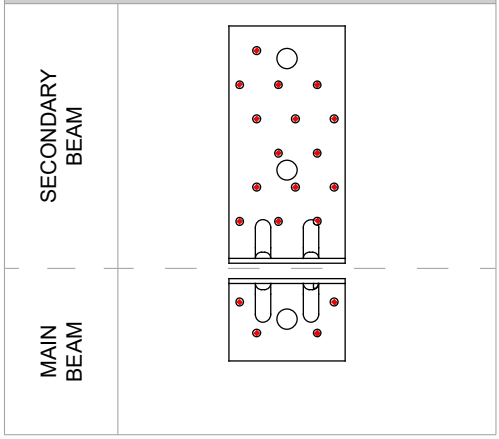
Post to Purlin connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
E19/3	12 pcs.	4 pcs.	CNA4,0x50	6,7	10,7

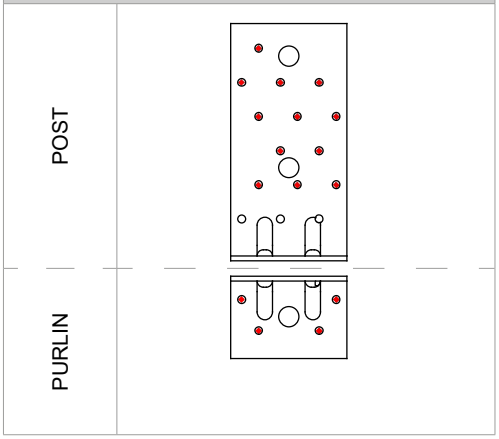
Load scheme
post to purlin
2 brackets per connection



NAILING PATTERN
Beam to Beam connection



NAILING PATTERN
Post to Purlin connection



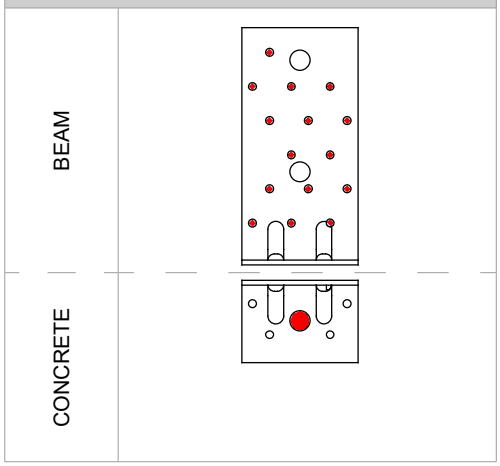
E19 Large Reinforced Angle Bracket

CE ETA 06/0106

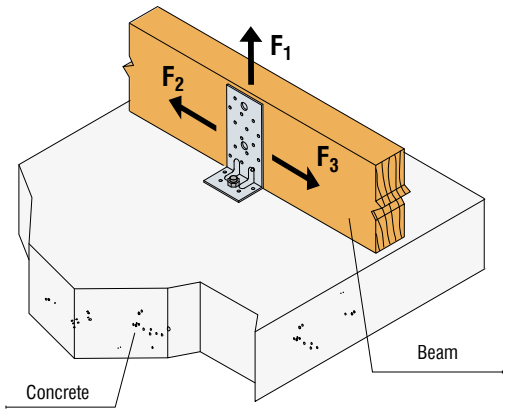
Beam to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$
E19/3	15 x CNA4,0x50	1 x WA-M12	28,1	11,6

NAILING PATTERN
Beam to Concrete connection



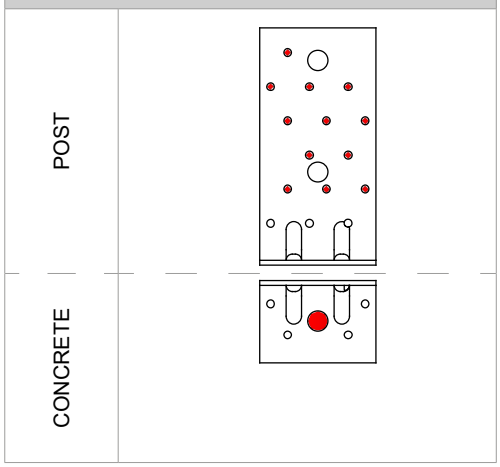
Load scheme
beam to concrete
2 brackets per connection



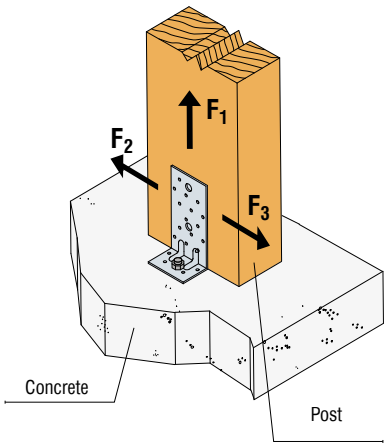
Post to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$
E19/3	12 x CNA4,0x50	1 x WA-M10	13,9	10,1

NAILING PATTERN
Post to Concrete



Load scheme
post to concrete
2 brackets per connection



AG Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

AG angle brackets are fitted with Ø5, Ø8,5 and Ø11mm holes. These bracketsare used in timber to timber connections. In some cases they can be applied on concrete. Can be used in many applications requiring 90° fixing.

Fixing:

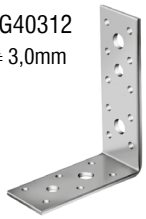
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

AG40312
≠ 3,0mm



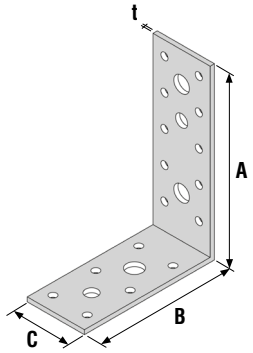
AG40412
≠ 4,0mm

AG40314
≠ 3,0mm

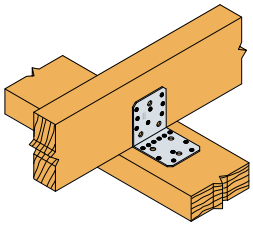
AG40414
≠ 4,0mm

Available Sizes

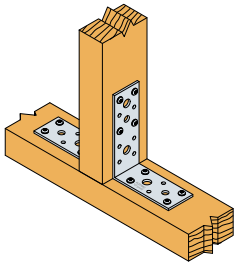
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AG40312	120	90	40	3,0	10-Ø5 1-Ø8,5; 2-Ø11	6-Ø5 1-Ø8,5; 1-Ø11
AG40412	120	90	40	4,0	10-Ø5 1-Ø8,5; 2-Ø11	6-Ø5 1-Ø8,5; 1-Ø11
AG40314	140	90	40	3,0	12-Ø5 1-Ø8,5; 2-Ø11	6-Ø5 1-Ø8,5; 1-Ø11
AG40414	140	90	40	4,0	12-Ø5 1-Ø8,5; 2-Ø11	6-Ø5 1-Ø8,5; 1-Ø11



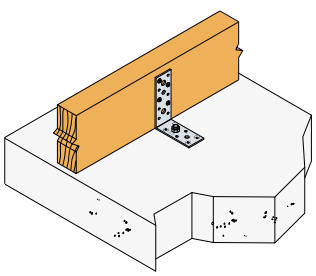
Installation Examples



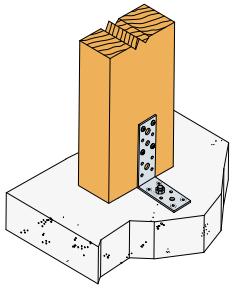
Beam to Beam connection



Post to Purlin connection



Beam to Concrete connection



Post to Concrete connection

AG Angle Brackets

CE ETA 06/0106

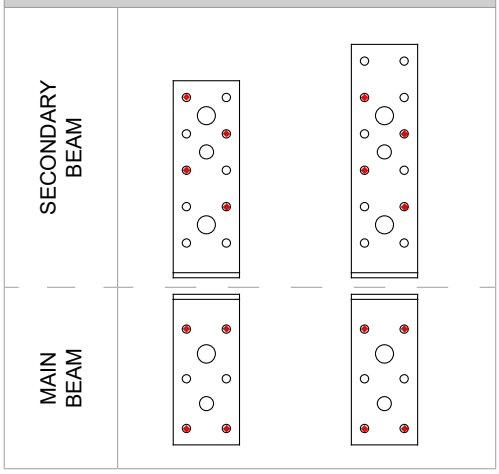
SIMPSON Strong-Tie

Beam to Beam and Post to Purlin connection

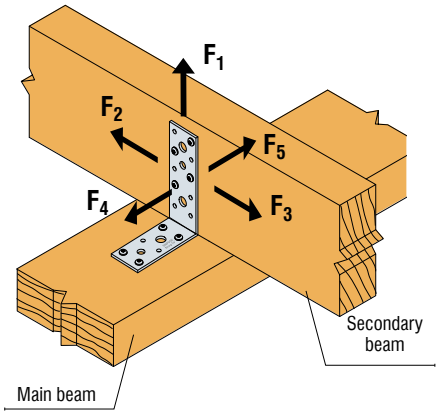
Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AG40312	4 pcs.	4 pcs.	CNA4,0x40	2,9	3,3	$1,5/k_{mod}^{0,25}$
			CNA4,0x60	$4,2/k_{mod}^{0,3}$	5,0	$2,0/k_{mod}^{0,5}$
AG40412	4 pcs.	4 pcs.	CNA4,0x40	3,0	3,0	$1,6/k_{mod}^{0,25}$
			CNA4,0x60	4,9	4,9	$2,5/k_{mod}^{0,5}$
AG40314	4 pcs.	4 pcs.	CNA4,0x40	3,0	3,3	$1,5/k_{mod}^{0,25}$
			CNA4,0x60	$4,2/k_{mod}^{0,3}$	5,0	$2,0/k_{mod}^{0,25}$
AG40414	4 pcs.	4 pcs.	CNA4,0x40	3,0	3,2	$1,6/k_{mod}^{0,25}$
			CNA4,0x60	4,9	4,4	$2,5/k_{mod}^{0,25}$

* b=80 i e=120 (more details in ETA)

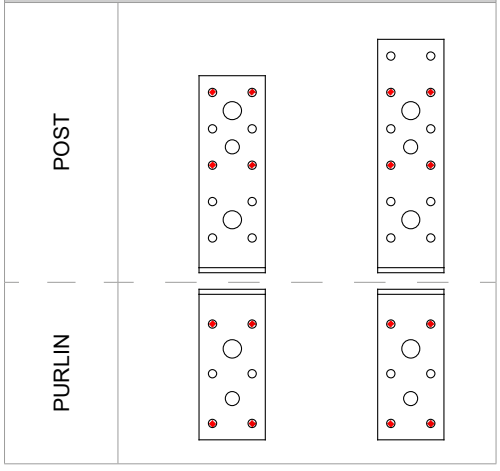
NAILING PATTERN
Beam to Beam connection



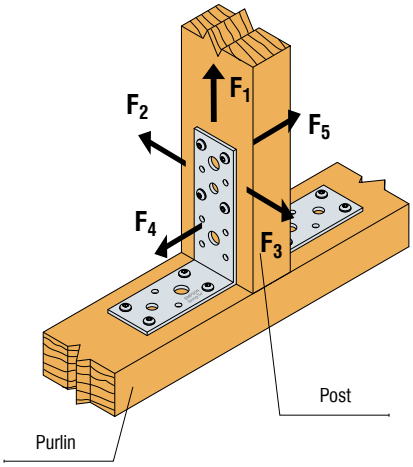
Load scheme
beam to beam
2 brackets per connection



NAILING PATTERN
Post to Purlin connection



Load scheme
post to purlin
2 brackets per connection



AG Angle Brackets

CE ETA 06/0106

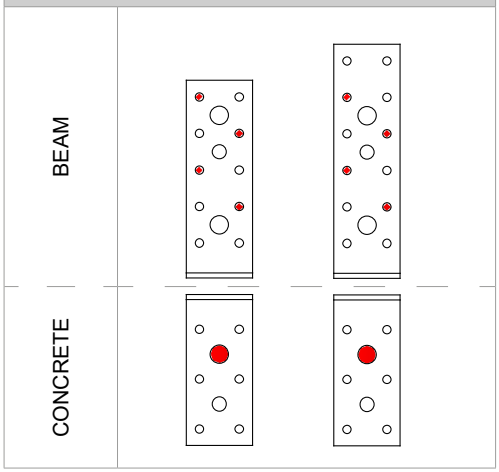
SIMPSON Strong-Tie

Beam to Concrete and Post to Concrete connection

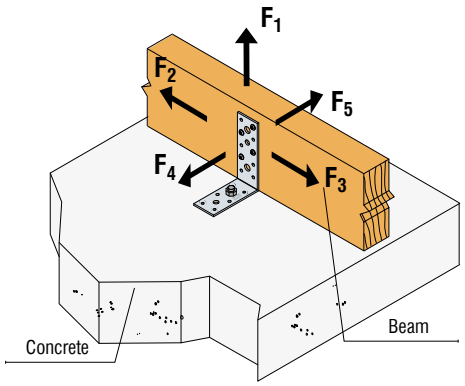
Model No	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AG40312	4 x CNA4,0x40	1 x WA-M10	min { 10,5 ; 8,1/k_{mod} }	0,9	min { 3,9 ; 3,3/k_{mod} }
AG40314	4 x CNA4,0x40	1 x WA-M10			
AG40412	4 x CNA4,0x40	1 x WA-M10	8,1/k_{mod}	1,0/k_{mod}	3,4/k_{mod}
AG40414	4 x CNA4,0x40	1 x WA-M10			

* b=80 i e=120 (for other values see ETA)

NAILING PATTERN
Beam to Concrete connection

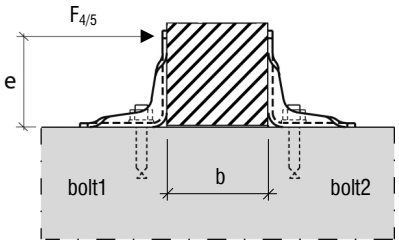


Load scheme
beam to concrete
2 brackets per connection



Modification factor

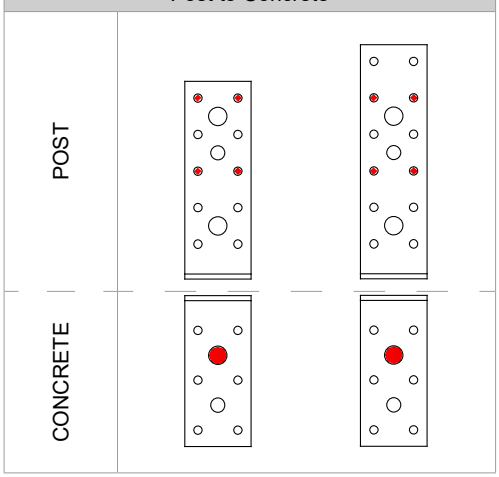
2 angle brackets per connection with anchor					
Factor	Type	for F_1	for $F_{2/3}$	for $F_{4/5,\ bolt1}$	for $F_{4/5,\ bolt1}$
k_{ax}	All models	0,93	1,69	1,85e / b	-
k_{lat}	All models	-	0,50	-	1,0



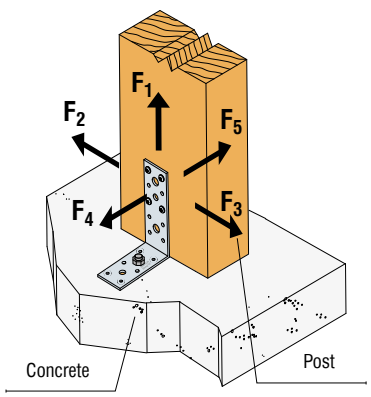
For each bolt group it is needed to check:

$V_{Rd} \geq k_{lat} \times F_{i,d}$; $N_{Rd} \geq k_{ax} \times F_{i,d}$; also for load combinations

NAILING PATTERN
Post to Concrete



Load scheme
post to concrete
2 brackets per connection



ACW Connector for Curtain Wall

CE ETA 06/0106

SIMPSON Strong-Tie®

The ACW console bracket is used to connect the timberen elements to the supporting concrete support structure. Enables you to apply both front and back of the facade. Its small size makes it easy to hide the connector in wall or ceiling layers.

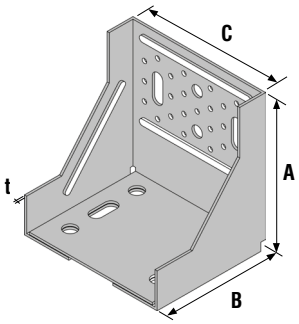
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



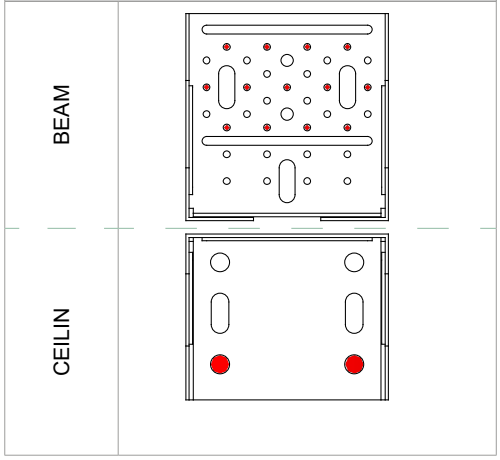
Available Sizes

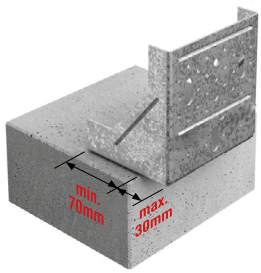
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ACW155	123	154	150	2,5	33 - Ø5 2-Ø9 - 3-Ø13x30	4 - Ø14 2 - Ø14x30

Beam to Ceiling connection

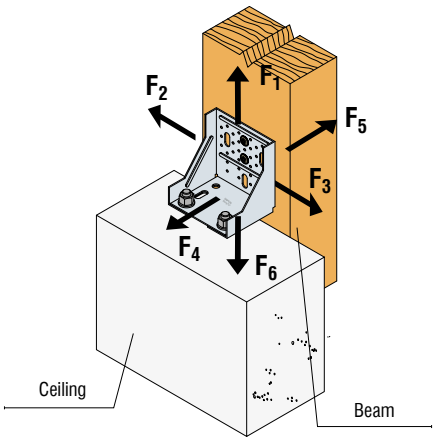
Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)				
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$	$R_{4,k}$	$R_{5,k}$	$R_{6,k}$
ACW155	13 x CNA 4,0x40	2 x WA-M12	8,8	8,9	6,0	11,4	21,2

NAILING PATTERN
Beam to Ceiling connection





Load scheme
beam to ceiling
1 bracket per connection



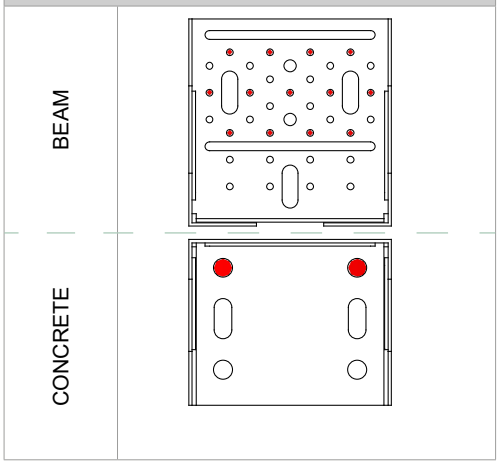
ACW Connector for Curtain Wall

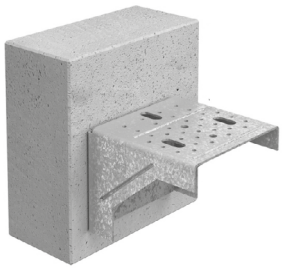
CE ETA 06/0106

Beam to Concrete wall connection

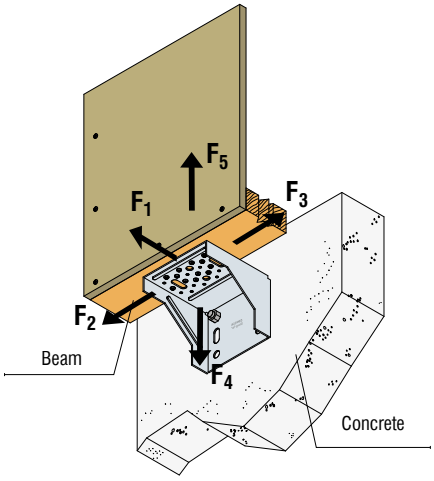
Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN]			
	Part - A	Part - B	$R_{1,k}$	$R_{2/3,k}$	$R_{4,k}$	$R_{5,k}$
ACW155	13 x CNA 4,0x40	2 x WA-M12	16,3	15,3	21,1	5,0

NAILING PATTERN
Beam to Concrete





Load scheme
beam to concrete
1 bracket per connection



AA Angle Brackets

CE ETA 06/0106

The AA60280 angle bracket is fitted with a small reinforcement rib. This angle bracket can be used in timber to timber connections in small timber structures. It can be used in many applications requiring 90° fixing.

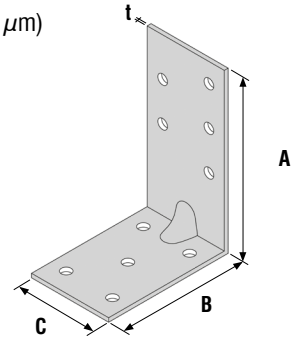
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AA60280	83	62	40	2,0	5-Ø5	5-Ø5

Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$
AA60280	5 pcs.	5 pcs.	CNA4,0x40	2,8	4,1	$1,1/k_{mod}^{0,5}$
			CNA4,0x40	4,4	6,1	$1,7/k_{mod}^{0,5}$

Load scheme
beam to beam
2 brackets per connection

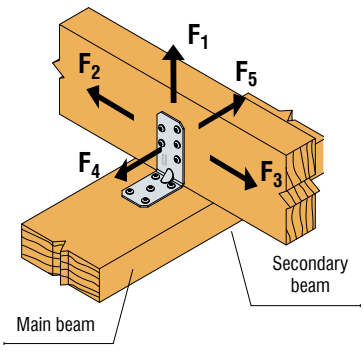


ABB Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

This angle bracket is usually used in timber to timber connections in small timber structures. It can be used in many applications requiring 90° fixing. Can be used for applications to solid timber, composite timber, glulam beams, trusses, profiles.

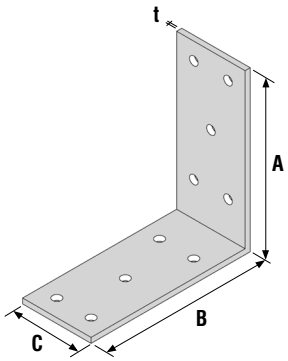
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



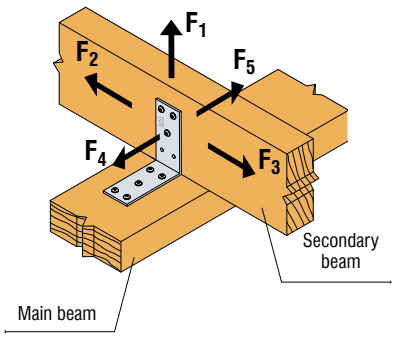
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ABB40390	93	93	40	3,0	5-Ø5	5-Ø5

Beam to Beam connection (full nailing)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$
ABB40390	3 pcs.	5 pcs.	CNA4,0x40	$\min\left\{\frac{3,0}{3,1/k_{mod}}\right.$	2,0	$1,4/k_{mod}^{0.5}$
	3 pcs.	5 pcs.	CNA4,0x60	$\min\left\{\frac{4,9}{4,4/k_{mod}}\right.$	2,8	$1,9/k_{mod}^{0.5}$

Load scheme
beam to beam
2 brackets per connection



Beam to Beam connection (partial nailing)

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
ABB40390	3 pcs.	3 pcs.	CNA4,0x40	$\min\left\{\frac{2,3}{2,0/k_{mod}}\right.$	1,7	$1,0/k_{mod}^{0.5}$
	3 pcs.	3 pcs.	CNA4,0x60	$\min\left\{\frac{3,1}{2,8/k_{mod}}\right.$	2,2	$1,3/k_{mod}^{0.5}$

* b=75 i e=130 (for other values see ETA)

AJ Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®

AJ angle bracket are designed for connecting timber elements using CNA4.0 ring nails or alternatively CSA5.0 connector screws.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

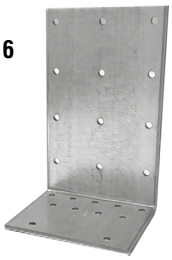
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

AJ60416

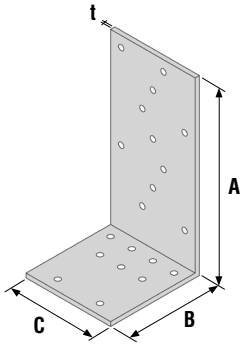
AJ80416

AJ90416



Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AJ60416	164	84	60	4,0	8-Ø5	7-Ø5
AJ80416	164	84	80	4,0	11-Ø5	9-Ø5
AJ90416	164	84	90	4,0	12-Ø5	11-Ø5

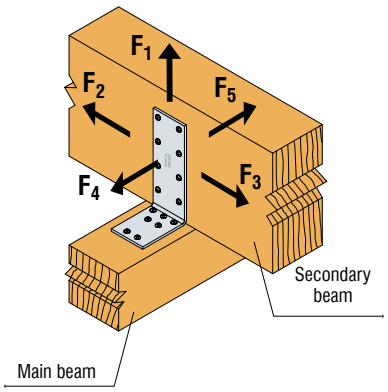


Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)		
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
AJ60416	8 pcs.	7 pcs.	CNA4,0x40 CNA4,0x60	$11,1/k_{mod}^{0,2}$	7,8	$4,1/k_{mod}^{0,25}$
AJ80416	11 pcs.	9 pcs.	CNA4,0x40 CNA4,0x60	$15,3/k_{mod}^{0,2}$	10,0	$5,5/k_{mod}^{0,25}$
AJ90416	12 pcs.	11 pcs.	CNA4,0x40 CNA4,0x60	$19,3/k_{mod}^{0,1}$	13,0	$7,1/k_{mod}^{0,25}$

* b=75 i e=130 (for other values see ETA)

Load scheme
beam to beam
2 brackets per connection

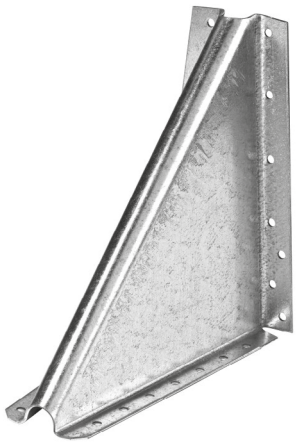


AJ connectors are fixed with CNA 4.0 x 40 nails in the vertical flange and CNA 4.0 x 60 in the horizontal arm. In the case of a rigid connection with one connector, for R_{1k} and $R_{2\,/\,3k}$ the load values can be assumed to be half that of those given in the table. If the purlin is twisted and the forces F_4 and F_5 have different distances b and e, further information can be found in the European Technical Approval.

KNAG Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®



The KNAG connector is used in beam-to-beam connections with large timber dimensions. This connector is especially suitable for roof constructions with high roof pitch. The KNAG connector can be used alone or together with two pcs. of purlin anchors SPF if extra high strength is needed.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

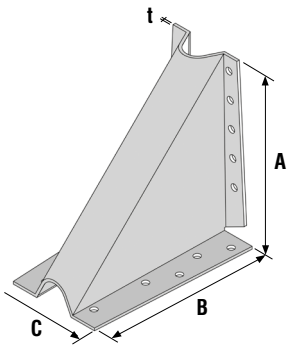
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
KNAG90	90	90	65	2,0	6-Ø5	8-Ø5
KNAG130	125	125	80	2,0	9-Ø5	10-Ø5
KNAG170	160	160	95	2,0	11-Ø5	12-Ø5
KNAG210	200	200	100	2,0	14-Ø5	14-Ø5

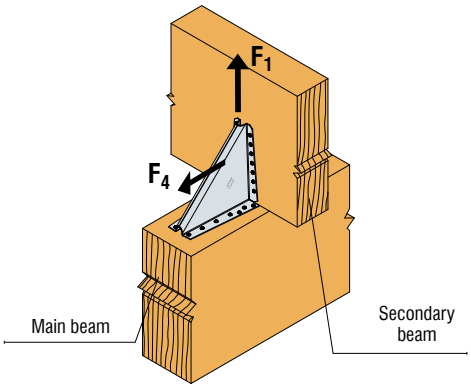


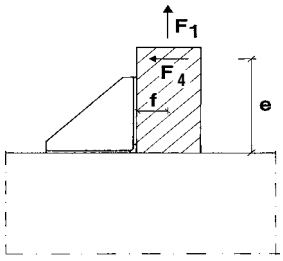
Beam to Beam connection

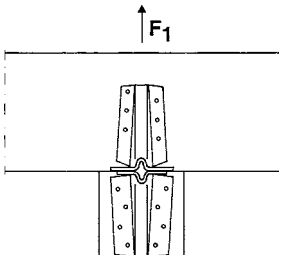
Model No	Fixing - Fasteners			Characteristic capacity [kN] (1 bracket per connection)	
	Part - A	Part - B	Type	$R_{1,k}$*	$R_{4,k}$*
KNAG90	6 pcs.	6 pcs.	CNA4,0x40	4,0	0,9
KNAG130	9 pcs.	9 pcs.	CNA4,0x40	4,6	2,6
KNAG170	11 pcs.	11 pcs.	CNA4,0x40	5,8	4,4
KNAG210	14 pcs.	14 pcs.	CNA4,0x40	6,9	6,7

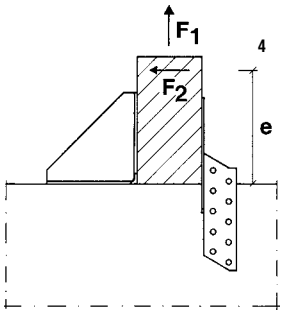
* f=20 i e=170 (for other values see ETA)

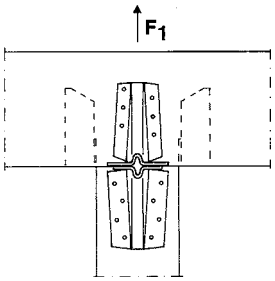
Load scheme
beam to beam
1 bracket per connection











ANP Nail Plate Angle Brackets

CE ETA 06/0106

Simple angle brackets which are very versatile used for timber to timber connections in small timber structures. Can be used in many applications requiring 90° fixing. Can be used for following applications: solid timber, glulam beams, trusses, profiles and composite timber.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

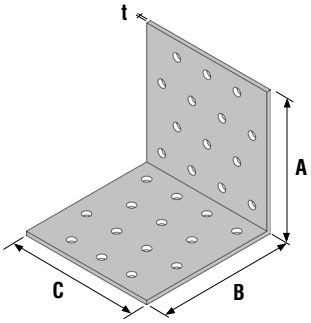
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
ANP254660	40	60	60	2,5	5-Ø5	7-Ø5
ANP256650	60	60	50	2,5	6-Ø5	6-Ø5
ANP256660	60	60	60	2,5	8-Ø5	8-Ø5
ANP256680	60	60	80	2,5	11-Ø5	11-Ø5
ANP2566100	60	60	100	2,5	14-Ø5	14-Ø5
ANP2561060	60	100	60	2,5	8-Ø5	12-Ø5
ANP2588100	80	80	100	2,5	18-Ø5	18-Ø5
ANP258860	80	80	60	2,5	10-Ø5	10-Ø5
ANP258880	80	80	80	2,5	14-Ø5	14-Ø5
ANP251010100	100	100	100	2,5	23-Ø5	23-Ø5
ANP25101060	100	100	60	2,5	13-Ø5	13-Ø5
ANP25101080	100	100	80	2,5	18-Ø5	18-Ø5
ANP251020100	100	200	100	2,5	23-Ø5	45-Ø5



ANP Nail Plate Angle Brackets

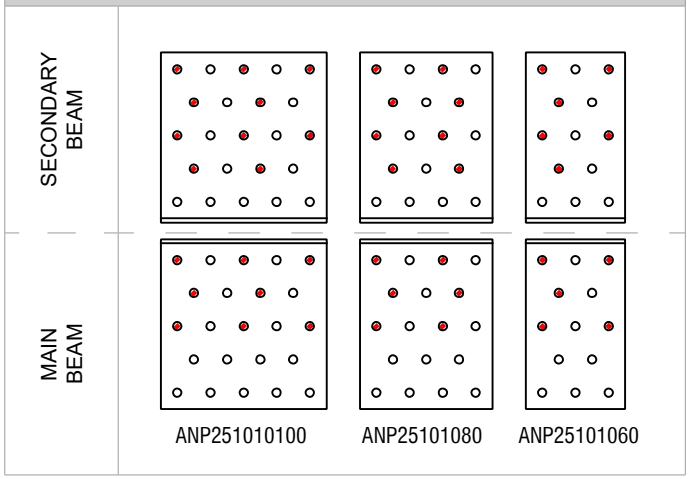
CE ETA 06/0106

SIMPSON Strong-Tie®

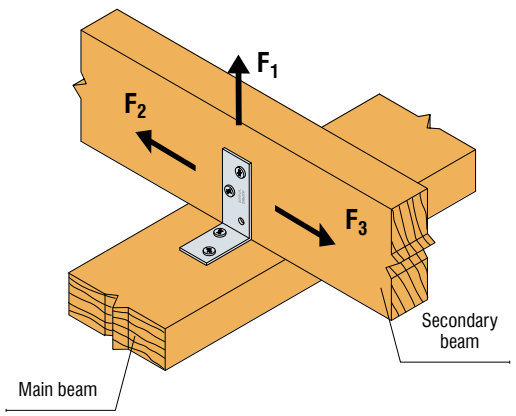
Beam to Beam connection

Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
ANP254660	3 pcs.	3 pcs.	CNA4,0x40	3,48	3,74
			CNA4,0x60	5,80	5,32
ANP256650	2 pcs.	2 pcs.	CNA4,0x40	2,82	2,88
			CNA4,0x60	3,96	3,96
ANP256660	3 pcs.	3 pcs.	CNA4,0x40	3,60	3,38
			CNA4,0x60	5,70	4,68
ANP256680	4 pcs.	4 pcs.	CNA4,0x40	5,12	6,02
			CNA4,0x60	7,42	8,42
ANP2566100	5 pcs.	5 pcs.	CNA4,0x40	5,90	7,96
			CNA4,0x60	9,26	11,06
ANP2561060	6 pcs.	5 pcs.	CNA4,0x40	3,94	5,74
			CNA4,0x60	6,58	7,70
ANP2588100	7 pcs.	8 pcs.	CNA4,0x40	6,44	9,20
			CNA4,0x60	9,74	12,70
ANP258860	4 pcs.	5 pcs.	CNA4,0x40	3,88	3,96
			CNA4,0x60	5,92	5,54
ANP258880	6 pcs.	6 pcs.	CNA4,0x40	5,34	7,28
			CNA4,0x60	7,26	9,90
ANP251010100	10 pcs.	8 pcs.	CNA4,0x40	6,48	11,02
			CNA4,0x60	9,64	15,00
ANP25101060	6 pcs.	5 pcs.	CNA4,0x40	3,88	5,86
			CNA4,0x60	6,04	7,88
ANP25101080	8 pcs.	8 pcs.	CNA4,0x40	5,46	7,76
			CNA4,0x60	7,16	10,60
ANP251020100	16 pcs.	10 pcs.	CNA4,0x40	7,18	13,14
			CNA4,0x60	11,96	17,52

NAILING PATTERN
Beam to Beam connection



Load scheme
beam to beam
2 brackets per connection



Nailing detail diagrams for all ANP find in ETA 06/0106.

ANP Nail Plate Angle Brackets

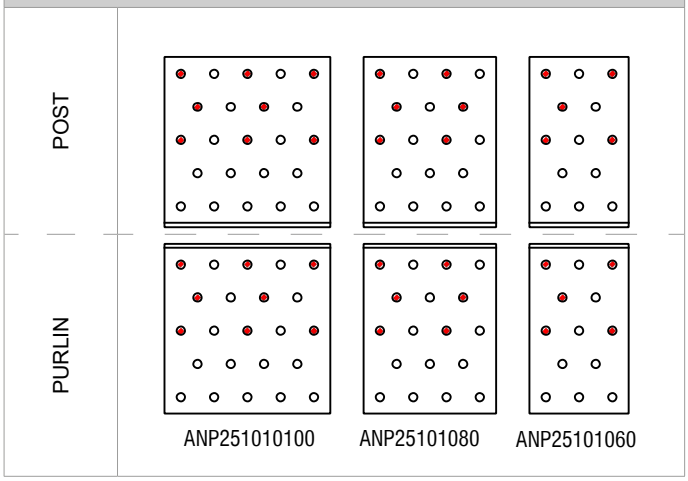
CE ETA 06/0106

SIMPSON Strong-Tie®

Post to Purlin connection

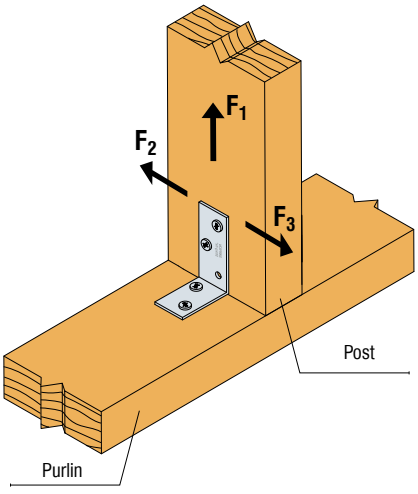
Model No	Fixing - Fasteners			Characteristic capacity [kN] (2 brackets per connection)	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2/3,k}$
ANP2561060	4 pcs.	5 pcs.	CNA4,0x40	3,94	3,08
			CNA4,0x60	6,58	4,10
ANP2588100	5 pcs.	8 pcs.	CNA4,0x40	6,44	7,26
			CNA4,0x60	9,74	9,66
ANP258860	3 pcs.	5 pcs.	CNA4,0x40	3,88	3,16
			CNA4,0x60	5,92	4,22
ANP258880	4 pcs.	6 pcs.	CNA4,0x40	5,34	5,14
			CNA4,0x60	7,26	7,02
ANP251010100	8 pcs.	8 pcs.	CNA4,0x40	6,48	9,56
			CNA4,0x60	9,64	12,96
ANP25101060	5 pcs.	5 pcs.	CNA4,0x40	3,88	4,90
			CNA4,0x60	6,04	6,68
ANP25101080	6 pcs.	6 pcs.	CNA4,0x40	5,46	4,90
			CNA4,0x60	7,16	6,68
ANP251020100	13 pcs.	10 pcs.	CNA4,0x40	7,18	11,20
			CNA4,0x60	11,96	14,91

NAILING PATTERN
Post to Purlin connection



Nailing detail diagrams for all ANP find in ETA 06/0106.

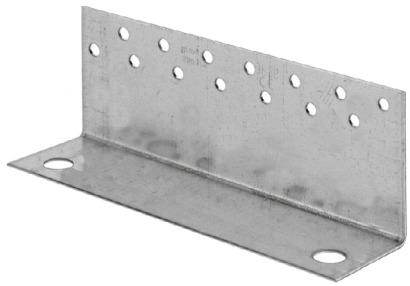
Load scheme
post to purlin
2 brackets per connection



AB6983 and AB36125 Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie®



The AB6983 and AB36125 angle brackets were created for timber structure constructions. They have the task of transferring horizontal forces that moves the wall over the foundation.
The AB6983 connector is designed to create a connection between the foundation and the sole plate of the timber structure wall of the ground floor.
Angle AB36125 is designed to connect the timber structure walls of higher floors to the construction of a wooden ceiling below.These connectors are used mainly in prefabricated skeletal joints, eliminating the need to make installation holes in prefabricated elements.

Fixing:

- For fastening to timber – for AB6983 use nails CNA3,1. For AB36125 use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm
- For fastening to concrete – use mechanical anchor (WA-M12) or AT-HP chemical anchor with LMAS threaded rod

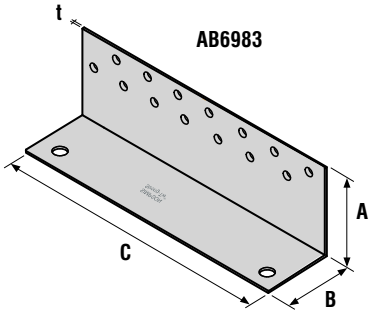
Material:
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm).

NEW

Zn 20 μm | CL.2 | DWG

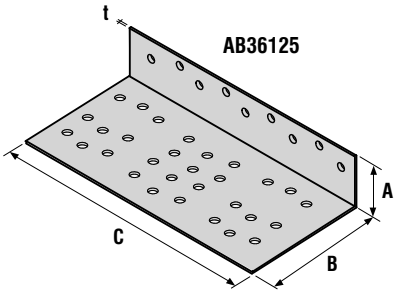
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AB6983	69	83	300	2,5	14-Ø4	2-Ø13
AB36125	36	125	248	2,0	9-Ø5	30-Ø5

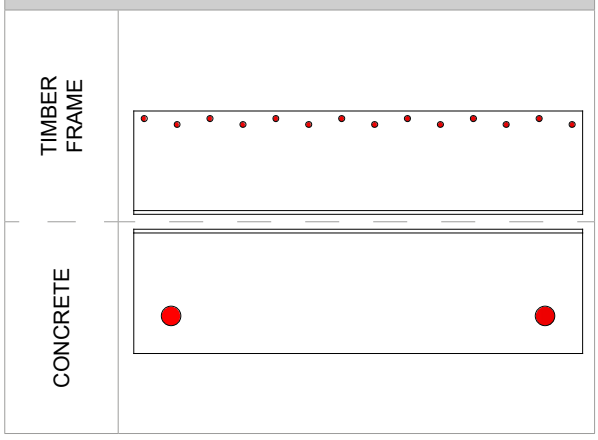


Timber frame to Concrete connection

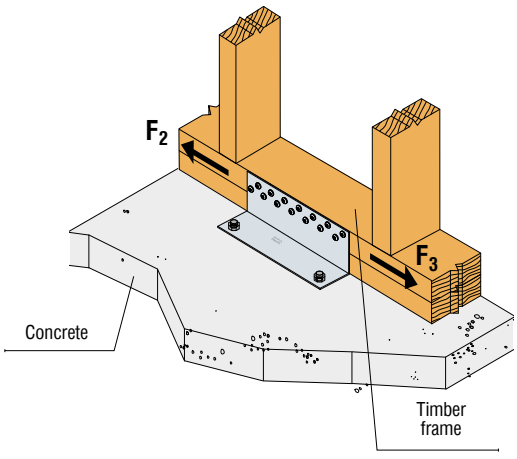
Model No	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	$R_{2/3,k}$
AB6983	14 x CNA3,1x40	2 x WA-M12	min (13.1 ; 16/k_{mod})



NAILING PATTERN FULL NAILING
Timber frame to Concrete connection



Load scheme
timber frame to concrete
1 bracket per connection



AB6983 and 36125 Angle Brackets

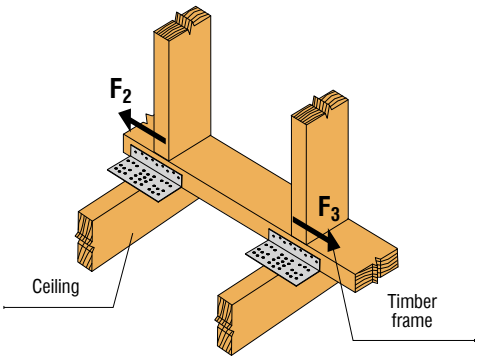
CE ETA 06/0106

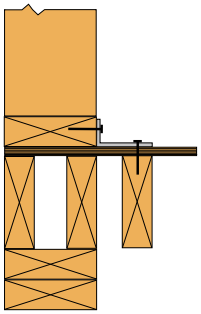
SIMPSON Strong-Tie®

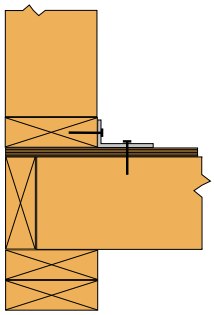
Timber frame to Beam connection

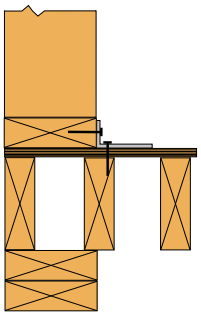
Model No.	Scheme	Fixing - Fasteners		Characteristic capacity [kN] (1 bracket per connection)		
				$R_{2/3,k}$		
		Part - A	Part - B	CNA4,0x40	CNA4,0x50	CNA4,0x60
AB36125	1	7 pcs.	12 pcs.	10,2	12,4	13,2
	2	7 pcs.	12 pcs.			
	3	7 pcs.	7 pcs.			

Load scheme
timber frame to beam
1 bracket per connection

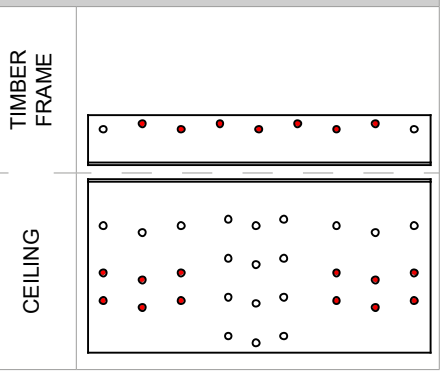




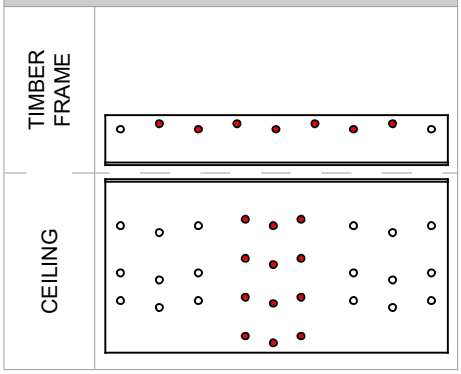




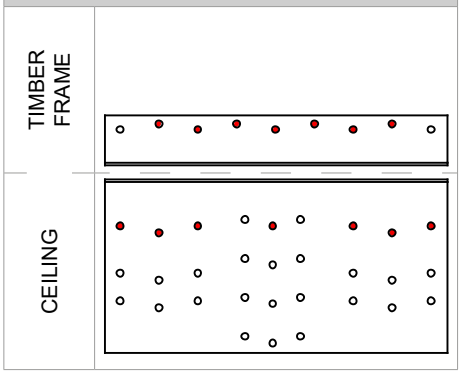
NAILING PATTERN-1
Timber frame to Beam connection

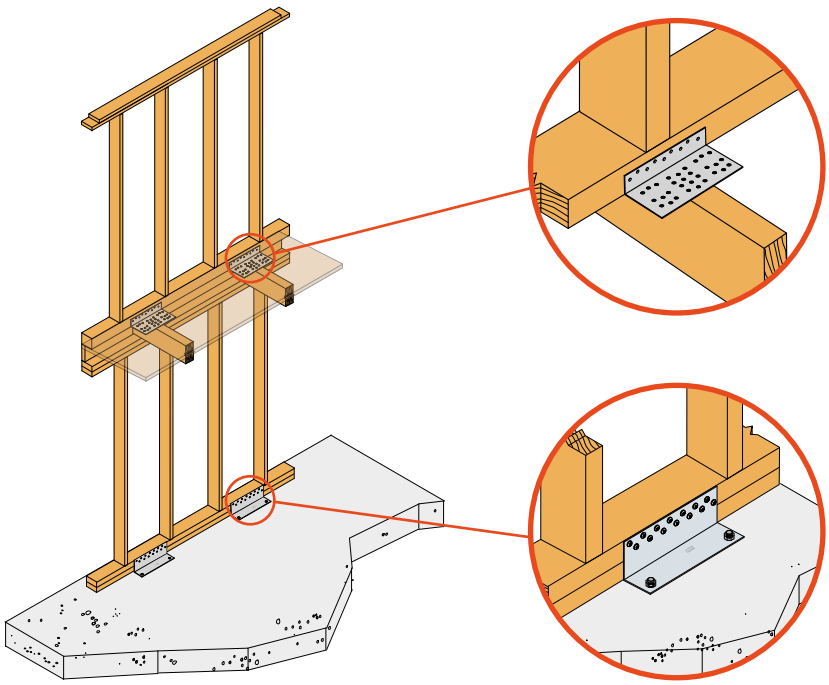


NAILING PATTERN-2
Timber frame to Beam connection



NAILING PATTERN-3
Timber frame to Beam connection





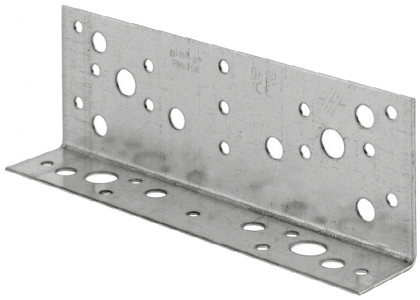
Securing against sliding is onefrom basic structural requirements in timber strucyure buildings. Angle brackets acting against the sliding should be used not only in the connections of the ground floor walls with a foundation slab, but also in the connections of the walls of the higher floors with the ceiling below. Angle AB36125 is designed for this application. Thanks to the possibility of using three different nailing patterns, it can be used in various construction systems.

Scheme 1 is intended for structures in which the wall is parallel to the floor beams and the first beam is offset from the wall.
Scheme 2 is intended for structures in which the wall is perpendicular to the floor beams. The angle brackets are installed at the crossing of walls with ceiling beams.
Scheme 3 has a similar application to scheme 1 but it is used if the first joist meets the wall.

BNV Angle Brackets

CE ETA 06/0106

SIMPSON Strong-Tie



These angle brackets have Ø5, Ø8,5 and Ø11 mm fixing holes. BNV is used to prevent sliding of the timber frame walls. Dedicated especially for the prefabricated, closed walls which cannot be simply anchored through the bottom plate.

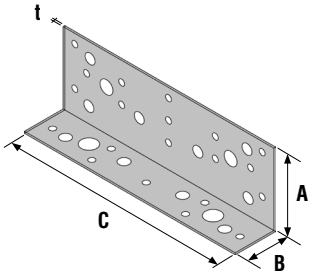
Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



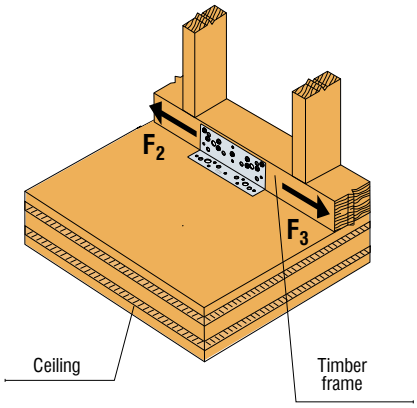
Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
BNV33	63	38	150	1,5	13-Ø5; 6-Ø8,5; 2-Ø11	7-Ø5; 4-Ø8,5; 2-Ø13

Load scheme
timber frame to ceiling
1 bracket per connection

Timber frame to Ceiling connection

Model No	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	$R_{2/3,k}$
BNV33	9 x CNA4,0x40	7 x CNA4,0x40	10,7

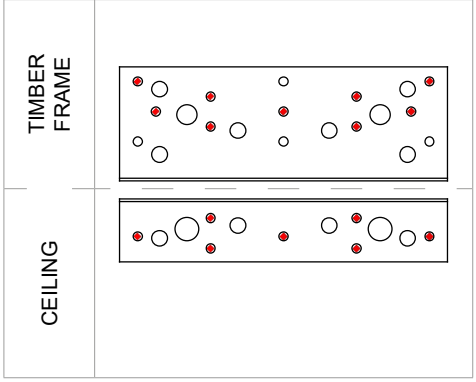


Timber frame to Concrete connection

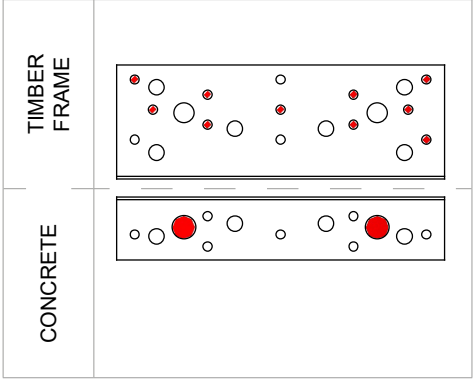
Model No	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	$R_{2/3,k}$
BNV33	9 x CNA4,0x40	2 x WA-M12	$\min\{10,7; 10,1 / k_{mod}\}$

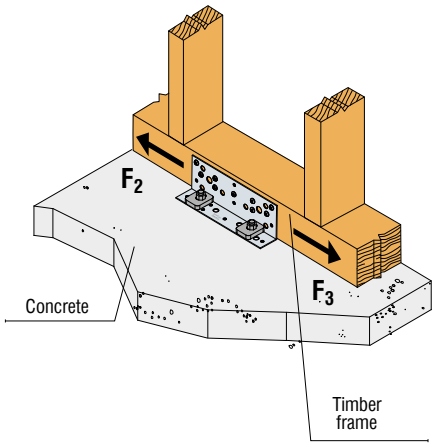
Load scheme
timber frame to concrete
1 bracket per connection

NAILING PATTERN
Timber frame to Ceiling connection



NAILING PATTERN
Timber frame to Concrete connection





Hold Downs

heavy angle brackets and timber frame racking resistance

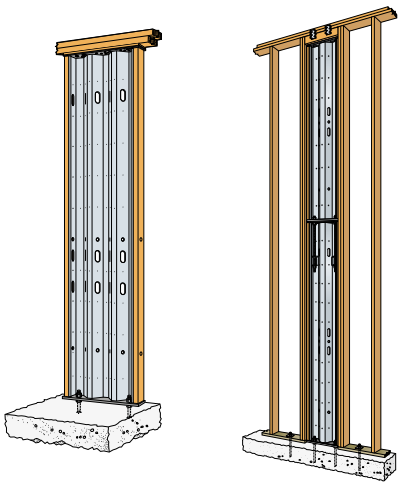
TECHNICAL INFORMATION hold downs

Designing timber structure buildings

Designing buildings with a timber structure is quite specific. Includes calculations and occurrence that are not taken into account when designing traditional buildings. Four specific mechanisms of destruction of the skeleton building that the designer has to consider are: racking, rotation of the building or its part, sliding over the foundation, roof uplift or defragmentation of the entire building.

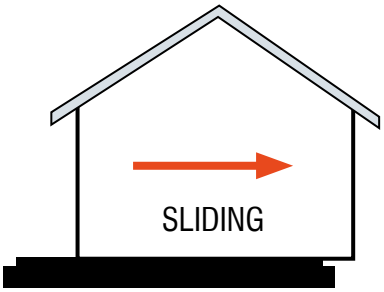
Stiffness of the timber structure

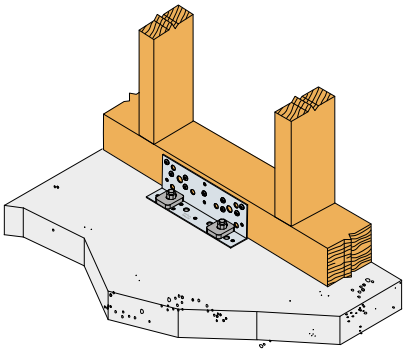
The stiffening walls are walls covered with wood-based panels, parallel to the considered wind direction. The binding standard for wooden structures PN-EN 1995-1-1 (Eurocode 5 - section 9.2.4 - wall diaphragms) allows to calculate the stiffness of the frame wall. If the load-bearing capacity of the building walls is insufficient, it can be increased with additional stiffening products such as Steel Strong-Wall ™ or Steel Strong-Portal ™



Sliding over the foundation.

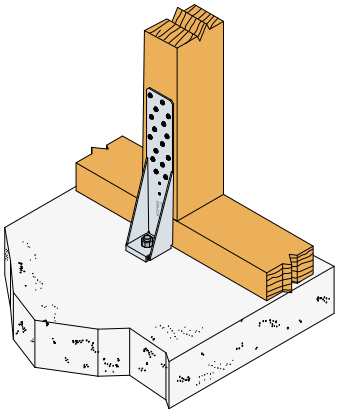
Protection against this occurrence is quite simple and can be done in several ways. The most commonly used connection is anchoring the sole plate to the foundation by using mechanical or chemical anchors. Making such anchoring requires access from the top of the sole plate. If the connection cannot be made by installing the anchors from the top of the sole plate, due to wall prefabrication, it is possible to use angle brackets mounted along the side of the sole plate (BNV33, AB6983)





Overturning

The horizontal forces acting at the height of the top plate have a tendency to rotate the wall relative to the pivot point. To counteract this occurrence, appropriate connector called „tie down" or „hold down" should be used, which have a very high load capacity. This combination allows you to create a large force holding the wall in the original position and counteract the rotation. We should clearly distinguish the two types of anchoring. The first, described earlier against the building displacement, causes shearing of connections between the frame walls and the foundation. The second type of anchoring has the task of counteracting the lifting and rotation resulting from wall stiffening. To secure the building against rotation, it is necessary to use the connector provided for this purpose, called „tie down" or „hold down".



AKR Heavy Angle Brackets

CE ETA 07/0285

SIMPSON Strong-Tie

AKR angle brackets are used for connections between timber and concrete. The brackets are produced of 3 mm (pregalvanized) and 4mm (hot dip gavlanized) steel. The brackets are provided with reinforcement rib for extra rigidity. AKR angles can be used for following applications: timber, concrete, light concrete and masonry.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Hot dip galvanized S235JR (50 μm)

HDG 50 μm | CL.3 | CS | DWG

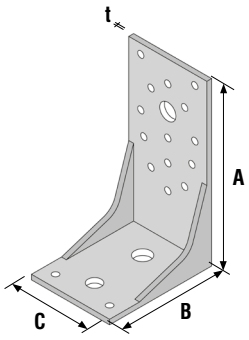
AKR95L **AKR95**

AKR135L **AKR135**

AKR285L **AKR285**

Available Sizes

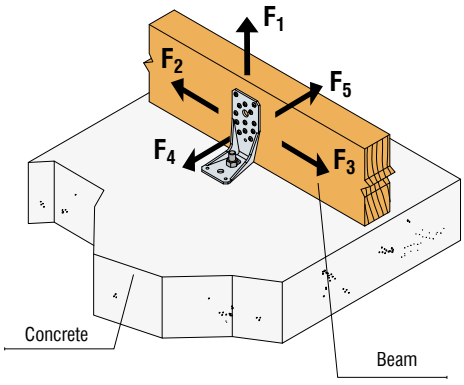
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AKR95G	95	85	65	4,0	9-Ø5	2-Ø5; 1-Ø11; 1-Ø13,5
AKR95LG	95	85	65	4,0	9-Ø5	2-Ø5; 1-Ø11; 1-Ø13,5x25
AKR135G	135	85	65	4,0	14-Ø5; 1-Ø13,5	2-Ø5; 1-Ø11; 1-Ø13,5
AKR135LG	135	85	65	4,0	14-Ø5; 1-Ø13,5	2-Ø5; 1-Ø11; 1-Ø13,5x25
AKR285G	285	85	65	4,0	26-Ø5; 3-Ø13,5	2-Ø5; 1-Ø11; 1-Ø13,5
AKR285LG	285	85	65	4,0	26-Ø5; 3-Ø13,5	2-Ø5; 1-Ø11; 1-Ø13,5x25



Load scheme
beam to concrete
2 brackets per connection

Beam to Concrete connection (full nailing)

Model No.	Fixing Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)			
			Factor to define $R_{1,k}$ [1]		$R_{2/3,k}$ [2]	$R_{4/5,k}$ [3,4]
	Part - A	Part - B	$R_{bend,nail,k}$	$R_{1,nail,k}$		
AKR95G	8 x CNA4,0x50	1 x WA-M12	11,6	22,6	6,2	26.5 / k_{mod}
AKR95LG			7,8	17,4	5,5	-
AKR135G	13 x CNA4,0x50	1 x WA-M12	11,6	40,7	10,1	26.5 / k_{mod}
AKR135LG			7,8	32,3	8,9	-
AKR285G	25 x CNA4,0x50	1 x WA-M12	11,6	59,0	12,7	26.5 / k_{mod}
AKR285LG			7,8	59,0	12,7	-



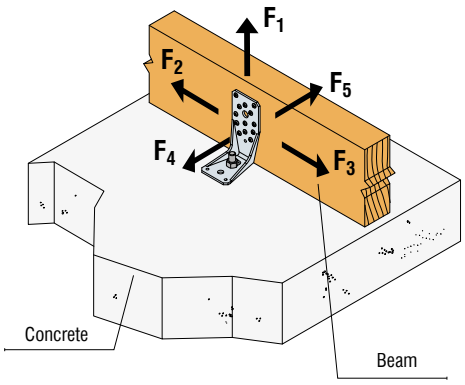
AKR Heavy Angle Brackets

ETA 07/0285

Beam to Concrete connection (partial nailing)

Model No.	Fixing Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)			
			Factor to define $R_{1,k}$ [1]		$R_{2/3,k}$ [2]	$R_{2/3,k}$ [3,4]
	Part - A	Part - B	$R_{bend,nail,k}$	$R_{1,nail,k}$		
AKR135G	9 x CNA4,0x50	1 x WA-M12	11,6	27,2	7,5	26,5/k_{mod}
AKR135LG			7,8	21,4	6,5	-
AKR285G	18 x CNA4,0x50	1 x WA-M12	11,6	52,3	9,4	26,5/k_{mod}
AKR285LG			7,8	40,6	6,4	-

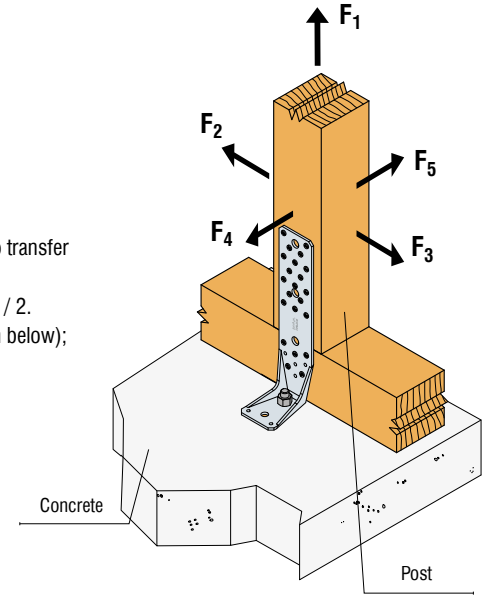
Load scheme
beam to concrete
2 brackets per connection



Post to Concrete connection

Model No.	Fixing Fasteners / Anchors		Characteristic capacity [kN] (2 brackets per connection)			
			Factor to define $R_{1,k}$ [1]		$R_{2/3,k}$ [2]	$R_{2/3,k}$ [3,4]
	Part - A	Part - B	$R_{bend,nail,k}$	$R_{1,nail,k}$		
AKR95G	5 x CNA4,0x50	1 x WA-M12	11,6	14,8	4,4	26,5/k_{mod}
AKR95LG			7,8	11,5	3,8	-
AKR135G	8 x CNA4,0x50	1 x WA-M12	11,6	26,1	7,0	26,5/k_{mod}
AKR135LG			7,8	21,1	6,1	-
AKR285G	22 x CNA4,0x50	1 x WA-M12	11,6	54,2	8,0	26,5/k_{mod}
AKR285LG			7,8	40,2	5,5	-

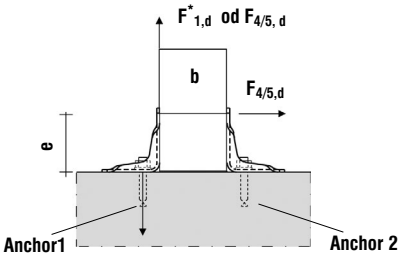
Load scheme
post to concrete
2 brackets per connection

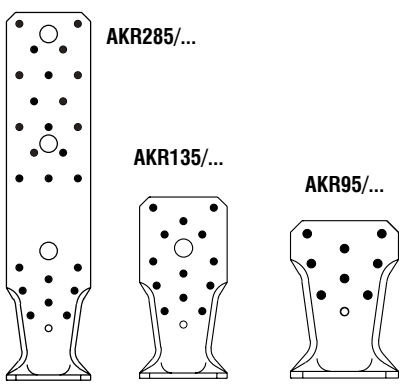
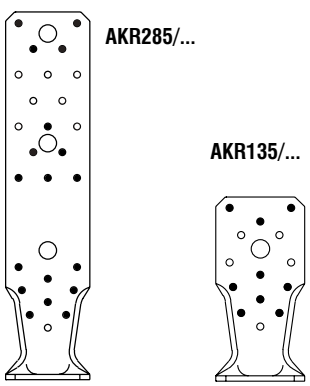
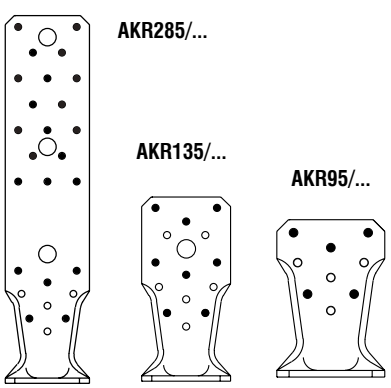


[1] Capacity $R_{1,k}$ must be determined in accordance with the formula below. In addition, each anchor must be able to transfer the pulling force $F_{ax,d} = F_{1,d} / 2$.
[2] In addition, each anchor must be able to transfer the pulling force $F_{ax,d} = F_{2,d} \times 0.2$, and shear force $F_{lat,d} = F_{2,d} / 2$.
[3] The anchor 1 must be able to transfer the pulling force $F_{1,d} = F_{4/5,d} \times (e\text{-}16.5\ mm) / (b + 83\ mm)$ (see diagram below);
[4] Anchor 2 must be able to take a tension force $F_{ax,d} = F_{4/5,d} \times 0.5$ and shear force $F_{lat,d} = F_{5,d}$.

For pair AKR

$$R_{1,k} = \min \left\{ \begin{array}{l} R_{1,nail,k} \\ \dfrac{42{,}8\ kN}{k_{mod}} \end{array} \right. + R_{bend,nail,k}$$



NAILING PATTERN - FULL NAILING Beam to Concrete connection	NAILING PATTERN - PARTIAL NAILING Beam to Concrete connection	NAILING PATTERN Post to Concrete connection
		

AH Light Hold Down Brackets

CE ETA 07/0285

SIMPSON Strong-Tie®

AH hold downs can be used for fixing timber elements, posts and straps to concrete, light concrete or masonry. These connectors ensure absorption of tensile force. This is the basic hold-down used to tie end posts of shear walls down to the foundation.
For correct connection and load transer it is recommended to use US washers.

Fixing:

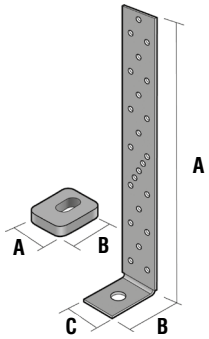
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.+ washers US

Material:
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

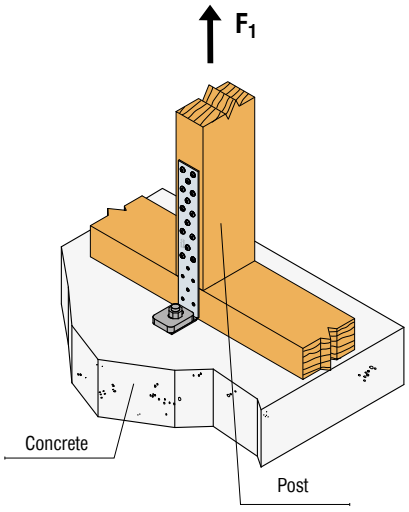
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
AH9035	90	35	40	2,0	6-Ø5; 1-Ø9	4-Ø5; 1-Ø9
AH16050	160	50	40	3,0	10-Ø5; 3-Ø13	4-Ø5; 1-Ø13
AH19050/2	192	52	40	2,0	16-Ø5	1-Ø13
AH19050/4	192	52	40	4,0	12-Ø5	1-Ø13
AH29050/2	292	52	40	2,0	23-Ø5	1-Ø13
AH29050/4	292	52	40	4,0	21-Ø5	1-Ø13



Post to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	$R_{1,k}$
AH9035	CNA4.0x40 (n ≥ 2)	1 x WA-M8	min { 4,0 / k_{mod} ; 3,40+(n-2) x 1,8
AH16050	n ≥ 2	1 x WA-M12	min { 15,0 / k_{mod} ; n x $R_{lat,k}$
AH19050/2	n ≥ 2	1 x WA-M12	
AH19050/4	n ≥ 2	1 x WA-M12	
AH29050/2	n ≥ 2	1 x WA-M12	
AH29050/4	n ≥ 2	1 x WA-M12	

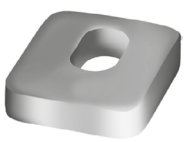
Load scheme
post to concrete
1 bracket per connection

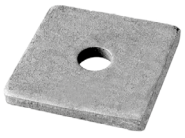


Where:
n = n_{ef} – effective number of nails according to Eurocode 5 p. 8.3.1.1 (8)
$R_{lat,k}$ - load capacity of the used fasteners nails/screws on shear. (page 42)
The anchor must be able to take a tension force $F_{ax,d} = 3,0 \times F_{1,d}$

Model No.	Dimensions [mm]			
	A	B	t	Ø
US40/40/10G-B	40	40	10	13.5
US40/50/10G-B	40	50	10	13.5 x 25
US50/50/8G-B	50	50	8	18
US60/60/6G-B	60	60	6	14

Use additional washers to achieve the declared load capacity of the AH connection.
It is recommended to use US40 / 50/10 washers.





HD Hold Down Brackets

CE ETA 07/0285

SIMPSON Strong-Tie®

HD anchor connectors are used to connect timber frame walls of timber buildings with foundations. The thick pad integrated into the bottom arm evenly distributes the anchoring force and is pressed against the concrete while the angle is being drawn.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

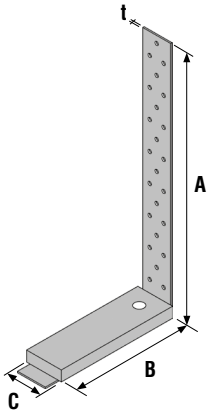
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

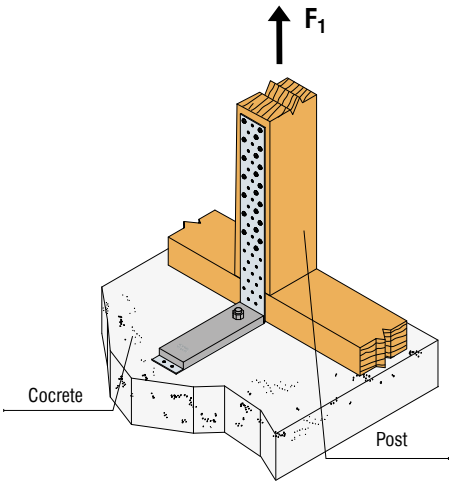
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
HD340M12G	340	182	40	2,0	25-Ø5	10-Ø5; 1-Ø14
HD400M16G	400	123	40	3,0	30-Ø5	5-Ø5; 1-Ø18
HD420M16H	420	222	60	2,0	53-Ø5	26-Ø5; 1-Ø18
HD420M20G	420	102	60	2,0	53-Ø5	6-Ø5; 1-Ø22



Load scheme
post to concrete
1 bracket per connection

Post to Concrete connection

Model No.	Characteristic capacity [kN] $R_{1,k}$	Factor for anchor k_A[-]
HD340M12G	min { 17,0 / k_{mod} ; n x $R_{lat,k}$ }	1,19
HD400M16G	min { 25,5 / k_{mod} ; n x $R_{lat,k}$ }	1,31
HD420M16H		1,22
HD420M20G		1,78



n = n_{ef} - effective number of nails according to Eurocode 5 p. 8.3.1.1 (8)

$R_{lat,k}$ - load capacity of the used fasteners nails/screws on shear. (page 42)

The anchor must be able to take a tension force $F_{ax,d} = k_A \times F_{1,d}$

Example:

Post to concrete connection, connector HD340M12G

$F_{1,d}$ = 8,9 kN

Service class-2, [K] – medium term load ⇒ k_{mod} = 0,9

8 nails CNA 4,0 x 40 , $R_{lat,k}$ = 1,84 kN (see table value for nails CNA)

$R_{1,k}$ = min{17,0 / k_{mod}; n x $R_{lat,k}$} = min{17,0 / 0,9; 8 x 1,84} = 14,7 kN

$R_{1,d}$ = 14,7 x 0,9 / 1,3 = 10,2 kN

Ultimate limit state:

$F_{1,d} / R_{1,d} < 1 \geq 8,9 / 10,2 = 0,87 < 1 \geq$ OK

Necessity permissible load on anchor:

$F_{ax,d} = k_A \times F_{1,d}$ = 1,19 x 8,9 = 10,6 kN

The selected anchor must be tested for transfer of design load. 10,6 kN.

HDU/HDB Two Part Hold Down Brackets

CE ETA 07/0285

US

HDB...

HDU...

Two part hold down brackets are used to anchor prefabricated frame walls to foundation. The biggest problem when installing prefabricated walls is the lack of access to the supporting layer - the timber framework, because it is hidden under the finishing layers.
Two piece anchor joints offer many possibilities for joints. With different combinations, you can get 46 different connection options for your individual needs and find the best solution to any problem.

Fixing:

- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor + washer US for HDBU

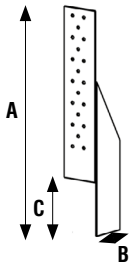
Material:
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

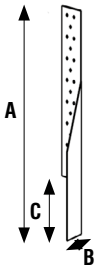
Available Sizes - top element

Model No.	Dimensions [mm]				Holes
	A	B	C	t	
HDUF250G	250	40	-	2,0	11 - Ø5
HDUF400G	400	60	-	2,0	40 - Ø5
HDUS336G	336	60	-	2,0	12 - Ø5
HDUL380G	380	55	65	2,0	20 - Ø5
HDUR380G	380	55	65	2,0	20 - Ø5
HDUL465G	465	55	150	2,0	20 - Ø5
HDUR465G	465	55	150	2,0	20 - Ø5
HDUF40XG	*	40	-	2,0	*
HDUF60XG*	*	60	-	2,0	*

* Special product, dimension A according to the order

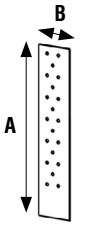


HDUR...



HDUL...

HDUS...



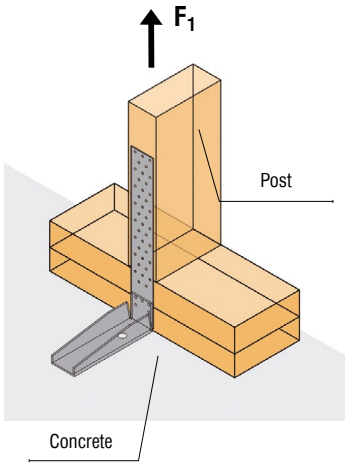
HDUF...

Post to Concrete connection top element

Model No.	Fixing Fasteners	Characteristic capacity [kN]
		$R_{1,k}$
HDUF250G	Max. 11 pcs.	min (n x $R_{lat.k}$; 17.0/k_{mod})
HDUF400G	Max. 40 pcs.	min (n x $R_{lat.k}$; 26.7/k_{mod})
HDUS336G	Max. 12 pcs.	min (21.3 ; 23.1/k_{mod})
HDUL380G	Max. 20 pcs.	min (11.7 x $R_{lat.k}$; 21.4 x $R_{ax.k}$)
HDUR380G	Max. 20 pcs.	min (11.7 x $R_{lat.k}$; 21.4 x $R_{ax.k}$)
HDUL465G	Max. 20 pcs.	min (11.7 x $R_{lat.k}$; 21.4 x $R_{ax.k}$)
HDUR465G	Max. 20 pcs..	min (11.7 x $R_{lat.k}$; 21.4 x $R_{ax.k}$)
HDUF40XG	-	min (n x $R_{lat.k}$; 17.0/k_{mod})
HDUF60XG	-	min (n x $R_{lat.k}$; 26.7/k_{mod})

$R_{lat,k}$ - load capacity of the used fasteners nails/screws on shear. (page 42)
$R_{ax,k}$ - load capacity of the used fasteners nails/screws on tension. (page 42)
Depending on the length

Load scheme
post to concrete
1 bracket per connection



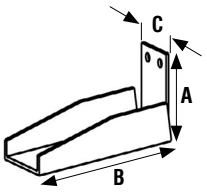
HDU/HDB Two Part Hold Down Brackets

CE ETA 07/0285

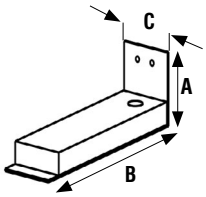
SIMPSON Strong-Tie

Available Sizes - bottom element

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
HDBU163G*	65	163	40	4,0	2-Ø6	1-Ø13
HDBU220G*	65	220	54	4,0	5-Ø6	1-Ø18
HDBU379G*	65	379	54	4,0	5-Ø6	1-Ø18
HDBW60G	82	65	50	4,0	2-Ø6	1-Ø13,5
HDBW160G	65	160	50	4,0	2-Ø6	1-Ø13,5
HDBW200G	65	222	50	4,0	5-Ø6	1-Ø17,5



HDBU...



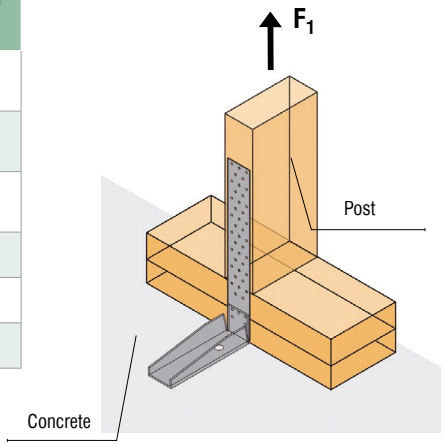
HDBW...

* Use washers US40/50/10

Post to Concrete connection bottom element

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN]	Factor for anchor k_A[-]
	Part - A	Part - B	$R_{1,k}$	
HDBU163G	2 x JY2-3/5x25[1)]	1 x WA-M12 US40/50/10	12.8/k_{mod}	1,55
HDBU220G	3 x JY2-3/5x25	1 x WA-M16 US40/50/10	19.2/k_{mod}	1,40
HDBU379G		1 x WA-M16 US40/50/10	12.8/k_{mod}	1,46
HDBW60G		1 x WA-M12	12.8/k_{mod}	2,00
HDBW160G		1 x WA-M12	12.8/k_{mod}	1,24
HDBW200G		1 x WA-M16	19.2/k_{mod}	1,23

Load scheme
post to concrete
1 bracket per connection



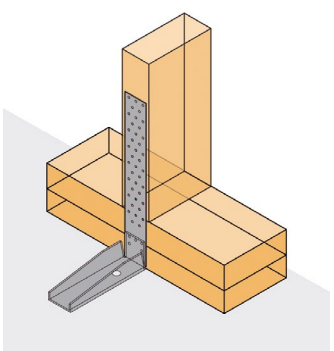
[1)] Self-drilling screws JY2-3/5x25 to connect both parts

The anchor must be able to take the tension force $F_{ax,d} = k_A \times F_{1,d}$

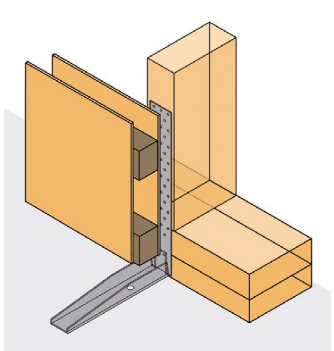
Combination		Top elemnet								
		HDUF250G	HDUF400G	HDUS336G	HDUL380G	HDUR380G	HDUL465G	HDUR465G	HDUF40XG	HDUF60XG
Bottom element	HDBU163G	+	+	+	+	+	+	+	+	-
	HDBU220G	-	x [1)]	-	+	+	+	+	-	-
	HDBU379G	x [2)]	+	+	+	+	+	+	-	+
	HDBW60G	+	+	+	+	+	+	+	+	-
	HDBW160G	+	+	+	+	+	+	+	+	-
	HDBW200G	-	+	+	+	+	+	+	-	+

Alternative name [1)] HD2P60G [2)] HD2PL40G + combination possible - combination impossible

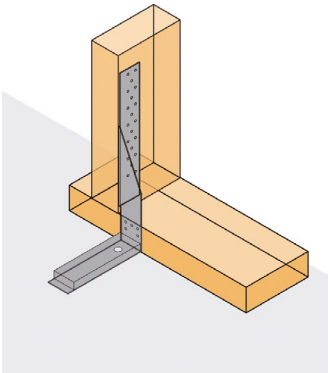
HDUF400G + HDBU220G
(HD2P60G)



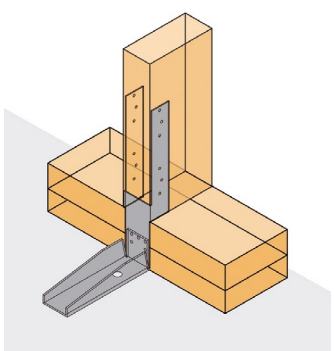
HDUF250G + HDBU379G
(HD2PL40G)



HDUR380G + HDBW200G



HDUS250G + HDBU379G



To achieve the declared load capacity, it is necessary to use additional pads distributing force on the entire surface of the lower bracket arm.

HTT Hold Down

CE ETA 07/0285

NEW ≠

HTT group anchor connectors are designed for transferring high tension force resulting from the rotation of the timber structure wall. Different heights allow you to choose an adequate connector model for the required loads. HTT4, HTT5, HTT22E connectors are used in anchoring „open" timber structure walls, i.e. in which we have access to a wooden supporting structure during assembly. The angle brackets can be installed on the outside of the wall as well as inside on the side of the post. The HTT31 connector is an unusual hold down. It can be fixed with standard CNA or CSA connectors. In addition, metric bolts can be used. A unique solution is the fixing using the ZYKT and ZYK fasteners, which allow installation to the wall through a non-bearing layer, such as a plasterboard.

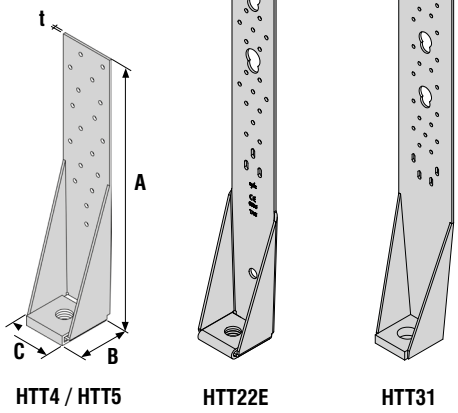
Fixing:

- For fastening to timber: use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm. Bolt M20 for HTT22E. ZYKT69 or ZYK 10 for HTT31
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



HTT4 / HTT5 HTT22E HTT31

Available Sizes

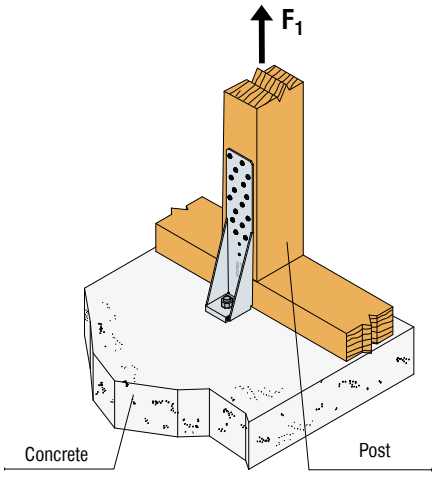
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
HTT4	314	51	58	2,8	18-Ø4,7	1-Ø17,5
HTT5	404	51	58	2,8	26-Ø4,7	1-Ø17,5
HTT22E	558	60	63	3,0	31-Ø5; 3-Ø21	1-Ø18
HTT31	790	60	90	3,0	41-Ø5; 6-Ø21	1-Ø26

Post to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	$R_{1,k}$
Anchoring without washer US			
HTT4	n pcs. - CNA for CSA	1 x WA-M16	min { (n - 3,5) x $R_{lat,k}$; 25,2 x $R_{ax,k}$; 43,0 / k_{mod} }
HTT5	n pcs. - CNA for CSA	1 x WA-M16	
Anchoring with washer US			
HTT4	n pcs. - CNA for CSA	1 x WA-M16 US50/50/8	min { (n - 3,5) x $R_{lat,k}$; 32,3 x $R_{ax,k}$ }
HTT5	n pcs. - CNAfor CSA	1 x WA-M16 US50/50/8	

$R_{lat,k}$ - load capacity of the used fasteners nails/screws on shear. (page 42)
$R_{ax,k}$ - load capacity of the used fasteners nails/screws on tension. (page 42)
$n = n_{ef}$ - effective number of nails according to Eurocode 5 pkt. 8.3.1.1 (8)*

Load scheme
post to concrete
1 bracket per connection



Post to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity $R_{1,k}$ [kN] (1 bracket per connection)				
	Part - A	Part - B	CNA4,0x40	CNA4,0x50	CNA4,0x60	CSA5,0x40	CSA5,0x50
HTT22E	n pcs. CNA lub CSA	1 x WA-M16	min { (n - 3,5) x 1,83 ; 39,6 ; 57,5 / k_{mod} }	min { (n - 3,5) x 2,22 ; 53,1 ; 57,5 / k_{mod} }	min { (n - 3,5) x 2,36 ; 53,1 ; 57,5 / k_{mod} }	min { (n - 3,5) x 2,25 ; 106,7 ; 57,5 / k_{mod} }	min { (n - 3,5) x 2,63 ; 138,2 ; 57,5 / k_{mod} }

$n = n_{ef}$ - Number of nails in series according to Eurocode 5 pkt. 8.3.1.1 (8)

HTT Hold Down

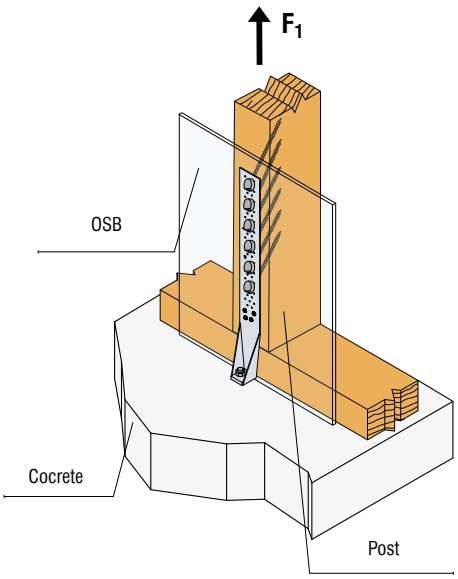
CE ETA 07/0285

SIMPSON Strong-Tie®

Post to Concrete connection

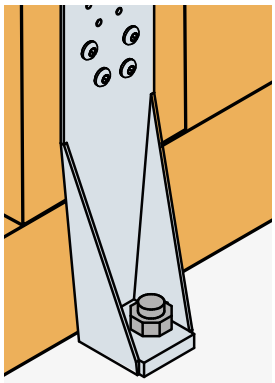
Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN] (1 bracket per connection)
	Part - A	Part - B	$R_{1,k}$
HTT31	n pcs. - CNA lub CSA	1 – AT-HP-M24	min { (n - 4) x $R_{lat,k}$; 26,8 x $R_{ax,k}$; 81,5 / k_{mod} }
	6 – ZYKT69 + 4 – CSA5,0x80[1)]	1 – AT-HP-M24	min { $n_z^{0,9}$ x 66,9 x l_{ef} x 0,86 1000 ; 78,3 / k_{mod} }
	6 – ZYKT69 + 4 – CSA5,0x80[2)]	1 – AT-HP-M24	$n_z^{0,9}$ x 62,1 x l_{ef} x 0,86 / 1000

Load scheme
post to concrete
1 bracket per connection



$R_{lat,k}$ - load capacity of the used fasteners nails/screws on shear. (page 42)
$R_{ax,k}$ - load capacity of the used fasteners nails/screws on tension. (page 42)
n = n_{ef} - effective number of nails according to Eurocode 5 pkt. 8.3.1.1 (8)*
n_z = the number fasteners used ZYKT69 lub ZYK10
l_{ef} = the effective thread length in the element [mm]
1) Use the CSA screws into the 4 lowest holes in the upper arm, see scheme. The minimum timber thickness 150mm.
2) Use the CSA screws into the 4 lowest holes in the upper arm, see scheme. The minimum timber thickness 95mm



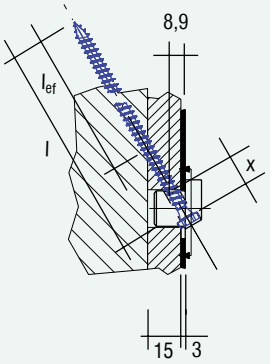



Hold down HTT31 plus ZYKT69 or ZYK10 enables installation through non-bearing layers (finishing boards) When using ZYKT69 or ZYK10, it is necessary to use 4 x CSA5,0x80 screws into the lowest holes in the long hold down arm.

Example for HTT31:

Edge post of a timber structure wall with dimensions: 80x140mm, timber class: C24. The traction force $F_{1,d}$ = 50 kN. Installation using the hold down HTT31 through the intermediate layer (plasterboard) with a thickness of 15mm. Fixing of the connector to the post using 6 pcs. ZYKT69 connectors + 4 pcs. CSA5,0x80. Load duration class - Medium term load, class of serviceability: 2 ≥ k_{mod} = 0.9

Determining the effective length of the screw threads in the support (l_{ef}):
l_{ef} = l – X – (15 + 3 – 8,9) / sin 30° = 300 – 17 – 18 = 265mm
$R_{1,k}$ = min ($6^{0,9}$ x 66,9 x 265 / 1000 x 0,86 ; 78,3 / 0,9) = min (76,4 ; 87,0) = 76,4 kN
$R_{1,d}$ = $R_{1,k}$ x k_{mod} / γ_M = 76,4 x 0,9 / 1,3 = 52,9 kN
Ultimate limit state:
$F_{1,d}$ / $R_{1,d}$ < 1 => 50 kN / 52,9 kN = 0,95 < 1 ≥ OK
The anchor must be able to use the tension force $F_{1,d}$ = 50 kN



MAH Banding Hold Down

CE ETA 07/0285

SIMPSON Strong-Tie®

The MAH hold down allows two anchoring methods to the foundation. The first is the standard connection of the timber structure post with the top of the foundation slab. To make such a connection, bend the connector at 90 degrees and install it like other hold downs. An alternative way of anchoring is instalation with a straight connector. Such assembly is used when anchoring the outside of the timber structure wall to the side of the foundation slab is required. To make such a connection, it is required to align the outer edge of the wall with the edge of the foundation slab

Fixing:

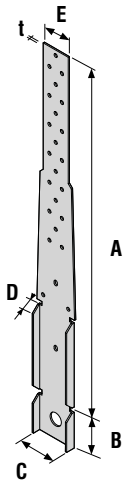
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete:
  use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

NEW



Straight hold down

Available Sizes

Model No.	Dimensions [mm]						Holes	
	A	B	C	D	E	t	Part - A	Part - B
MAH485	484	53	55	12	40	2,0	23-Ø5	1-Ø18

Post to Concrete connection

Model No.	Fixing - Fasteners / Anchors		Characteristic capacity [kN]	
			$R_{1,k}$	
	Part - a	Part - b	straight hold down	bend hold down*
MAH485	n > 2	1 x WA-M16 US50/50/8*	min (n x $R_{lat,k}$; 18,7/k_{mod})	min (n x $R_{lat,k}$; 24,6/k_{mod})

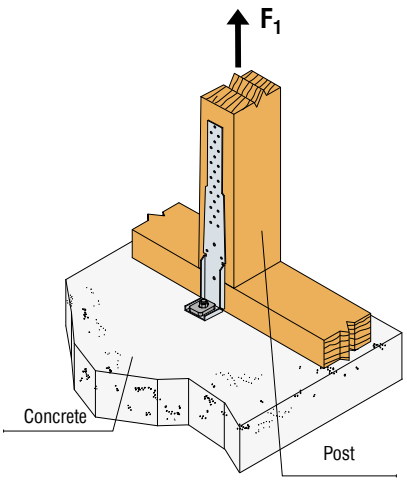
$R_{lat,k}$ - load capacity of the used fasteners nails/screws on shear. (page 42)

n = n_{ef} - effective number of nails according to Eurocode 5 pkt. 8.3.1.1 (8)*)

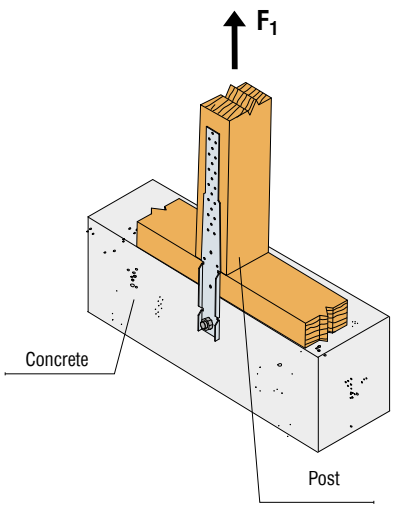
The anchor must be able to take the tension force $F_{anchor,\,k} \geq 1{,}96 \times F_{k,1}$

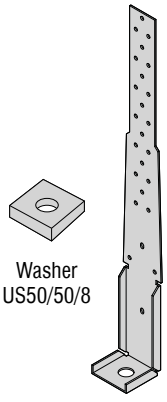
* When installing the bend connector, a US 50/50/8 washer is required (ordered separately)

Load scheme
post to concrete
1 bracket per connection
bend hold down



Load scheme
post to concrete
1 bracket per connection
straight hold down





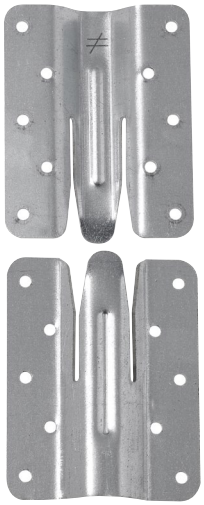
Washer
US50/50/8

Bend hold down

ICST Wall Panel Connectors

CE ETA 07/0245

SIMPSON Strong-Tie



ICST is a two-part symmetrical connector designed for the assembly of closed prefabricated wall panels. When using this connector, it is not necessary to use inspection holes in the wall panel.

Fixing:

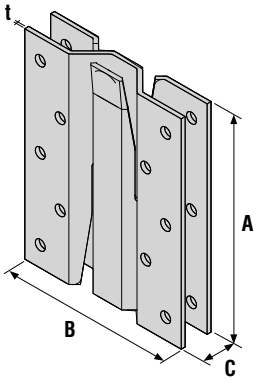
- For fastening to timber:
  use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG | R30

NEW

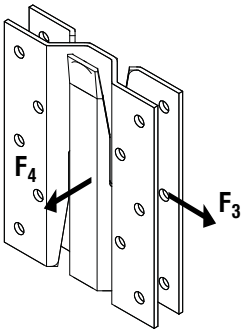


Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - a	PArt - b
ICST	100	78	15	2,0	10-Ø5	10-Ø5

Prefabricated panels connection

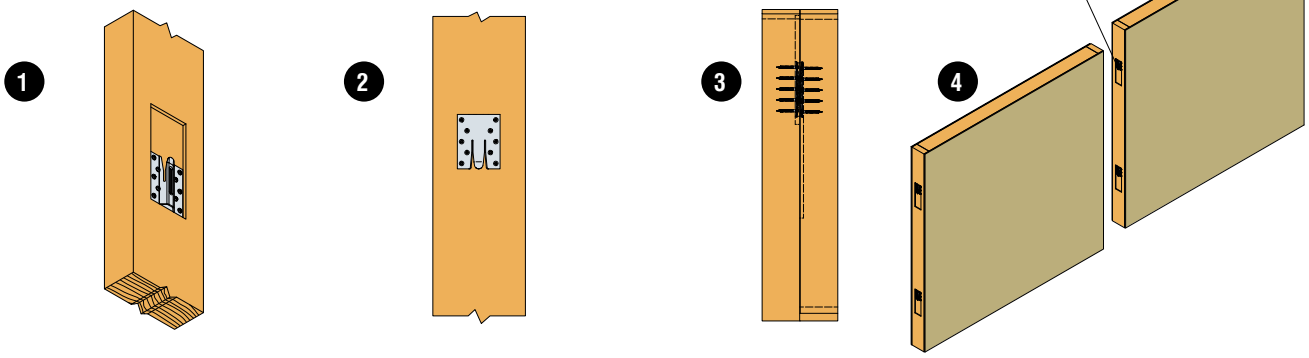
Model No.	Fixing - Fasteners		Characteristic capacity [kN]	
	Part - A	Part - B	$R_{3,k}$	$R_{4,k}$
ICST	10 pcs.	10 pcs.	min (6,72 x $R_{lat,k}$; 16,9 / k_{mod})	min (4 x $R_{ax,k}$; 5.35 / k_{mod})



$R_{lat,k}$ - load bearing capacity of applied nails or screws on shear. (page 42)
$R_{ax,k}$ - load bearing capacity of applied nails or screw on tension. (page 42)

ICST Installation

ICST is used in pairs. Its assembly requires only milling only on one side chosen by the user. The hollow should have a depth of 15 mm, a width of 90 mm and a length of at least 220 mm. The minimum distance between ICST and vertical ends is 100 mm. Both parts of the ICST combine to form a symmetrical connection.



Do milling with dimensions of 220x90x15. Minimum distance 100 mm from the end of the element. Secure Part A with connectors dedicated for this connection.

Secure Part B to the panel not being milled using connectors dedicated for this connection.

The installation two timber elements is facilitated by the central guidance in the connector in the inner part. More than two pairs can be used for larger structural loads.

SSW Steel Strong-Wall for Timber Frame Racking Resistance

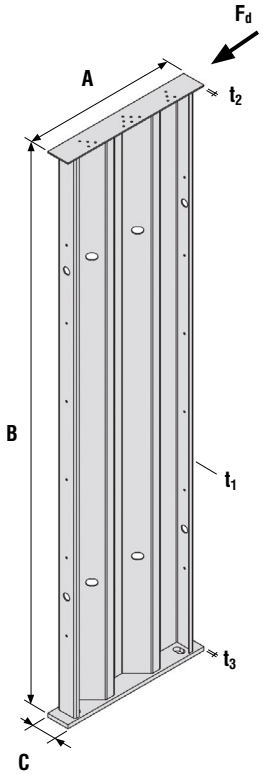
The Steel Strong-Wall is a corrugated steel panel which is designed to be fixed directly to the concrete foundations of a building, within the external or internal wall, via a bolted connection.
Being relatively small in width the Steel Strong-Wall™ can be used in areas where only small sections of wall are available, offering significantly higher racking resistance than the equivalent sized standard timber frame wall panel..

Fixing:
Screws SDS25312 (Ø6.35 x 89) and chemical anchor AT-HP + LMAS M24x210.
ALL ITEMS DELIVERED IN THE SET.

Material:
S250GD + Z275 t=3,5mm (trapezoidal profile), t=5,0mm (top sheet metal), t=12,0 lub 15,0 (botton sheet metal)

Zn 20 μm

CL.2



Available Sizes

Model No.	Dimensions [mm]						Anchoring to concrete	Fixing to top beam 1)
	A	B	C	t_1	t_2	t_3		
SSW300	300	1900 - 2200	89	3,5	5,0	12,0	2 anchors M20	4 - SDS25312 (Ø6,35x89)
		2201 - 2700						
SSW450	450	1900 - 2200	89	3,5	5,0	15,0	2 anchors M24	10 - SDS25312 (Ø6,35x89)
		2201 - 2700						
SSW600	600	1900 - 2200	89	3,5	5,0	15,0	2 anchors M24	14 - SDS25312 (Ø6,35x89)
		2201 - 2700						

1) Fasteners supplied complete with main element

Dimension and characteristic capacity consistent with the design method EN1995-1-1

Model No.	Characteristic capacity horizontal force R_k [kN] 2)	Single anchor load	
		Tension 1)	Shear
SSW300	13,00	$T = 9.514 \times F_d$	$F_d / 2$
	8,90	$T = 11.053 \times F_d$	
SSW450	29,00	$T = 5.961 \times F_d$	$F_d / 2$
	22,50	$T = 5.624 \times F_d$	
SSW600	45,00	$T = 3.962 \times F_d$	$F_d / 2$
	38,00	$T = 4.268 \times F_d$	

1) R_k is the characteristic capacity on the transverse force F_d applied to the top edge of the element acting in the Steel Strong-Wall plane.
2) The load of the anchor bolt is closely related to the transverse force F_d, the anchorage of the element should be verified to ensure the required load F_d is the actual load transmitted to the Steel Strong-Wall

SSW Steel Strong-Wall for Timber Frame Racking Resistance

METHOD OF INSTALLATION

Connection with timber:

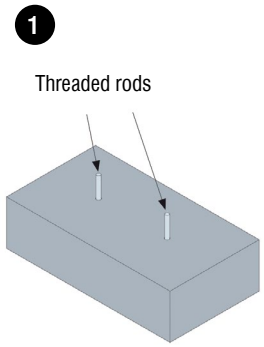
SDS - Construction Screw (SDS25312): Simpson Strong-Tie® SDS Screw is a hexagonal head screw, does not require any pre-drilling, ideal for both timber-timber and timber-steel connections. Protected against corrosion by hot dip galvanizing.

Fixing to concrete:

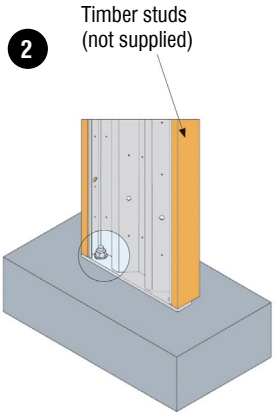
SET-XP - Epoxy Resin for highest loads: Can be used with both non-cracked and cracked concrete, carrying the highest loads.
AT-HP - methacrylate resin without styrene, can be used with all popular building materials (wall, concrete)
Anchoring is a very important aspect of using Steel Strong-Wall, which must be verified at every application of this solution. The dimensions of the foundation must also be verified in order to achieve effective anchorage.

Installation procedure

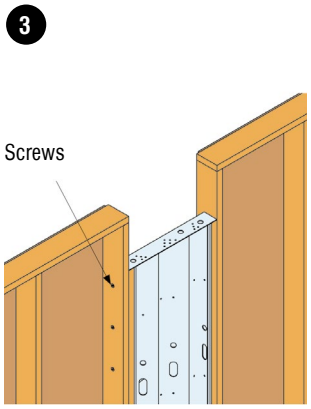
Steel Strong-Wall is custom-made for a specific height, when the bottom than timber wall element is to be installed, the load must be transferred from the top timber frame wall to the Steel Strong-Wall by means of additional timberen components and connectors capable of transferring the required forces. The maximum height of the supplementary element is 300mm
Due to the large clamping force, the Steel Strong-Wall profile can not be installed on timber elements (such as sole plates). The SSW must be anchored directly to the concrete.



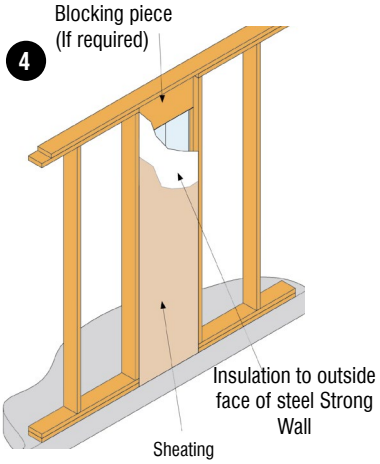
Installation of threaded rods according to chemical anchor instructions



Tighten the nuts without the use of impact or impulse tools



Connection wall panels



connection between Steel Strong-Wall and the top of the wall with Steel Strong--Wall

Load capacity for lateral force as load capacity for anchor withdraw

It is possible to determine the capacity of the element as the derivative of the load capacity of the anchor. The calculated load capacity must not exceed the characteristic load capacity of the whole element

To calculate the load capacity as a derivative of the anchor load, use the formula:

$$R_d = \frac{R_{d,ax} \times L_{anchor}}{H_{sww}}$$

Where :
R_d - Design load bearing capacity of applied anchors for tension
$R_{d,ax}$ - Design load bearing capacity of applied anchors
L_{anchor} - The distance between the rotation point and the most loaded anchor.
H_{sww} - height of the Steel Strong-Wall [mm]

Model No.	L_{anchor} [mm]
SSWT300	236
SSWT450	379
SSWT600	531

Anchor loads

The capacity of the anchor should be checked in each case

Shear

$F_{d,lat}$ - Design shear force in one of the anchor
F_d - Horizontal force acting on the whole element Steel Strong-Wall:

$$F_{d,lat} = \frac{F_d}{2}$$

Pullingof the anchor

In order to calculate the pull-out strength of the anchor use the formula

$$F_{d,ax} = \frac{F_d \times H_{sww}}{L_{anchor}}$$

Where:
F_d - Horizontal force applied to the top edge Steel Strong - Wall
H_{sww}- height of the Steel Strong-Wall
L_{anchor}- The distance between the rotation point and the most loaded anchor

SSP Steel Strong-Portal for Timber Frame Racking Resistance

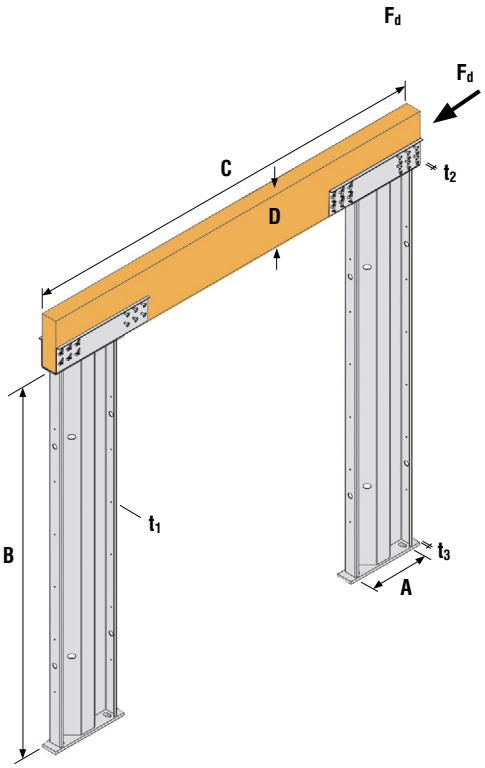
Steel Strong-Portal is a combined timber-steel frame for increasing the horizontal stiffness of timber frame buildings. It is fixed inside the wall directly to the foundation. Allows the transfer of very high horizontal forces relative to its small width. The height is adjusted to the height of the project. Steel Strong-Portal achieves much greater load capacity than two individual Steel Strong-Wall products. Glulam or LVL is not part of the set.

Fixing:
Screws SDS25312 (Ø6.35 x 89) and chemical anchor AT-HP + LMAS M24x210.
ALL ITEMS DELIVERED IN THE SET..

Material:
S250GD + Z275 t=3,5mm (trapezoidal profile), t=5,0mm (top sheet metal), t=12,0 lub 15,0 (botton sheet metal)

Zn 20 μm

CL.2



Available Sizes

Model No.	Dimensions [mm]						width of the whole layout C
	A	B	Min. height of the lintel D	t_1	t_2	t_3	
SSP300	300	1900 - 2200	315	3,5	5,0	12,0	1500 - 3600
		2201 - 2500					
SSP450	450	1900 - 2200		3,5	5,0	15,0	1500 - 3600
		2201 - 2500					
SSP600	600	1900 - 2200		3,5	5,0	15,0	1500 - 3600
		2201 - 2500					

Dimension and characteristic capacity consistent with the design method EN1995-1-1

Model No.	Characteristic capacity horizontal force R_k [kN]	Single anchor load	
		Tension [3]	Shear
SSP300	38,0	9,5	1,875
	35,0	8,5	1,625
SSP450	69,0	25	4,875
	61,0	20,5	4,0
SSP600	69,0	40	7,875
	69,0	30,5	6,0

[1] R_k is the characteristic capacity of the lateral force F_d applied to the upper edge of the element in the Steel Strong Portal. See the scheme above.

SSP Steel Strong-Portal for Timber Frame Racking Resistance

METHOD OF INSTALLATION

Connection with timber

SDS - Construction Screw (SDS25312): Simpson Strong-Tie® SDS Screw is a hexagonal head screw, does not require any pre-drilling, ideal for both timber-timber and timber-steel connections. Protected against corrosion by hot dip galvanizing

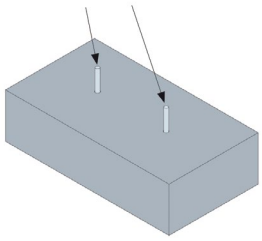
Fixing to concrete:

SET-XP - Epoxy Resin for highest loads: Can be used with both non-cracked and cracked concrete, carrying the highest loads.
AT-HP - methacrylate resin without styrene, can be used with all popular building materials (wall, concrete)
Anchoring is a very important aspect of using Steel Strong-Wall, which must be verified at every application of this solution. The dimensions of the foundation must also be verified in order to achieve effective anchorage

Installation procedure

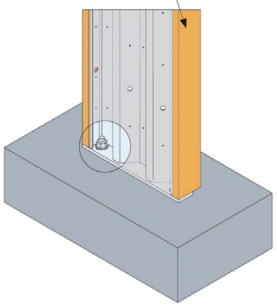
Steel Strong-Portal is custom-made for a specific height, when the bottom than timberen wall element is to be installed, the load must be transferred from the top timber frame wall to the Steel Strong-Portal by means of additional timberen components and connectors capable of transferring the required forces.
The maximum height of the supplementary element is 300mm
Due to the large clamping force, the Steel Strong-Portal can not be installed on timber elements (such as sole plates). The SSP must be anchored directly to the concrete.

1



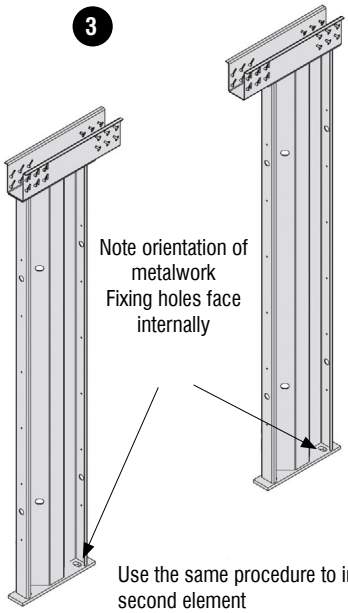
Installation of threaded rods according to chemical anchor instructions

2



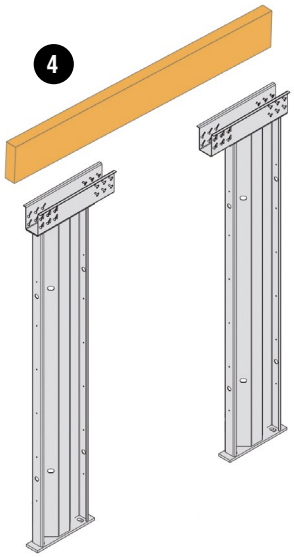
Tighten the nuts without the use of impact or impulse tools

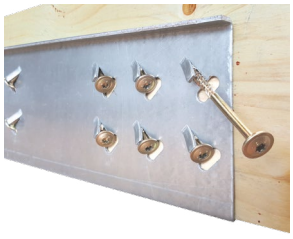
3



Use the same procedure to install the second element

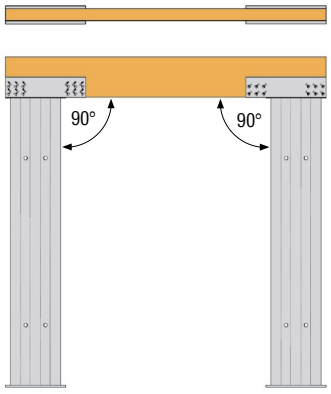
4





Install header (Glulam or LVL) and connect the Steel Strong Portal with the header using the screws ESCR screwed in by the holes on the specified angle.

5



Connection between Steel Strong-portal and the top of the wall

GAR Steel Mesh Protection

Steel mesh protecting the ventilated space of the facade. Prevents the entry of rodents and insects. The diameter of the hole (3mm) also protects against small insects. The proper area of holes per meter of tape enables efficient ventilation of the facade. Highest quality anti-corrosion coating, ensuring durability of the product as for A2 stainless steel. Sold in rolls, which makes transport easer, minimizes waste (cutting to size) and speeds up work with the product.

Fixing:

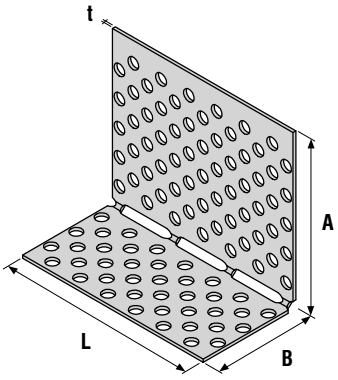
- For fastening to timber: use connector nails CNA2.5x35

Material:

Galvanized steel 0,9 mm S250GD + ZM310 MBC U

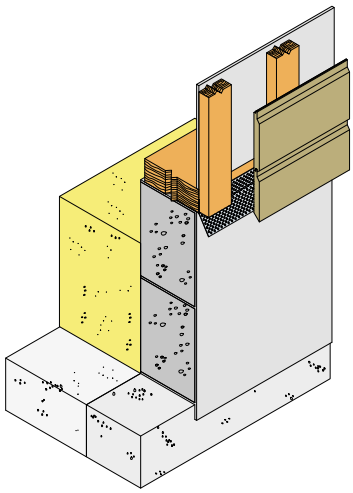
EZG CL.3 CS DWG

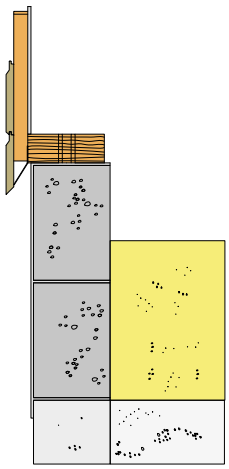
NEW



Available Sizes

Model No.	Dimensions				Holes
	A [mm]	B [mm]	L [m]	t [mm]	
GAR22	45	22	25	0,8	Ø3; Ø3x12
GAR25	42	25	25	0,8	Ø3; Ø3x12





The protection mesh should not be combined with stainless steel elements and fittings.

Application

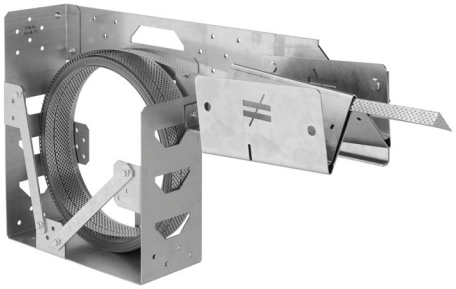
- Expand and profile the mesh using the DEVGAR device, for profiling,
- Cut the safety mesh to the required length,
- Fix the mesh by installing the CNA2.5x35 nails

.

It is recommended to wear protective gloves when profiling and installing the protective mesh.
The equivalent finish for A2 stainless steel has very good corrosion resistance,

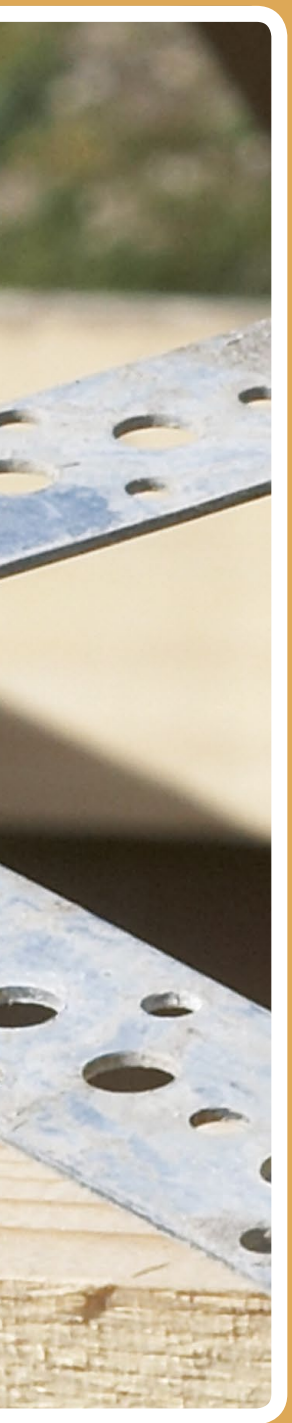
Model No.	Dimensions [mm]		
	A	B	C
DEVGAR	425	170	760

Mesh feeder / bending machine



Nail plates and wind bracing

nail plates, steel straps and roof bracing system



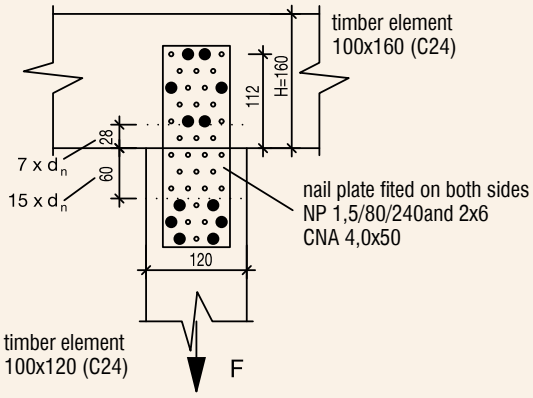
TECHNICAL INFORMATION nail plates

Perforated plates carry tensile forces. It is recommended to use two plates for each joint one on each side of the timber elements. In the case of connections from one side eccentricy must be taken into account. In the case of fixing with CNA connector nails or CSA connector screws, calculations as a thick plates may also be made for plates of thickness 1, 5 mm. The characteristic values of tensile strength for the plates is calculated as follows: The steel S250GD .: Z275 + k = A_{ef} x 297 N / mm. The design value is calculated at γ_M = 1, 3 and the net section area. A_{ef} = A x T x 0,75. Perforated plates also can be used in trusses nodes, static proof is required here.

Example:

Cross section of timber elements 100x160mm and 100x120mm, Chosen perforated plates: NP15/80/240 with nails 2x 6 CNA 4.0 x 50.
$F_{1,d}$ = 14,5 kN, Load duration class = short-term

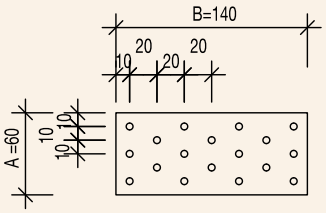
Nails capacity:
$R_{1,d}$ = 2 x 6 x 2,22 kN x 0.9 / 1,3 = 18,4 kN
Plates capacity (2 pcs.)
Aef = 2 x 80 x 1, 5 x 0, 75 = 180 mm^2
$R_{1\ Bl,d}$ = 180 x 297 N/mm^2 / 1,3 = 41,2 kN



$$\frac{14,5}{18,4} = 0,79 < 1 \Rightarrow \text{ok}$$

$$\frac{14,5}{41,2} = 0,35 < 1 \Rightarrow \text{ok}$$

The nail pattern should be symmetrical about the force direction.
Keep the minimum spacing between the nails and the distance between the end and the side of the timber element.



Holes patern on perforated plates and straps

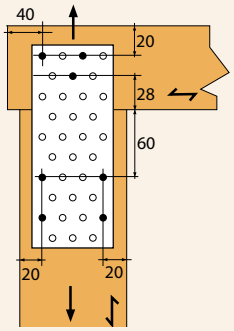
Spacing and edge distances

To reach the full capacity of the connection it is critical to fulfil the Eurocode 5 (p. 8.3.1.4) requirement regarding minimum spacing between the fasteners and minimum timber edge and end distances.

Minimum timber edge and end distance:

$a_{3,c}$ – Distance between fastener and unloaded end
$a_{3,t}$ – Distance between fastener and loaded end
$a_{4,c}$ – Distance between fastener and unloaded edge
$a_{4,t}$ – Distance between fastener and loaded edge

Minimum timber edge and end distance

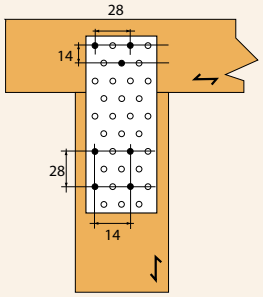


Minimum fasteners spacing:

a_1 – Spacing, parallel to grain, of fasteners within one row
a_2 - Spacing, perpendicular to grain, between rows of fasteners
a_1 = 0,7 x 10d = 0,7 x 10 x 4 = 28mm
a_2 = 0,7 x 5d = 0,7 x 5 x 4 = 14mm

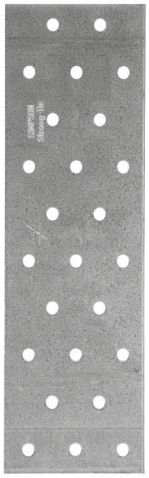
a_2 = 0,7 x 5d = 0,7 x 5 x 4 = 14mm
$a_{3,c}$ = 10d = 10 x 4 = 40mm
$a_{3,t}$ = 15d = 15 x 4 = 60mm
$a_{4,c}$ = 5d = 5 x 4 = 20mm
$a_{4,t}$ = 7d = 7 x 4 = 28mm

Minimum fasteners spacing



NP Nail Plates

DoP-h10-0005



NP perforated nail plates can be used in timber structures of any kind. They are used to connect two or more timber members together and available in a variety of sizes. Always use two perforated nail plates per connection, one on each side.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

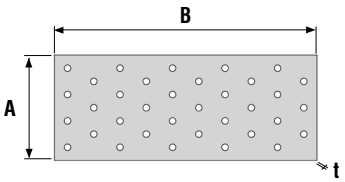
Material:

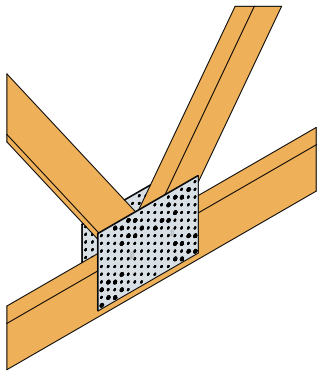
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes (1,5 mm)

Model No.	Dimensions [mm]			
	A	B	t	Ø
NP15/40/120	40	120	1,5	9-Ø5
NP15/40/160	40	160	1,5	12-Ø5
NP15/50/200	50	200	1,5	20-Ø5
NP15/60/140	60	140	1,5	18-Ø5
NP15/60/160	60	160	1,5	20-Ø5
NP15/60/200	60	200	1,5	25-Ø5
NP15/60/240	60	240	1,5	30-Ø5
NP15/60/300	60	300	1,5	38-Ø5
NP15/60/340	60	340	1,5	43-Ø5
NP15/60/420	60	420	1,5	54-Ø5
NP15/60/500	60	500	1,5	62-Ø5
NP15/80/140	80	140	1,5	25-Ø5
NP15/80/200	80	200	1,5	35-Ø5
NP15/80/240	80	240	1,5	42-Ø5
NP15/80/280	80	280	1,5	49-Ø5
NP15/80/300	80	300	1,5	51-Ø5
NP15/80/340	80	340	1,5	60-Ø5
NP15/100/140	100	140	1,5	32-Ø5
NP15/100/200	100	200	1,5	45-Ø5
NP15/100/220	100	220	1,5	50-Ø5
NP15/100/240	100	240	1,5	54-Ø5
NP15/100/300	100	300	1,5	68-Ø5
NP15/100/340	100	340	1,5	77-Ø5
NP15/120/240	120	240	1,5	66-Ø5
NP15/120/300	120	300	1,5	83-Ø5
NP15/140/200	140	200	1,5	65-Ø5
NP15/140/300	140	300	1,5	98-Ø5
NP15/160/260	160	260	1,5	98-Ø5
NP15/160/400	160	400	1,5	150-Ø5
NP15/180/220	180	220	1,5	94-Ø5



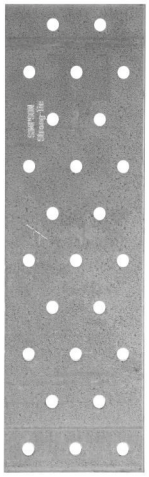


Available Sizes (2,0 mm)

Model No.	Dimensions [mm]			
	A	B	t	Ø
NP20/40/120	40	120	2,0	9-Ø5
NP20/40/160	40	160	2,0	12-Ø5
NP20/50/200	50	200	2,0	20-Ø5
NP20/60/140	60	140	2,0	18-Ø5
NP20/60/200	60	200	2,0	25-Ø5
NP20/60/240	60	240	2,0	30-Ø5
NP20/80/200	80	200	2,0	35-Ø5
NP20/80/240	80	240	2,0	42-Ø5
NP20/80/300	80	300	2,0	51-Ø5
NP20/100/140	100	140	2,0	32-Ø5
NP20/100/200	100	200	2,0	45-Ø5
NP20/100/240	100	240	2,0	54-Ø5
NP20/100/260	100	260	2,0	59-Ø5
NP20/100/300	100	300	2,0	68-Ø5
NP20/100/400	100	400	2,0	90-Ø5
NP20/100/500	100	500	2,0	112-Ø5
NP20/120/200	120	200	2,0	55-Ø5
NP20/120/240	120	240	2,0	66-Ø5
NP20/120/260	120	260	2,0	72-Ø5
NP20/120/300	120	300	2,0	83-Ø5
NP20/120/400	120	400	2,0	110-Ø5
NP20/140/400	140	400	2,0	130-Ø5
NP20/160/300	160	300	2,0	113-Ø5
NP20/160/400	160	400	2,0	150-Ø5
NP20/200/300	200	300	2,0	134-Ø5

NP Nail Plates

DoP-h10-0005



NP perforated nail plates can be used in timber structures of any kind. They are used to connect two or more timber members together and available in a variety of sizes.Always use two perforated nail plates per connection, one on each side.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

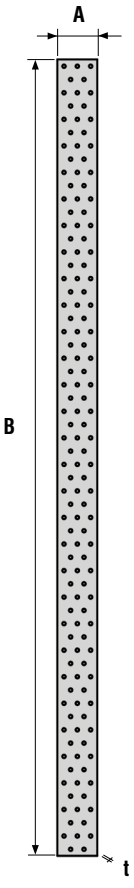
Zn 20 μm | CL.2 | CS | DWG

Available Sizes (2,0 mm)

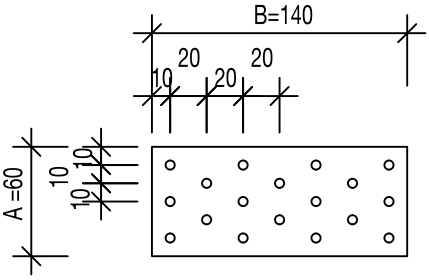
Model No.	Dimensions [mm]			
	A	B	t	Ø
NP20/40/1200	40	1200	2,0	90-Ø5
NP20/60/1200-B	60	1200	2,0	150-Ø5
NP20/80/1200-B	80	1200	2,0	210-Ø5
NP20/100/1200-B	100	1200	2,0	270-Ø5
NP20/120/1200-B	120	1200	2,0	330-Ø5
NP20/140/1200-B	140	1200	2,0	390-Ø5
NP20/160/1200-B	160	1200	2,0	450-Ø5
NP20/180/1200-B	180	1200	2,0	510-Ø5
NP20/200/1200-B	200	1200	2,0	570-Ø5
NP20/220/1200-B	220	1200	2,0	630-Ø5
NP20/240/1200-B	240	1200	2,0	690-Ø5
NP20/260/1200-B	260	1200	2,0	750-Ø5
NP20/280/1200-B	280	1200	2,0	810-Ø5
NP20/300/1200-B	300	1200	2,0	870-Ø5

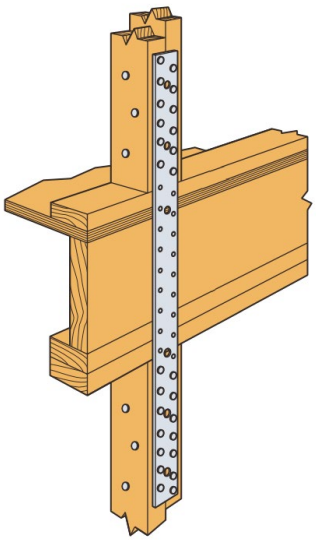
Available Sizes (2,5 mm)

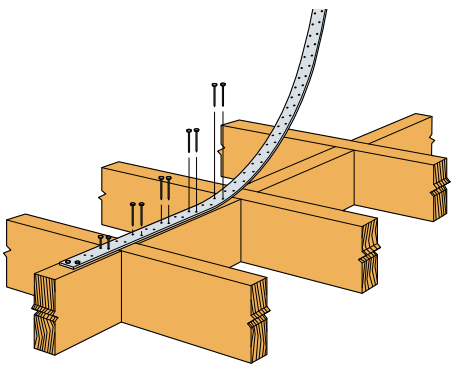
Model No.	Dimensions [mm]			
	A	B	t	Ø
NP25/40/1200	40	1200	2,5	90-Ø5
NP25/60/1200	60	1200	2,5	150-Ø5
NP25/80/1200	80	1200	2,5	210-Ø5
NP25/120/1200	120	1200	2,5	330-Ø5
NP25/160/1200	160	1200	2,5	450-Ø5
NP25/220/1200	220	1200	2,5	630-Ø5
NP25/240/1200	240	1200	2,5	690-Ø5
NP25/260/1200	260	1200	2,5	750-Ø5
NP25/280/1200	280	1200	2,5	810-Ø5
NP25/300/1200	300	1200	2,5	870-Ø5



Pattern holes location
in plates and perforated strips

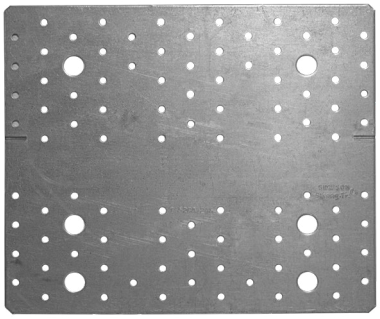






NPB Anchoring nail plates

DoP-h10-0005



Perforated plates have many applications to simple overlay connections. Perforated nail plate NPB255 was developed for fixing CLT panels to timber or concrete elements. Easy installation thanks to the marking line that allows the positioning of two elements.

Fixing:

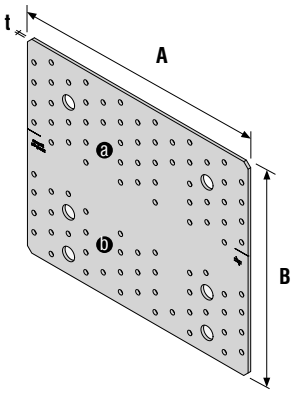
- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

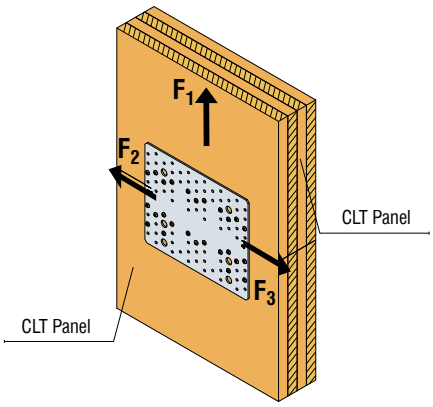
NEW



Available Sizes

Model No.	Dimensions [mm]			Holes	
	A	B	t	Part A	Part B
NPB255	255	214	3,0	52-Ø5; 2-Ø14	41-Ø5; 4-Ø14

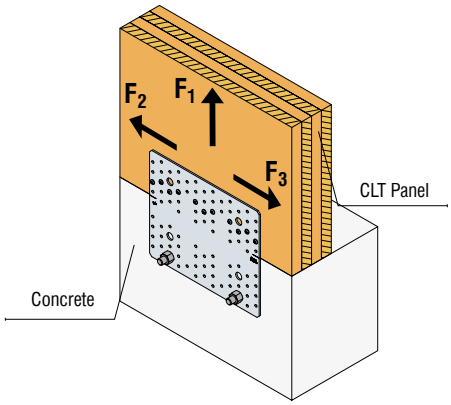
Load scheme
CLT panel
1 nail plate per connection



CLT panel to CLT panel connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN]	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2,k}$
NPB255	11 pcs.	15 pcs.	CNA4,0x50	23.9	20.8

Load scheme
CLT panel - concrete
1nail plate per connection

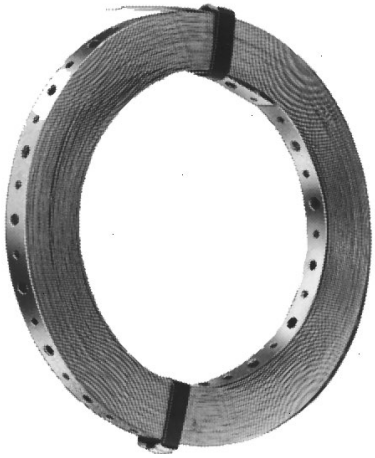


CLT panel to concrete connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN]	
	Part - A	Part - B	Type	$R_{1,k}$	$R_{2,k}$
NPB255	11 pcs.	2 x WA M12	CNA4,0x50	23.1	18.1

BAN20 Perforated Steel Straps

DoP-h10-0010



Steel straps are usually used for anchoring and assembling small timber structures. Typical applications can be: carports, playhouses and pergolas.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

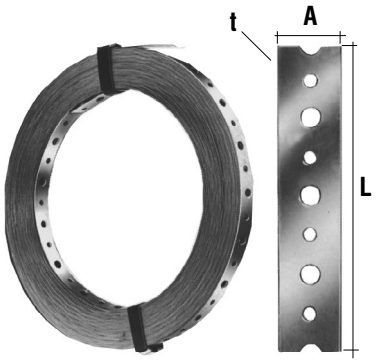
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm

CL.2

Available Sizes and Technical Data

Model No.	Dimensions				Characteristic capacity [kN]
	A [mm]	t [mm]	L [m]	Ø	$R_{1,k}$*
BAN102003	20	1,0	3	Ø5 -Ø6,5	min { $4,0/k_{mod}$; n x $R_{lat,k}$ }
BAN102010	20	1,0	10	Ø5 -Ø6,5	
BAN102025	20	1,0	25	Ø5 -Ø6,5	
BAN152010	20	1,5	10	Ø5 -Ø6,5	min { $6,0/k_{mod}$; n x $R_{lat,k}$ }
BAN152025	20	1,5	25	Ø5 -Ø6,5	



n = n_{ef} - Number of nails in series according to the Eurocode 5 p. 8.3.1.1 (8)

$R_{lat,k}$ - Shear capacity of the fasteners

BANSTR/S Tightening Tool for Wind Bracing Strap

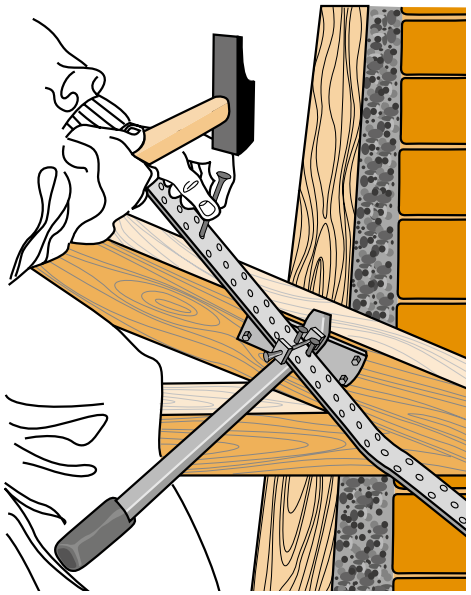
For correct tension of BAN 40mm wide perforated strap, it is recommended to use a handgrip. For other straps wider than 40mm we recommend using a professional strap tensioner.

Hand tool BANST

This is a very useful hand tool designed to tension the perforated straps up to 40x2,0. It can also be used for 60mm wide straps. In this case, we recommend the BANSTRS professional tool. Until the nails is finally secured, hold the strap by holding the hand lever.

Strapping machine BANSTRS

This device is an optimal tool for mounting 40, 60 and 80mm wide straps. The pull function allows you to automatically hold the strap in the correct tension until it is fixed with the nails.



BAN Wind Bracing Straps

DoP-h10-0010

These straps are made of galvanized steel. They come in several sizes and different widths and lengths. Wind bracing Straps are used for anchoring and stabilizing timber structures. Straps of 80x2,0 mm can be used where higher tension strength is required. To achieve more efficiency, wind straps must be tightened when the structure / building is finished. It is recommended to use it together with BNG and BNF wind bracing connectors for achieving maximum strength in the truss construction.

Fixing:

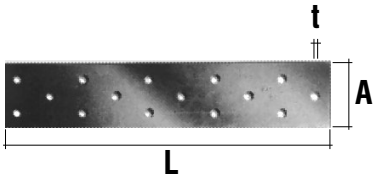
- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm

CL.2



Available Sizes and Technical Data

Model No.	Dimensions				Characteristic capacity [kN]
	A [mm]	t [mm]	L [m]	Ø	$R_{1,k}$*
BAN202510	25	2,0	10	Ø5	min { 11,8/k_{mod} ; n x $R_{lat,k}$ }
BAN202525	25	2,0	25	Ø5	
BAN154025	40	1,5	25	Ø5	min { 17,7/k_{mod} ; n x $R_{lat,k}$ }
BAN154050	40	1,5	50	Ø5	
BAN204025	50	2,0	25	Ø5	
BAN204050	40	2,0	50	Ø5	
BAN156050	60	1,5	50	Ø5	min { 26,6/k_{mod} ; n x $R_{lat,k}$ }
BAN206050	60	2,0	50	Ø5	
BAN158025	80	1,5	25	Ø5	min { 35,5/k_{mod} ; n x $R_{lat,k}$ }
BAN208025	80	2,0	25	Ø5	

* n = n_{ef} - Number of nails in series according to the Eurocode 5 p. 8.3.1.1 (8)

$R_{lat,k}$ - Shear capacity of the fasteners

FMBS Tension Straps Connectors

ETA-10/0440

The FMBS tension straps are used in the wind bracing system to tighten the straps and to give the opportunity to retighten the straps. The new FMBS is suitable for 25, 40 and 60 mm straps. The FMBS can be installed between two straps or between a wind bracing connector and a strap. As shown in table 1, the FMBS is packed in boxes with associated clips and dowel for respectively 25, 40 and 60 mm wind bracing straps. The FMBS tension strap has minimum tensile capacity the same as the 60x2,0 mm wind bracing strap.

Fixing:

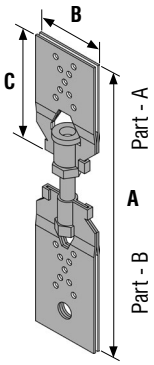
For fastening to wind bracing straps use BF clips.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm

CL.2

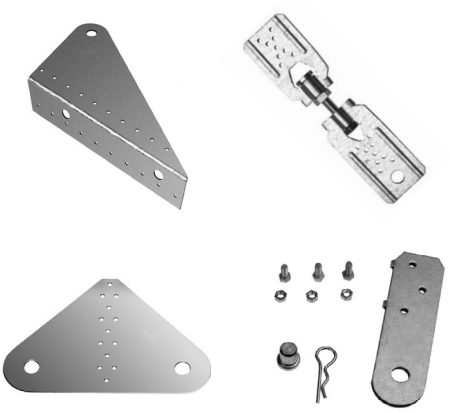


Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
FMBS25	253-297	65	25	2,0	9-Ø5,5	9-Ø5,5; 1-Ø15
FMBS4060	253-297	65	25	2,0	9-Ø5,5	9-Ø5,5; 1-Ø15

Roof Bracing System 25

ETA-10/0440



The wind bracing connectors BNF, BNG and BNK are used in combination with wind bracing straps for stabilizing roof and wall constructions. These connectors and straps must be installed on top of the rafter. at the foot of the rafter the connectors are fastened either on top of the rafter or on the bulkhead. at the rafter end the connectors are fastened on top of the rafter. There is one system – System 25 for smaller buildings.

Fixing:

- For fastening to timber – use connector nails CNA 3,1x40 mm or connector screws CSA4,0x30 mm.

Material:

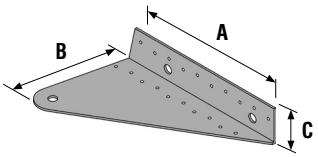
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm

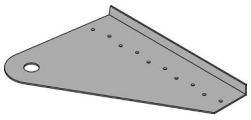
CL.2

Available Sizes

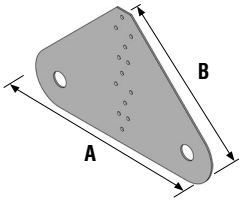
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
BNG25-14	285	153	50	3,0	10-Ø4, 1-Ø15	10-Ø4, 2-Ø13
BNF25-14	218	128	15	2,0	10-Ø4, 1-Ø15	-
BNK25-14	200	125	-	2,0	16-Ø4, 2-Ø15	-
BNKK25-14	125	36	-	2,0	3-Ø5,5, 1-Ø15	-
FMBS25	253-297	65	25	2,0	9-Ø5,5	9-Ø5,5 1-Ø15



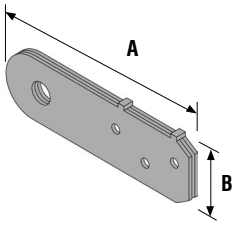
Node plate
BNG25-14



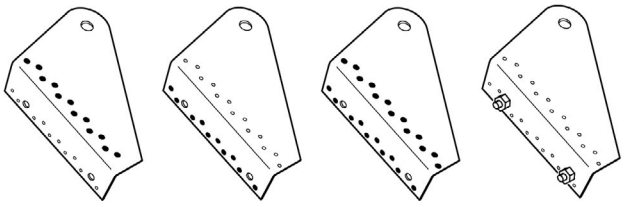
Node plateBNF25-14



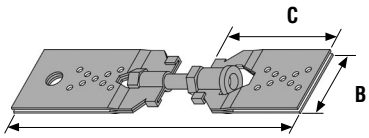
Node plate
BNK25-14



Adapter
BNKK25-14



Option-2 Option-3 Option-4 Option-5



Tension straps
FMBS25

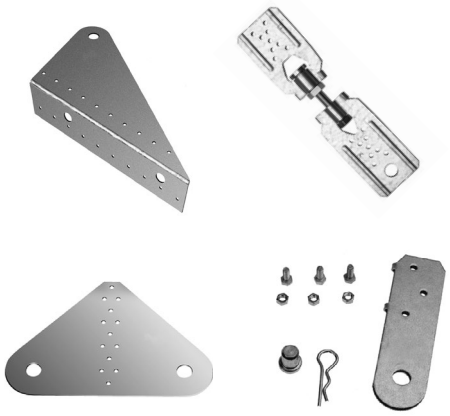
Technical data

Connector	Option	Timber	Fixing	Characteristic capacity $R_{1,k}$ [kN] *							
				Timber							Steel
				30º	35º	40º	45º	50º	55º	60º	
BNG25-14	2	b ≥ 36.5 mm	10 x CNA 3.1 x 40	15,3	16,2	17,3	18,8	21,8	23,6	25,2	20,6/k_{mod}
	3	b ≥ 38 mm	10 x CNA 3.1 x 40	14,7	15,6	16,7	18,1	19,9	20,5	15,5	
	4	b ≥ 38 mm	20 x CNA 3.1 x 40	23,3	28,1	32,0	35,1	26,8	26,3	21,9	
	5	b ≥ 90 mm	2 x Ø12	10,5	11,1	11,9	12,9	14,2	15,9	18,2	
	5	b = 60 mm	2 x Ø12	11,1	12,8	15,3	12,6	9,8	7,9	6,7	
BNF25-14	2	b ≥ 36.5 mm	10 x CNA 3.1 x 40	15,6	16,7	17,8	18,9	21,3	21,6	21,0	13,7/k_{mod}

* Load carrying capacity is the minimum value of the „timber" and „steel" values. When determining the design load for steel, it is necessary to assume k_{mod} = 1.0 for all load classes

Roof Bracing System 40-60

ETA-10/0440



The wind bracing connectors BNF and BNG are used in combination with wind bracing straps for stabilizing roof and wall constructions. These connectors and straps must be installed on top of the rafter. at the foot of the rafter the connectors are fastened either on top of the rafter or on the bulkhead. at the rafter end the connectors are fastened on top of the rafter. There are two systems – System 40/60 for larger buildings.

Fixing:

- For fastening to timber – use connector nails CNA 3,1x40 mm or connector screws CSA4,0x30 mm.

Material:

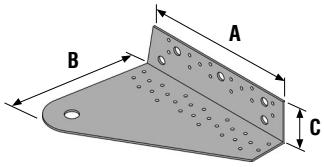
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm

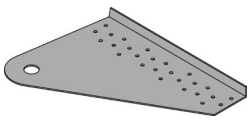
CL.2

Available Sizes

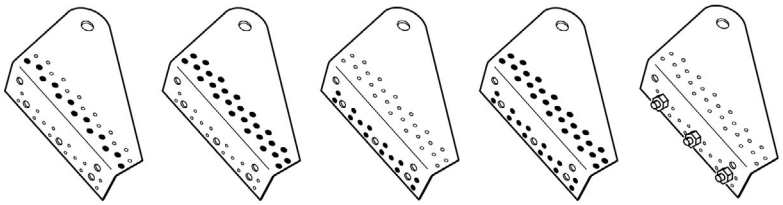
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
BNG60-14	285	153	50	3,0	26-Ø5, 1-Ø15	14-Ø5, 5-Ø13
BNF40-14	218	128	15	2,0	26-Ø5, 1-Ø15	-
BNK40/60/14	290	190	-	2,0	13-Ø5, 2-Ø15	-
BNKK40/60-14	125	36	-	2,0	7-Ø5,5, 1-Ø15	-
FMBS4060	253-297	65	25	2,0	9-Ø5,5	9-Ø5,5 1-Ø15



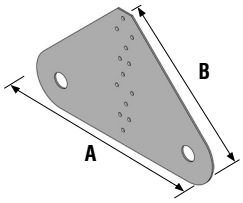
Node plate
BNG60-14



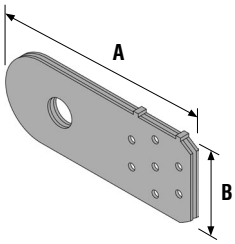
Node plate
BNF40-14



Option-1 Option-2 Option-3 Option-4 Option-5



Node plate
BNK40/60-14

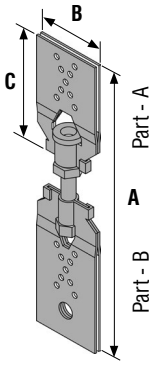


Adapter
BNKK40/60-14

Technical data

Connector	Option	Timber	Fixing	Characteristic capacity $R_{1,k}$ [kN] *						
				Timber						Steel
				30°	35°	40°	45°	50°	55°	60°	
BNF40-14	1	b ≥ 50 mm	13 x CNA 4.0 x 50	16,5	18,2	19,7	22,0	24,0	25,6	25,8	22,9/k_{mod}
BNG60-14	2	b ≥ 64 mm	26 x CNA 4.0 x 50	26,6	26,3	24,4	35,6	36,8	35,1	31,7	
	1	b ≥ 50 mm	13 x CNA 4.0 x 50	10,9	23,8	29,4	31,9	39,6	32,0	27,7	34,3/k_{mod}
	3	b ≥ 50 mm	14 x CNA 4.0 x 50	15,0	19,5	19,7	26,8	31,6	31,0	24,7	
	4	b ≥ 64 mm	40 x CNA 4,0 x 50	44,2	39,8	33,4	35,4	36,4	37,5	35,7	
	5	b ≥ 100 mm	3 x M12	11,9	12,5	13,4	14,5	16,0	15,7	12,8	
	5	b = 60 mm	3 x M12	8,5	9,2	10,0	11,0	12,3	13,2	10,5	

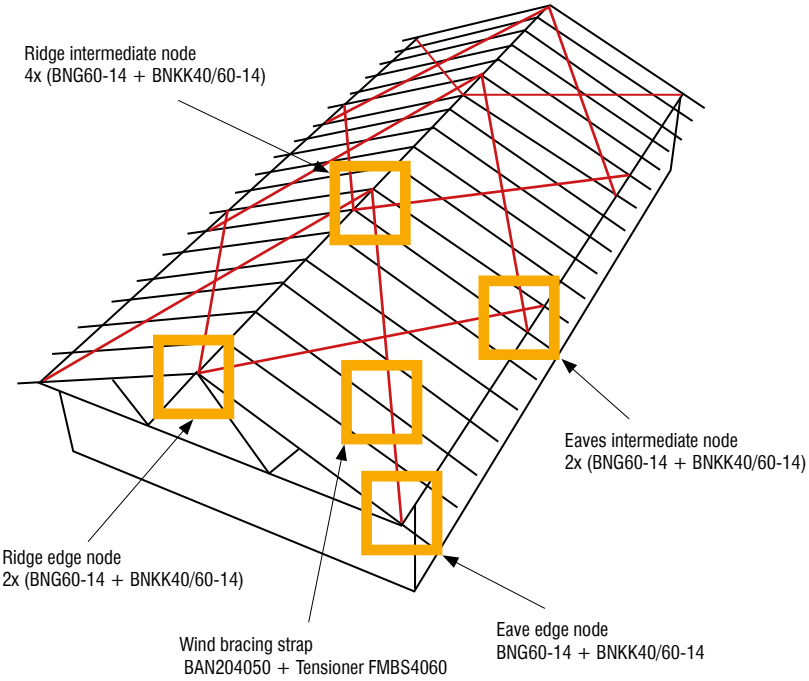
* Load carrying capacity is the minimum value of the „timber" and „steel" values. When determining the design load for steel, it is necessary to assume k_{mod} = 1.0 for all load classes

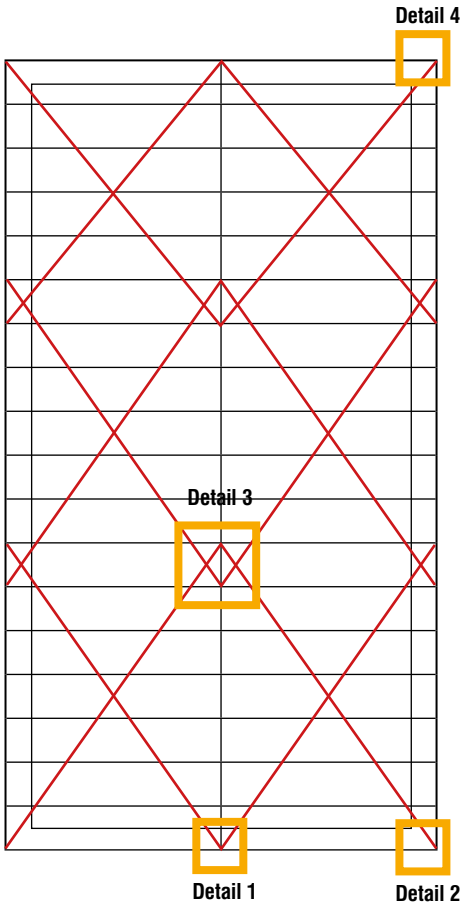


Tension straps
FMBS4060

Roof Bracing System - Example

Exaple of application the wind system on a gable roof.

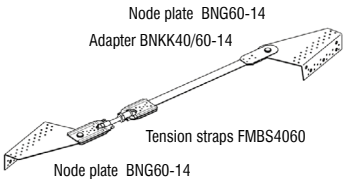


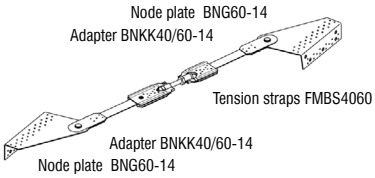


For each section of perforated strap the following system elements are used:

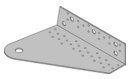
- 1 node angle bracket set BNG60-14 (sold in sets of 1 left + 1 right)
- 2 BNKK40 / 60-14 adapters that connect the node angle brackets
- 1 piece of FMBS4060 tensioner

Note: The FMBS4060 tensioner can be mounted directly to the node angle bracket and this eliminates one of the BNKK40/60-14 adapters.
Both options for compiling system components on a single strap section are shown below



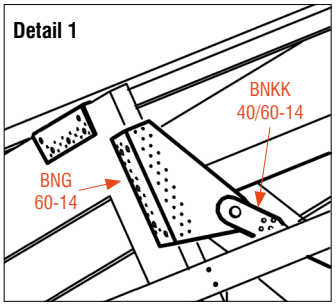


BNG60-14



BNKK4060-14

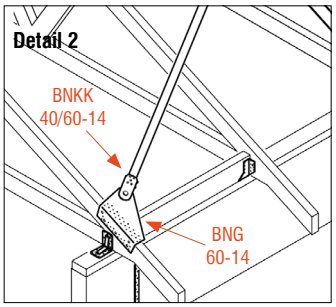
FMBS4060



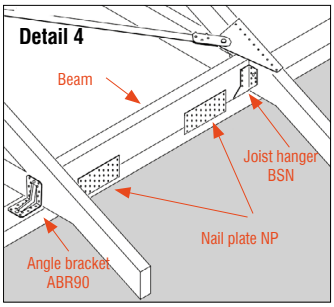
Essential components list of roof bracing system

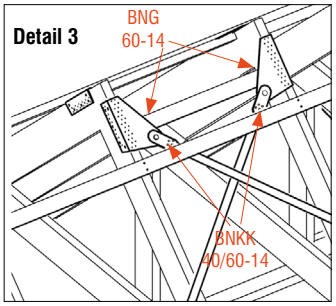
- BAN204050 strap (quantity based on roof geometry)
- Node angle brackets BNG60-14 - 12 sets (left and right connector included)
- Adapters BNKK40 / 60-14 - 24 pieces
- FMBS4060 tensioner - 12 pieces.

Check:
Number of strap sections = number of node angle bracket sets = number of tensioners FMBS4060
Number of strapsections x2 = number of adapters BNKK40 / 60-14
Note: Using the FMBS4060 tensioner directly to node anglebracket, as described above, you can reduce the number of BNKK40 / 60-14 adapters from 24 to 12 pieces.

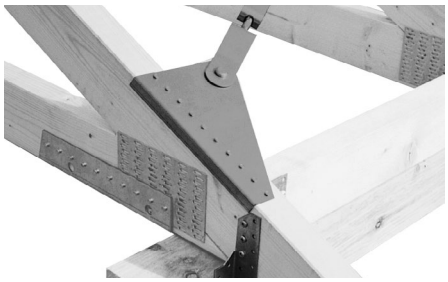


The above example is only an overview of the Simpson Strong-Tie roof wind bracing system components. Each roof should be treated individually. The designer of the structure is responsible for the correct design of both the roof and bracing of it. The example does not show the loads and the selection of components in terms of load bearing capacity. The Simpson Strong-Tie wind bracing system does not eliminate the need for other components of bracing including temporary bracing, buckling bracing, etc.. The final decision is made by a designer of the roof structure

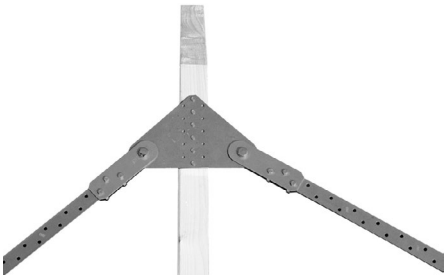




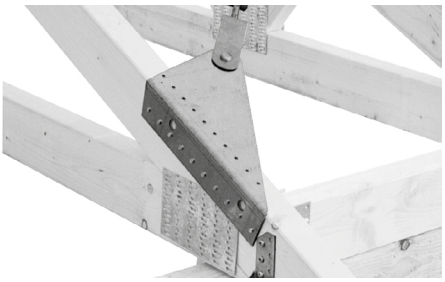
Roof Bracing System - Example



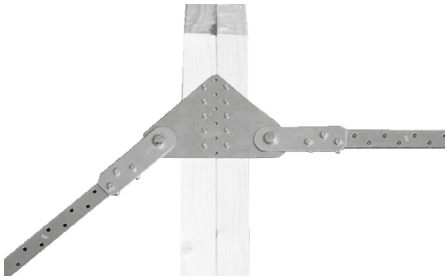
Connection of the BNF25-14 node plate with a tensioning strap fixed in the lower part of the truss. Timer thickness: min. 45 mm max. 75 mm



Connection of the BNK25-14 node plate with BNKK25-14 adapters. Fixing nails only in the middle row.
Tibmer thickness: min 45 mm



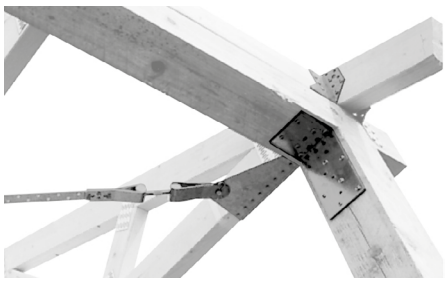
Connection of the BNG25-14 node plate with a tensioning strap fixed in the lower part of the truss. Timber thickness: min. 45 mm max. 100 mm



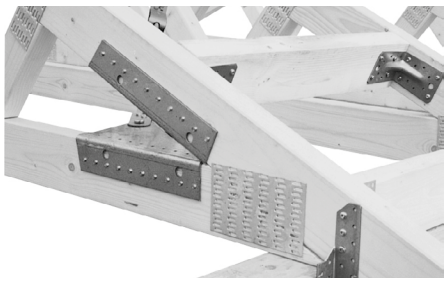
Connection of the BNK25-14 node plate with BNKK25-14 adapters. In the case of a double rafter thickness of 45 mm and a length of approx. 400 mm, internal rows of holes should be omitted when hammering nails.

Connection of the BNG25-14 node plate with a tensioning strap. Fixed with M12 bolts through the upper truss belt. In the same way, the BNG25-14 node plate can be combined with the concrete wall.

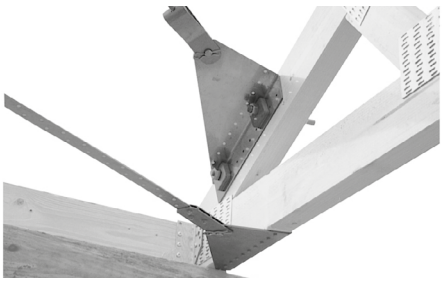
Connection of the BNF25-14 node plate with adapters, BNKK25-14 attached to the top of the rafters. Timber thickness: min. 45 mm.



Connection of the BNF25-14 node plate with the tensioning strap fixed at the bottom of the lower truss belt. Timber thickness: min. 45 mm.



The combination of the node plate belt BNG25-14 lower and upper truss connector with tension.



Connection of the BNG25-14 gusset plate with the extreme truss of M12 bolts

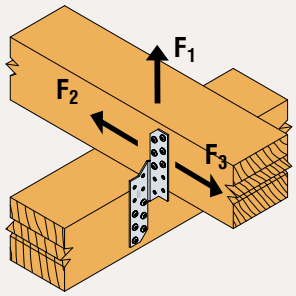
Roof and truss connectors

purlin anchors and rafter connectors

Calculation examples of selected models.

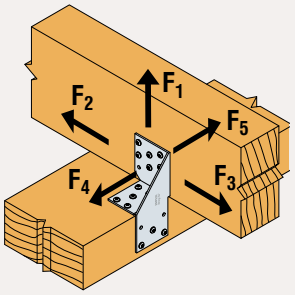
Purlin anchors **SPF330**
13 pcs. CNA4,0x40 nails per flange.
Load: $F_{1,d} = 9,0$ kN
Service class - 2 [K] medium term load - $K_{mod} = 0,9$
$R_{1,k} = \min\{21,6;\ 13,4 / k_{mod}\} = 16,75$ kN
$R_{1,d} = R_{1,k} \times k_{mod} / \gamma_M = 16,75 \times 0,8 / 1,3 = 10,3$ kN

Ultimate limit state: $\frac{9,0}{10,3} = 0,83 < 1 \Rightarrow$ ok



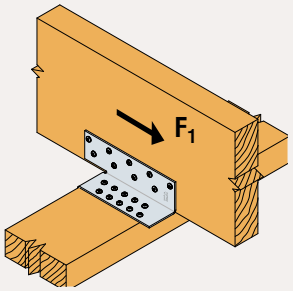
Universal purlin anchors **UNI190 L+R** full nailing CNA4.0 x 40
Purlin 80/180 fixing to truss,
Load: $F_{1,d} = 5,8$ kN; $F_{4,d} = 1,0$ kN z e = 150 mm;
Service class-2; [K] medium term load $\Rightarrow k_{mod} = 0.9$
$R_{1,d} = 13,0 \times 0.9 / 1,3 = 9,0$ kN
$R_{4,k} = \min\{7,4(b+7)/e;\ 5,8\} = \min\{7,4(80+7)/150;\ 5,8\} = 4,3$ kN
$R_{4,d} = 4,3 \times 0,9 / 1,3 = 3,0$ kN

Ultimate limit state: $\frac{5,8}{9,0} + \frac{1,0}{3,0} = 0,98 < 1 \Rightarrow$ ok



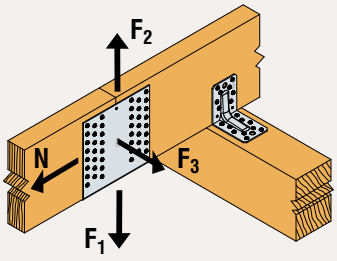
Rafter connectors 2 pcs. per connection **SFN**
Full nailing 20 x CNA 4.0 x 40
Truss 80x160 mm fixing to beam 100x120mm
Load: $F_{1,d} = 12,5$ kN; Service class-2; [K] medium term load $\Rightarrow k_{mod} = 0.9$
$R_{1,d} = 27,6 \times 0.9 / 1,3 = 19,1$ kN

Ultimate limit state: $\frac{12,5}{19,1} = 0,65 < 1 \Rightarrow$ ok



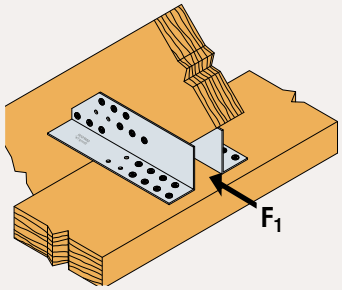
Cantilever brackets **GERW180** partial nailing CNA4.0 x 50
Purlin 100x200 mm
Load: $F_{1,d} = 12,5$ kN; $F_{3,d} = 2,6$ kN; $N_d = 9,5$kN; Service class-2;
[K] medium term load $\Rightarrow k_{mod} = 0.9$
$R_{1,d} = 31,5 \times 0,9/1,3 = 21,8$ kN
$R_{3,d} = 8,9 \times 0,9/1,3 = 6,2$ kN
$R_{N,d} = 66,6 \times 0,9/1,3 = 46,1$ kN

Ultimate limit state: $\left(\frac{12,5}{21,8}\right)^{1,25} + \left(\sqrt{\left(\frac{2,6}{6,2}\right)^2 + \left(\frac{9,5}{46,1}\right)^2}\right)^{1,25} = 0,89 \leq 1 \Rightarrow$ ok



Rafter angle bracket 2 connectros **SVI200**
Purlin 45x120 mm,
Full nailing CNA 4.0 x 40 (16 szt)
Load: $F_{1,d} = 11,8$ kN; Service class-2; [K] medium term load $\Rightarrow k_{mod} = 0.90$
$R_{1,d} = 21,5 \times 0,90/1,3 = 14,8$ kN

Ultimate limit state: $\frac{11,8}{14,8} = 0,79 \leq 1 \Rightarrow$ ok



SPF Purlin Anchors

CE ETA-07/0137

Purlin Anchors are used for anchoring beam to beam connections in roof constructions against wind uplift. These connectors can also resist horizontal forces. Always use 2 or 4 connectors per connection depending on the applied force. if using 2 connectors they must be placed diagonally. The connectors are available in a right and a left version..

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

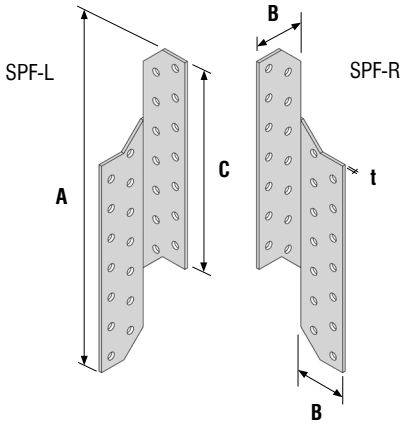
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
SPF170R	170	32,5	100	2,0	10-Ø5	10-Ø5
SPF170L	170	32,5	100	2,0	10-Ø5	10-Ø5
SPF210R	210	32,5	140	2,0	14-Ø5	14-Ø5
SPF210L	210	32,5	140	2,0	14-Ø5	14-Ø5
SPF250R	250	32,5	180	2,0	18-Ø5	18-Ø5
SPF250L	250	32,5	180	2,0	18-Ø5	18-Ø5
SPF290R	290	32,5	220	2,0	22-Ø5	22-Ø5
SPF290L	290	32,5	220	2,0	22-Ø5	22-Ø5
SPF330R	330	32,5	260	2,0	26-Ø5	26-Ø5
SPF330L	330	32,5	260	2,0	26-Ø5	26-Ø5
SPF370R	370	32,5	300	2,0	30-Ø5	30-Ø5
SPF370L	370	32,5	300	2,0	30-Ø5	30-Ø5

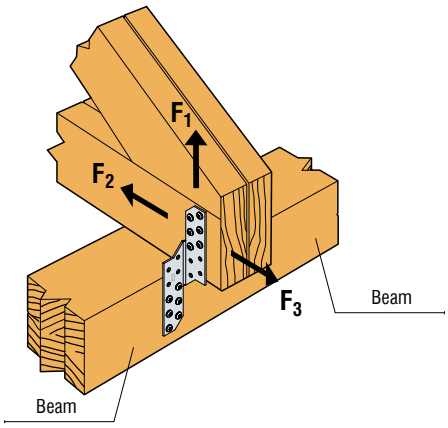


Beam to Beam connection

Model No	Fixing - Fasteners		Characteristic capacity [kN] (1 bracket per connection) timber class C24		
	Part - A	Part - B	$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
SPF170 L	5 x CNA4,0x40	5 x CNA4,0x40	min(5,7; 6,0 /k_{mod})	2,2	1,5
SPF210 L	7 x CNA4,0x40	7 x CNA4,0x40	min(9,6; 8,4 /k_{mod})	3,3	1,5
SPF250 L	9 x CNA4,0x40	9 x CNA4,0x40	min(13,6; 10,8 /k_{mod})	min(4,6 ; 4,1 /$k_{mod}^{0,7}$)	1,5
SPF290 L	11 x CNA4,0x40	11 x CNA4,0x40	min(17,6; 13,2 /k_{mod})	min(5,7 ; 4,1 /$k_{mod}^{0,7}$)	1,5
SPF330 L	13 x CNA4,0x40	13 x CNA4,0x40	min(21,6; 13,4 /k_{mod})	min(5,7 ; 4,1 /$k_{mod}^{0,7}$)	1,5
SPF370 L	15 x CNA4,0x40	15 x CNA4,0x40	min(22,3; 13,4 /k_{mod})	min(5,7 ; 4,1 /$k_{mod}^{0,7}$)	1,5
SPF170 R	5 x CNA4,0x40	5 x CNA4,0x40	min(5,7; 6,0 /k_{mod})	2,2	1,5
SPF210 R	7 x CNA4,0x40	7 x CNA4,0x40	min(9,6; 8,4 /k_{mod})	3,3	1,5
SPF250 R	9 x CNA4,0x40	9 x CNA4,0x40	min(13,6; 10,8 /k_{mod})	min(4,6 ; 4,1 /$k_{mod}^{0,7}$)	1,5
SPF290 R	11 x CNA4,0x40	11 x CNA4,0x40	min(17,6; 13,2 /k_{mod})	min(5,7 ; 4,1 /$k_{mod}^{0,7}$)	1,5
SPF330 R	13 x CNA4,0x40	13 x CNA4,0x40	min(21,6; 13,4 /k_{mod})	min(5,7 ; 4,1 /$k_{mod}^{0,7}$)	1,5
SPF370 R	15 x CNA4,0x40	15 x CNA4,0x40	min(22,3; 13,4 /k_{mod})	min(5,7 ; 4,1 /$k_{mod}^{0,7}$)	1,5

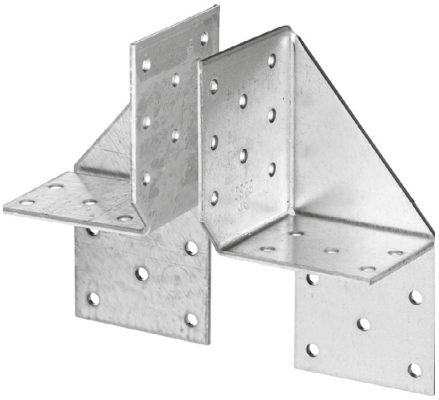
When using two SPF connectors in a connection, the values should be doubled.

Load scheme
beam to beam
1 bracket per connection



UNI Universal Purlin Anchors

CE ETA-07/0137



Universal purlin anchors for timber can be used for cross fixing timber elements in smaller structures or for fixing roof trusses to ceiling, intermediate and ridge purlins. The universal connector kit consists of the right and left hand elements. Universal connectors UNI can be used in light constructions ie. garden arbors, terraces. In order to correctly apply loads to the connection and eliminate the eccentrics, use a pair of connectors, positioned diagonally from each other.

Fixing:

- For fastening use connector nails CNA3,1x40 (UNI96)
  Connector nails CNA4,0 or CSA5,0 connector scews (UNI100, 130, 190)

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

UNI190R UNI190L

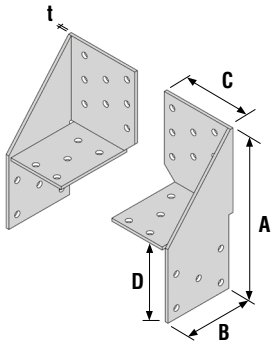
UNI130L UNI130R

UNI100L UNI100R

UNI96R UNI96L

Available Sizes

Model No.	Dimensions [mm]					Holes
	A	B	C	D	t	
UNI190L-B	192	49,5	49,5	96	2,0	14-Ø5
UNI190R-B	192	49,5	49,5	96	2,0	14-Ø5
UNI130L-B	130	61,5	62,5	58	2,5	18-Ø5
UNI130R-B	130	61,5	62,5	58	2,5	18-Ø5
UNI100L-B	100	52,5	62,5	47,5	2,5	11-Ø5
UNI100R-B	100	52,5	62,5	47,5	2,5	11-Ø5
UNI96L-B	96	34	35	46	2,0	8-Ø5
UNI96R-B	96	34	35	46	2,0	8-Ø5

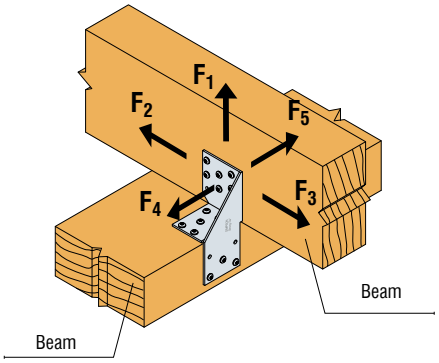


Beam to Beam connection

Model No.	Characteristic capacity [kN] (two connectors per connection)		
	$R_{1,k}$	$R_{2/3,k}$	$R_{4/5,k}$*
UNI190L-B	16,0	5,4	min { 7,4 (b+7)/e ; 5,8 }
UNI190R-B	16,0	5,4	
UNI130L-B	10,8	7,9	min { 5,4 (b+21)/e ; 7,9 }
UNI130R-B	10,8	7,9	
UNI100L-B	5,8	4,7	min { 2,9 (b+16)/e ; 7,3 }
UNI100R-B	5,8	4,7	
UNI96L-B	3,4	1,9	min { 2,2 (b+10)/e ; 3,9 }
UNI96R-B	3,4	1,9	

* values “b” and “e” given in [mm]. For other values, see details in ETA.

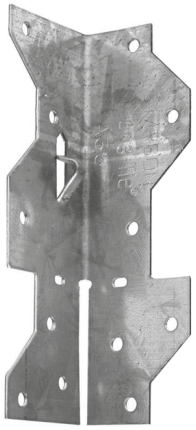
Load scheme
beam to beam
2 connectors per connection
diagonal system



A35 Framing Anchors

CE ETA-07/0137

SIMPSON Strong-Tie®



The A35 anchors exclusive bending slot allows instant, accurate bending on site for all two and three way ties. Balanced, completely reversible design allows the A35 to be used to secure a wide variety of connections.

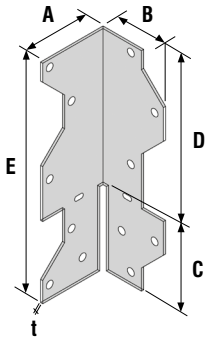
Fixing:

- For fastening to timber use square twisted nails N.3.75x30 mm as showed in the table below.

Material:

Pre galvanized mild steel Sendzimir method G30 + Z275 according eith ASTM A653

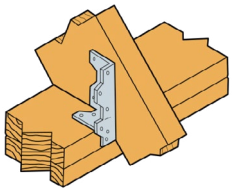
Zn 20 µm | CL.2 | CS | DWG



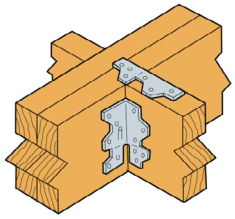
Available Sizes

Model No.	Dimensions [mm]						Holes	
	A	B	C	D	E	t	Part - A	Part - B
A35	35	35	38	76	104	1,2	6-Ø3,8 1-Ø3,8 x 7	6-Ø3,8 1-Ø3,8 x 7

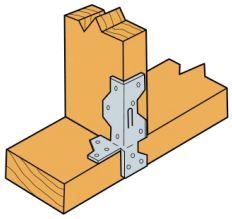
Example application



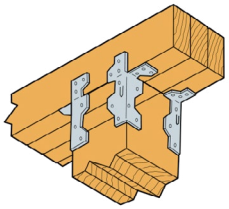
rafter to purlin connection



beam to beam connection



celing beam to column connection



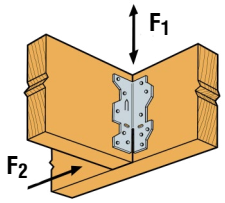
beam to column connection

Beam to Beam connection

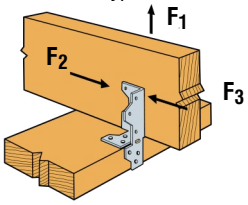
Model No.	Connection type	Fixing Fasteners	Characteristic capacity [1] [kN] timber class C24		
			$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
A35	1	12 x N3,75x30	1,33	0,89	-
	2	12 x N3,75x30	0,60	0,59	0,46
	3	12 x N3,75x30	1,03	1,14	0,84

[1] Capacity for one A35 connector. For connections using a pair of connectors, the minimum timber thickness is 47mm.

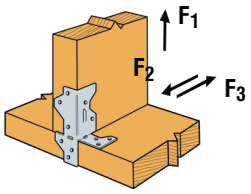
Connection type 1



Connection type 2

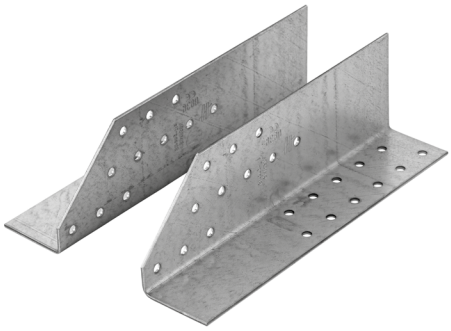


Connection type 3



SVI Rafter Angle Brakets

CE ETA-07/0317



SVI bracket is used in connections between rafters and horizontal wall plates. The bracket can transfer horizontal loads. The bracket is available in a left and a right version and is sold in pairs (one left and one right). Always use two brackets per connection.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm

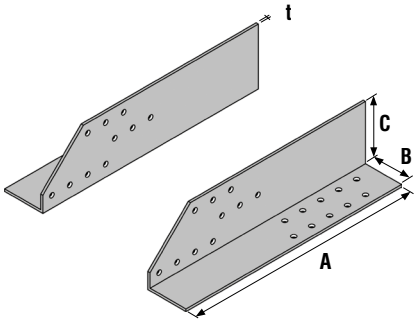
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m2 (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

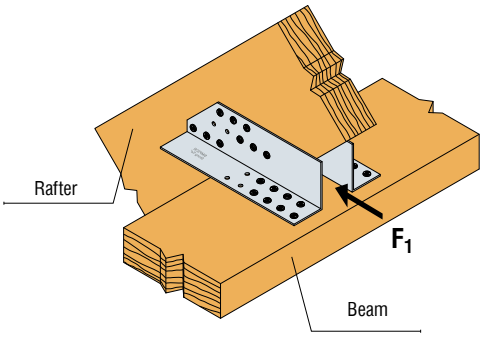
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
SVI200	200	42	62	2,0	11-Ø5	11-Ø5
SVI240	240	43	63	2,0	10-Ø5	10-Ø5



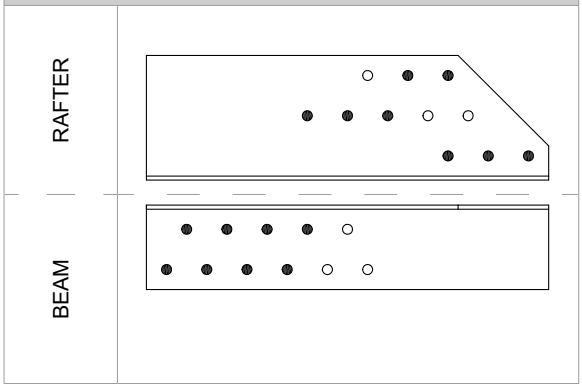
Rafter to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (1 set per connection)
	Part - A	Part - B	Type	$R_{1,k}$
SVI200	8 pcs.	8 pcs.	CNA4,0x40	21,5
			CNA4,0x60	27,6
SVI240	10 pcs.	10 pcs.	CNA4,0x40	25,9
			CNA4,0x60	33,3

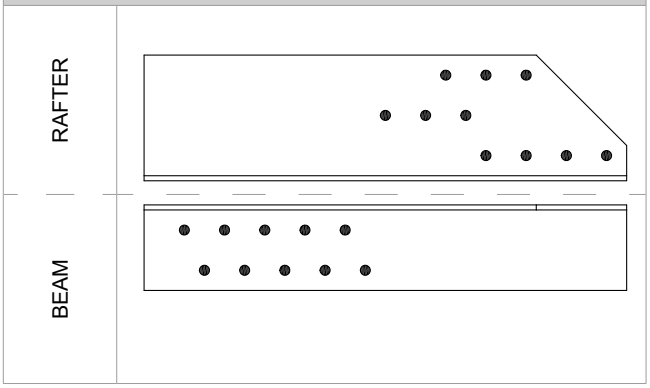
Load scheme rafter to beam



NAILING PATTERN **SVI200**
RAFTER TO BEAM CONNECTION

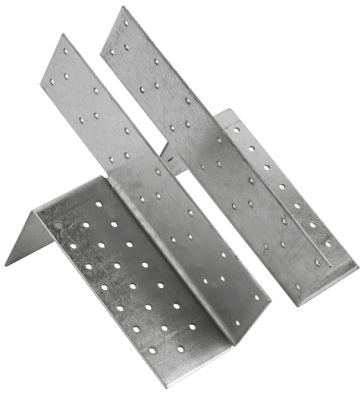


NAILING PATTERN **SVI240**
RAFTER TO BEAM CONNECTION



SFN / SFM Rafter Connectors

CE ETA-07/0317



The SFN and SFM rafter brackets are used in connections between rafters and tilted wall plates. The brackets are available in a left and a right version and is sold in pairs (one left and one right). Always use two brackets / one pair per connection.

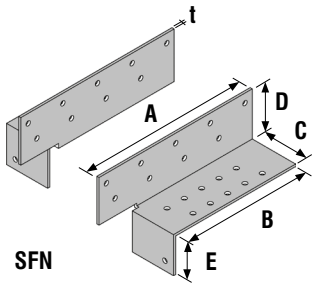
Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm

Material:

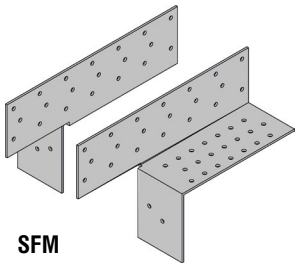
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG



Available Sizes

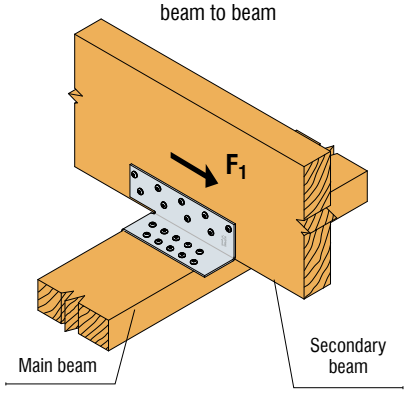
Model No.	Dimensions [mm]						Holes	
	A	B	C	D	E	t	Part - A	Part - B
SFN	177	139	53	53	39	2,0	9-Ø5	11-Ø5
SFM	260	169	73	73	91	2,0	20-Ø5	23-Ø5

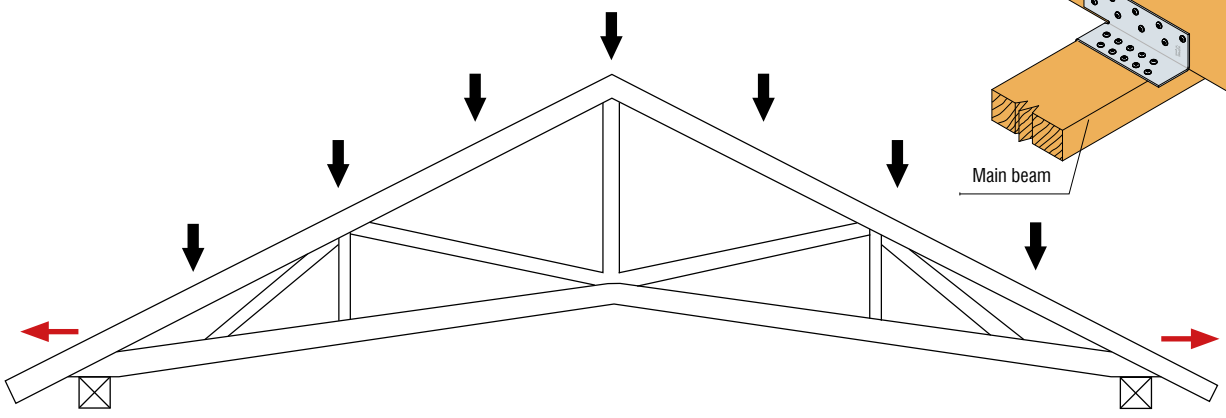


Beam to Beam connection

Model No.	Fixing - Fasteners			Characteristic capacity [kN] (1 set per connection)
	Part - A	Part - B	Type	$R_{1/2,k}$
SFN	9+9 pcs.	11+11 pcs.	CNA4,0x40	27,6
			CNA4,0x60	35,5
SFM	20+20 pcs.	23+23 pcs.	CNA4,0x40	63,6
			CNA4,0x60	79,0

Load scheme beam to beam

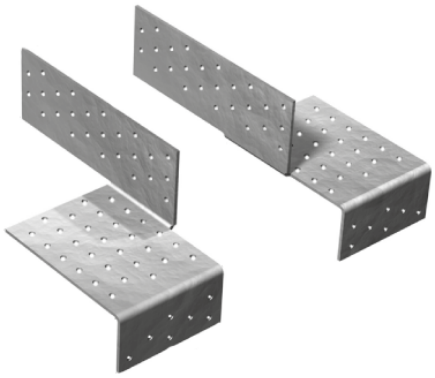




Horizontal forces in combination with vertical loads in rafters are very dangerous. Some popular roof trusses and prefabricated trusses are prone to generate high horizontal forces on supports. This mainly concerns rafter-collar ties. With heavy coverage and large spans, horizontal forces can reach values that are unable to transfer standard carpentry solutions.

SFH/SFHM/SFHS Rafter Connectors

CE ETA-07/0317



The SFH and SFHS rafter brackets are used in connections between rafters and tilted wall plates. The brackets are available in a left and a right version and is sold in pairs (one left and one right). Always use two brackets / one pair per connection.

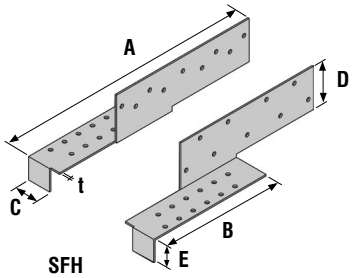
Fixing:

- Fixing złączy do drewna – przy pomocy gwoździ pierścieniowych CNA4,0 lub alternatywnie wkrętów CSA5,0.

Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

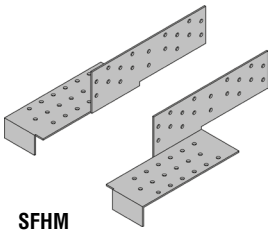
Zn 20 μm | CL.2 | CS | DWG



SFH

Available Sizes

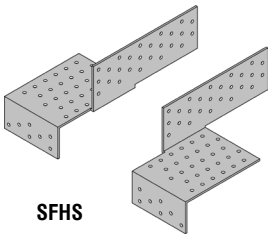
Model No.	Dimensions [mm]						Holes	
	A	B	C	D	E	t	Part - A	Part - B
SFH	270	159	45	60	27	2,0	9-Ø5	12-Ø5
SFHM	270	159	63	60	27	2,0	18-Ø5	18-Ø5
SFHS	260	140	108	75	50	3,0	25-Ø5	37-Ø5



SFHM

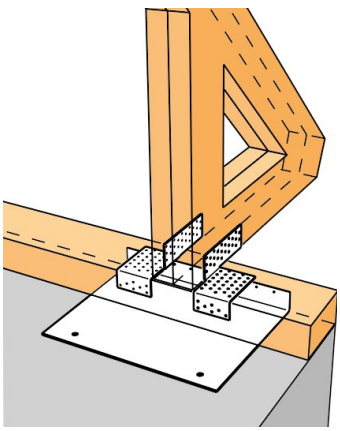
Beam to Beam connection

Model No.	Fixing -Fasteners			Characteristic capacity [kN] (1 set per connection)
	Part - A	Part - B	Type	$R_{1/2,k}$
SFH	9+9 pcs.	12+12 pcs.	CNA4,0x40	27,7
			CNA4,0x60	35,7
SFHM	18+18 pcs.	18+18 pcs.	CNA4,0x40	51,6
			CNA4,0x60	64,8
SFHS	25+25 pcs.	37+37 szt	CNA4,0x40	79,9
			CNA4,0x60	102,9



SFHS

Horizontal forces in combination with vertical loads in rafters are very dangerous. Some popular roof trusses and prefabricated trusses are prone to generate high horizontal forces on supports. This mainly concerns rafter-collar ties. With heavy coverage and large spans, horizontal forces can reach values that are unable to transfer standard carpentry solutions.



SHH/SHB Rafter Connectors

CE ETA-07/0317

SIMPSON Strong-Tie®

SHH / SHB connectors are designed to carry horizontal forces. The SHH connector is designed to connect rafters with timber (beam pulling a pair of rafters). The SHB connector is designed for mounting to a concrete rim. SHH / SHB rafter joints are used in roofs with slopes of 30° to 60° degrees.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.
- For fastening to concrete – use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

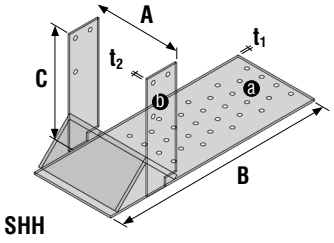
Material:

Pre galvanized mild steel S235JR (50 μm)

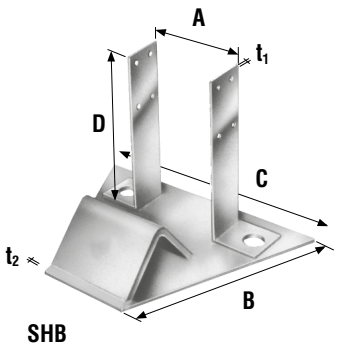
HDG 50 μm | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]						Holes	
	A	B	C	D	t		Part - a	Part - b
SHH80G	84	298	139	-	2,0	2,5	25-Ø5	6-Ø5
SHH100G	104	278	139	-	2,0	2,5	31-Ø5	6-Ø5
SHH120G	124	260	139	-	2,0	2,5	44-Ø5	6-Ø5
SHB80G	84	170	220	140	2,0	2,5	2-Ø17,5	8-Ø5
SHB100G	104	170	240	140	2,0	2,5	2-Ø17,5	8-Ø5
SHB120G	124	170	260	140	2,0	2,5	2-Ø17,5	8-Ø5



SHH

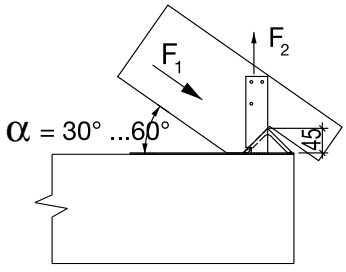


SHB

Beam to Beam connection

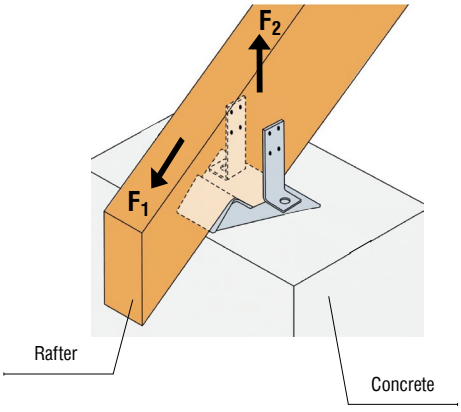
Model No.	Fixing - Fasteners		Characteristic capacity [kN]	
	Part - A	Part - B	$R_{1,k}$	$R_{2,k}$
SHH80G	19 x CNA4.0x50	6 x CNA4.0x50	32,2	4,9
SHH100G	26 x CNA4.0x50	6 x CNA4.0x50	40,3	6,9
SHH120G	31 x CNA4.0x50	6 x CNA4.0x50	48,3	8,8
SHB80G	2 x WA-M16	8 x CNA4.0x50	32,2/k_{mod}	17,8
SHB100G			40,3/k_{mod}	17,8
SHB120G			48,3/k_{mod}	17,8

SHB connectors use two M16 anchors.



Slope angles of > 60 ° and <30 ° are not allowed, and separate designs may be required. Make sure the vertical loads can be resisted by a sufficiently large clamping surface with the base plate.

Load scheme rafter to concrete



HE Steel Beam Anchor

CE ETA-07/0285

The HE anchors are designed for hanging steel beams for timber construction or for fixing timber beams on a steel beams. Please note that 2 or 4 HE connectors are used in combination, depending on the required load capacity. When using 2 HE anchors, they must be installed in a diagonal arrangement. HE anchors are a popular solution for assembling prefabricated roof trusses for steel I-beams.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

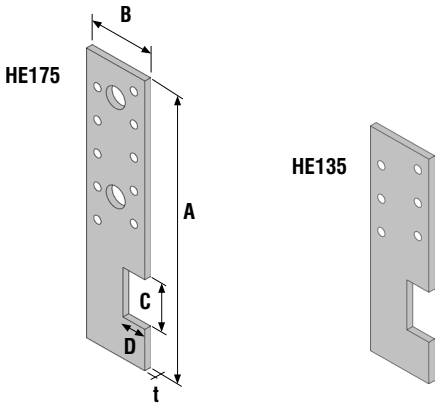
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

Model No.	Dimensions [mm]					Holes
	A	B	C	D	t	
HE135	135	40	30	15	4,0	6-Ø5
HE175	175	40	30	15	4,0	10-Ø5; 2-Ø13

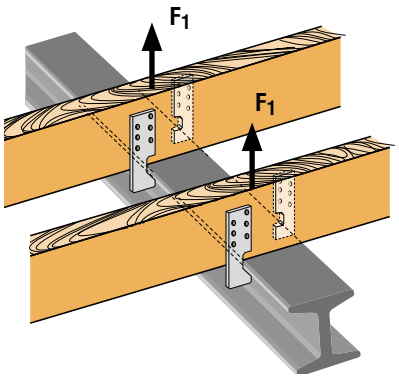


Beam to Beam connection

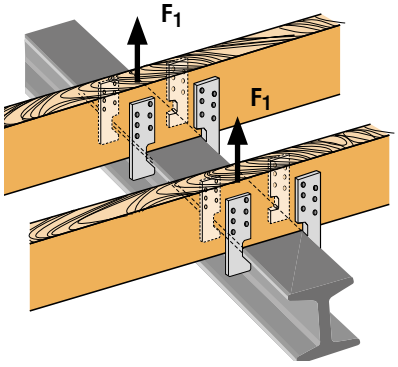
Model No.	Fixing - Fasteners CNA4.0x40	Characteristic capacity [kN] (2 connectors per connection)
		$R_{1,k}$
HE135	3 pcs.	$\min\{10,7;\ 17,0/k_{mod}\}$
	4 pcs.	$\min\{13,6;\ 17,0/k_{mod}\}$
	5 pcs.	$\min\{15,7;\ 17,0/k_{mod}\}$
	6 pcs.	$\min\{16,8;\ 17,0/k_{mod}\}$
HE175	7 pcs.	$\min\{21,8;\ 12,75/k_{mod}\}$
	8 pcs.	$\min\{23,6;\ 12,75/k_{mod}\}$
	9 pcs.	$\min\{28,6;\ 12,75/k_{mod}\}$
	10 pcs.	$\min\{30,7;\ 12,75/k_{mod}\}$

For four HE anchors, it is possible to double the value from the table.

two connectors per connection



four connectors per connection



Example:

Beam 120 x 240,2 pcs. HE175 z 8 x CNA 4.0 x 40

$F_{1,d}$ – 7,0 kN

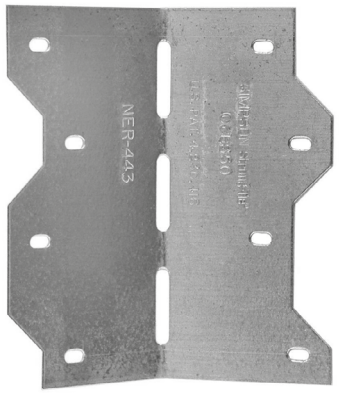
Service class-2, [K] = medium term load $\Rightarrow k_{mod} = 0,9$

$$R_{1,d} = \min\begin{cases} 23,6 \times 0,9/1,3 \\ 12,75/1,3 \end{cases} = \min\begin{cases} 16,3\,kN \\ 9,8\,kN \end{cases} = 9,8\,kN$$

Ultimate limit state: $\frac{7,0}{9,8} = 0,71 \leq 1$

LS Skewable Angle

CE ETA-07/0106



Designed to secure timber members at irregular angles, these connectors can be bent on site from 0° to 135°. The staggered nail pattern reduces the possibility for splitting the timber and allows installation on both sides of the member.

Fixing:

- For fastening to timber – use connector nails CNA3,7x50

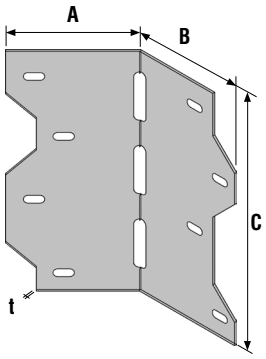
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

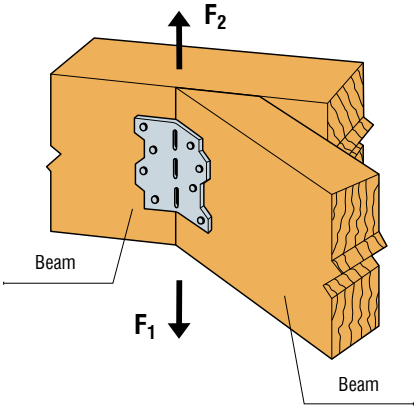
Model No.	Dimensions [mm]				Holes	
	A	B	C	t	Part - A	Part - B
LS30	57	57	86	1,2	3-Ø4x7	3-Ø4x7
LS50	57	57	124	1,2	4-Ø4x7	4-Ø4x7
LS70	57	57	162	1,2	5-Ø4x7	5-Ø4x7



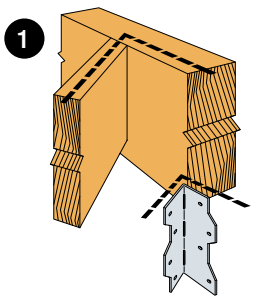
Load scheme
beam to beam
1 bracket per connection

Beam to Beam connection

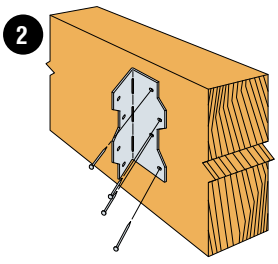
Model No.	Fixing / Fasteners		Characteristic capacity [kN] 1 bracket per connection
	Part - A	Part - B	$R_{1,k} = R_{2,k}$
LS30	3 x CNA3,7x50	3 x CNA3,7x50	2,8
LS50	4 x CNA3,7x50	4 x CNA3,7x50	4,3
LS70	5 x CNA3,7x50	5 x CNA3,7x50	4,4



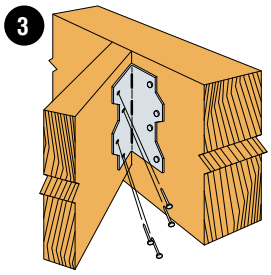
LS Installation



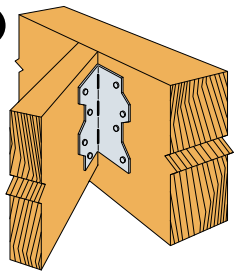
Trim the secondary beam to the required angle between 0 and 135 degrees



Use 3.7X50 CNA nails to secure the adjustable angle to the main beam.



Connect the secondary beam to the angle bracket using CNA3,7x50 nails



If necessary, the LS angle bracket can be fastened on both sides.

NOTE: The oblong holes in LS bracket allow for nailing at a different angle than the right angle. This makes it possible to fix LS brackets at the bend to the sharp angle.

VTCR Valley Truss Clip

CE ETA 07/0317

SIMPSON Strong-Tie®

The VTCR is designed to to connect valley trusses to common trusses. Structural valley connection. Single sided for new construction or retro fit. Field adjustment for pitch. Adjustable between 10 and 40 degrees. Eliminates bottom chord bevelling or wedging. Reduces valley installation cost. Reduces valley truss manufacture cost.

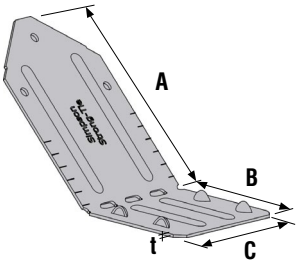
Fixing:

- For fastening to timber – use connector nails CNA3,7x50 and CNA3,1x60

Material:

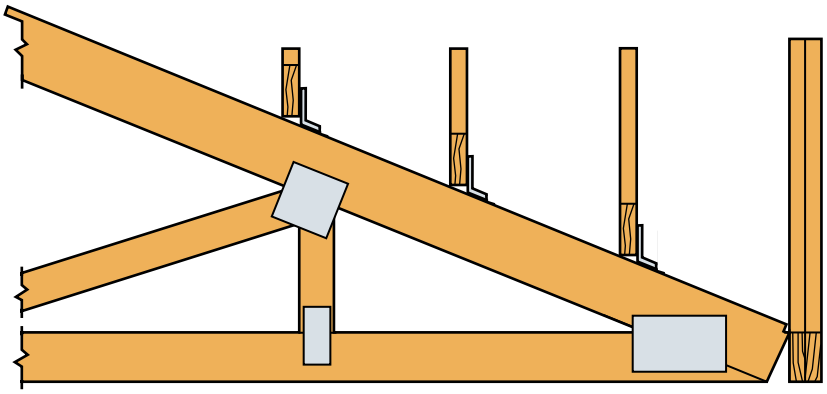
Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

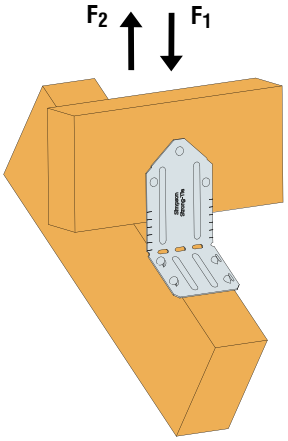
Zn 20 μm | CL.2 | CS | DWG



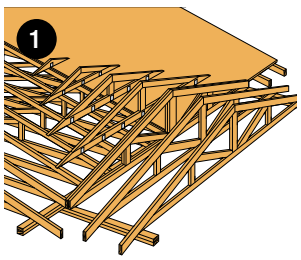
Available Sizes

Model No.	Dimensions [mm]				Fixing		Characteristic capacity [kN]	
	A	B	C	t	Part - A	Part - B	$R_{1,k}$	$R_{2,k}$
VTCR	90	50	63	1,2	4 x CNA3.6x60	3 x N3.75x30	8,0	0,97

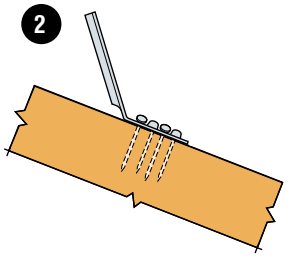




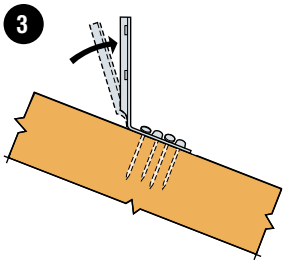
VTCR Installation



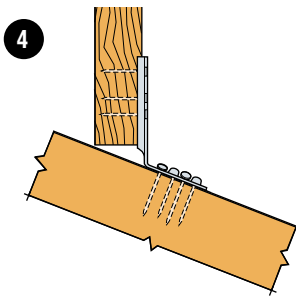
Mark the horizontal lines and points for the truss connection. Prepare the right number of clips and connectors.



Using the CNA3,1x60 ring nails, secure the clip to the upper truss belt.



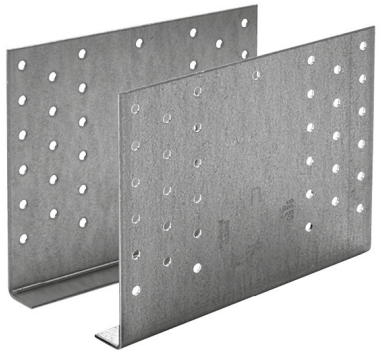
Set the correct angle and position of the clip



Connect the truss with the clip using N3.75x30 nails

GERW Cantilever brackets type W

CE ETA-07/0053



The GERW cantilever brackets are intended for use in end grain to end grain connections between timber based beams in a cantilever system. The brackets can transfer shear and axial loads in a cantilever system. The GERW cantilever brackets are used in agricultural and industrial buildings with a large span and / or with a large roof pitch. Always use two brackets per connection.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

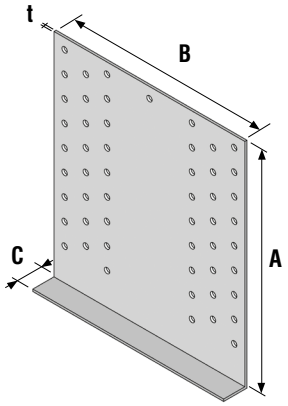
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

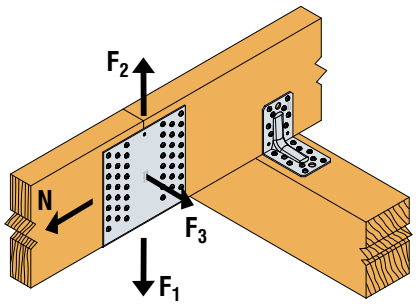
Model No	Dimensions [mm]				Holes
	A	B	C	t	
GERW90	90	140	20	2,0	10-Ø5
GERW140	140	180	20	2,0	34-Ø5
GERW180	180	180	20	2,0	46-Ø5
GERW200	200	180	20	2,0	52-Ø5
GERW220	220	180	20	2,0	58-Ø5
GERW240	240	180	20	2,0	64-Ø5
GERW260	260	180	20	2,0	70-Ø5
GERW280	280	180	20	2,0	76-Ø5
GERW300	300	180	20	2,0	82-Ø5
GERW320	320	180	20	2,0	88-Ø5
GERW340	340	180	20	2,0	94-Ø5
GERW360	360	180	20	2,0	100-Ø5
GERW380	380	180	20	2,0	106-Ø5
GERW400	400	180	20	2,0	112-Ø5
GERW420	420	180	20	2,0	118-Ø5



Load scheme
end-grain to end-grain connection
2 connectors per connection

End-grain to End-grain connection (full nailing)

Model No	Fixing / Fasteners	Characteristic capacity [kN] 1 set GERW per connection	
		$R_{1,k} = R_{2,k}$	$R_{3,k}$
GERW90	20-CNA4,0x50	6,0	5,9
GERW140	68-CNA4,0x50	34,6	11,8
GERW180	92-CNA4,0x50	56,4	15,7
GERW200	104-CNA4,0x50	68,6	17,6
GERW220	116-CNA4,0x50	81,5	19,6



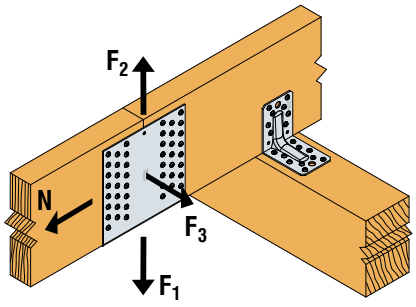
GERW Cantilever brackets type W

CE ETA-07/0053

End-grain to End-grain connection (full nailing)

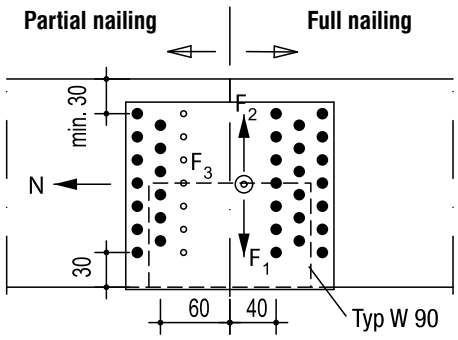
Model No	Fixing / Fasteners	Characteristic capacity [kN] 1 set GERW per connection	
		$R_{1,k} = R_{2,k}$	$R_{3,k}$
GERW240	128-CNA4,0x50	94,8	21,6
GERW260	140-CNA4,0x50	108,3	23,5
GERW280	152-CNA4,0x50	122,3	25,5
GERW300	164-CNA4,0x50	135,8	27,4
GERW320	176-CNA4,0x50	149,7	29,4
GERW340	188-CNA4,0x50	163,7	31,4
GERW360	200-CNA4,0x50	177,6	33,3
GERW380	212-CNA4,0x50	187,6	35,3
GERW400	224-CNA4,0x50	200,5	37,2
GERW420	420-CNA4,0x50	213,3	39,2

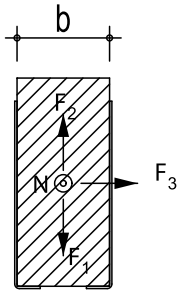
Load scheme
end-grain to end-grain connection
2 connectors per connection



End-grain to End-grain connection (partial nailing)

Model No	Fixing / Fasteners	Characteristic capacity [kN] 1 set GERW per connection		
		$R_{1,k} = R_{2,k}$	$R_{3,k}$	$R_{N,k}$
GERW90	20-CNA4,0x50	4,5	3,6	-
GERW140	68-CNA4,0x50	18,2	6,7	48,8
GERW180	92-CNA4,0x50	31,5	8,9	66,6
GERW200	104-CNA4,0x50	39,1	10,0	75,5
GERW220	116-CNA4,0x50	47,3	11,1	84,4
GERW240	128-CNA4,0x50	55,7	12,2	93,2
GERW260	140-CNA4,0x50	64,6	13,3	102,1
GERW280	152-CNA4,0x50	73,8	14,4	111,0
GERW300	164-CNA4,0x50	82,7	15,5	119,9
GERW320	176-CNA4,0x50	92,0	16,7	128,8
GERW340	188-CNA4,0x50	101,2	17,8	137,6
GERW360	200-CNA4,0x50	110,5	18,9	146,5
GERW380	212-CNA4,0x50	116,1	20,0	155,4
GERW400	224-CNA4,0x50	124,5	21,1	164,3
GERW420	420-CNA4,0x50	132,8	22,2	173,2





Ultimate limit state:

$$\left(\frac{F_{1,d}}{R_{1,d}}\right)^2 + \left(\frac{F_{3,d}}{R_{3,d}}\right)^2 \le 1$$

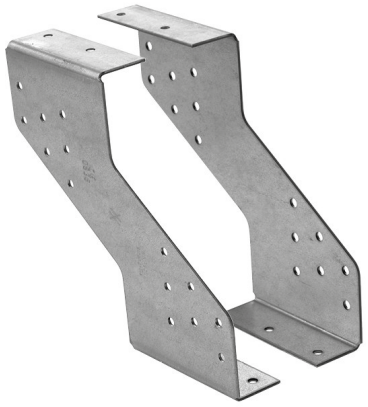
$$\left(\frac{F_{2,d}}{R_{2,d}}\right)^2 + \left(\frac{F_{3,d}}{R_{3,d}}\right)^2 \le 1$$

$$\left(\frac{F_{1,d}}{R_{1,d}}\right)^{1,25} + \left(\sqrt{\left(\frac{F_{3,d}}{R_{3,d}}\right)^2 + \left(\frac{N_d}{R_{N,d}}\right)^2}\right)^{1,25} \le 1$$

$$\left(\frac{F_{2,d}}{R_{2,d}}\right)^{1,25} + \left(\sqrt{\left(\frac{F_{3,d}}{R_{3,d}}\right)^2 + \left(\frac{N_d}{R_{N,d}}\right)^2}\right)^{1,25} \le 1$$

GERB Cantilever brackets type B

CE ETA-07/0053



The GERB cantilever brackets are intended for use in end grain to end grain connections between timber based beams in a cantilever system. The bracket can transfer shear and axial loads in a cantilever system. The GERB cantilever bracket is used in agricultural and industrial buildings with a large spans and / or with a large roof pitch. Always use two brackets per connection.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm.

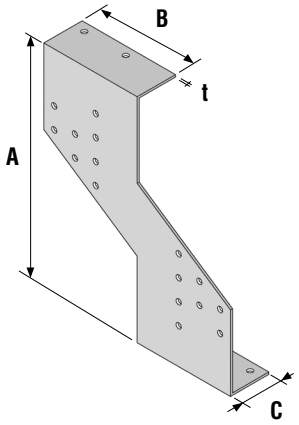
Material:

Pre galvanized mild steel Sendzimir method S250GD + Z 275 g/m² (20 μm)

Zn 20 μm | CL.2 | CS | DWG

Available Sizes

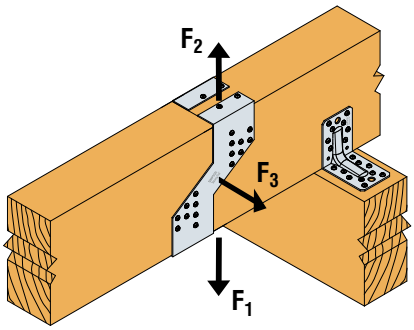
Model No	Dimensions [mm]				Holes
	A	B	C	t	
GERB150	154	90	29	2,0	18-Ø5
GERB160	160	90	30	2,0	18-Ø5
GERB175	179	90	33	2,0	18-Ø5
GERB180	180	90	33	2,0	18-Ø5
GERB220	220	90	34	2,0	20-Ø5



End-grain to End-grain connection (full nailing)

Model No	Fixing / Fasteners	Characteristic capacity [kN] 1 set GERB per connection		
		$R_{1,k}$	$R_{2,k}$	$R_{3,k}$
GERB150	36-CNA4,0x50	25,3	8,9	5,9
GERB160	36-CNA4,0x50	25,5	8,9	5,9
GERB175	36-CNA4,0x50	26,4	8,9	5,9
GERB180	36-CNA4,0x50	26,4	8,9	5,9
GERB220	40-CNA4,0x50	28,3	11,2	5,9

Load scheme
end-grain to end-grain connection
2 connectors per connection

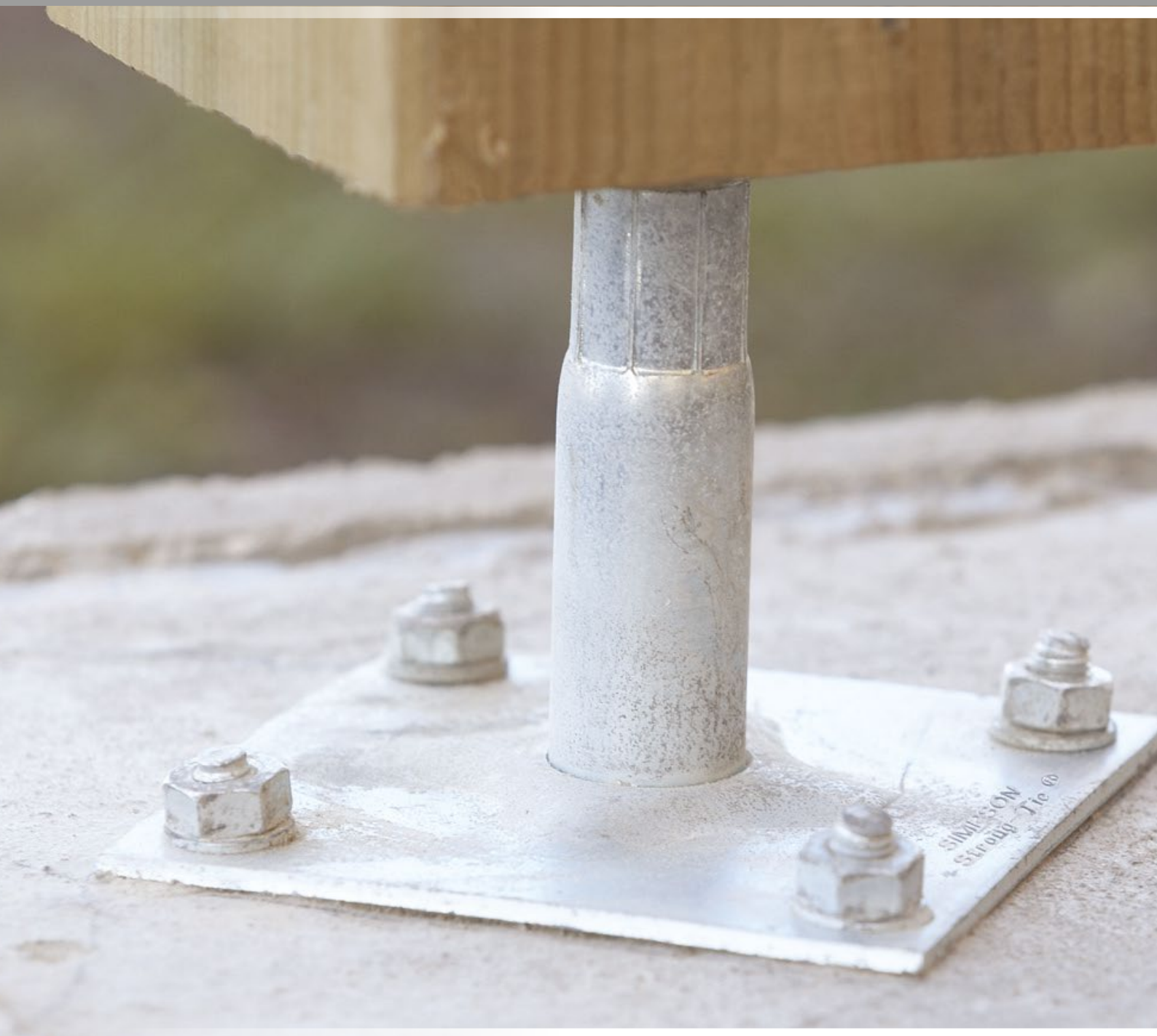


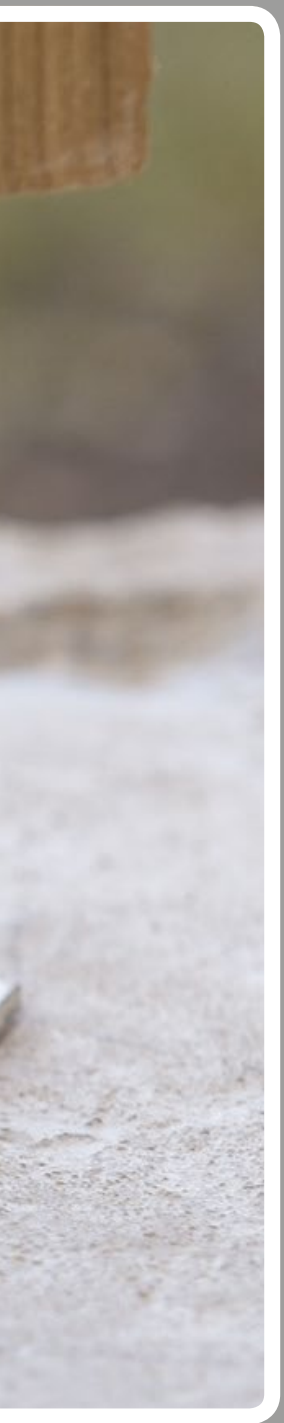
End-grain to End-grain connection (partial nailing)

Model No	Fixing / Fasteners	Characteristic capacity [kN] 1 set GERB per connection	
		$R_{1,k}$	$R_{2,k}$
GERB150	16-CNA4,0x50	15,3	5,2
GERB160	16-CNA4,0x50	15,4	5,2
GERB175	16-CNA4,0x50	15,9	5,2
GERB180	16-CNA4,0x50	15,9	5,2
GERB220	16-CNA4,0x50	15,4	5,7

Column Bases

adjustable, cast-in, screw and lateral





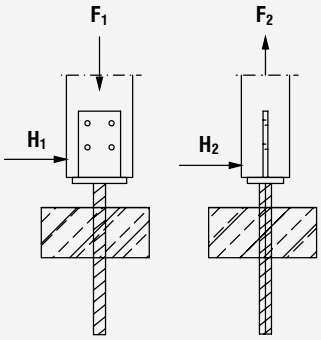
TECHNICAL INFORMATION post base

Post bases are hot dip galvanized with minimum zinc layer thickness ≥ 55 μm according to EN1461, and they can be used service class 3.

Fixing:

- Connector nails CNA 4.0
- Connector screws CSA 5.0
- Screws with hexagonal head
- Bolts from Ø8 do 12 mm
- Chemical and mechanical anchors

Definition of force directions



The actual force directions are indicated at each post base.

For values given in table the general formula for timber constructions is applied:

$$R_{i,d} = \frac{R_{i,k} \times k_{mod}}{\gamma_M}$$

$$R_{i,d} = \frac{R_{i,k}}{\gamma_M}$$

Always use 1, 3 for timber, also for steel values given in the table.

Requirements

Concrete class must be min. C20/25. For column bases with base plate and bolted to concrete the calculation for bolts bearing capacity should be calculated separately.

Anchor connection

The capacity of the anchor bolts are to be checked according to the forces acting on post base.. The tensile force in anchors resulting from horizontal force acting on lever arm should be calculated accroding to formulas.

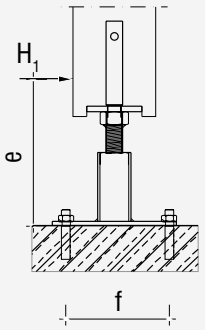
$$N_d = \frac{H \times e}{f}$$

$$V_d = \frac{H}{n}$$

where:

N_d - tensile force

V_d - shear force



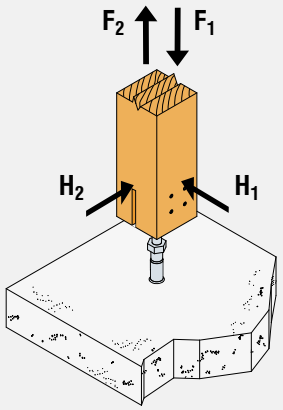
Type	ETA	Cast-in	Anchorage	Slotted	Drilled	Lateral	Screw	Adjustable	Height from [mm]	Height to [mm]	Capacity $R_{i,k}$				
											F_1	F_2	H_1	H_2	M
											[kN]				[kNm]
PIG	●	●		●					50	-	91	21	2	5	-
PILG	●	●		●					20	250	91	21	2	2	-
PIS	●	●		●					20	150	143	21	13	7	-
PISB	●		●	●					20	150	143	21	11	8	-
PISBMAXI	●		●	●					20	150	272	42	28	12	-
PISMAXI	●	●		●					20	150	272	42	28	12	-
PPB	●		●		●		●	●	40	100	88	-	-	-	-
PPS	●	●			●		●	●	40	100	50	-	-	-	-
PPRC	●		●				●	●	100	150	58	-	-	-	-
PU			●			●			24	-	-	-	-	-	-
PJIB	●		●	●				●	163	213	91	21	1	3	-
PPD	●	●				●			10	50	41	18	7	10	-
PL	●	●				●			20	250	61	22	3	4	-
PVD	●	●				●		●	48	98	78	18	3	7	-
PVDB	●		●			●		●	136	186	78	18	1	3	-
PVI	●	●		●				●	32	82	82	21	3	6	-
PVIB	●		●	●				●	120	170	82	21	3	4	-
CMR	●	●				●	●	●	-	250	117	90	21	31	14
CMS	●	●				●	●	●	-	150	96	96	15	20	7

Information given above is only indicative. Actual information about each product is given on the next pages of this catalogue. Combined forces have to be checked each time.

Calculation examples of selected models.

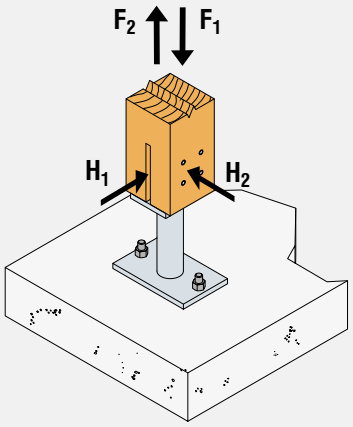
Adjustable post base **PVIG**, g=32 mm
Timber sizes 120 x 120 mm,
$F_{1,d}$ = 22,0 kN
$H_{1,d}$ = 0,8 kN
Service class-3,
[K]: medium term load ⇒ k_{mod}= 0,7
$R_{1,k}$ = min{49,0 / k_{mod}; 90,7} = min{49,0 / 0,7; 90,7} = 70,0 kN
$R_{1,d}$ = 70,0 x 0,7 / 1,3 = 37,7 kN
$R_{H2,k}$ = min{3,8 / k_{mod}; 3,8} = min{3,8 / 0,7; 3,8} = 3,8 kN
$R_{H2,d}$ = 3,8 x 0,7 / 1,3 x 1,15 = 2,4 kN
The value 1.15 is the correction factor of the dimension g - see table.

Ultimate limit state: $\left(\frac{22,0}{37,7}\right)+\left(\frac{0,8}{2,4}\right)=0,92\leq 1$



Heavy duty post base **PISB**
Timber sizes 120 x 120 mm,
$F_{1,d}$ = 46,0 kN
$H_{2,d}$ = 1,0 kN
Service class-3,
[K]: medium term load ⇒ k_{mod} = 0,65
$R_{1,k}$ = min{101,9 / k_{mod}; 142,8} = min{101,9 / 0,65; 142,8} = 142,8 kN
$R_{1,d}$ = 142,8 x 0,65 / 1,3 = 71,4 kN
$R_{H2,k}$ = min{5,5 / k_{mod}; 7,9} = min{5,5 / 0,65; 7,9} = 7,9 kN
$R_{H2,d}$ = 7,9 x 0,65 / 1,3 = 4,0 kN

Ultimate limit state: $\left(\frac{46,0}{71,4}\right)+\left(\frac{1,0}{4,0}\right)=0,89\leq 1$

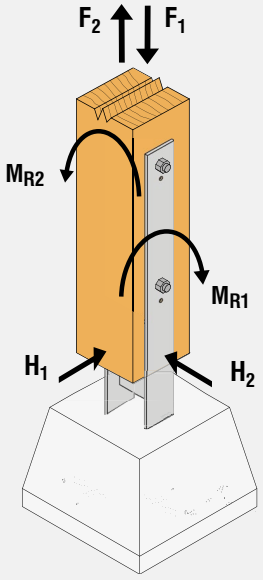


Column base **CMR**
Ultimate limit state for load combination:

$$\left(\frac{F_{1/2,d}}{R_{1/2,d}}\right)^2+\left(\frac{H_{1,d}}{R_{H1,d}}+\frac{M_{1,d}}{R_{M1,d}}\right)^2\leq 1 \qquad \left(\frac{F_{1/2,d}}{R_{1/2,d}}+\frac{M_{2,d}}{R_{M2,d}}\right)^2+\left(\frac{H_{2,d}}{R_{H2,d}}\right)^2\leq 1$$

Timber sizes 140 x 140 mm
$F_{1,d}$= 29 kN
$H_{2,d}$= 4,2 kN
$M_{2,d}$= 1,9 kNm
Service class-3; medium term load ⇒ K_{mod} = 0,65
$R_{1,d}$= 117,2 x 0,65 / 1,3 = 58,6 kN
$R_{H2,k}$ = min{33,0; 30,9 / k_{mod}} = min{33,0; 30,9 / 0,65} = 33,0 kN
$R_{H2,d}$ = 33,0 x 0,65 / 1,3 = 16,5 kN
$R_{M2,d}$= 8,2 x 0,65 / 1,3 = 4,1 kNm

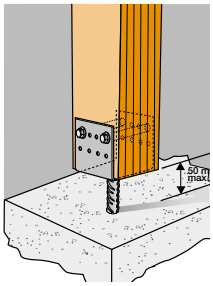
Ultimate limit state: $\left(\frac{29,0}{58,6}+\frac{1,9}{4,1}\right)^2+\left(\frac{4,2}{16,5}\right)^2=0,98\leq 1$



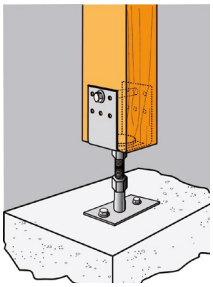
CHOICE OF THE POST BASE

Step 1 — Post Base to cast-in or anchoring

For cast-in fresh concrete mix



For anchoring with mechanical or chemical anchors



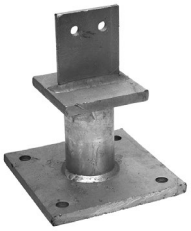
Step 2 — Connection visible or hidden

Lateral fixing

Hidden fixing

Lateral fixing

Hidden fixing



Step 3 — Base with fixed height and width or adjustable

Adjustable lateral attachmen

Hidden fixing with height adjustment

Lateral fixing with width and height adjustment

Hidden fixing attachment with width and height adjustment

Hidden fixing with adjustable

Hidden fixing with adjustable

PPD Regular Post Base

CE ETA-07/0285

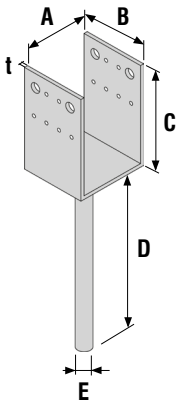
This column base consists of a 5 mm thick U-shaped base stand welded to a 250 mm rebar for embedment in concrete. The column base has Ø5 and Ø13 mm fixing holes. The distance from the stand of the base to the top of the concrete may not exceed 50 mm.
Column base to be cast-in or anchored using AT-HP adhesive anchor.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm or screws Ø12
- For fastening to concrete - fit in fresh concrete mix or chemically anchored with AT-HP Simpson Strong-Tie.
  The maximum distance of the bottom post base from the ground should be 50 mm.

Material:
Hot dip galvanized S235JR / B550BR+AC (rebar) (50 μm)

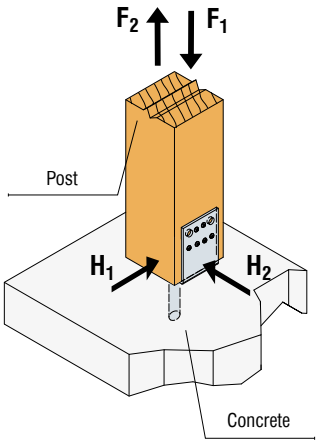
HDG 50 μm | CL.3 | CS | DWG

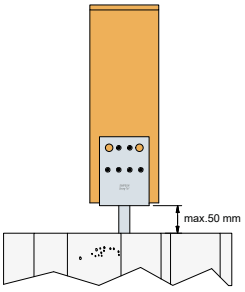


Post to concrete connection

Model No.	Dimensions [mm]						Holes	Characteristic capacity [kN]			
	A	B	C	D	E	t		$R_{1,k}$	$R_{2,k}$	$R_{H1,k}$	$R_{H2,k}$
PPD80x70G	80	70	126	250	16	5,0	10-Ø5; 2-Ø13,5	28,0/k_{mod}	min { 11,4/k_{mod} ; 18,4 }	3,7/k_{mod}	min { 5,8/k_{mod} ; 10,9 }
PPD90x90G	90	90	141	250	20	5,0	12-Ø5; 4-Ø13,5	36,0/k_{mod}	min { 13,4/k_{mod} ; 22,0 }	6,4/k_{mod}	min { 11,4/k_{mod} ; 18,7 }
PPD98x60G	98	60	127	250	16	5,0	10-Ø5; 2-Ø13,5	28,0/k_{mod}	7,6/k_{mod}	3,6k_{mod}	5,8/k_{mod}
PPD100x40G	100	40	125	250	16	5,0	8-Ø5; 2-Ø13,5	min { 28,0/k_{mod} ; 47,9 }	5,0/k_{mod}	3,4/k_{mod}	5,8/k_{mod}
PPD100x70G	100	70	126	250	16	5,0	10-Ø5; 2-Ø13,5	28,0/k_{mod}	8,7/k_{mod}	3,7/k_{mod}	5,8/k_{mod}
PPD100x90G	100	90	136	250	20	5,0	12-Ø5; 4-Ø13,5	36,0/k_{mod}	min { 11,7/k_{mod} ; 22,0 }	6,6/k_{mod}	min { 11,4/k_{mod} ; 18,7 }
PPD120x90G	120	90	126	250	20	5,0	12-Ø5; 4-Ø13,5	36,0/k_{mod}	9,4/k_{mod}	7,2k_{mod}	11,4/k_{mod}
PPD123x90G	123	90	125	250	20	5,0	12-Ø5; 4-Ø13,5	36,0/k_{mod}	9,1/k_{mod}	7,2/k_{mod}	11,4/k_{mod}
PPD125x90G	125	90	124	250	16	5,0	8-Ø5; 2-Ø13,5	36,0/k_{mod}	8,9/k_{mod}	7,3/k_{mod}	11,4/k_{mod}
PPD140x90G	140	90	126	250	16	5,0	12-Ø5; 4-Ø13,5	39,0/k_{mod}	7,8/k_{mod}	7,2/k_{mod}	11,4/k_{mod}
PPD148x90G	148	90	122	250	16	5,0	12-Ø5; 4-Ø13,5	39,0/k_{mod}	7,3/k_{mod}	7,3/k_{mod}	11,4/k_{mod}

Load scheme post to concrete





PL Post Base

CE ETA-07/0285

Post bases are usually used for supporting timber columns in concrete This type of post bases is cast in into a fresh mix concrete. In this version, the rebar is replaced by a tubular cross section. Thanks to this resulting in greater rigidity and joint strength. Thanks to the rigid profile in the place of the rebar, the permissible distance between the concrete and the bottom of the pole is 250mm.

Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm or screws Ø12
- For fastening to concrete - fit in fresh concrete mix or chemically anchored with AT-HP Simpson Strong-Tie.
  The maximum distance of the bottom post base from the ground should be 250 mm.

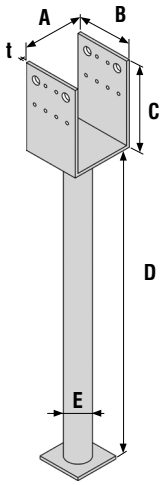
Material:

Hot dip galvanized S235JR / B550BR+AC (50 μm)

HDG 50 μm | CL.3 | CS | DWG

Column to concrete connection

Model No	Dimensions [mm]						Holes	Characteristic capacity [kN]			
	A	B	C	D	E	t		$R_{1,k}$	$R_{2,k}$	$R_{H1,k}$	$R_{H2,k}$
PL90/90G	90	90	141	500	38	5,0	12-Ø5; 4-Ø13,5	$57,1/k_{mod}$	min $\{18,0/k_{mod}; 22,0\}$	$2,8/k_{mod}$	$3,5/k_{mod}$
PL100/70G	100	70	126	500	38	5,0	10-Ø5; 4-Ø13,5	$57,1/k_{mod}$	min $\{11,7/k_{mod}; 18,4\}$	$2,8/k_{mod}$	$3,5/k_{mod}$
PL120/90G	120	90	126	500	38	5,0	12-Ø5; 4-Ø13,5	$57,1/k_{mod}$	min $\{11,4/k_{mod}; 19,0\}$	$2,8/k_{mod}$	$3,5/k_{mod}$
PL140/90G	140	90	126	500	38	5,0	12-Ø5; 4-Ø13,5	$57,1/k_{mod}$	$9,2/k_{mod}$	$2,8/k_{mod}$	$3,5/k_{mod}$



Ultimate limit state: $\sum \frac{F_{i,d}}{R_{i,d}} \leq 1$

Example:

Beam 120 x 120 mm, post base PL120/90G

$F_{1,d} = 25,0$ kN

$H_{2,d} = 1,0$ kN

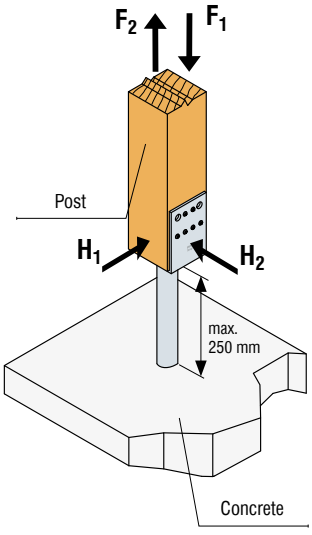
Can be installed outdoors, service class-3, [K]: medium term load $\Rightarrow k_{mod} = 0,65$

$R_{1,k} = 57,1 / k_{mod} = 57,1 / 0,65 = 87,8$ kN; $R_{1,d} = 87,8 \times 0,65 / 1,3 = 43,9$ kN

$R_{H2,k} = 3,5 / 0,65 = 5,4$ kN; $R_{H2,d} = 5,4 \times 0,65 / 1,3 = 2,7$ kN

Ultimate limit state: $\left(\frac{25,0}{43,9}\right) + \left(\frac{1,0}{2,7}\right) = 0,94 \leq 1$

Load scheme post to concrete



PIG / PILG Post Base

CE ETA-07/0285

SIMPSON Strong-Tie

PIG/PILG column bases are usually used for supporting timber columns with widths from 60 mm and more. The rebar is used for cast-in installations. For PIG column bases the distance from the base stand to the top of the concrete may not exceed 50 mm and 250 mm for PIL. Column bases can absorb compression, tensile load and horizontal load.

Fixing:

- For fastening to timber – use steel dowels STD8
- For fastening to concrete - fit in fresh concrete mix or chemically anchored with AT-HP Simpson Strong-Tie.
  PIG-The maximum distance of the bottom post base from the ground should be 50 mm.
  PILG-The maximum distance of the bottom post base from the ground should be 250 mm.

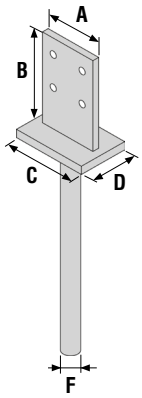
Material:

Hot dip galvanized S235JR / B550BR+AC (rebar) (50 μm)

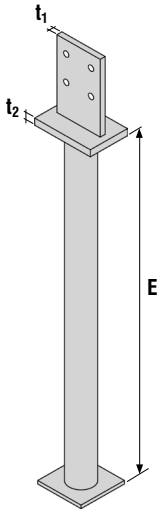
HDG 50 μm | CL.3 | CS | DWG

Available Sizes

Model No	Dimensions [mm]								Holes
	A	B	C	D	E	F	t_1	t_2	
PIG	70	110	90	60	250	20	8,0	10,0	4-Ø8,5
PILG	70	110	90	60	495	38	8,0	10,0	4-Ø8,5



PIG

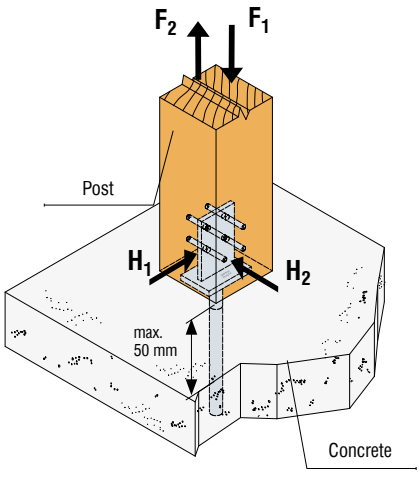


PILG

Post to concrete connection

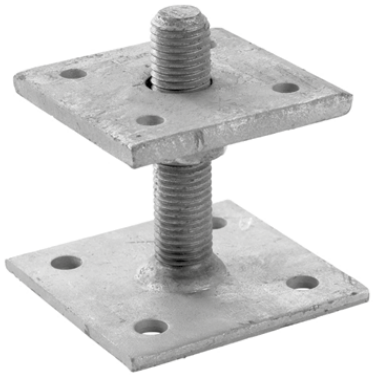
Load direction	Post width (dowels lenght - mm))	Characteristic capacity [kN]	
		PIG	PILG
$R_{1,k}$	-	min{54,5/k_{mod}; 90,7}	min{60,6/k_{mod}; 90,7}
$R_{2,k}$	60	13,8	13,8
	80	16,0	16,0
	100	18,7	18,7
	120	20,7	20,7
	140	20,7	20,7
$R_{H1,k}$	60	min{7,2/k_{mod}; 9,4}	2,2/kmod
	80	min{7,2/k_{mod}; 10,9}	
	100	min{7,2/k_{mod}; 12,7}	
	120	min{7,2kmod; 14,1}	
	140		
$R_{H2,k}$	60	3,1	min{1,9/k_{mod}; 3,1}
	80	4,1	min{2,0/k_{mod}; 3,4}
	100	min{5,0/k_{mod}; 5,9}	min{2,1/k_{mod}; 3,6}
	120	min{5,1/k_{mod}; 7,9}	min{2,4/k_{mod}; 4,1}
	140	min{5,3/kmod; 9,4}	min{2,6/k_{mod}; 4,6}

Load scheme post to concrete



PPB / PPS Adjustable Post Base

CE ETA-07/0285



PPB/PPS column base is adjustable in height and easy and quick to install. This column base keeps timber columns off the ground and provides separation of timber from the concrete base which helps to prevent moisture absorption out of the concrete. Fits various sizes and elevation requirements. This column base can be adjusted on site after installation

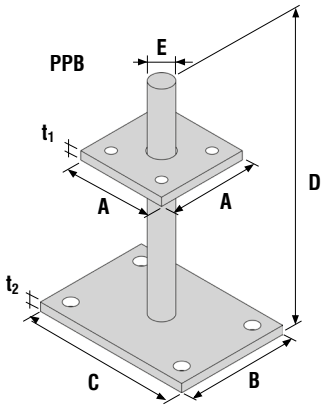
Fixing:

- For fastening to timber – use screws Ø8x60.
- For fastening to concrete - PPS fit in fresh concrete mix or chemically anchored with AT-HP Simpson Strong-Tie.
  The maximum distance of the bottom post base from the ground should be 200 mm.
- PPB use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

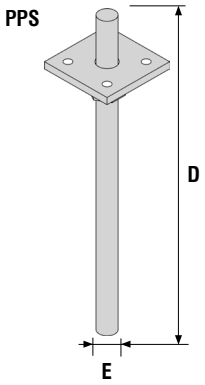
Hot dip galvanized S235JR / B550BR+AC (50 μm)

HDG 50 μm | CL.3 | CS | DWG



Post to Concrete connection

Nr Artykułu	Dimensions [mm]							Holes	Characteristic capacity [kN]
	A	B	C	D	E	t_1	t_2		$R_{1,k}$
PPB70G	70	90	90	30 - 100	M16	6,0	5,0	2-Ø5,5; 4-Ø12	min { $63,9/k_{mod}$; 88,3 }
PPB75G	80	90	90	30 - 90	M20	8,0	5,0	4-Ø9; 4-Ø12	
PPB80G	80	100	140	200	M20	8,0	8,0	4-Ø9; 4-Ø12	
PPS80G	80	-	-	350	M20	8,0	-	4-Ø9	$49,5/k_{mod}$



Ultimate limit state: $\frac{F_{i,d}}{R_{i,d}} \leq 1$

Example:

Beam 120 x 120 mm, adjustable post base PPB

$F_{1,d}$ = 38, 0kN

Can be installed outdoors, service class-3,

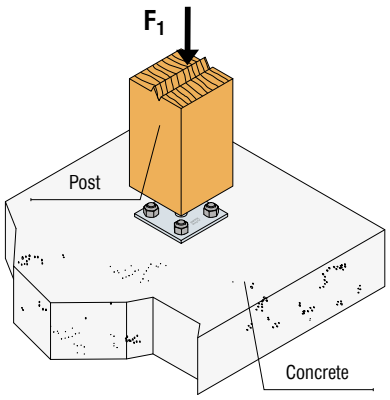
[K]: medium term load $\Rightarrow k_{mod} = 0,65$

$R_{1,k}$ =min {63,9 / k_{mod}; 88,3} = {63,9 / 0,65; 88,3} = 88,3 kN

$R_{1,d}$ = 88,3 x 0,65 / 1,3 = 44,2

Ultimate limit state: $\left(\frac{38,0}{44,2}\right) = 0,86 \leq 1$

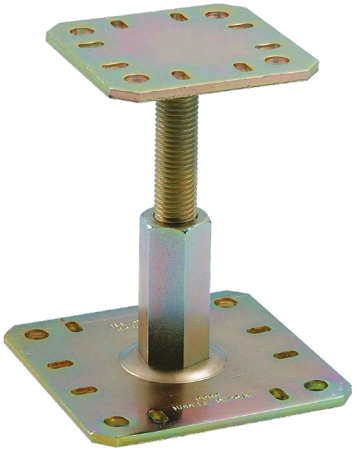
Load scheme post to concrete



PPRC / APB Adjustable Post Base

CE ETA-07/0285

SIMPSON Strong-Tie



PPRC column base is adjustable in height and easy and quick to install. This column base keeps timberen columns off the ground and provides separation of timber from the concrete base which helps to prevent moisture absorption out of the concrete. Fits various sizes and elevation requirements. This column base can be adjusted on site after installation. For adjustment use 30 mm wrench.

Fixing:

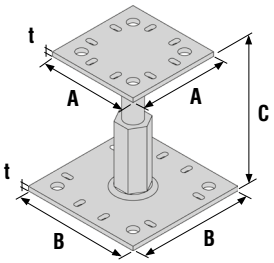
- For fastening to timber – for PPRC use screws Ø10x60 or screws Ø5,0x80 for angle 45°
  For fastening to timber - APB use screws Ø10x60
- For fastening to concrete - use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

PPRC - Galvanized S235JR dichromate coating (Fe/Zn12/C) according to EN ISO 2081
APB - Pre-galvanised mild steel S235JR ZN25/Aaccording with EN 10025

YZG | Zn 20 µm | CL.3 | CS | DWG

PPRC

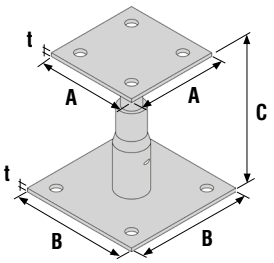


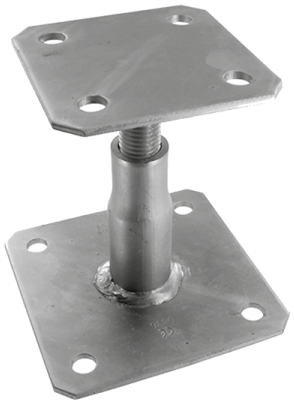
PPRC Post to concrete connection

Model No	Dimensions [mm]				Holes		Characteristic capacity [kN]
	A	B	C	t	Part A	Part B	$R_{1,k}$
PPRC	100	130	100-150	5,0	8-Ø12 [1]; 4-Ø12 [2]	8-Ø12; 4-Ø12 [3]	48,8

[1] Screws Ø5,0x80 screwed at an angle45°
[2] Screws Ø10x60
[3] Mechanical anchor WA M10 or chemical anchor AT-HP and LMAS M10

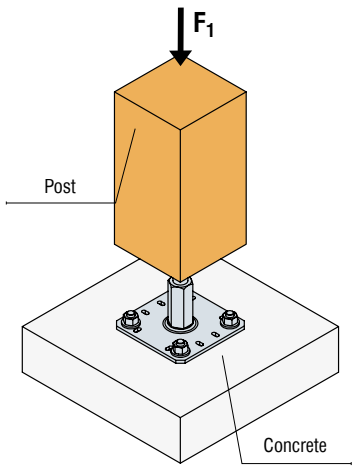
APB





The adjustable base of the PPRC and APB columns has a vertical adjustment range of up to 150 mm.
The vertical adjustment allows for precise positioning of the pole support position when the support level is difficult to determine at the moment of fixing the base and due to the adjustment it is adjusted later or in case of inaccurate concrete work..

Load scheme
post to concrete



APB Post to concrete connection

Model No	Dimensions [mm]				Hole		Characteristic capacity [kN]
	A	B	C	t	Part A	Part B	$R_{1,k}$
APB	100	130	100-150	4,0	4-Ø12 [1]	4-Ø12 [1]	56,2

[1] Screws Ø10x60
[2] Mechanical anchor WA M10 or chemical anchor AT-HP M10

PVD / PVDB Adjustable Post Base

CE ETA-07/0285

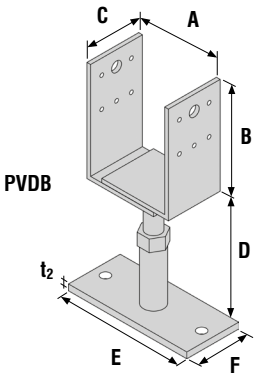
The PVD and PVDB are column bases consist of two parts. These column bases are adjustable in height and width. Column base PVD80 and PVDB80 can be adjusted in width from 80 to 120 mm. PVDB120 and PVD120 are adjustable in width from 120 to 160 mm. Column shoes are used to support timberen columns where there is a need for adjustment. Column base can absorb compression, tensile load and horizontal load.

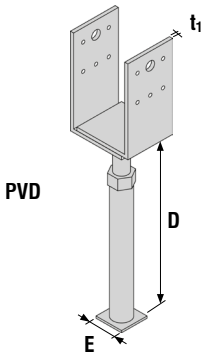
Fixing:

- For fastening to timber – use connector nails CNA4,0 x ℓ mm or connector screws CSA5,0 x ℓ mm or screws Ø8x60.
- For fastening to concrete:
  PVD fit in fresh concrete mix or chemically anchored with AT-HP Simpson Strong-Tie.
- PVDB use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:
Hot dip galvanized S235JR / S355JO (50 μm)

HDG 50 μm | CL.3 | CS | DWG





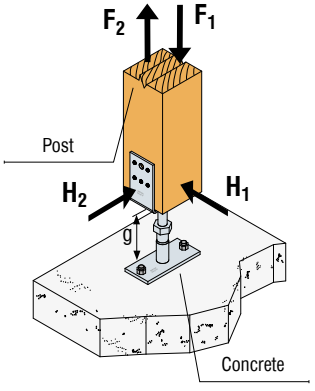
Available Sizes

Model No	Dimensions [mm]								Holes	
	A	B	C	D	E	F	t_1	t_2	Part A	Part B
PVD80G	80-120	120	70	248-298	40	40	5,0	-	8-Ø5 2-Ø12	-
PVD120G	120-160	120	70	248-298	40	40	5,0	-	8-Ø5 2-Ø12	-
PVDB80G	80-120	120	70	136-186	160	70	5,0	8,0	8-Ø5 2-Ø12	2-Ø12
PVDB120G	120-160	120	70	136-186	160	70	5,0	8,0	8-Ø5 2-Ø12	2-Ø12

Post to concrete connection

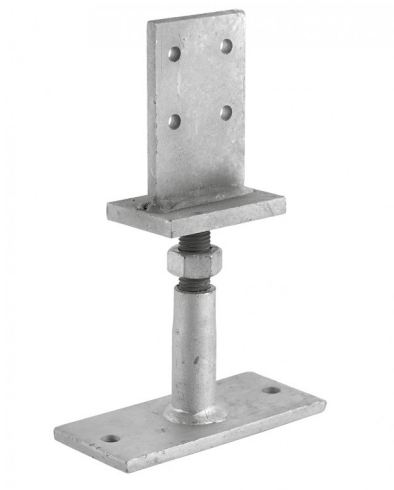
Load direction	Post width (dowels lenght - mm))	Characteristic capacity [kN]			
		PVD		PVDB	
$R_{1,k}$	-	min {49,0/k_{mod}; 77,8}			
$R_{2,k}$	80	17,6			
	120	min {11,6/k_{mod}; 17,6}			
	160	min {7,6/k_{mod}; 15,2}			
		for g=		for g=	
$R_{H1,k}$	min. 80	48 mm	2,7/k_{mod}	136 mm	1,4/k_{mod}
		73 mm	2,1/k_{mod}	161 mm	1,2/k_{mod}
		98 mm	1,7/k_{mod}	186 mm	1,1/k_{mod}
$R_{H2,k}$	min. 80	48 mm	6,5/k_{mod}	136 mm	3,2/k_{mod}
		73 mm	3,9/k_{mod}	161 mm	2,7/k_{mod}
		98 mm	2,8/k_{mod}	186 mm	2,3/k_{mod}

Load scheme post to concrete



PVIG / PVIB Adjustable Post Base

CE ETA-07/0285



The PVI and PVIB are column bases consist of two parts. These column bases are adjustable only in height. The connection beam to post base is concealed. Column shoes are used to support timberen columns where there is a need for adjustment. Column base can absorb compression, tensile load and horizontal load.

Fixing:

- For fastening to timber – use steel dowels STDØ8
- For fastening to concrete:
  PVIG fit in fresh concrete mix or chemically anchored with AT-HP Simpson Strong-Tie.
  PIG - The maximum distance of the bottom post base from the ground should be 50 mm.
- PVIB use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

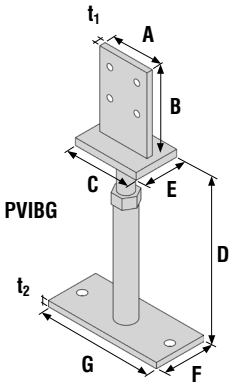
Material:

Hot dip galvanized S235JR / S355JO (50 μm)

HDG 50 μm | CL.3 | CS | DWG

Available Sizes

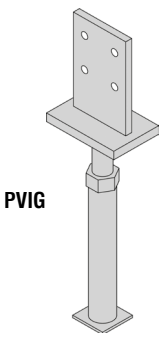
Model No	Dimensions [mm]									Holes	
	A	B	C	D	E	F	G	t_1	t_2	Part A	Part B
PVIG80G	70	110	60	259-282	70	40	40	8,0	10,0	4-Ø8,5	-
PVIBG120G	70	110	90	146-170	60	70	160	8,0	8,0	4-Ø8,5	2-Ø12



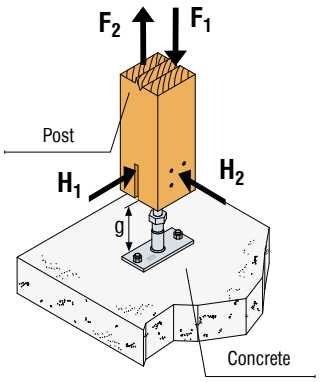
Post to concrete connection

Load direction	Post width (dowels lenght - mm)	Characteristic capacity [kN]	
		PVIG	PVIBG
$R_{1,k}$	-	min{49,0/k_{mod}; 90,7}	
$R_{2,k}$	80	16,0	
	120	20,7	
	160		
		przy g=57 mm[1)]	przy g=145 mm[1)]
$R_{H1,k}$	-	2,7/k_{mod}	2,6/k_{mod}
$R_{H2,k}$	80	min{2,2/k_{mod}; 2,5}	min{1,9/k_{mod}; 1,9}
	120	min{3,8/k_{mod}; 3,8}	min{2,7/k_{mod}; 3,3}
	160	min{4,7/k_{mod} 5,7}	min{2,7/k_{mod}; 3,5}

[1)] For other g values, use the correction factor.



Load scheme post to concrete



Correction factors for other dimensions g

For dimension g=57mm		For dimension g=145mm	
value g	factor	value g	factor
32	1,15	120	1,1
82	0,85	170	0,85

Minimum bolt length STD = 60mm

PJIB Adjustable Post Base

CE ETA-07/0285

The PJIB is a post base which allowed adjustable only in height. The connection between beam to post base is concealed. Column shoes are used to support timberen columns where there is a need for adjustment. Column base can absorb compression, tensile load and horizontal load.

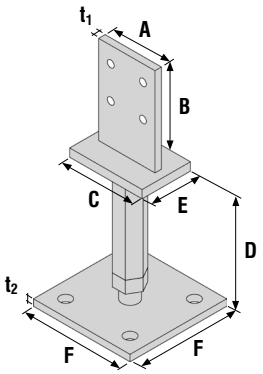
Fixing:

- For fastening to timber – use steel dowels STDØ8
- For fastening to concrete - use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Hot dip galvanized S235JR / S355 JO (50 μm)

HDG 50 μm | CL.3 | CS | DWG



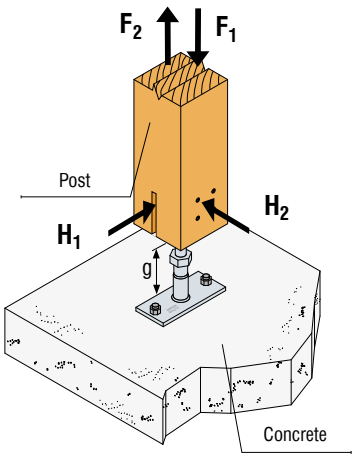
Available Sizes

Model No	Dimensions [mm]								Holes	
	A	B	C	D	E	F	t_1	t_2	Part A	Part B
PJIB	70	110	90	163-213	60	120	8,0	8,0	4-Ø8,5	4-Ø14

Post to concrete connection

Load direction	Post width (dowels lenght - mm)	Characteristic capacity [kN]
$R_{1,k}$	-	min{90,7; 54,5 k_{mod}}
$R_{2,k}$	80	16,0
	100	18,7
	120	20,7
$R_{H1,k}$	for g_{min}	1,4 k_{mod}
	for g_{max}	1,1 k_{mod}
$R_{H2,k}$ przy g_{min}	80	min{2,0; 1,6 k_{mod}}
	100	min{2,3; 1,8 k_{mod}}
	120	min{2,6; 1,8 k_{mod}}
$R_{H2,k}$ przy g_{max}	80	min{1,7; 1,4 k_{mod}}
	100	min{2,0; 1,4 k_{mod}}
	120	min{2,1; 1,4 k_{mod}}

Load scheme post to concrete



PIS / PISB Heavy Duty Post Base

CE ETA-07/0285

Post base for carrying high vertical and horizontal loads. The vertical fin plate allows you to use it in places where it is necessary to hide the connector as much as possible (eg. for architectural reasons).

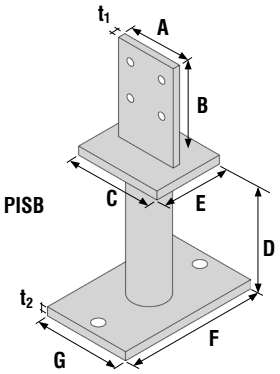
Fixing:

- For fastening to timber –use steel dowels STDØ8
- For fastening to concrete:
  PIS - fit in fresh concrete mix.
  The maximum distance of the bottom post base from the ground should be150 mm.
- PISB use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

Material:

Hot dip galvanized S235JR (50 μm)

HDG 50 μm | CL.3 | CS | DWG

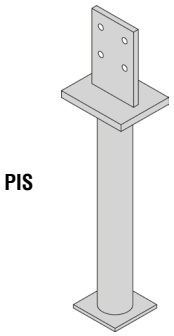


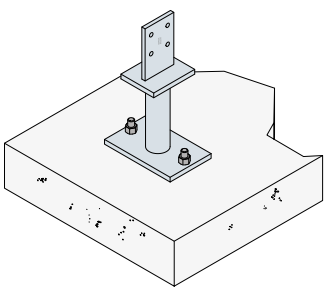
Available Sizes

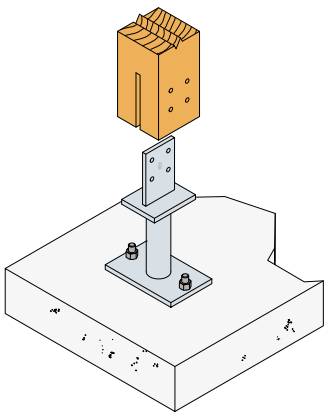
Model No	Dimensions [mm]									Holes	
	A	B	C	D	E	F	G	t_1	t_2	Part A	Part B
PIS70G-B	70	110	100	298	80	70	70	8,0	-	4-Ø8,5	-
PISB160G-B	70	110	100	148	80	160	100	8,0	10,0	4-Ø8,5	2-Ø14
PISB260G-B	70	110	100	148	80	260	100	8,0	10,0	4-Ø8,5	4-Ø14

Post to concrete connection

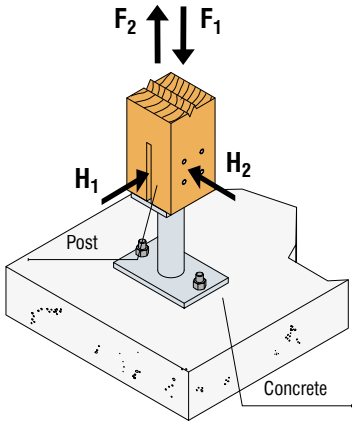
Load direction	Post width (dowels lenght - mm)	Characteristic capacity [kN]	
		PIS	PISB
$R_{1,k}$	> 80	$\min\{101,9/k_{mod}; 142,8\}$	
$R_{2,k}$	80	16,0	
	100	18,7	
	120	20,7	
$R_{H1,k}$	80	$\min\{6,7/k_{mod}; 10,9\}$	$\min\{6,1/k_{mod}; 10,9\}$
	100	$\min\{6,7/k_{mod}; 12,7\}$	$\min\{6,1/k_{mod}; 11,0\}$
	120	$6,7/k_{mod}$	
$R_{H2,k}$	80	4,1	4,1
	100	$\min\{5,1/k_{mod}; 5,9\}$	$\min\{5,0/k_{mod}; 5,9\}$
	120	$\min\{5,7/k_{mod}; 7,0\}$	$\min\{5,5/k_{mod}; 7,9\}$





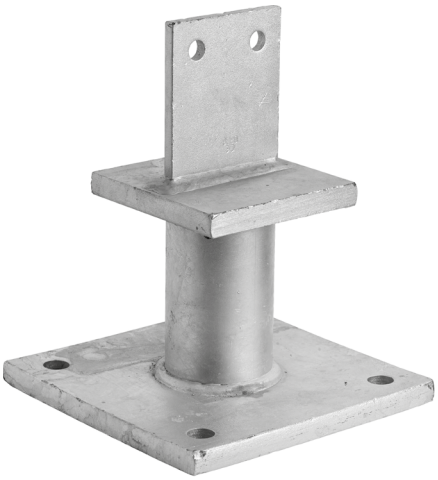


Load scheme post to concrete



PISMAXI / PISBMAXI Heavy Duty Post Base

CE ETA-07/0285



The bigest post bases, designed to carry very heavy loads both vertically and horizontally. The use of thick (8-15 mm) sheets and rigid pipe sections allows for very high load carrying capacity and rigidity.

Fixing:

- For fastening to timber – use steel dowels STDØ8
- For fastening to concrete:
  PISMAXI fit in fresh concrete mix.
  The maximum distance of the bottom post base from the ground should be 150 mm.
- PISBMAXI use WA mechanical anchor or AT-HP chemical anchor with LMAS threaded rod.

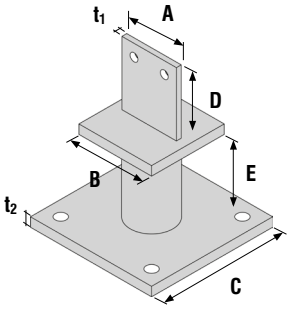
Material:

Hot dip galvanized S235JR (50 μm)

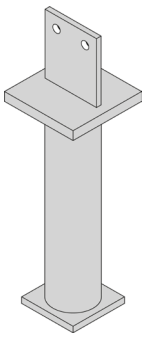
HDG 50 μm | CL.3 | CS | DWG

Available Sizes

Model No	Dimensions [mm]							Holes	
	A	B	C	D	E	t_1	t_2	Part A	Part B
PISMAXIG-B	90	120	90	105	298	8,0	10,0	2-Ø13	-
PISBMAXIG-B	90	120	200	105	118	8,0	10,0	2-Ø8,5	4-Ø18



PISBMAXI

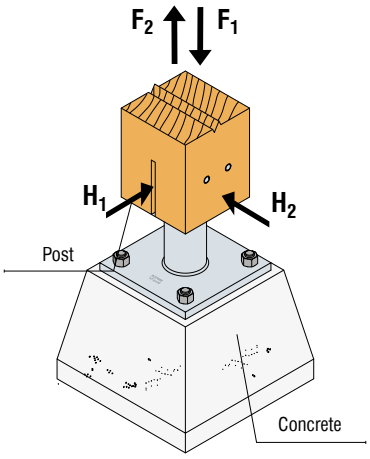


PISMAXI

Post to concrete connection

Load direction	Post width (dowels lenght - mm)	Characteristic capacity [kN]	
		PISMAXI	PISBMAXI
$R_{1,k}$	> 120	min{187,9/k_{mod}; 272,2}	min{256,9/k_{mod}; 272,2}
$R_{2,k}$	120	34,5	34,5
	140	38,5	38,5
	160	42,1	42,1
$R_{H1,k}$	120	min{24,0/k_{mod}; 22,5}	min{14,1/k_{mod}; 22,5}
	140	min{24,0/k_{mod}; 25,2}	min{14,1/k_{mod}; 25,2}
	160	min{24,0/k_{mod}; 27,5}	min{14,1/k_{mod}; 27,5}
$R_{H2,k}$	120	7,6	7,6
	140	9,9	9,9
	160	12,3	12,3

Load scheme post to concrete



CMR / CMS Column Base

CE ETA-07/0285

SIMPSON Strong-Tie

Connections using the CMR / CMS bases as rigid, capable of bearing moments (static - cantile-ver model). This feature of the CMR / CMS makes it applicable in any construction subjected to horizontal loads (eg. wind) based on free-standing columns. Horizontal adjustment allows remove space the use of these bases with columns of different cross section, also non-standard.

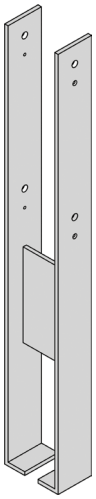
Fixing:

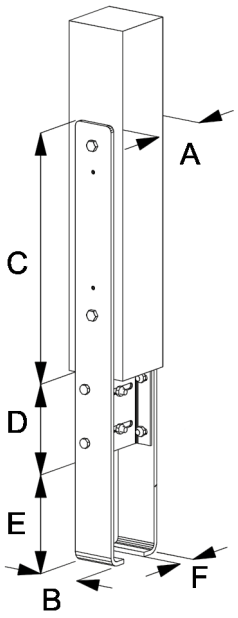
- For fastening to timber - using M16 metric bolt and a pair of Bulldog C2-62M16G-B single sided rings.
- For fastening to concrete - fit in fresh concrete mix. in fresh concrete mix.

Material:

Hot dip galvanized S235JR / S355JO (50 μm)

HDG 50 μm | CL.3 | CS | DWG





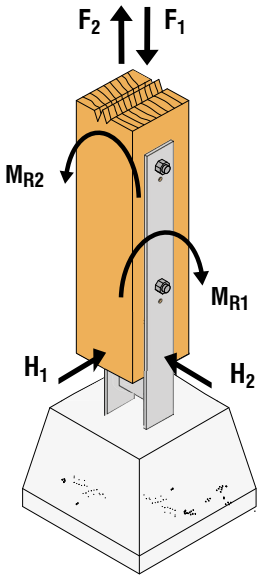
Available Sizes

Model No	Dimensions [mm]							Holes
	A	B	C	D	E	F	t	
CMR	115-165	100	600	250	300	60	10,0	4-Ø6,5; 4-Ø17
CMS	80-140	80	470	150	200	40	8,0	4-Ø6,5; 4-Ø17

Column to concrete connection

Load direction	CMR		CMS	
	Timber dimention [mm]	Characteristic capacity $R_{i,k}$	Timber dimention [mm]	Characteristic capacity $R_{i,k}$
$R_{1,k} = R_{2,k}$ [kN]	≥115	117,2	≥80	96,9
$R_{H1,k}$ [kN]	≥115	min{99,0; 21,3/k_{mod}}	≥80	min{74,0; 15,0/k_{mod}}
$R_{H2,k}$ [kN]	≥115	min{33,0; 30,9/k_{mod}}	≥80	min{21,1; 19,8/k_{mod}}
$R_{M1,k}$ [kNm]	≥115	min{19,8; 13,9/k_{mod}}	≥80	min{11,6; 7,1/k_{mod}}
$R_{M2,k}$ [kNm]	115	6,7	80	3,9
	120	7,0	100	4,8
	125	7,3	120	5,8
	140	8,2	140	6,8
	150	8,8	-	-
	160	9,4	-	-

Load scheme column to concrete

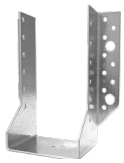


Stainless steel connectors

Standard products such as angle connectors, beam hangers and fasteners are also made of stainless steel. Products made of this material can be used outdoors and in an aggressive environment in the 3rd service class.
The list below is a standard product that is available on request.
In addition to standard items, we can make items for individual orders.

Material:
Stainless steel 1.4401; 1,4404

A4 CL.3

Products group		Model No.
	Joist hanger	BSN60/100S-B
		BSN80/120S-B
		BSN100/140S
		BSN120/160-B
		BSN140/180S
	Concealed connectors	BT4-90S-B
		BT4-120S-B
		BT4-160S-B
		BT4-200S-B
		BT4-240S-B
		BTN120S-B
		BTN160S-B
	Fasteners	C1-50S
		C1-62S
		C1-75S
		C1-117S
		C2-50M10S
		C2-50M12S
		C2-50M16S
		C2-50M20S
		C2-62M12S
		C2-62M16S
		C2-62M20S
		C2-75M12S
		C2-75M16S
		C2-75M20S
		C2-75M22S
		C2-75M24S
		C2-117M16S

Products group		Model No.
 	Fastenrs	C2-117M20S
		C2-117M22S
		CNA4,0X40S
		CNA4,0X50S
		CNA4,0X60S
		CNA6,0X60S
		CSA5,0x25S
		CSA5,0x35S
		CSA5,0X40S
		CSA5,0x40HCR
	Roof and truss connectors	SPF170LS
		SPF170RS
		SPF210LS
		GERWS
		SPF210RS
	Nail plates	BAN102010S
		NP
		BAN204025S
 	Angle brakets	AB70S-B
		AB90S-B
		AB105S
		AB55365S
		ABB40390S
		ABR70S
		ABR90S
		ABR100S
		ABR105S
		AC35350S
		ANP256660S

Solid Wood

SW

The app is fast and easy to use, yet it understands a deep set of fastener specification requirements such as: material density, performance characteristics, corrosivity class and load duration.
In just 4 steps, SOLID WOOD searches one of Europe's leading ranges of nails and screws to provide you with a selection of fasteners suitable for your need - as well as a full calculation report.

Anchor Designer

AD

Anchor Designer will quickly guide the designer through the calculations and will conduct any necessary analysis to fulfill the Limit States as well as will suggest the product that will be most efficient in the connection.
The software allows the designer to input any necessary data needed for the calculation: Cracked/non-cracked concrete, concrete class, loads directions, steel plate geometry etc.

Connector Selector

CS

The Simpson Strong-Tie European Connector Selector is a program that rapidly selects all the connector options for your particular application in whichever country of Europe you are operating. It also includes a wide range of fasteners that are suitable for use in structural connections.

Library DWG

DWG

New updated CAD library. Our archive allows you to quickly download drawings needed for your project. This way we can select the most convenient formats with just a few clicks to download the selected DWG drawing in 2D or 3D of our products.

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Strong-Tie
®

Simpson Strong-Tie Sp. Z o. o
02 - 234 Warszawa
ul. Działkowa 115A
Tel/Fax : +48 22 865 22 00
E-mail : poland@strongtie.com
www.strongtie.pl

Premium Fasteners

FRANCJA
Simpson Strong-Tie®
ZAC des Quatre Chemins
85400 Sainte Gemme La Plaine
Tel : +33 2 51 28 44 00
Fax : +33 2 51 28 44 01
commercial@strongtie.com
www.strongtie.eu

DANIA
Simpson Strong-Tie A/S
Hedegardesvej 11, Boulstrup
DK - 8300 Odder
Tel : +45 87 81 74 00
Fax : +45 87 81 74 09
E-mail : info@simpsonstrongtie.dk
www.simpsonstrongtie.dk
www.strongtie.eu

ANGLIA
Simpson Strong-Tie
Winchester Road - Cardinal Point,
Tamworth, Staffordshire B78 3HG
Tel : +44 1827 255 600
Fax : +44 1287 255 616
E-mail : web-uk@strongtie.com
www.strongtie.co.uk
www.strongtie.eu

NIEMCY
Simpson Strong-Tie GmbH
Hubert-Vergölst-Str. 6-14
D – 61231 Bad Nauheim
Tel : +49 (0)6032 8680-0
E-mail : info@simpsonstrongtie.de
www.strongtie.de
www.strongtie.eu

SZKOCJA
Simpson Strong-Tie®
Unit 6 Macintosch Road
Kirkton Campus, Livingstone EH54
7BW
Tel.: +44 1827 255600
Fax: +44 1827 255616
www.strongtie.co.uk
www.strongtie.eu

SIEDZIBA GŁÓWNA USA
Simpson Strong-Tie®
5956 W. Las Positas Blvd
Pleasanton, CA 94588
U.S.A.
Tel.: +1 925 560 9000
Fax: +1 925 833 1496
web@strongtie.com
www.strongtie.com

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