SCREWS FOR TIMBER

SCREWS AND FASTENERS FOR DECKS

SCREWS FOR METAL

PLATES AND ANGLE BRACKETS

POST BASES AND FENCES

ANCHORS AND CHEMICAL ANCHORS

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TOOLS

HT70

CE

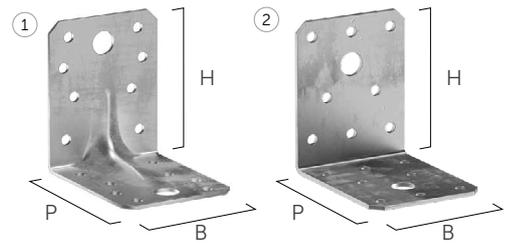## ANGLE BRACKET 70

- Perfect for small frames and simple structures
- It can be used on timber with screws (SBL) or nails (LBA-HT) or on concrete using 11 mm holes with anchors
- The reinforced version features a reduced thickness for maximum performance at the best price

MATERIAL		HT7070SR	**S250** Z275	HT07015	**DX51D** Z275

CODE		B		P		H		s		n Ø5	n Ø11			pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	n Ø0.20	n Ø0.43			
HT07015	①	55	2 3/16	70	2 3/4	70	2 3/4	1,5	0.059	16	2	●	●	100
HT7070SR	②	55	2 3/16	70	2 3/4	70	2 3/4	2,0	0.079	16	2	●	●	100

HT90

CE

ANGLE BRACKET 90

- Suitable for reinforcement and assembling timber structures, ideal for timber frame houses
- It can be used on timber with screws (SBL) or nails (LBA-HT) or on concrete using 11 mm holes with anchors
- The reinforced version features a reduced thickness for maximum performance at the best price
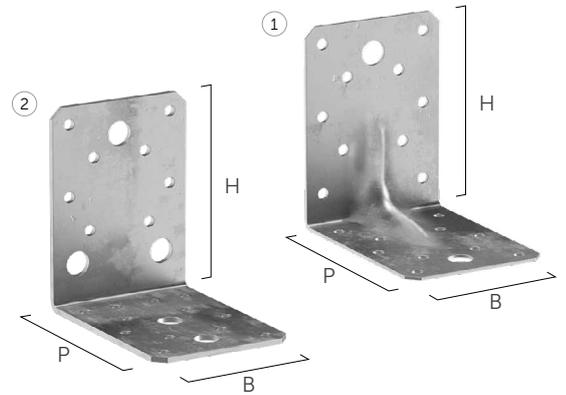
MATERIAL		HT9090SR	**S250** Z275	HT09015	**DX51D** Z275

CODE		B		P		H		s		n Ø5	n Ø11			pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	n Ø0.20	n Ø0.43			
HT09015	①	65	2 9/16	90	3 1/2	90	3 1/2	1,5	0.059	20	2	●	●	100
HT9090SR	②	65	2 9/16	90	3 1/2	90	3 1/2	2,5	0.098	20	2	●	●	100

HT100

CE

ANGLE BRACKET 100 FOR SHEAR LOADS

- The most classic of the shear angle brackets is available in versions with or without reinforcement: universal use, ideal for frame houses or small CLT houses
- 5 mm holes for fastening on timber with screws (SBL) or nails (LBA-HT)
- 11 mm and 13 mm holes for certified fastening on concrete with anchors. Available in 2 versions: with and without reinforcement
- The reinforced version features a reduced thickness for maximum performance at the best price
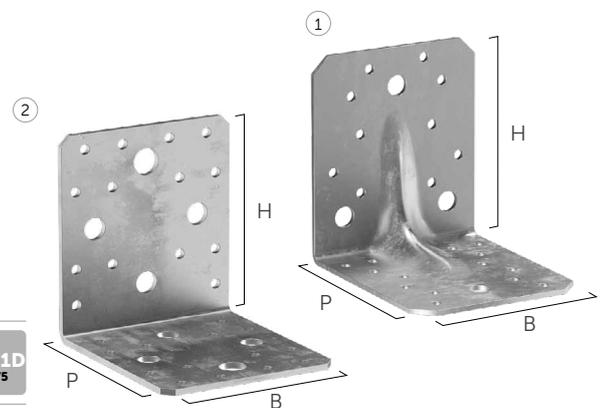
MATERIAL		HT100100SR	**S250** Z275	HT10020	**DX51D** Z275

CODE		B		P		H		s		n Ø5	n Ø11	n Ø13			pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	n Ø0.20	n Ø0.43	n Ø0.51			
HT10020	①	90	3 1/2	105	4 1/8	105	4 1/8	2,0	0.079	24	4	2	●	●	50
HT100100SR	②	90	3 1/2	100	4	100	4	3,0	0.118	28	6	2	●	●	50

HT170

ANGLE BRACKET 170 FOR SHEAR LOADS

- Ideal for small CLT houses
- Extended angle brackets for fastening raised elements (on kerb or platform)
- 5 mm holes for fastening on timber with screws (SBL) or nails (LBA-HT) and 13 mm holes for fastening on concrete with anchors
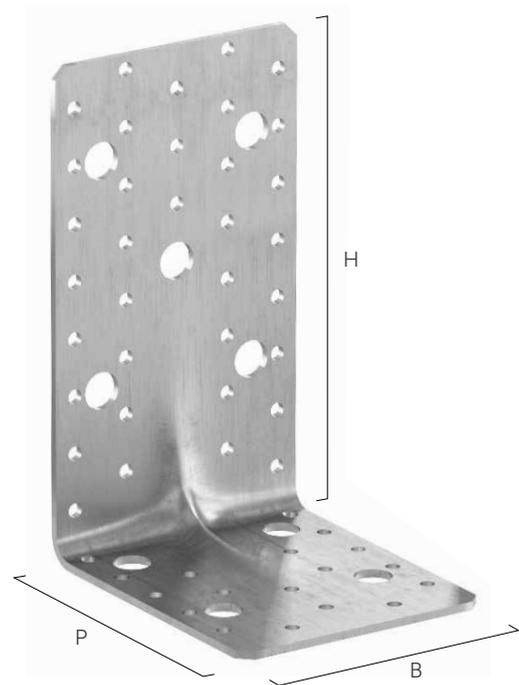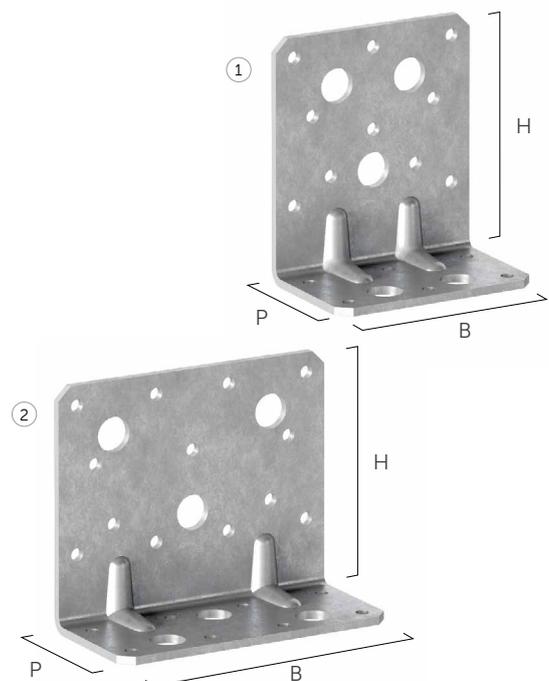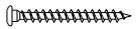
MATERIAL											DX51D Z275

CODE	B		P		H		s		n Ø5	n Ø13			pcs
	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	n Ø0.20	n Ø0.51			
HT170110	95	3 3/4	114	4 1/2	174	6 7/8	3,0	0.118	53	9	●	●	25

HTW

ANGLE BRACKET FOR SHEAR LOADS

- Ideal for frame houses or small CLT houses
- Asymmetrical angle bracket with a width of only 50 mm, designed for installation in small spaces
- 5 mm holes for fastening on timber with screws (SBL) or nails (LBA-HT) and 13 mm holes for fastening on concrete with anchors
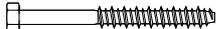
MATERIAL		HT509080	S250 Z275		HT90110	DX51D Z275

CODE		B		P		H		s		n Ø5	n Ø13			pcs
		[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	n Ø0.20	n Ø0.51			
HT509080	①	80	3 1/8	50	1 15/16	90	3 1/2	3,0	0.118	16	5	●	●	100
HT90110	②	110	4 3/8	50	1 15/16	90	3 1/2	3,0	0.118	21	6	●	●	50

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ADDITIONAL PRODUCTS - FASTENING

type	description		d	support
			[mm]	
LBA-HT	high bond nail		4	
SBL	round head screw		5	
SKR	screw-in anchor		10-12	
V-NEX	vinyl ester chemical anchor		M10-M12	

FASTENING PATTERNS

TIMBER-TO-TIMBER
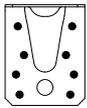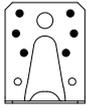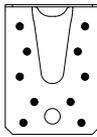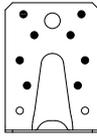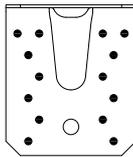
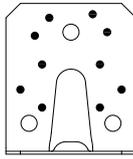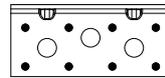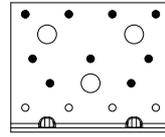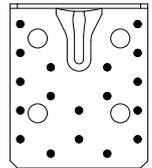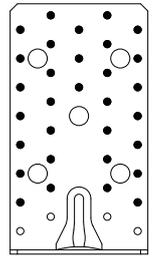| HT07015	HT09015	HT10020	HT90110	HT170110
pattern 1	pattern 1	pattern 1	pattern 1	pattern 1

TIMBER-TO-CONCRETE
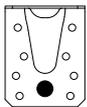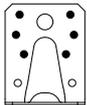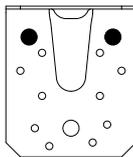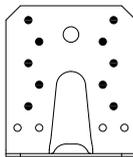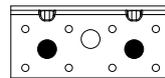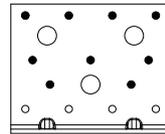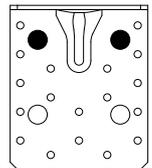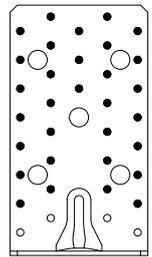
HT07015	HT09015	HT10020	HT90110	HT170110
pattern 2	pattern 2	pattern 2	pattern 2	pattern 2

STRUCTURAL VALUES | TENSILE JOINT F_1 | TIMBER-TO-TIMBER

HT07015 | HT09015 | HT10020 | HT170110 | HT90110

TIMBER STRENGTH

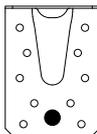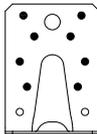| CODE	configuration on timber	fastening holes Ø5				$R_{1,k\ timber}$	$R_{1,k\ steel}$
		type	Ø x L [mm]	n_v pcs	n_H pcs	[kN]	[kN]
HT07015	pattern 1	LBA nails	Ø4,0 x 60	6	8	2,0	-
		SBL screws	Ø5,0 x 60			5,0	-
HT09015	pattern 1	LBA nails	Ø4,0 x 60	8	10	2,1	-
		SBL screws	Ø5,0 x 60			5,4	-
HT10020	pattern 1	LBA nails	Ø4,0 x 60	10	14	4,1	-
		SBL screws	Ø5,0 x 60			11,0	-
HT90110	pattern 1	LBA nails	Ø4,0 x 60	9	8	2,5	3,4
HT170110	pattern 1	LBA nails	Ø4,0 x 60	31	18	1,7	3,7

STRUCTURAL VALUES | SHEAR JOINT $F_{2/3}$ | TIMBER-TO-TIMBER

HT07015 | HT09015 | HT10020 | HT170110 | HT90110

TIMBER STRENGTH

CODE	configuration on timber	fastening holes Ø5				$R_{2/3,k\ timber}$
		type	Ø x L [mm]	n_v pcs	n_H pcs	[kN]
HT07015	pattern 1	LBA nails	Ø4,0 x 60	6	8	5,6
		SBL screws	Ø5,0 x 60			5,9
HT09015	pattern 1	LBA nails	Ø4,0 x 60	8	10	6,8
		SBL screws	Ø5,0 x 60			7,1
HT10020	pattern 1	LBA nails	Ø4,0 x 60	10	14	9,3
		SBL screws	Ø5,0 x 60			10,1
HT90110	pattern 1	LBA nails	Ø4,0 x 60	9	8	7,1
HT170110	pattern 1	LBA nails	Ø4,0 x 60	31	18	11,0

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WINDOW SEALING
SOUNDPROOFING
ROOF ELEMENTS
TOOLS

STRUCTURAL VALUES | TENSILE JOINT F_1 | TIMBER-TO-CONCRETE
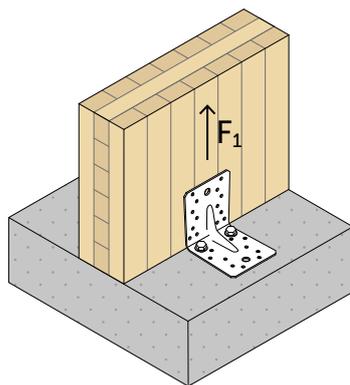
HT10020

TIMBER STRENGTH

CODE	TIMBER			STEEL
	fastening holes Ø5			$R_{1,k\ timber}$	$R_{1,k\ steel}$
	type	Ø x L	n_V		
		[mm]	pcs	[kN]	[kN]
HT10020	LBA nails	Ø4,0 x 60	10	**26,6**	**8,6**
	SBL screws	Ø5,0 x 60		**24,1**	**8,6**

CONCRETE STRENGTH

Strength values of some of the possible fastening solutions.

| configuration on timber | fastening holes Ø11 | | | $R_{1,d\ concrete}$ | $K_{t//}$ |
| | type | Ø x L | n_H | | |
		[mm]	pcs	[kN]	
• **uncracked**	V-NEX 5.8	M10 x 140	2	**21,2**	1,15
	SKR	M10 x 80		**11,7**	
• **cracked**	V-NEX 5.8	M10 x 140		**11,8**	
	SKR	M10 x 80		**8,0**	

CHEMICAL ANCHORS INSTALLATION STRENGTH

| anchor type | | d_0 | h_{ef} | h_{nom} | h_1 | h_{min} |
	Ø x L	[mm]	[mm]	[mm]	[mm]	[mm]
V-NEX 5.8	M10 x 140	12	115	115	120	200
SKR	M10 x 80	8	56	70	85	150

GENERAL PRINCIPLES:

For the general principles of calculation, see page 7.

SCREWS FOR TIMBER
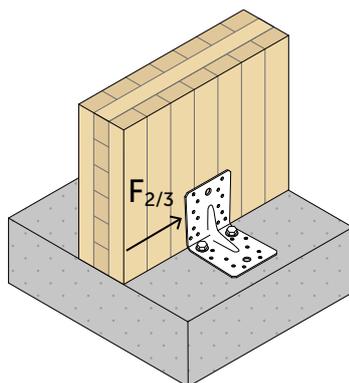
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STRUCTURAL VALUES | SHEAR JOINT $F_{2/3}$ | TIMBER-TO-CONCRETE

HT10020

TIMBER STRENGTH

CODE	fastening holes Ø5			$R_{2/3,k \text{ timber}}$
	type	Ø x L	n_V	
		[mm]	pcs	[kN]
HT10020	LBA nails	Ø4,0 x 60	10	8,6
	SBL screws	Ø5,0 x 60		7,8

CONCRETE STRENGTH

Strength values of some of the possible fastening solutions.

CODE	fastening holes Ø11			$R_{2/3,d \text{ concrete}}$	e_y
	type	Ø x L	n_H		
		[mm]	pcs	[kN]	[mm]
• uncracked	V-NEX 5.8	M10 x 140	2	27,1	21,5
	SKR	M10 x 80		16,1	
• cracked	V-NEX 5.8	M10 x 140		27,1	
	SKR	M10 x 80		11,2	

CHEMICAL ANCHORS INSTALLATION STRENGTH

anchor type		d_0	h_{ef}	h_{nom}	h_1	h_{min}
	Ø x L	[mm]	[mm]	[mm]	[mm]	[mm]
V-NEX 5.8	M10 x 140	12	115	115	120	200
SKR	M10 x 80	8	56	70	85	150

STRUCTURAL VALUES | SHEAR JOINT $F_{2/3}$ | TIMBER-TO-CONCRETE

HT90110 | HT170110

TIMBER STRENGTH

CODE	configuration on timber	fastening holes Ø5			fastening holes Ø11	$R_{2/3,k}$	
		type	Ø x L	n_V	n_H	$R_{2/3,k \text{ timber}}$	$\text{Bolt}_{2/3}$[1]
			[mm]	pcs	pcs	[kN]	[kN]
HT90110	pattern 1	LBA nails	Ø4,0 x 60	9	2	7,1	0,71
HT170110	pattern 2	LBA nails	Ø5,0 x 60	31	2	11,0	0,65

[1]Timber-to-concrete characteristic values are calculated by distributing part of the moment given by eccentricity on the nails. Other static diagrams can be calculated by the designer.

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GENERAL PRINCIPLES:

- Characteristic values are consistent with EN 1995-1-1 and in accordance with ETA. The design values of the anchors for concrete are calculated in accordance with the respective European Technical Assessments.

- The connection design strength values are obtained from the values on the table as follows:

$$R_d = min \begin{cases} \dfrac{R_{k,timber} \cdot k_{mod}}{\gamma_M} \\ \dfrac{R_{k,steel}}{\gamma_{steel}} \\ R_{d,concrete} \end{cases}$$

The coefficients k_{mod} and γ_M should be taken according to the current regulations used for the calculation.

- Installation with nails and screws of shorter length than proposed in the table is possible. In this case, the bearing capacity values $R_{k\ timber}$ must be multiplied by the following reductive factor k_F:

  - for nails

  $$k_F = min \left\{ \dfrac{F_{v,short,Rk}}{2,83\ kN} , \dfrac{F_{ax,short,Rk}}{1,39\ kN} \right\}$$

  - for screws

  $$k_F = min \left\{ \dfrac{F_{v,short,Rk}}{2,41\ kN} , \dfrac{F_{ax,short,Rk}}{3,28\ kN} \right\}$$

  $F_{v,short,Rk}$ = *characteristic shear strength of the nail or screw*
  $F_{ax,short,Rk}$ = *characteristic withdrawal strength of the nail or screw*

- Dimensioning and verification of timber and concrete elements must be carried out separately. Verify that there are no brittle failures before reaching the connection strength.

- Structural elements in timber, to which the connection devices are fastened, must be prevented from rotating.

- The calculation process used a timber characteristic density of $\rho_k = 350$ kg/m^3 and a C25/30 concrete strength class with a thin reinforcing layer, where there is no spacing and edge-distance and minimum thickness indicated in the installation parameters tables of the anchors used. The strength values are valid for the calculation hypothesis defined in the table; for boundary conditions different from the ones in the table (e.g. minimum distances from the edge or different concrete thickness), the concrete-side anchors can be verified using MyProject calculation software according to the design requirements.

- The anchors seismic design was carried out in performance category C2, without ductility requirements on anchors (option a2) elastic design according to EN 1992-4, with $\alpha_{sus} = 0,6$. For chemical anchors it is assumed that the annular space between the anchor and the plate hole is filled ($\alpha_{gap} = 1$).

- The product ETAs for the anchors used in the concrete-side strength calculation are indicated below:

  - VIN-FIX chemical anchor according to ETA-20/0363;
  - SKR screw-in anchor according to ETA-24/0024.