BSA

METAL HANGER WITH EXTERNAL WINGS

CE
ETA

FAST USE
Standardized, certified, fast and inexpensive system.

MIXED MODE BENDING
Suitable for the fasting of joints in mixed mode bending.

WIDE RANGE
More than 50 models to suit all needs, for beam widths from 40 to 200 mm. Strengths of up to 75 kN for use in heavy structural applications on both timber and concrete.

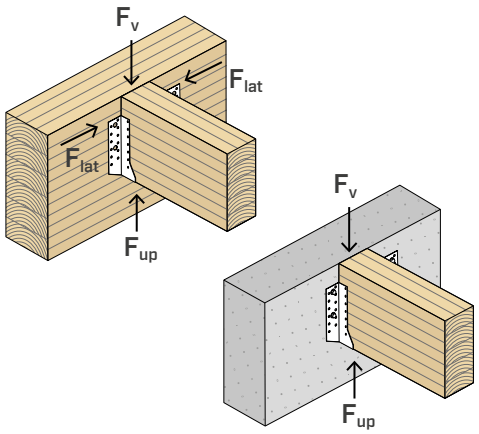
USA, Canada and more design values available online.

SERVICE CLASS SC1 SC2

MATERIAL

S250 Z275 Z275 bright zinc plated S250GD carbon steel

EXTERNAL LOADS



BSAD

BSAS

BSAG

FIELD OF USE

Joints for beams in timber-to-timber or timber-to-concrete configuration, suitable for beams, I-joists and wood trusses.

Can be applied to:
- solid timber softwood and hardwood
- glulam, LVL

WOOD TRUSS

Also ideal for the fastening of TRUSS and RAFTER with small cross-sections. Certified values also allow for the direct fastening of TIMBER STUD to OSB panels.

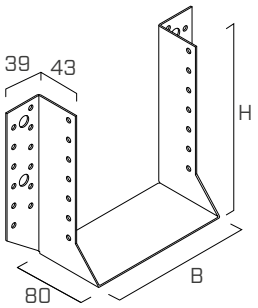
I-JOIST

Versions homologated for direct fastening on OSB panels, for joining „I" beams and for timber-to-concrete joints.

CODES AND DIMENSIONS

BSAS - smooth

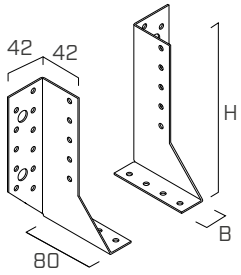
S250 Z275



CODE	B [mm]	H [mm]	s [mm]	*B [in]*	*H [in]*	*s [in]*			pcs
BSAS40110	40	110	2,0	*1 9/16*	*4 3/8*	*0.08*	●	●	50
BSAS46117	46	117	2,0	*1 13/16*	*4 5/8*	*0.08*	●	-	50
BSAS46137	46	137	2,0	*1 13/16*	*5 3/8*	*0.08*	●	●	50
BSAS46207	46	207	2,0	*1 13/16*	*8 1/8*	*0.08*	●	-	25
BSAS5070	50	70	2,0	*1 15/16*	*2 3/4*	*0.08*	●	-	50
BSAS51105	51	105	2,0	*2*	*4 1/8*	*0.08*	●	●	50
BSAS51135	51	135	2,0	*2*	*5 5/16*	*0.08*	●	●	50
BSAS60100	60	100	2,0	*2 3/8*	*4*	*0.08*	●	●	50
BSAS64128	64	128	2,0	*2 1/2*	*5 1/16*	*0.08*	●	●	50
BSAS64158	64	158	2,0	*2 1/2*	*6 1/4*	*0.08*	●	●	50
BSAS70125	70	125	2,0	*2 3/4*	*4 15/16*	*0.08*	●	●	50
BSAS70155	70	155	2,0	*2 3/4*	*6 1/8*	*0.08*	●	●	50
BSAS7690	76	90	2,0	*3*	*3 1/2*	*0.08*	●	-	50
BSAS76152	76	152	2,0	*3*	*6*	*0.08*	●	●	50
BSAS80120	80	120	2,0	*3 1/8*	*4 3/4*	*0.08*	●	●	50
BSAS80140	80	140	2,0	*3 1/8*	*5 1/2*	*0.08*	●	●	50
BSAS80150	80	150	2,0	*3 1/8*	*6*	*0.08*	●	●	50
BSAS80180	80	180	2,0	*3 1/8*	*7 1/8*	*0.08*	●	●	25
BSAS80210	80	210	2,0	*3 1/8*	*8 1/4*	*0.08*	●	●	50
BSAS90145	90	145	2,0	*3 1/2*	*5 11/16*	*0.08*	●	●	50
BSAS92184	92	184	2,0	*3 5/8*	*7 1/4*	*0.08*	●	-	25
BSAS10090	100	90	2,0	*4*	*3 1/2*	*0.08*	●	-	50
BSAS100120	100	120	2,0	*4*	*4 3/4*	*0.08*	●	-	50
BSAS100140	100	140	2,0	*4*	*5 1/2*	*0.08*	●	●	50
BSAS100160	100	160	2,0	*4*	*6 1/4*	*0.08*	●	-	50
BSAS100170	100	170	2,0	*4*	*6 3/4*	*0.08*	●	●	25
BSAS100200	100	200	2,0	*4*	*8*	*0.08*	●	●	25
BSAS120120	120	120	2,0	*4 3/4*	*4 3/4*	*0.08*	●	●	25
BSAS120160	120	160	2,0	*4 3/4*	*6 1/4*	*0.08*	●	●	50
BSAS120190	120	190	2,0	*4 3/4*	*7 1/2*	*0.08*	●	●	25
BSAS140140	140	140	2,0	*5 1/2*	*5 1/2*	*0.08*	●	●	25
BSAS140160	140	160	2,0	*5 1/2*	*6 1/4*	*0.08*	●	-	25
BSAS140180	140	180	2,0	*5 1/2*	*7 1/8*	*0.08*	●	●	25

BSAD - 2 pieces

S250 Z275



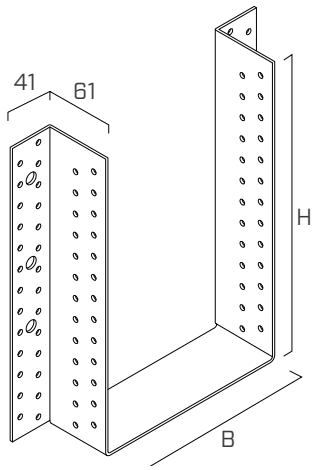
CODE	B [mm]	H [mm]	s [mm]	*B [in]*	*H [in]*	*s [in]*			pcs
BSAD25100	25	100	2,0	*1*	*4*	*0.08*	●	-	25
BSAD25140	25	140	2,0	*1*	*5 1/2*	*0.08*	●	-	25
BSAD25180	25	180	2,0	*1*	*7 1/8*	*0.08*	●	-	25

CODES AND DIMENSIONS

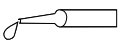
BSAG - large size

CODE	B [mm]	H [mm]	s [mm]	*B [in]*	*H [in]*	*s [in]*			pcs
BSAG100240	100	240	2,5	*4*	*9 1/2*	*0.10*	●	●	20
BSAG100280	100	280	2,5	*4*	*11*	*0.10*	●	●	20
BSAG120240	120	240	2,5	*4 3/4*	*9 1/2*	*0.10*	●	●	20
BSAG120280	120	280	2,5	*4 3/4*	*11*	*0.10*	●	●	20
BSAG140240	140	240	2,5	*5 1/2*	*9 1/2*	*0.10*	●	●	20
BSAG140280	140	280	2,5	*5 1/2*	*11*	*0.10*	●	●	20
BSAG160160	160	160	2,5	*6 1/4*	*6 1/4*	*0.10*	●	●	15
BSAG160200	160	200	2,5	*6 1/4*	*8*	*0.10*	●	●	15
BSAG160240	160	240	2,5	*6 1/4*	*9 1/2*	*0.10*	●	●	15
BSAG160280	160	280	2,5	*6 1/4*	*11*	*0.10*	●	●	15
BSAG160320	160	320	2,5	*6 1/4*	*12 5/8*	*0.10*	●	●	15
BSAG180220	180	220	2,5	*7 1/8*	*8 5/8*	*0.10*	●	●	10
BSAG180280	180	280	2,5	*7 1/8*	*11*	*0.10*	●	●	10
BSAG200200	200	200	2,5	*8*	*8*	*0.10*	●	●	10
BSAG200240	200	240	2,5	*8*	*9 1/2*	*0.10*	●	●	10

S250
Z275

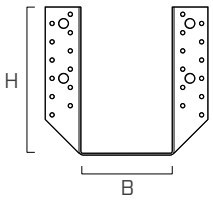


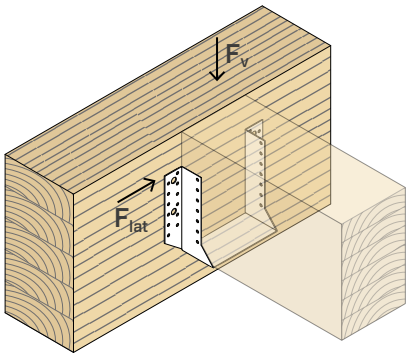
ADDITIONAL PRODUCTS - FASTENING

type	description		d [mm]	support	page
LBA	high bond nail		4		570
LBS	round head screw		5		571
AB1	CE1 expansion anchor		M8 - M10 -M12		536
VIN-FIX	vinyl ester chemical anchor		M8 - M10 -M12		545
HYB-FIX	hybrid chemical anchor		M8 - M10 -M12		552

STRUCTURAL VALUES | TIMBER-TO-TIMBER | F_v | F_{lat}

PARTIAL/TOTAL NAILING[1]



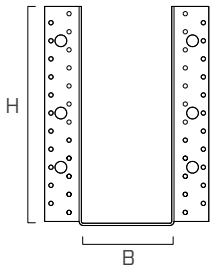


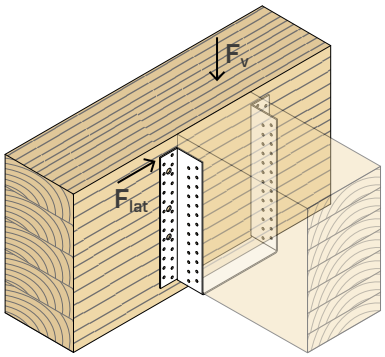
BSAS - SMOOTH			PARTIAL NAILING				FULL NAILING			
			fastening number		characteristic values		fastening number		characteristic values	
B	H	LBA nails	n_H[2]	n_J[3]	$R_{v,k}$	$R_{lat,k}$	n_H[2]	n_J[3]	$R_{v,k}$	$R_{lat,k}$
[mm]	[mm]	d x L [mm]	[pcs]	[pcs]	[kN]	[kN]	[pcs]	[pcs]	[kN]	[kN]
40 *	110	Ø4 x 40	8	4	**8,7**	**1,9**	-	-	**-**	**-**
46 *	117	Ø4 x 40	8	4	**9,0**	**2,1**	-	-	**-**	**-**
46 *	137	Ø4 x 40	10	6	**11,8**	**2,4**	-	-	**-**	**-**
46 *	207	Ø4 x 40	14	8	**16,9**	**2,9**	-	-	**-**	**-**
50 *	70	Ø4 x 40	4	2	**3,6**	**1,3**	-	-	**-**	**-**
51 *	105	Ø4 x 40	8	4	**8,1**	**2,3**	-	-	**-**	**-**
51 *	135	Ø4 x 40	10	6	**11,5**	**2,6**	-	-	**-**	**-**
60	100	Ø4 x 40	8	4	**7,6**	**2,6**	14	8	**13,0**	**4,9**
64	128	Ø4 x 40	10	6	**10,9**	**3,6**	18	10	**19,2**	**5,9**
64	158	Ø4 x 40	12	6	**15,0**	**3,6**	22	12	**26,3**	**6,7**
70	125	Ø4 x 40	10	6	**10,5**	**3,7**	18	10	**18,6**	**6,2**
70	155	Ø4 x 40	12	6	**15,0**	**3,8**	22	12	**26,3**	**7,1**
76	90	Ø4 x 40	6	4	**5,9**	**2,9**	12	6	**10,4**	**4,4**
76	152	Ø4 x 40	12	6	**15,0**	**3,9**	22	12	**26,3**	**7,4**
80	120	Ø4 x 40	10	6	**9,9**	**4,0**	18	10	**17,5**	**6,6**
80	140	Ø4 x 40	10	6	**12,3**	**4,0**	20	10	**22,5**	**6,7**
80	150	Ø4 x 40	12	6	**14,8**	**4,0**	22	12	**26,3**	**7,6**
80	180	Ø4 x 40	14	8	**18,8**	**4,8**	26	14	**30,0**	**8,4**
80	210	Ø4 x 40	16	8	**18,8**	**4,8**	30	16	**33,8**	**9,1**
90	145	Ø4 x 40	12	6	**14,2**	**4,2**	22	12	**25,7**	**8,0**
92	184	Ø4 x 40	14	8	**18,8**	**5,2**	26	14	**30,0**	**9,0**
100	90	Ø4 x 60	6	4	**8,7**	**4,8**	12	6	**15,2**	**7,2**
100	120	Ø4 x 60	10	6	**15,3**	**7,0**	18	10	**27,1**	**11,7**
100	140	Ø4 x 60	12	6	**18,9**	**6,5**	22	12	**33,1**	**12,3**
100	160	Ø4 x 60	12	6	**18,9**	**6,5**	22	12	**33,1**	**12,3**
100	170	Ø4 x 60	14	8	**23,6**	**7,7**	26	14	**37,8**	**13,5**
100	200	Ø4 x 60	16	8	**23,6**	**7,7**	30	16	**42,5**	**14,6**
120	120	Ø4 x 60	10	6	**15,3**	**7,0**	18	10	**27,1**	**11,7**
120	160	Ø4 x 60	14	8	**23,6**	**8,5**	26	14	**37,8**	**14,9**
120	190	Ø4 x 60	16	8	**23,6**	**8,5**	30	16	**42,5**	**16,2**
140	140	Ø4 x 60	12	6	**18,9**	**7,4**	22	12	**33,1**	**14,3**
140	160	Ø4 x 60	14	8	**23,6**	**9,1**	26	14	**37,8**	**16,0**
140	180	Ø4 x 60	16	8	**23,6**	**9,1**	30	16	**42,5**	**17,5**

* It cannot be to completely nailed.

STRUCTURAL VALUES | TIMBER-TO-TIMBER | F_v | F_{lat}

PARTIAL/TOTAL NAILING[1]





BSAG - LARGE SIZE			PARTIAL NAILING				FULL NAILING			
			fastening number		characteristic values		fastening number		characteristic values	
B	H	LBA nails	n_H[2]	n_J[3]	$R_{v,k}$	$R_{lat,k}$	n_H[2]	n_J[3]	$R_{v,k}$	$R_{lat,k}$
[mm]	[mm]	d x L [mm]	[pcs]	[pcs]	[kN]	[kN]	[pcs]	[pcs]	[kN]	[kN]
100	240	Ø4 x 60	24	16	**40,7**	**10,7**	46	30	**75,6**	**19,9**
100	280	Ø4 x 60	28	18	**47,3**	**10,8**	54	34	**85,1**	**20,3**
120	240	Ø4 x 60	24	16	**40,7**	**12,3**	46	30	**75,6**	**22,9**
120	280	Ø4 x 60	28	18	**47,3**	**12,6**	54	34	**85,1**	**23,5**
140	240	Ø4 x 60	24	16	**40,7**	**13,7**	46	30	**75,6**	**25,6**
140	280	Ø4 x 60	28	18	**47,3**	**14,1**	54	34	**85,1**	**26,4**
160	160	Ø4 x 60	16	10	**21,2**	**11,1**	30	18	**41,6**	**19,9**
160	200	Ø4 x 60	20	12	**30,7**	**12,3**	38	22	**56,7**	**22,4**
160	240	Ø4 x 60	24	16	**40,7**	**15,0**	46	30	**75,6**	**27,9**
160	280	Ø4 x 60	28	18	**47,3**	**15,5**	54	34	**85,1**	**29,0**
160	320	Ø4 x 60	32	20	**52,0**	**15,9**	62	38	**94,6**	**30,0**
180	220	Ø4 x 60	22	14	**35,7**	**15,2**	42	26	**66,2**	**27,0**
180	280	Ø4 x 60	28	18	**47,3**	**16,7**	54	34	**85,1**	**31,3**
200	200	Ø4 x 60	20	12	**30,7**	**13,7**	38	22	**56,7**	**25,0**
200	240	Ø4 x 60	24	16	**40,7**	**16,9**	46	30	**75,6**	**31,3**

NOTES

(1) For total or partial nailing patterns please refer to the guidelines reported at p. 150.

(2) n_H = number of fasteners on the main beam.

(3) n_J = number of fasteners on the secondary beam.

GENERAL PRINCIPLES

- Characteristic values are consistent with EN 1995:2014 and in accordance with ETA.
- Design values can be obtained from characteristic values as follows:

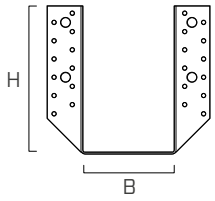
$$R_d = \frac{R_k \cdot k_{mod}}{\gamma_M}$$

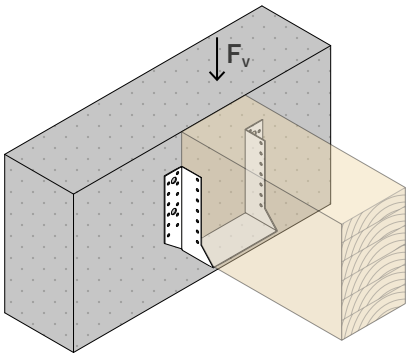
  The coefficients k_{mod} and γ_M should be taken according to the current regulations used for the calculation.
- A timber density of ρ_k = 350 kg/m^3 was considered for the calculation process.
- Dimensioning and verification of the timber elements must be carried out separately.
- In case of F_v parallel to the grain, partial nailing is required.
- The following verification shall be satisfied for combined loading:

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

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | F_V

CHEMICAL ANCHOR[1]



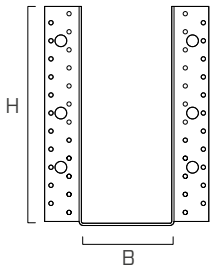


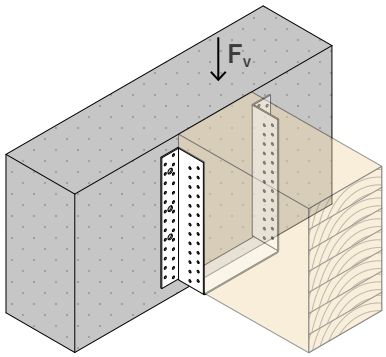
BSAS - SMOOTH		FASTENERS		CHARACTERISTIC VALUES	
B	**H**	**anchor VIN-FIX[2]**	**nails LBA**	**$R_{v,k\ timber}$**	**$R_{v,k\ steel}$**
[mm]	[mm]	[n_{bolt} - Ø x L] [3]	[n_J - Ø x L] [4]	[kN]	[kN]
40 *	110	2 - M8 x 110	4 - Ø4 x 40	**11,3**	**10,6**
46 *	137	2 - M10 x 110	6 - Ø4 x 40	**15,0**	**13,2**
51 *	105	2 - M8 x 110	4 - Ø4 x 40	**11,3**	**10,6**
51 *	135	2 - M10 x 110	6 - Ø4 x 40	**15,0**	**13,2**
60	100	2 - M8 x 110	8 - Ø4 x 40	**18,8**	**10,6**
64	128	4 - M10 x 110	10 - Ø4 x 40	**22,5**	**26,4**
64	158	4 - M10 x 110	12 - Ø4 x 40	**26,3**	**26,4**
70	125	4 - M10 x 110	10 - Ø4 x 40	**22,5**	**26,4**
70	155	4 - M10 x 110	12 - Ø4 x 40	**26,3**	**26,4**
76	152	4 - M10 x 110	12 - Ø4 x 40	**26,3**	**26,4**
80	120	4 - M10 x 110	10 - Ø4 x 40	**22,5**	**26,4**
80	140	4 - M10 x 110	10 - Ø4 x 40	**22,5**	**26,4**
80	150	4 - M10 x 110	12 - Ø4 x 40	**26,3**	**26,4**
80	180	4 - M10 x 110	14 - Ø4 x 40	**30,0**	**26,4**
80	210	4 - M10 x 110	16 - Ø4 x 40	**33,8**	**26,4**
90	145	4 - M10 x 110	12 - Ø4 x 40	**26,3**	**26,4**
100	140	4 - M10 x 110	12 - Ø4 x 60	**33,1**	**26,4**
100	170	4 - M10 x 110	14 - Ø4 x 60	**37,8**	**26,4**
100	200	4 - M10 x 110	16 - Ø4 x 60	**42,6**	**26,4**
120	120	4 - M10 x 110	10 - Ø4 x 60	**28,4**	**26,4**
120	160	4 - M10 x 110	14 - Ø4 x 60	**37,8**	**26,4**
120	190	4 - M10 x 110	16 - Ø4 x 60	**42,6**	**26,4**
140	140	2 - M10 x 110	12 - Ø4 x 60	**33,1**	**13,2**
140	180	4 - M10 x 110	16 - Ø4 x 60	**42,6**	**26,4**

* Partial nailing.

STRUCTURAL VALUES | TIMBER-TO-CONCRETE | F_V

CHEMICAL ANCHOR[1]





BSAG - LARGE SIZE		FASTENERS		CHARACTERISTIC VALUES	
B	**H**	**anchor VIN-FIX[2]**	**nails LBA**	**$R_{v,k\ timber}$**	**$R_{v,k\ steel}$**
[mm]	[mm]	[n_{bolt} - Ø x L] [3]	[n_J - Ø x L] [4]	[kN]	[kN]
100	240	6 - M12 x 130	30 - Ø4 x 60	**75,6**	**59,4**
100	280	6 - M12 x 130	34 - Ø4 x 60	**85,1**	**59,4**
120	240	6 - M12 x 130	30 - Ø4 x 60	**75,6**	**59,4**
120	280	6 - M12 x 130	34 - Ø4 x 60	**85,1**	**59,4**
140	240	6 - M12 x 130	30 - Ø4 x 60	**75,6**	**59,4**
140	280	6 - M12 x 130	34 - Ø4 x 60	**85,1**	**59,4**
160	160	4 - M12 x 130	18 - Ø4 x 60	**47,3**	**39,6**
160	200	6 - M12 x 130	22 - Ø4 x 60	**56,7**	**59,4**
160	240	6 - M12 x 130	30 - Ø4 x 60	**75,6**	**59,4**
160	280	6 - M12 x 130	34 - Ø4 x 60	**85,1**	**59,4**
160	320	6 - M12 x 130	38 - Ø4 x 60	**94,6**	**59,4**
180	220	6 - M12 x 130	26 - Ø4 x 60	**66,2**	**59,4**
180	280	6 - M12 x 130	34 - Ø4 x 60	**85,1**	**59,4**
200	200	6 - M12 x 130	22 - Ø4 x 60	**56,7**	**59,4**
200	240	6 - M12 x 130	30 - Ø4 x 60	**75,6**	**59,4**

NOTES

(1) For fixing on the concrete the two top holes must always be fixed and the anchors shall be positioned symmetrically with respect to the vertical axis of the hanger.

(2) Chemical anchor VIN-FIX with threaded rods (type INA) of minimum strength grade equal to 5.8. with $h_{ef} \geq 8d$.

(3) n_{bolt} = number of anchors on the concrete support.

(4) n_J = number of fasteners on the secondary beam.

GENERAL PRINCIPLES

- Characteristic values are consistent with EN 1995:2014 and in accordance with ETA.
- The connection design strength is the minimum between the design strength pertaining to the timber side ($R_{v,d\ timber}$) and the design strength of the steel part ($R_{v,d\ steel}$):

$$R_{v,d} = min \begin{cases} \frac{R_{v,k\ timber} \cdot k_{mod}}{\gamma_M} \\ \frac{R_{v,k\ steel}}{\gamma_{M2}} \end{cases}$$

  The coefficients k_{mod}, γ_M and γ_{M2} should be taken according to the current regulations used for the calculation.
- A timber density of ρ_k = 350 kg/m^3 was considered for the calculation process.
- Dimensioning and verification of timber and concrete elements must be carried out separately.
- The strength values of the connection system are valid under the calculation hypothesis listed in the table.