



Shoes serve as carriers of hidden forces between the secondary beams of the main beams and columns.



[ETA-07/0245](#), [UK-DoP-e07/0245](#)

## FEATURES



## Material

Steel quality:

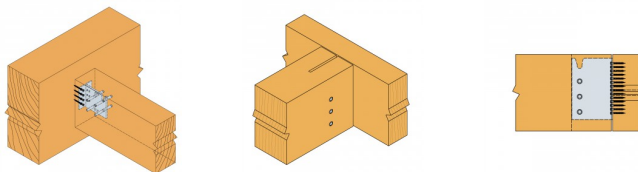
S 250 GD + Z 275 according to DIN EN 10346

Corrosion protection:

275 g / m galvanized on both sides 20mm

## Benefits

- The connection can be made up to 45 °.
- Shoes BT4 are particularly suitable for timber-to-timber connection, in which the fibers are perpendicular (e.g. columns)
- Mounting hole allows safe and comfortable hanging beam.
- In the shoe does not need additional support
- Fire protection according to DIN 4102nd



## APPLICATIONS

### Applications

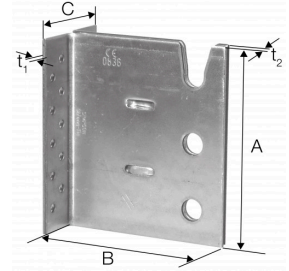
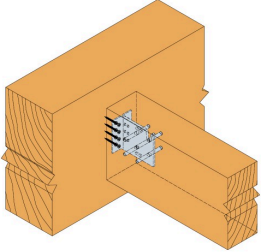
Wood, wood products

### Scope

- For connecting secondary beams of wood or wooden materials to the main support structure of wood / wood materials

TECHNICAL DATA

Product Dimensions



References	Product Dimensions [mm]					Joist Size [mm]		Header holes	Joist holes
	A	B	C	t <sub>1</sub>	t <sub>2</sub>	Width	Height	Ø5	Ø13
						Min	Min β=0		
BT4-90	90	103	61	3	6	60	90	16	4 (Ø8.5)
BT4-120	120	103	61	3	6	60	152	20	3
BT4-160	160	103	61	3	6	60	192	28	4
BT4-200	200	103	61	3	6	60	232	36	5
BT4-240	240	103	61	3	6	60	272	44	6

HT = Main beam or support

Combined value:

$$\sum \frac{F_{i,d}}{R_{i,d}} \leq 1$$

For angled connections, the resistance must reckon with multiplier.

Wood/wood fastening- Characteristic values in kn

References	Product Capacities															
	Number of Fasteners				Product characteristic capacities - Timber C24 [kN]											
	Header		Joist		R <sub>1,k</sub>						R <sub>2,k</sub>					
	Qty	Type	Qty	Type	Dowels length [mm]						Dowels length [mm]					
					60	80	100	120	140	160	60	80	100	120	140	160
BT4-90	16	CNA4.0x50	4	STD8	10.8	11.8	12.9	13.7	13.7	13.7	8.1	8.9	9.7	10.3	10.3	10.3
BT4-120	20	CNA4.0x50	3	STD12	17.3	18.2	19.4	20.7	22.3	23.9	11.5	12.1	12.9	13.8	14.9	15.9
BT4-160	28	CNA4.0x50	4	STD12	28	29.5	31.2	33.3	35.7	38.2	21	22.1	23.4	25	26.8	28.6
BT4-200	36	CNA4.0x50	5	STD12	39.8	41.9	44.3	47.2	50.4	53.9	31.8	33.5	35.4	37.8	40.3	43.1
BT4-240	44	CNA4.0x50	6	STD12	52.2	54.9	57.9	61.7	65.9	70.3	43.5	45.8	48.2	51.4	54.9	58.6

The joist shall have as minimum a width = length of steel dowel.

For beams with a slope β the capacities shall be multiply with the factor.

β	0°	15°	30°	45°
factor	1.0	0.95	0.9	0.85

R<sub>2,k</sub> capacities are calculated as R<sub>2,k</sub> = R<sub>1,k</sub> x (nb of dowels - 1) / (nb of dowels).

The top dowel is not considered for the uplift capacities as it is placed in an open hole.

More detailed information are given in the ETA.

Product characteristic capacities - Timber beam to timber beam - R<sub>3,k</sub> and R<sub>4,k</sub>

References	Product Capacities										
	Number of Fasteners				Product characteristic capacities - Timber C24 [kN]						
	Header		Joist		R <sub>3,k</sub>						R <sub>4,k</sub>
	Qty	Type	Qty	Type	Dowels length [mm]						
60					80	100	120	140	160		
BT4-90	16	CNA4.0x50	4	STD8	1.5	1.9	2.3	2.7	3.1	3.6	7.8
BT4-120	20	CNA4.0x50	3	STD12	2.2	2.9	3.5	4.2	4.8	5.6	9.8
BT4-160	28	CNA4.0x50	4	STD12	2.9	3.6	4.4	5.3	6.2	7	13.7
BT4-200	36	CNA4.0x50	5	STD12	3.5	4.4	5.4	6.4	7.4	8.4	17.6
BT4-240	44	CNA4.0x50	6	STD12	4.2	5.3	6.4	7.4	8.6	9.8	21.6

The joist shall have as minimum a width = length of steel dowel.  
The capacities R<sub>4</sub> are for all length of steel dowel.

**Product characteristic capacities - Timber beam to timber post**

References	Product characteristic capacities - Timber beam to timber post - partial nailing																
	Number of Fasteners				Post width	Product characteristic capacities - Timber C24 [kN]											
	Header		Joist			R <sub>1,k</sub>	R <sub>2,k</sub>										
	Qty	Type	Qty	Type	Min		Dowels length [mm]										
60							80	100	120	140	160	60	80	100	120	140	160
BT4-90	8	CNA4.0x50	4	STD8	86	9	9.9	10.9	11.6	11.6	11.6	6.8	7.4	8.2	8.7	8.7	
BT4-120	12	CNA4.0x50	3	STD12	86	14.6	15.5	16.6	17.9	19.4	20.7	9.7	10.3	11.1	11.9	12.9	13.8
BT4-160	16	CNA4.0x50	4	STD12	86	22.9	24.4	26	27.9	30	32	17.2	18.3	19.5	20.9	22.5	24
BT4-200	20	CNA4.0x50	5	STD12	86	32	34.1	36.2	38.7	41.2	43.4	25.6	27.3	29	31	33	34.7
BT4-240	24	CNA4.0x50	6	STD12	86	41.6	44.3	46.8	49.7	52.3	53.2	34.7	36.9	39	41.4	43.6	44.3

The joist shall have as minimum a width = length of steel dowel.  
For beams with a slope β the capacities shall be multiply with the factor.

β	0°	15°	30°	45°
factor	1.0	0.95	0.9	0.85

The capacities from this table are also valid for partial nailing beam to beam.

R<sub>2,k</sub> capacities are calculated as R<sub>2,k</sub> = R<sub>1,k</sub> x (nb of dowels - 1) / (nb of dowels).

The top dowel is not considered for the uplift capacities as it is placed in an open hole.

More detailed information are given in the ETA.

**Product characteristic capacities - Timber beam to timber post - R<sub>3,k</sub> and R<sub>4,k</sub>**

References	Product characteristic capacities - Timber beam to timber post - partial nailing											
	Number of Fasteners				Post width	Product characteristic capacities - Timber C24 [kN]						
	Header		Joist			R <sub>3,k</sub>	R <sub>4,k</sub>					
	Qty	Type	Qty	Type	Min		Dowels length [mm]					
60							80	100	120	140	160	
BT4-90	8	CNA4.0x50	4	STD8	86	1.5	1.9	2.3	2.7	2.7	2.7	3.9
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BT4-160	16	CNA4.0x50	4	STD12	86	2.9	3.6	4.4	5.3	6.2	7	7.8
BT4-200	20	CNA4.0x50	5	STD12	86	3.5	4.4	5.4	6.4	7.4	8.4	9.8
BT4-240	24	CNA4.0x50	6	STD12	86	4.2	5.3	6.4	7.4	8.6	9.8	11.8

The joist shall have as minimum a width = length of steel dowel.  
The capacities R<sub>4,k</sub> are for all length of steel dowel.

## INSTALLATION

### Fasteners

- CNA4,0 × L Nails
- Or CSA5,0 x L screws and dowels Ø12mm

