ALUMINI

CONCEALED BRACKET WITHOUT HOLES

VIDEO

MY PROJECT SOFTWARE

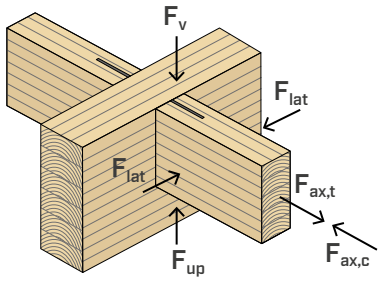
CE ETA-09/0361

SERVICE CLASS SC1 SC2 SC3

MATERIAL

alu 6060 EN AW-6060 aluminium alloy

EXTERNAL LOADS



SLENDER STRUCTURES

The small width of the bracket allows to connect secondary beams with limited width (starting from 55 mm).

LONG VERSION

The 2165 mm long version can be cut every 30 mm to make brackets of the most suitable size. SBD self-drilling dowels allow maximum installation freedom.

INCLINED JOINTS

Certified strengths calculated in all directions: vertical, horizontal and axial. They can be used in inclined joints.

USA, Canada and more design values available online.

VIDEO

Scan the QR Code and watch the video on our YouTube channel

FIELDS OF USE

Concealed beam joint in timber-to-timber or timber-to-concrete configuration, suitable for small structures, gazebos and furniture. Use also outdoors in non aggressive environments.

Can be applied to:

- solid timber softwood and hardwood
- glulam, LVL

QUICK ASSEMBLING

The fastening, simple and fast, is realized through screws HBS PLATE EVO on the main beam and self-drilling or smooth dowels on the secondary beam.

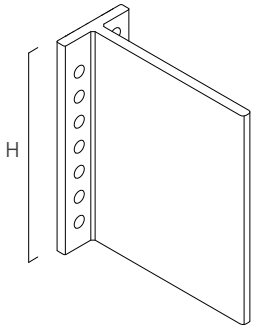
INVISIBLE

The concealed connection provides a satisfying appearance to the joint and fulfils the fire safety requirements. When adequately protected by timber, it is suitable for outdoor use.

CODES AND DIMENSIONS

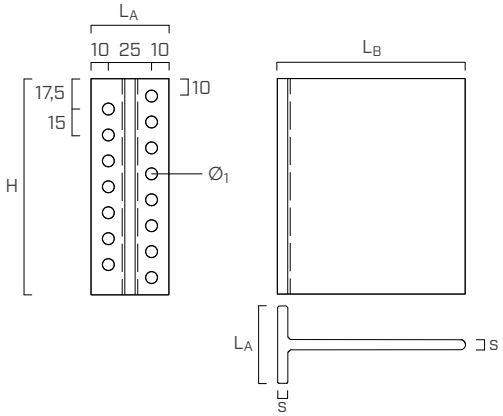
ALUMINI

CODE	type	H [mm]	*H [in]*	pcs
ALUMINI65	without holes	65	*2 9/16*	25
ALUMINI95	without holes	95	*3 3/4*	25
ALUMINI125	without holes	125	*4 15/16*	25
ALUMINI155	without holes	155	*6 1/8*	15
ALUMINI185	without holes	185	*7 1/4*	15
ALUMINI215	without holes	215	*8 7/16*	15
ALUMINI2165	without holes	2165	*85 1/4*	1

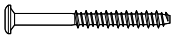
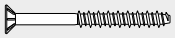
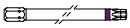


GEOMETRY

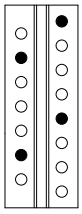
ALUMINI			
thickness	**s**	[mm]	6
flange width	**L_A**	[mm]	45
web length	**L_B**	[mm]	109,9
small flange-holes	**$Ø_1$**	[mm]	7,0

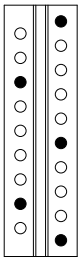


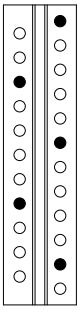
ADDITIONAL PRODUCTS - FASTENING

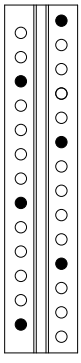
type	description		d [mm]	support	page
HBS PLATE EVO	C4 EVO pan head screw		5		573
SBD	self-drilling dowel		7,5		154
SKP	screw-in anchor with rounded head		6		528
SKS	screw-in anchor with countersunk head		6		528
BITS	long bit		-	-	-

TIMBER-TO-CONCRETE FASTENING PATTERNS

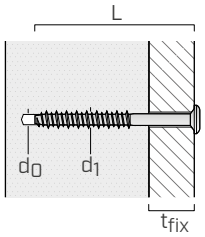

ALUMINI125


ALUMINI155


ALUMINI185

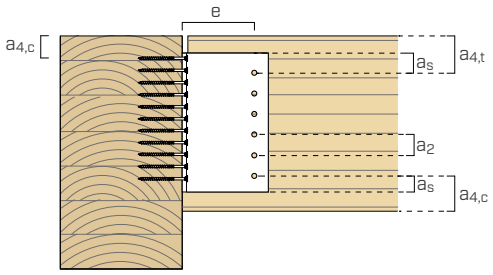

ALUMINI215

anchor	d_1 [mm]	L [mm]	d_0 [mm]	t_{fix} [mm]	TX
SKP680	6,0	80	5	30	TX 30
SKS660	6,0	60	5	10	TX 30



INSTALLATION

MINIMUM DISTANCES



secondary beam-timber				self-drilling dowel SBD Ø7,5	smooth dowel STA Ø8
dowel-dowel	a_2	[mm]	≥ 3·d	≥ 23	≥ 24
dowel-top of beam	$a_{4,t}$	[mm]	≥ 4·d	≥ 30	≥ 32
dowel-bottom of beam	$a_{4,c}$	[mm]	≥ 3·d	≥ 23	≥ 24
dowel-bracket edge	a_s	[mm]	≥ 1,2·d_0 (1)	≥ 10	≥ 12
dowel-main beam	e	[mm]		86	86

(1) Hole diameter.

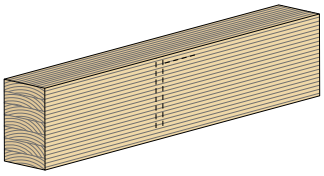
main beam-timber				screws HBS PLATE EVO Ø5
first connector-top of beam	$a_{4,c}$	[mm]	≥ 5·d	≥ 25

Minimum spacing and diameters refers to timber elements with density $\rho_k \leq 420$ kg/m^3, screws inserted without pre-drilling hole and stresses F_v.

MOUNTING

VIDEO

1



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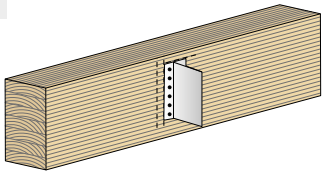

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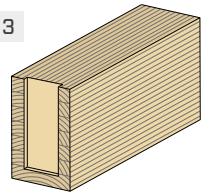
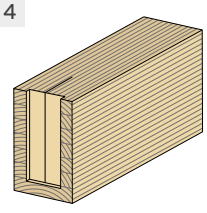


"BOTTOM-UP" INSTALLATION

4



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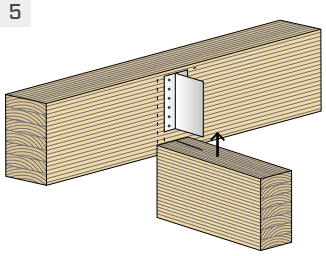

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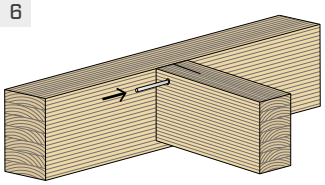

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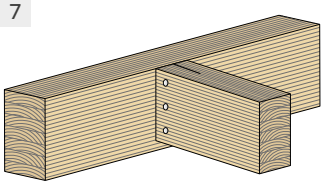
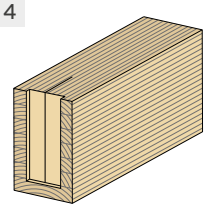


"AXIAL" INSTALLATION

4



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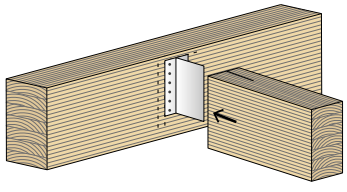

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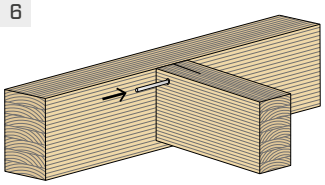

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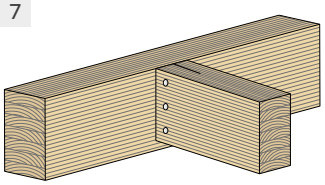
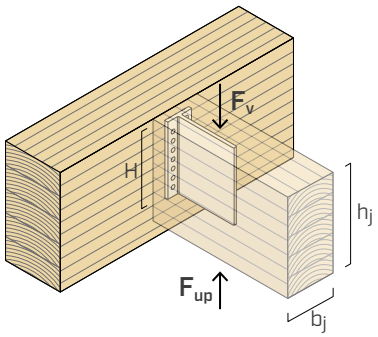


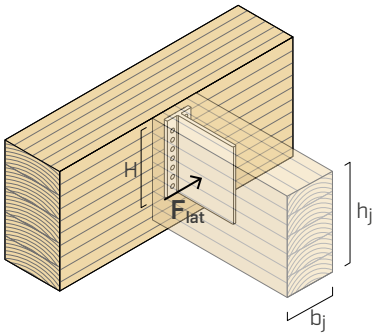
STRUCTURAL VALUES | TIMBER-TO-TIMBER | F_v | F_{up}

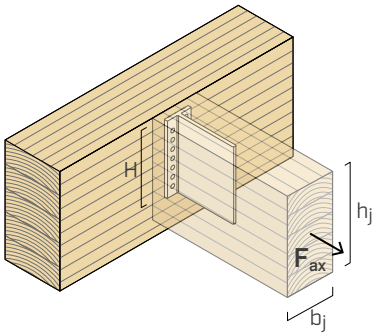


ALUMINI with SBD self drilling dowels and STA dowels

	SECONDARY BEAM		MAIN BEAM	
ALUMINI **H(1)** [mm]	**b_j x h_j** [mm]	**SBD dowels / STA dowels(2)** **SBD Ø7,5 x 55 / STA Ø8 x 60** [pcs]	**HBS PLATE EVO** **Ø5 x 60** [pcs]	**$R_{v,k}$ - $R_{up,k}$** **GL24h** [kN]
65	60 x 90	2	7	**2,9**
95	60 x 120	3	11	**7,1**
125	60 x 150	4	15	**12,9**
155	60 x 180	5	19	**19,9**
185	60 x 210	6	23	**27,9**
215(3)	60 x 240	7	27	**35,0**

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





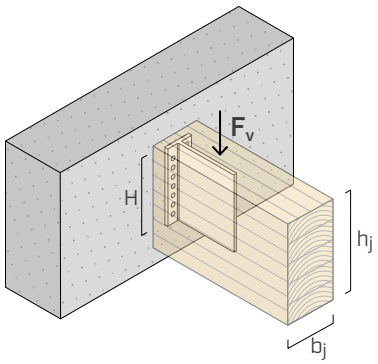
ALUMINI with SBD self drilling dowels and STA dowels

	SECONDARY BEAM		MAIN BEAM		
ALUMINI **H(1)** [mm]	**b_j x h_j** [mm]	**SBD dowels / STA dowels(2)** **SBD Ø7,5 x 55 / STA Ø8 x 60** [pcs]	**HBS PLATE EVO** **Ø5 x 60** [pcs]	**$R_{lat,k\ timber}$** **GL24h** [kN]	**$R_{lat,k\ alu}$** [kN]
65	60 x 90	2	7	**3,1**	**1,6**
95	60 x 120	3	11	**4,1**	**2,3**
125	60 x 150	4	15	**5,1**	**3,0**
155	60 x 180	5	19	**6,2**	**3,8**
185	60 x 210	6	23	**7,2**	**4,5**
215	60 x 240	7	27	**8,2**	**5,2**

ALUMINI with SBD self-drilling dowels

	SECONDARY BEAM		MAIN BEAM		
ALUMINI **H(1)** [mm]	**b_j x h_j** [mm]	**SBD dowels(2)** **SBD Ø7,5 x 55** [pcs]	**HBS PLATE EVO** **Ø5 x 60** [pcs]	**$R_{ax,k\ timber}$** **GL24h** [kN]	**$R_{ax,k\ alu}$** [kN]
65	60 x 90	2	7	**15,5**	**15,6**
95	60 x 120	3	11	**24,3**	**22,8**
125	60 x 150	4	15	**33,2**	**30,0**
155	60 x 180	5	19	**42,0**	**37,2**
185	60 x 210	6	23	**50,8**	**44,4**
215	60 x 240	7	27	**59,7**	**51,6**

RECOMMENDED STRUCTURAL VALUES | TIMBER-TO-CONCRETE | F_v



ALUMINI with SBD self drilling dowels and STA dowels

	SECONDARY BEAM					MAIN BEAM UNCRACKED CONCRETE	
ALUMINI		**SBD dowels(2)**		**STA dowels(2)**		**SKP680 / SKS660 anchor**	
H(1)	**b_j x h_j**	**Ø7,5 x 55**	**$R_{v,k}$**	**Ø8 x 60**	**$R_{v,k}$**	**Ø6 x 80 / Ø6 x 60**	**$R_{v,d\ concrete}$**
[mm]	[mm]	[pcs]	[kN]	[pcs]	[kN]	[pcs]	[kN]
125	60 x 150	3	**15,6**	3	**15,0**	4	**6,0**
155	60 x 180	3	**15,6**	3	**15,0**	5	**7,3**
185	60 x 210	4	**20,8**	4	**20,0**	5	**9,1**
215	60 x 240	5	**26,1**	5	**25,0**	6	**11,5**

NOTES

(1) The bracket with height H is available pre-cut (codes on page 74) or can be obtained from the ALUMINI2165 rod.

(2) SBD self-drilling dowels Ø7,5: $M_{y,k}$ = 42000 Nmm.
STA smooth dowel Ø8: $M_{y,k}$ = 24100 Nmm.

(3) ALUMINI215 bracket with 7 SBD dowels Ø7,5 x 55 $R_{v,k}$ = $R_{up,k}$ = 36,5 kN.

GENERAL PRINCIPLES

- Resistance values for the fastening system are valid for the calculation examples shown in the table. For different calculation methods, the MyProject software is available free of charge (www.rothoblaas.com).
- The calculation process used a timber characteristic density of ρ_k = 385 kg/m^3 and C20/25 concrete with a thin reinforcing layer, where edge-distance is not a limiting factor.
- The coefficients k_{mod} and γ_M should be taken according to the current regulations used for the calculation.
- Dimensioning and verification of timber and concrete elements must be carried out separately.
- The following verification shall be satisfied for combined loading:

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

  $F_{v,d}$ and $F_{up,d}$ are forces acting in opposite directions. Therefore only one of the forces $F_{v,d}$ and $F_{up,d}$ can act in combination with the forces $F_{ax,d}$ or $F_{lat,d}$.
- The values provided are calculated with a routing in the 8 mm thick timber.
- For configurations for which only the timber-side strength is reported, the aluminium-side overstrength can be assumed.

STRUCTURAL VALUES | F_v | F_{up}

TIMBER-TO-TIMBER

- Characteristic values comply with the EN 1995:2014 standard in accordance with ETA-09/0361.
- Design values can be obtained from characteristic values as follows:

$$R_{v,d}=\frac{R_{v,k}\cdot k_{mod}}{\gamma_M}$$

$$R_{up,d}=\frac{R_{up,k}\cdot k_{mod}}{\gamma_M}$$

- In some cases the connection shear strength $R_{V,k}$-$R_{up,k}$ is notably large and may be higher than the secondary beam strength. Particular attention should be paid to the shear check of the reduced timber cross-section at the bracket location.

STRUCTURAL VALUES | F_{lat} | F_{ax}

TIMBER-TO-TIMBER

- Characteristic values comply with the EN 1995:2014 standard in accordance with ETA-09/0361.
- Design values can be obtained from characteristic values as follows:

$$R_{lat,d}=min\begin{cases}\dfrac{R_{lat,k\ alu}}{\gamma_{M2}}\\ \dfrac{R_{lat,k\ timber}\cdot k_{mod}}{\gamma_M}\end{cases}$$

$$R_{ax,d}=min\begin{cases}\dfrac{R_{ax,k\ alu}}{\gamma_{M2}}\\ \dfrac{R_{ax,k\ timber}\cdot k_{mod}}{\gamma_M}\end{cases}$$

with γ_{M2} partial coefficient of the aluminium.

STRUCTURAL VALUES | F_v

TIMBER-TO-CONCRETE

- Characteristic values comply with the EN 1995:2014 standard in accordance with ETA-09/0361. Strength values for concrete anchors are design values derived from laboratory data and in accordance with the respective European Technical Assessments.
- Design resistance values can be obtained from the tabulated values as follows:

$$R_{v,d}=min\begin{cases}\dfrac{R_{v,k}\cdot k_{mod}}{\gamma_M}\\ R_{v,d\ concrete}\end{cases}$$

- Because of the arrangement of the fasteners on concrete, special care should be taken during installation.