ALUMINI

CONCEALED BRACKET WITHOUT HOLES

MY PROJECT SOFTWARE | VIDEO | ETA 09/0361

STEEL-ALUMINUM
EN AW-6060 aluminium alloy bracket obtained by extrusion and therefore weld-free.

SLENDER STRUCTURES
The small dimensions of the side allows to connect secondary beams with limited width (starting from 45 mm).

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

CHARACTERISTICS

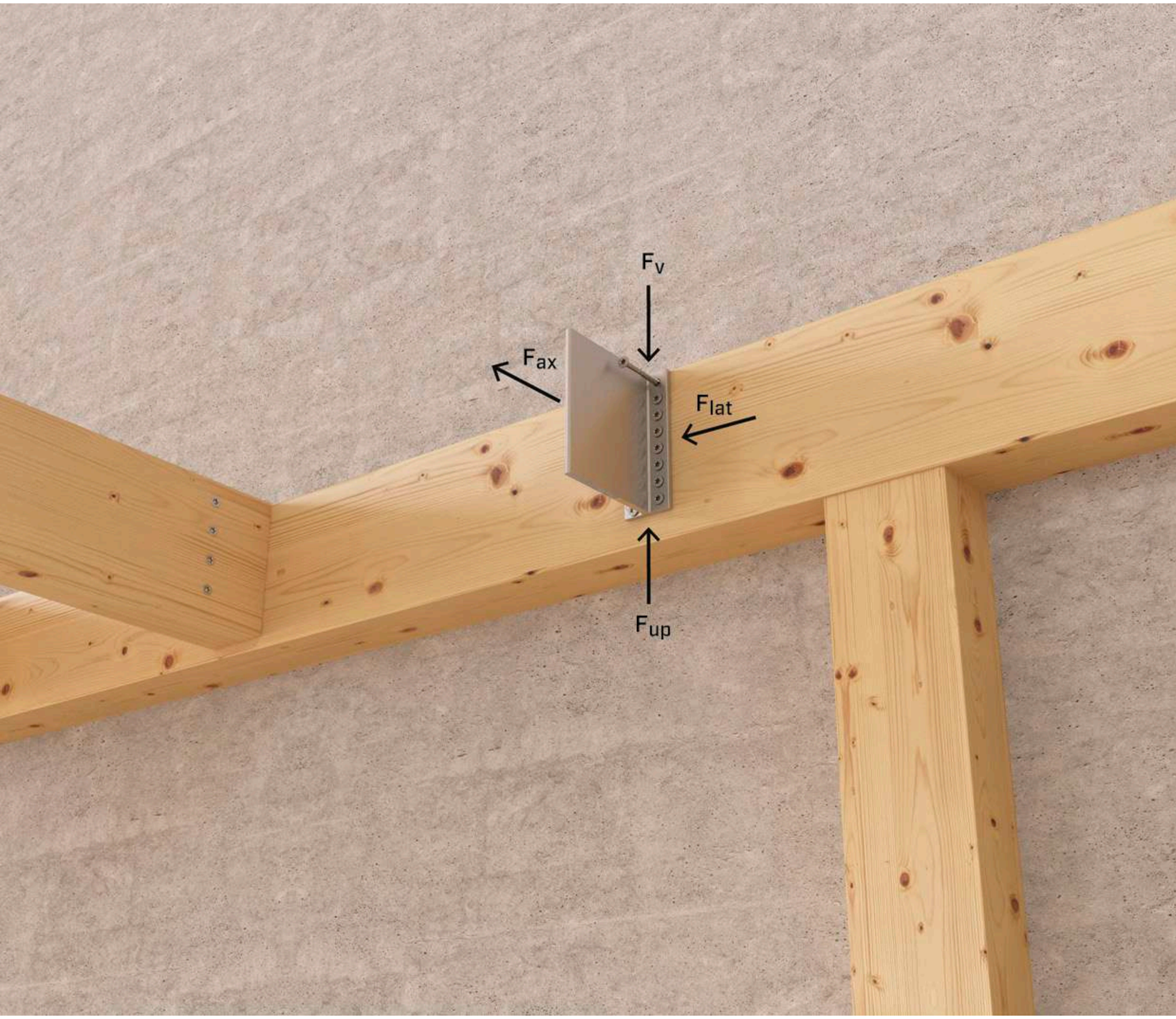
FOCUS	concealed joints
TIMBER SECTIONS	from 45 x 70 mm to 140 x 280 mm
STRENGTH	$R_{v,k}$ up to 36 kN
FASTENERS	HBS PLATE EVO, SBD, STA, SKS

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

MATERIAL
Aluminium alloy three dimensional perforated plate.

FIELDS OF USE
Timber-to-timber and timber-to-concrete shear joints, both perpendicular and inclined

- solid timber and glulam
- CLT, LVL
- timber based panels



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.

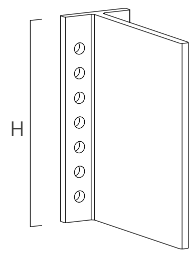
INVISIBLE

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

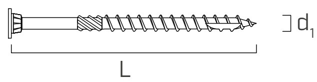
ALUMINI

CODE	type	H [mm]	pcs
ALUMINI65	without holes	65	25
ALUMINI95	without holes	95	25
ALUMINI125	without holes	125	25
ALUMINI155	without holes	155	15
ALUMINI185	without holes	185	15
ALUMINI215	without holes	215	15
ALUMINI2165	without holes	2165	1



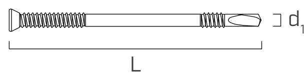
HBS PLATE EVO

CODE	d_1 [mm]	L [mm]	b [mm]	TX	pcs
HBSPEVO550	5	50	30	TX25	200
HBSPEVO560	5	60	35	TX25	200



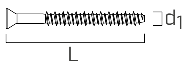
SBD

CODE	d_1 [mm]	L [mm]	TX	pcs
SBD7555	7,5	55	TX40	50
SBD7575	7,5	75	TX40	50
SBD7595	7,5	95	TX40	50



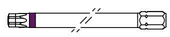
SKS ALUMINI

CODE	d_1 [mm]	L [mm]	TX	pcs
SKSALUMINI660	6	60	TX30	100



LONG BIT

CODE	L [mm]	colour	TX	pcs
TX30200	200	purple	TX30	100



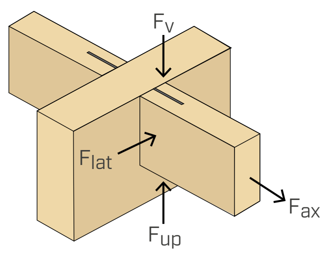
MATERIAL AND DURABILITY

ALUMINI: EN AW-6060 aluminium alloy.
To be used in service classes 1 and 2 (EN 1995-1-1).

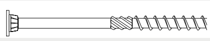
FIELDS OF USE

- Timber-to-timber, timber-to-concrete and timber-to-steel joints
- Perpendicular and inclined joints

EXTERNAL LOADS

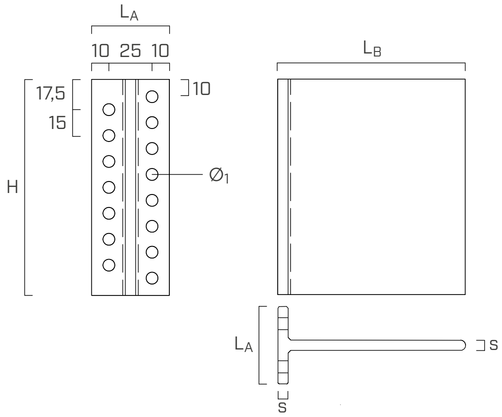


ADDITIONAL PRODUCTS - FASTENING

type	description		d [mm]	support	page
HBS PLATE EVO	screw for timber		5		568
SBD	self-drilling dowel		7,5		48
STA	smooth dowel		8		54

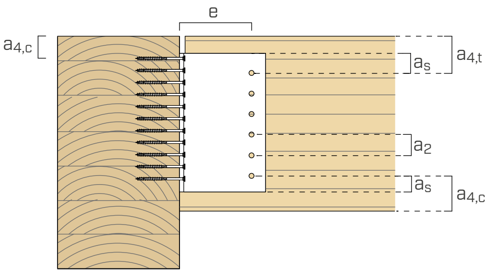
GEOMETRY

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



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

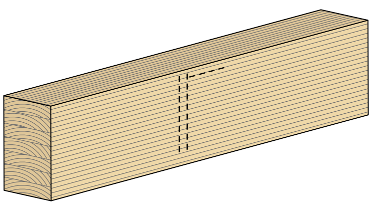
(1) Hole diameter.

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

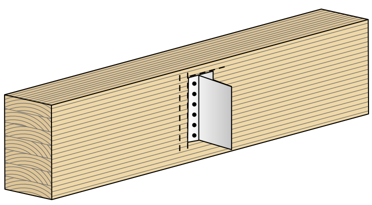
ASSEMBLY

VIDEO

01



02



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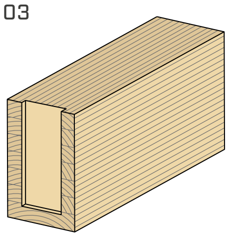

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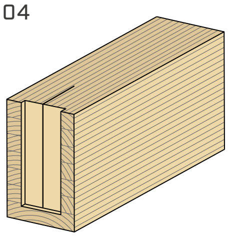

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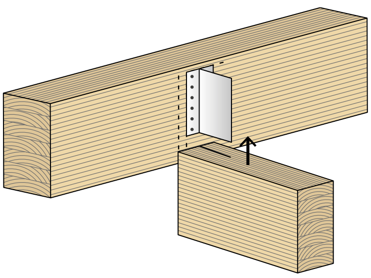

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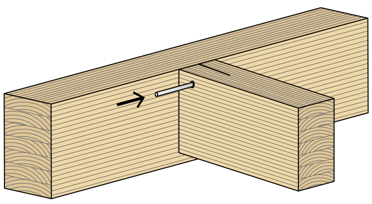

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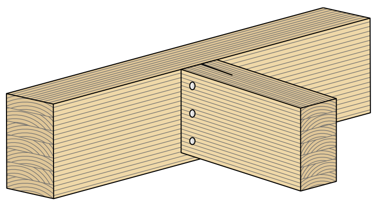
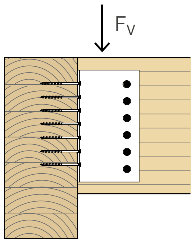
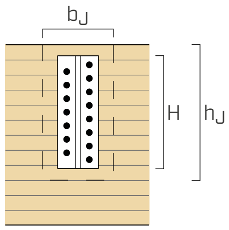


STATIC VALUES | TIMBER-TO-TIMBER JOINT | F_V





ALUMINI with SBD self-drilling dowels

	SECONDARY BEAM			MAIN BEAM	
ALUMINI H[1] [mm]	**b_J** [mm]	**h_J** [mm]	**SBD dowels Ø7,5**[2] [pcs Ø x L]	**HBS PLATE EVO screw Ø5 x 60** [pcs]	**$R_{v,k}$** [kN]
65	60	90	2 - SBD Ø7,5 x 55	7	**2,9**
95	60	120	3 - SBD Ø7,5 x 55	11	**7,1**
125	60	150	4 - SBD Ø7,5 x 55	15	**12,9**
155	60	180	5 - SBD Ø7,5 x 55	19	**19,9**
185	60	210	6 - SBD Ø7,5 x 55	23	**27,9**
215	60	240	7 - SBD Ø7,5 x 55	27	**36,5**

ALUMINI with STA dowels

	SECONDARY BEAM			MAIN BEAM	
ALUMINI H[1] [mm]	**b_J** [mm]	**h_J** [mm]	**STA dowels Ø8**[3] [pcs Ø x L]	**HBS PLATE EVO screw Ø5 x 60** [pcs]	**$R_{v,k}$** [kN]
65	60	90	2 - STA Ø8 x 60	7	**2,9**
95	60	120	3 - STA Ø8 x 60	11	**7,1**
125	60	150	4 - STA Ø8 x 60	15	**12,9**
155	60	180	5 - STA Ø8 x 60	19	**19,9**
185	60	210	6 - STA Ø8 x 60	23	**27,9**
215	60	240	7 - STA Ø8 x 60	27	**35,0**

NOTES:

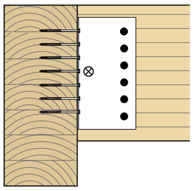
(1) The bracket with height H is available pre-cut (codes on page 20) or can be obtained from the rod ALUMINI2165.

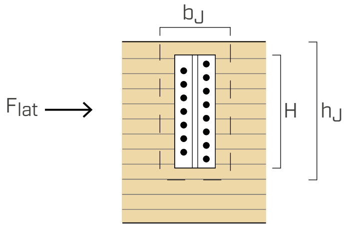
(2) SBD self-drilling dowels Ø7,5: $M_{y,k}$ = 42000 Nmm.

(3) STA smooth dowels Ø8: $M_{y,k}$ = 24100 Nmm.

General calculation principles see page 25.

STATIC VALUES | TIMBER-TO-TIMBER JOINT | F_{lat}

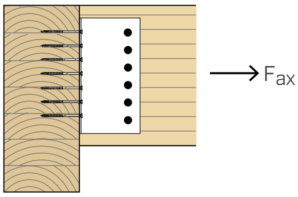


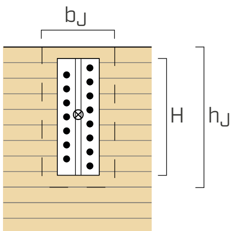


ALUMINI with SBD self drilling dowels and STA dowels

	SECONDARY BEAM[1]		MAIN BEAM		
ALUMINI H [mm]	**b_J** [mm]	**h_J** [mm]	**HBS PLATE EVO screw Ø5 x 60** [pcs]	**$R_{lat,k,alu}$** [kN]	**$R_{lat,k,beam}$**[2] [kN]
65	60	90	7	**1,6**	**3,1**
95	60	120	11	**2,3**	**4,1**
125	60	150	15	**3,0**	**5,1**
155	60	180	19	**3,8**	**6,2**
185	60	210	23	**4,5**	**7,2**
215	60	240	27	**5,2**	**8,2**

STATIC VALUES | TIMBER-TO-TIMBER JOINT | F_{ax}





ALUMINI with SBD self-drilling dowels

	SECONDARY BEAM			MAIN BEAM	
ALUMINI H [mm]	**b_J** [mm]	**h_J** [mm]	**SBD dowels Ø7,5** [pcs Ø x L]	**HBS PLATE EVO screw Ø5 x 60** [pcs]	**$R_{ax,k}$** [kN]
65	60	90	2 - SBD Ø7,5 x 55	7	**15,5**
95	60	120	3 - SBD Ø7,5 x 55	11	**24,3**
125	60	150	4 - SBD Ø7,5 x 55	15	**33,2**
155	60	180	5 - SBD Ø7,5 x 55	19	**42,0**
185	60	210	6 - SBD Ø7,5 x 55	23	**50,8**
215	60	240	7 - SBD Ø7,5 x 55	27	**59,7**

NOTES:

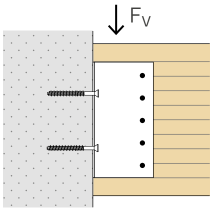
(1) The strength values are valid for both SBD Ø7,5 self-drilling dowels and STA Ø8 dowels.

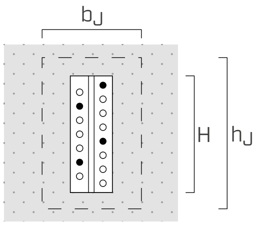
(2) Glulam GL24h.

General calculation principles see page 25.

RECOMMENDED STATIC VALUES | TIMBER-TO-CONCRETE JOINT | F_V

SCREW ANCHOR





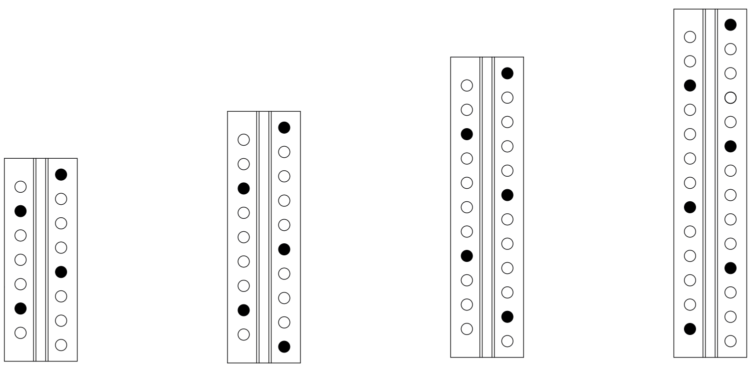
ALUMINI with SBD self-drilling dowels

	SECONDARY BEAM TIMBER				MAIN BEAM UNCRACKED CONCRETE	
ALUMINI			**SBD dowels**		**SKSALUMINI660 anchor**[3]	
H[1]	**b_J**	**h_J**	**Ø7,5**	**$R_{v,k\ timber}$**	**Ø6 x 60**	**$R_{v,d\ concrete}$**
[mm]	[mm]	[mm]	[pcs Ø x L]	[kN]	[pcs]	[kN]
125	60	150	3 - SBD Ø7,5 x 55	**15,6**	4	**6,0**
155	60	180	3 - SBD Ø7,5 x 55	**15,6**	5	**7,3**
185	60	210	4 - SBD Ø7,5 x 55	**20,8**	5	**9,1**
215	60	240	5 - SBD Ø7,5 x 55	**26,1**	6	**11,5**

ALUMINI with STA dowels

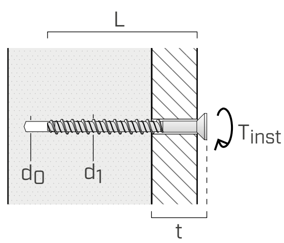
	SECONDARY BEAM TIMBER				MAIN BEAM UNCRACKED CONCRETE	
ALUMINI			**STA dowels**		**SKSALUMINI660 anchor**[3]	
H[1]	**b_J**	**h_J**	**Ø8**	**$R_{v,k\ timber}$**	**Ø6 x 60**	**$R_{v,d\ concrete}$**
[mm]	[mm]	[mm]	[pcs Ø x L]	[kN]	[pcs]	[kN]
125	60	150	3 - STA Ø8 x 60	**15,0**	4	**6,0**
155	60	180	3 - STA Ø8 x 60	**15,0**	5	**7,3**
185	60	210	4 - STA Ø8 x 60	**20,0**	5	**9,1**
215	60	240	5 - STA Ø8 x 60	**25,0**	6	**11,5**

ANCHORS INSTALLATION



ALUMINI125 ALUMINI155 ALUMINI185 ALUMINI215

anchor	**d_1** [mm]	**L** [mm]	**d_0** [mm]	**t** [mm]	**TX**	**T_{inst}** [Nm]
SKSALUMINI660	6,0	60	5	≈ 10	TX30	15



GENERAL PRINCIPLES:

- Resistance values for the fastening system are valid for the calculation examples shown in the table.
- The calculation process used a timber characteristic density of $\rho_k = 385\ kg/m^3$ 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.

STATIC VALUES | F_v

TIMBER-TO-TIMBER

- Characteristic values are consistent with EN 1995-1-1 and in accordance with ETA-09/0361.

  The design values are obtained from the characteristic values as follows:

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

- In some cases the connection shear strength $R_{V,k}$ 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 in correspondence with the bracket location.

STATIC VALUES | F_{lat} | F_{ax}

TIMBER-TO-TIMBER

- Characteristic values are consistent with EN 1995-1-1 and in accordance with ETA-09/0361. The design values are obtained from the characteristic values as follows:

$$R_{lat,d} = min \begin{cases} \dfrac{R_{lat,k,alu}}{\gamma_{M,alu}} \\ \dfrac{R_{lat,k,beam} \cdot k_{mod}}{\gamma_{M,T}} \end{cases}$$

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

with $\gamma_{M,T}$ partial coefficient of the timber.

STATIC VALUES | F_v

TIMBER-TO-CONCRETE

- Characteristic values on wood side are consistent with EN 1995-1-1 and in accordance with ETA-09/0361. The strength values of anchors for concrete are recommended design values derived from laboratory data. Fastening on concrete is not CE marked, it is advisable to use the joint system for non-structural applications.

  Design resistance values can be obtained from the tabled values as follows:

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

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