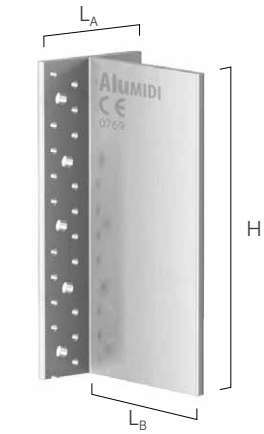
ALUMIDI HT

CE ETA-09/0361

CONCEALED BRACKET WITH AND WITHOUT HOLES

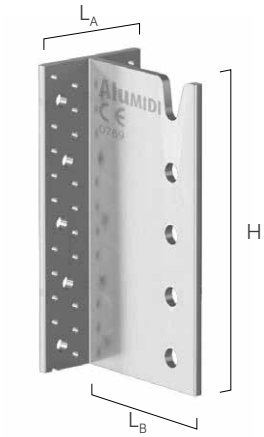
- Large load capacity. Version without holes to be used with SBD-HT self-drilling dowels and with holes to be used with STA smooth dowels
- Strengths calculated in all directions: vertical, horizontal and axial. They can be used in inclined joints
- Optimal hole spacing both for timber and reinforced concrete joints

alu VIDEO



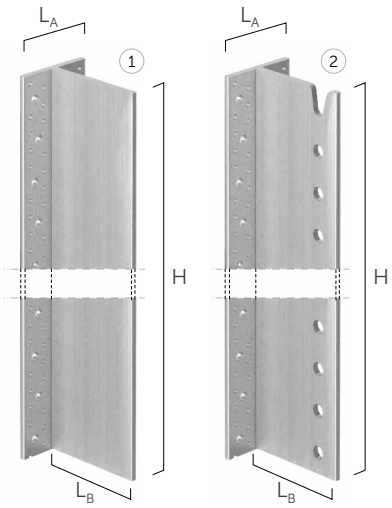
ALUMIDI HT WITHOUT HOLES

CODE	H [mm]	L_A [mm]	L_B [mm]	pcs
ALUMIDIHT80	80	80	109	25
ALUMIDIHT120	120	80	109	25
ALUMIDIHT160	160	80	109	25
ALUMIDIHT200	200	80	109	15
ALUMIDIHT240	240	80	109	15
ALUMIDIHT2200	2200	80	109	1



ALUMIDI WITH HOLES

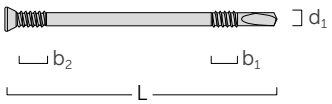
CODE	H [mm]	L_A [mm]	L_B [mm]	pcs
ALUMIDI120L	120	80	109	25
ALUMIDI160L	160	80	109	25
ALUMIDI200L	200	80	109	15
ALUMIDI240L	240	80	109	15
ALUMIDI280L	280	80	109	15
ALUMIDI320L	320	80	109	8
ALUMIDI360L	360	80	109	8



ALUMAXI WITH AND WITHOUT HOLES

CODE		H [mm]	L_A [mm]	L_B [mm]	pcs
ALUMAXI2176	1	2176	130	172	1
ALUMAXI2176L	2	2176	130	172	1

FASTENERS

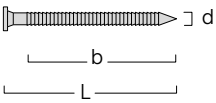


SBD-HT | SELF-DRILLING DOWEL

d_1 [mm]	CODE	L [mm]	b_2 [mm]	b_1 [mm]	pcs
7,5 TX 40	**SBD75115H**	115	10	15	50
	SBD75135H	135	10	15	50
	SBD75155H	155	20	15	50

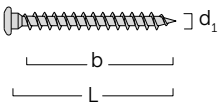
STA | SMOOTH DOWEL

d_1 [mm]	CODE	L [mm]	steel	pcs
12	**STA12120B**	120	S235	100
	STA12140B	140	S235	100
	STA12160B	160	S235	100
16	**STA16160B**	160	S355	50
	STA16180B	180	S355	50
	STA16200B	200	S355	50



LBA-HT | ANKER NAIL

d_1 [mm]	CODE	L [mm]	b [mm]	pcs
4	**HT4060**	60	50	250
6	**LBA6100**	100	80	250

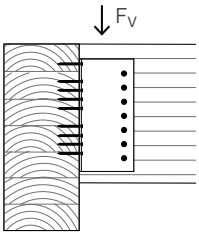


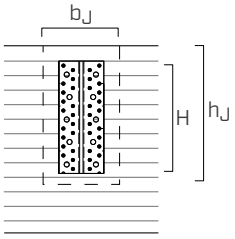
SBL | ROUND-HEAD SCREW AND FLAT UNDERHEAD

d_1 [mm]	CODE	L [mm]	b [mm]	pcs
5 TX 20	**SBL560**	60	56	200
7 TX 30	**LBS780**	80	75	100

STRUCTURAL VALUES

TIMBER-TO-TIMBER JOINT | F_V





ALUMIDI HT without holes with SBD-HT self-drilling dowels

	SECONDARY BEAM			MAIN BEAM			
				FASTENING THROUGH NAILS		FASTENING THROUGH SCREWS	
ALUMIDI HT H [mm]	b_J [mm]	h_J [mm]	SBD-HT dowels(1) Ø7,5 [pcs Ø x L]	LBA-HT nails Ø4 x 60 [pcs]	$R_{V,k}$ [kN]	SBL screws Ø5 x 60 [pcs]	$R_{V,k}$ [kN]
80	120	120	3 - Ø7,5 x 115	14	**10,9**	14	**13,4**
120	120	160	4 - Ø7,5 x 115	22	**19,7**	22	**24,6**
160	120	200	5 - Ø7,5 x 115	30	**29,6**	30	**35,3**
200	120	240	7 - Ø7,5 x 115	38	**42,5**	38	**51,6**
240	120	280	9 - Ø7,5 x 115	46	**54,6**	46	**66,5**
280(*)	140	320	10 - Ø7,5 x 135	54	**71,8**	54	**85,0**
320(*)	140	360	11 - Ø7,5 x 135	62	**84,9**	62	**99,9**
360(*)	160	400	12 - Ø7,5 x 155	70	**103,6**	70	**119,9**
400(*)	160	440	13 - Ø7,5 x 155	78	**116,3**	78	**130,7**
440(*)	160	480	14 - Ø7,5 x 155	86	**134,5**	86	**145,6**

ALUMIDI with holes with STA dowels

	SECONDARY BEAM			MAIN BEAM			
				FASTENING THROUGH NAILS		FASTENING THROUGH SCREWS	
ALUMIDI HT H [mm]	b_J [mm]	h_J [mm]	STA dowels(2) Ø12 [pcs Ø x L]	LBA-HT nails Ø4 x 60 [pcs]	$R_{V,k}$ [kN]	SBL screws Ø5 x 60 [pcs]	$R_{V,k}$ [kN]
120	120	160	3 - Ø12 x 120	22	**23,0**	22	**25,8**
160	120	200	4 - Ø12 x 120	30	**34,5**	30	**40,6**
200	120	240	5 - Ø12 x 120	38	**46,5**	38	**54,8**
240	120	280	6 - Ø12 x 120	46	**60,9**	46	**68,4**
280	140	320	7 - Ø12 x 140	54	**77,2**	54	**87,0**
320	140	360	8 - Ø12 x 140	62	**93,2**	62	**102,4**
360	160	400	9 - Ø12 x 160	70	**114,3**	70	**124,7**
400(*)	160	440	10 - Ø12 x 160	78	**127,3**	78	**141,0**
440(*)	160	480	11 - Ø12 x 160	86	**144,6**	86	**154,9**

NOTES

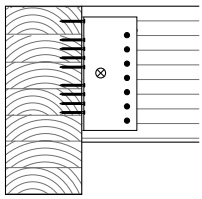
(*) Dimension obtainable from ALUMIDIHT2200.

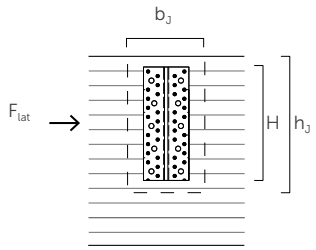
TIMBER-TO-TIMBER | Fv
(1) SBD-HT self-drilling dowels Ø7,5: My,k = 42000 Nmm.
(2) STA smooth dowels Ø12: My,k = 69100 Nmm.

General calculation principles, see page 8.

STRUCTURAL VALUES

TIMBER-TO-TIMBER JOINT | F_{lat}

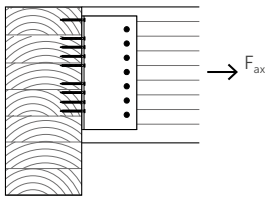


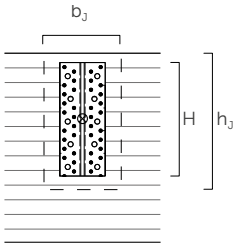


ALUMIDI HT without holes with SBD-HT self-drilling dowels | ALUMIDI with holes with STA dowels

	SECONDARY BEAM(1)		MAIN BEAM(2)		
ALUMIDI HT			LBA-HT nails / SBL screws	$R_{lat,k,alu}$	$R_{lat,k,beam}$(3)
H	b_J	h_J	Ø4 x 60 / Ø5 x 60		
[mm]	[mm]	[mm]	[pcs]	[kN]	[kN]
80	120	120	≥ 10	**3,6**	**9,0**
120	120	160	≥ 14	**5,4**	**12,0**
160	120	200	≥ 18	**7,2**	**15,0**
200	120	240	≥ 22	**9,1**	**18,0**
240	120	280	≥ 26	**10,9**	**21,0**
280(*)	140	320	≥ 30	**12,7**	**28,1**
320(*)	140	360	≥ 34	**14,5**	**31,6**
360(*)	160	400	≥ 38	**16,3**	**40,1**
400(*)	160	440	≥ 42	**18,1**	**44,1**
440(*)	160	480	≥ 46	**19,9**	**48,1**

TIMBER-TO-TIMBER JOINT | F_{ax}





ALUMIDI HT without holes with SBD-HT self-drilling dowels

	SECONDARY BEAM			MAIN BEAM			
				FASTENING THROUGH NAILS		FASTENING THROUGH SCREWS	
ALUMIDI HT			SBD-HT dowels	LBA-HT nails	$R_{ax,k}$(3)	SBL screws	$R_{ax,k}$(3)
H	b_J	h_J	Ø7,5	Ø4 x 60		Ø5 x 60	
[mm]	[mm]	[mm]	[pcs Ø x L]	[pcs]	[kN]	[pcs]	[kN]
80	120	120	3 - Ø7,5 x 115	14	**11,3**	14	**23,9**
120	120	160	4 - Ø7,5 x 115	22	**17,8**	22	**37,5**
160	120	200	5 - Ø7,5 x 115	30	**24,3**	30	**51,2**
200	120	240	7 - Ø7,5 x 115	38	**30,8**	38	**64,8**
240	120	280	9 - Ø7,5 x 115	46	**37,3**	46	**78,4**
280	140	320	10 - Ø7,5 x 135	54	**43,7**	54	**92,1**
320	140	360	11 - Ø7,5 x 135	62	**50,2**	62	**105,7**
360	160	400	12 - Ø7,5 x 155	70	**56,7**	70	**119,4**
400(*)	160	440	13 - Ø7,5 x 155	78	**63,2**	78	**133,0**
440(*)	160	480	14 - Ø7,5 x 155	86	**69,7**	86	**146,6**

NOTES

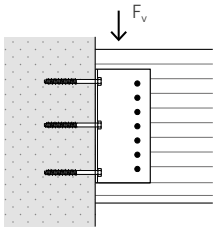
(*) Dimension obtainable from ALUMIDIHT2200.

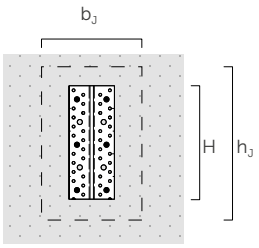
TIMBER-TO-TIMBER | F_{lat} | F_{ax}
(1) The strength values are valid for both SBD-HT Ø7,5 self-drilling dowels and STA Ø12 dowels.
(2) The strength values are valid for both LBA-HT Ø4 nails and for SBL Ø5 screws.
(3) The strength values have been calculated for GL24h glulam.
General calculation principles, see page 8.

STRUCTURAL VALUES

TIMBER-TO-CONCRETE JOINT | F_V

CHEMICAL ANCHOR





ALUMIDI HT without holes with SBD-HT self-drilling dowels

	SECONDARY BEAM TIMBER				MAIN BEAM uncracked concrete	
ALUMIDI HT			SBD-HT dowels		SKR-CE anchor	
H	b_J	h_J	Ø7,5	$R_{V,k\ timber}$	Ø10 x 80	$R_{V,d\ concrete}$
[mm]	[mm]	[mm]	[pcs Ø x L]	[kN]	[pcs]	[kN]
80	120	120	2 - Ø7,5 x 115	**16,6**	2	**6,1**
120	120	160	3 - Ø7,5 x 115	**24,9**	4	**10,2**
160	120	200	4 - Ø7,5 x 115	**33,2**	4	**12,9**
200	120	240	5 - Ø7,5 x 115	**41,6**	6	**17,4**
240	120	280	6 - Ø7,5 x 115	**49,9**	6	**19,8**
280(*)	140	320	6 - Ø7,5 x 135	**55,1**	8	**24,3**
320(*)	140	360	7 - Ø7,5 x 135	**64,3**	8	**26,5**
360(*)	160	400	7 - Ø7,5 x 155	**71,1**	10	**31,1**
400(*)	160	440	8 - Ø7,5 x 155	**81,2**	10	**33,1**
440(*)	160	480	9 - Ø7,5 x 155	**91,4**	12	**38,8**

ALUMIDI with holes with STA dowels

	SECONDARY BEAM TIMBER				MAIN BEAM uncracked concrete	
ALUMIDI HT			STA dowels		SKR-CE anchor	
H	b_J	h_J	Ø12	$R_{V,k\ timber}$	Ø10 x 80	$R_{V,d\ concrete}$
[mm]	[mm]	[mm]	[pcs Ø x L]	[kN]	[pcs]	[kN]
120	120	160	3 - Ø12 x 120	**35,5**	4	**10,2**
160	120	200	4 - Ø12 x 120	**47,3**	4	**12,9**
200	120	240	5 - Ø12 x 120	**59,1**	6	**17,4**
240	120	280	6 - Ø12 x 120	**70,9**	6	**19,8**
280(*)	140	320	7 - Ø12 x 140	**91,0**	8	**24,3**
320(*)	140	360	8 - Ø12 x 140	**104,0**	8	**26,5**
360(*)	160	400	9 - Ø12 x 160	**128,4**	10	**31,1**
400(*)	160	440	10 - Ø12 x 160	**142,7**	10	**33,1**
440(*)	160	480	11 - Ø12 x 160	**157,0**	12	**38,8**

NOTES

(*) Dimension obtainable from ALUMIDIHT2200.

TIMBER-TO-CONCRETE

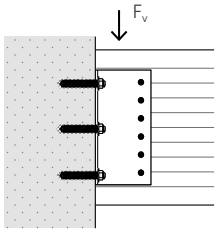
- Install the SKR-CE screw anchors two at a time, starting from the top, dowelling alternate rows.

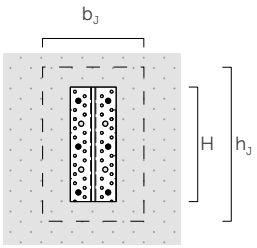
General calculation principles, see page 8.

STRUCTURAL VALUES

TIMBER-TO-CONCRETE JOINT | F_V

CHEMICAL ANCHOR





ALUMIDI HT without holes with SBD-HT self-drilling dowels

	SECONDARY BEAM TIMBER				MAIN BEAM uncracked concrete	
ALUMIDI HT			SBD-HT dowels		V-NEX anchor(1)	
H [mm]	b_J [mm]	h_J [mm]	Ø7,5 [pcs Ø x L]	$R_{v,k\ timber}$ [kN]	Ø8 x 110 [pcs]	$R_{v,d\ concrete}$ [kN]
80	120	120	3 - Ø7,5 x 115	**24,9**	2	**8,8**
120	120	160	4 - Ø7,5 x 115	**33,2**	4	**15,4**
160	120	200	5 - Ø7,5 x 115	**41,6**	4	**22,1**
200	120	240	7 - Ø7,5 x 115	**58,2**	6	**30,7**
240	120	280	8 - Ø7,5 x 115	**66,5**	6	**37,0**
280(*)	140	320	10 - Ø7,5 x 135	**91,9**	8	**48,7**
320(*)	140	360	11 - Ø7,5 x 135	**101,1**	8	**55,6**
360(*)	160	400	12 - Ø7,5 x 155	**121,9**	10	**64,4**
400(*)	160	440	13 - Ø7,5 x 155	**132,0**	10	**66,4**
440(*)	160	480	14 - Ø7,5 x 155	**142,2**	12	**80,0**

ALUMIDI with holes with STA dowels

	SECONDARY BEAM TIMBER				MAIN BEAM uncracked concrete	
ALUMIDI HT			STA dowels		V-NEX anchor(1)	
H [mm]	b_J [mm]	h_J [mm]	Ø12 [pcs Ø x L]	$R_{v,k\ timber}$ [kN]	Ø8 x 110 [pcs]	$R_{v,d\ concrete}$ [kN]
120	120	160	3 - Ø12 x 120	**35,5**	4	**15,4**
160	120	200	4 - Ø12 x 120	**47,3**	4	**22,1**
200	120	240	5 - Ø12 x 120	**59,1**	6	**30,7**
240	120	280	6 - Ø12 x 120	**70,9**	6	**37,0**
280(*)	140	320	7 - Ø12 x 140	**91,0**	8	**48,7**
320(*)	140	360	8 - Ø12 x 140	**104,0**	8	**55,6**
360(*)	160	400	9 - Ø12 x 160	**128,4**	10	**64,4**
400(*)	160	440	10 - Ø12 x 160	**142,7**	10	**66,4**
440(*)	160	480	11 - Ø12 x 160	**157,0**	12	**80,0**

NOTES

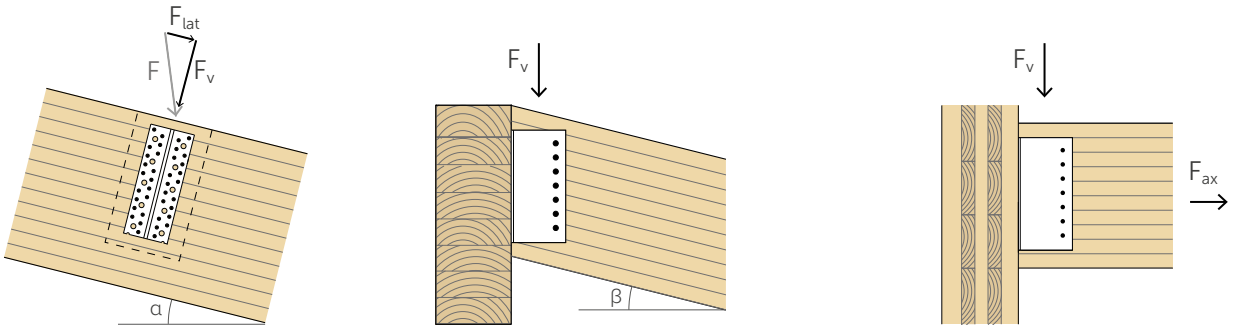
(*) Dimension obtainable from ALUMIDIHT2200.

TIMBER-TO-CONCRETE

(1) Chemical anchor V-NEX according to ETA-20/0363 with threaded rods (type INA) of minimum steel class 5.8 with h_{ef}= 93 mm: Install the anchors two at a time, starting from the top, dowelling alternate rows.

General calculation principles, see page 8.

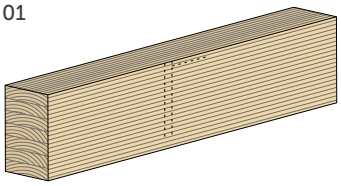
APPLICATION EXAMPLES



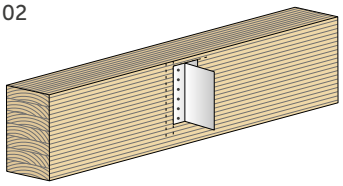
ASSEMBLY

VIDEO

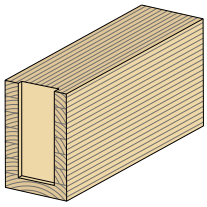
01



02

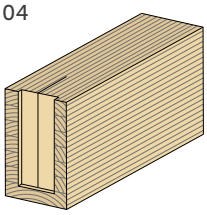


03

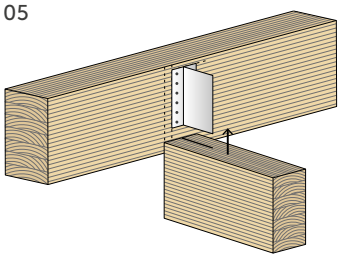


ALUMIDI HT WITHOUT HOLES

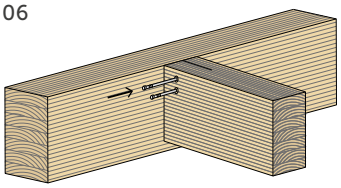
04



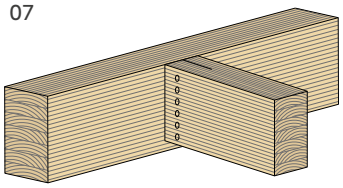
05



06

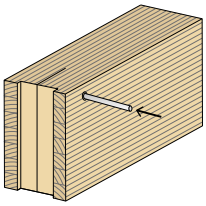


07

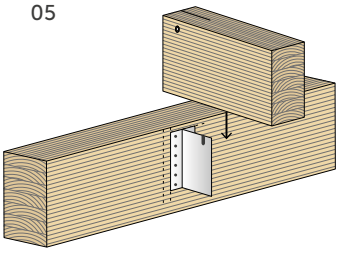


ALUMIDI HT WITHOUT HOLES WITH UPPER COUNTERSINK

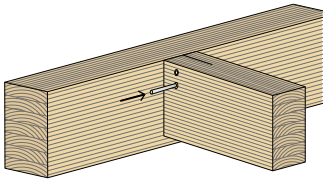
04



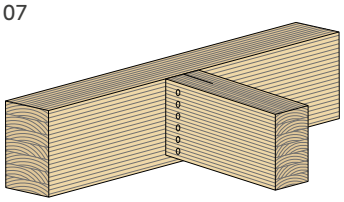
05



06

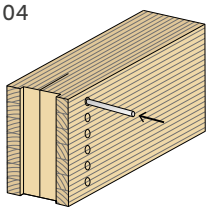


07

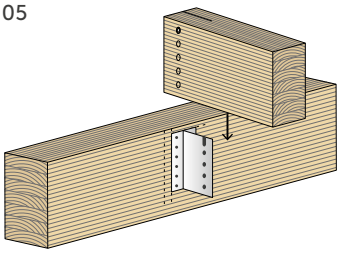


ALUMIDI WITH HOLES

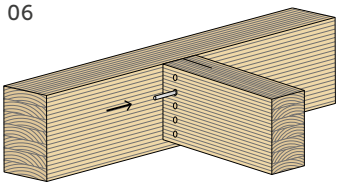
04



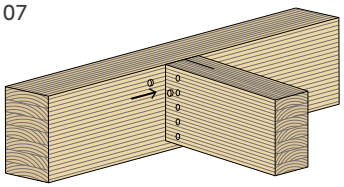
05



06



07



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 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 y_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.
- In case of combined loading the following verification shall be satisfied:

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

STRUCTURAL VALUES | F_v

TIMBER-TO-TIMBER

- Characteristic values comply with the EN 1995-1-1 standard in accordance with ETA-09/0361.
- Design values can be obtained from 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.

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

TIMBER-TO-TIMBER

- Characteristic values comply with the EN 1995-1-1 standard in accordance with ETA-09/0361. Design values can be obtained from characteristic values as follows:

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

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

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

STRUCTURAL 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 design values of the anchors for concrete are calculated in accordance with the respective European Technical Assessments.
  Design resistance values can be obtained from the tabled values as follows:

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