ALUMIDI HT

ETA-09/0361

CONCEALED BRACKET WITH AND WITHOUT HOLES

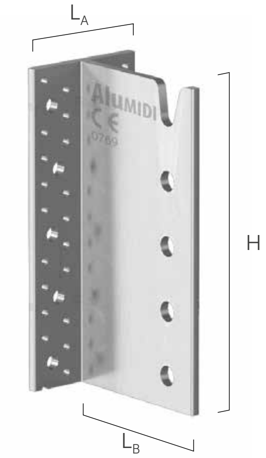
- Large load capacity. Version without holes to be used with SBD-HT self-drilling dowels and with holes to be used with STA smooth dowels
- Strengths calculated in all directions: vertical, horizontal and axial. They can be used in inclined joints
- Optimal hole spacing both for timber and reinforced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

alu

VIDEO

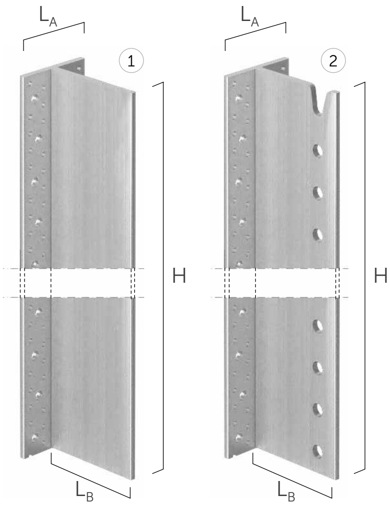
ALUMIDI HT WITHOUT HOLES

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

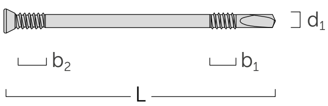


ALUMAXI WITH AND WITHOUT HOLES

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

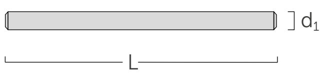
FASTENERS

SBD-HT | SELF-DRILLING DOWEL



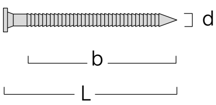
d_1 [mm]	CODE	L [mm]	b_2 [mm]	b_1 [mm]	pcs
7,5 TX 40	**SBD75115H**	115	10	15	50
	SBD75135H	135	10	15	50
	SBD75155H	155	20	15	50

STA | SMOOTH DOWEL



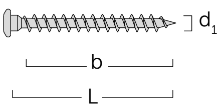
d_1 [mm]	CODE	L [mm]	steel	pcs
12	**STA12120B**	120	S235	100
	STA12140B	140	S235	100
	STA12160B	160	S235	100
16	**STA16160B**	160	S355	50
	STA16180B	180	S355	50
	STA16200B	200	S355	50

LBA-HT | ANKER NAIL



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

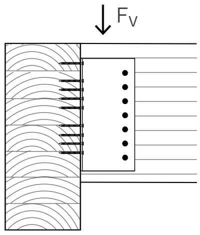
SBL | ROUND-HEAD SCREW AND FLAT UNDERHEAD

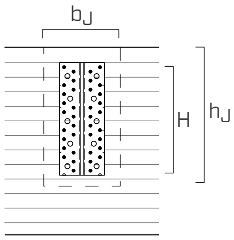


d_1 [mm]	CODE	L [mm]	b [mm]	pcs
5 TX 20	**SBL560**	60	56	200
7 TX 30	**LBS780**	80	75	100

STRUCTURAL VALUES

TIMBER-TO-TIMBER JOINT | F_V





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

ALUMIDI HT	SECONDARY BEAM			MAIN BEAM			
				FASTENING THROUGH NAILS		FASTENING THROUGH SCREWS	
			SBD-HT dowels(1)	LBA-HT nails		SBL screws	
H	b_J	h_J	Ø7,5	Ø4 x 60	$R_{V,k}$	Ø5 x 60	$R_{V,k}$
[mm]	[mm]	[mm]	[pcs Ø x L]	[pcs]	[kN]	[pcs]	[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

ALUMIDI HT	SECONDARY BEAM			MAIN BEAM			
				FASTENING THROUGH NAILS		FASTENING THROUGH SCREWS	
			STA dowels(2)	LBA-HT nails		SBL screws	
H	b_J	h_J	Ø12	Ø4 x 60	$R_{V,k}$	Ø5 x 60	$R_{V,k}$
[mm]	[mm]	[mm]	[pcs Ø x L]	[pcs]	[kN]	[pcs]	[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

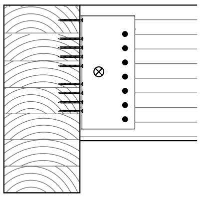
(*) Dimension obtainable from ALUMIDIHT2200.

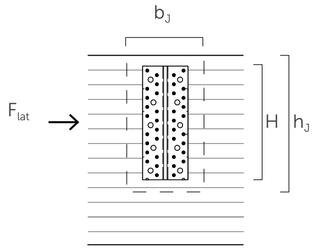
TIMBER-TO-TIMBER | Fv
(1) SBD-HT self-drilling dowels Ø7,5: My,k = 42000 Nmm.
(2) STA smooth dowels Ø12: My,k = 69100 Nmm.

General calculation principles, see page 8.

STRUCTURAL VALUES

TIMBER-TO-TIMBER JOINT | F_{lat}

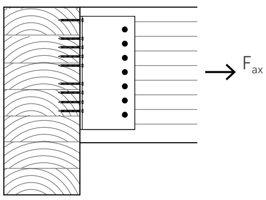


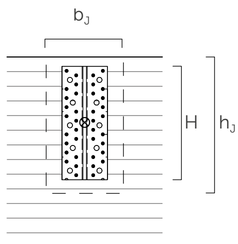


ALUMIDI HT without holes with SBD-HT self-drilling dowels | ALUMIDI with holes with STA dowels

ALUMIDI HT	SECONDARY BEAM[1]		MAIN BEAM[2]		
H	b_J	h_J	LBA-HT nails / SBL screws Ø4 x 60 / Ø5 x 60	$R_{lat,k,alu}$	$R_{lat,k,beam}$ [3]
[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

ALUMIDI HT	SECONDARY BEAM			MAIN BEAM			
				FASTENING THROUGH NAILS		FASTENING THROUGH SCREWS	
H	b_J	h_J	SBD-HT dowels Ø7,5	LBA-HT nails Ø4 x 60	$R_{ax,k}$ [3]	SBL screws Ø5 x 60	$R_{ax,k}$ [3]
[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

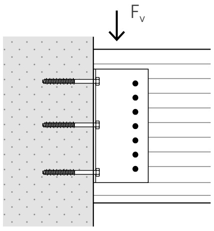
(*) Dimension obtainable from ALUMIDIHT2200.

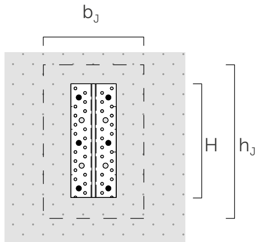
TIMBER-TO-TIMBER | F_{lat} | F_{ax}
(1) The strength values are valid for both SBD-HT Ø7,5 self-drilling dowels and STA Ø12 dowels.
(2) The strength values are valid for both LBA-HT Ø4 nails and for SBL Ø5 screws.
(3) The strength values have been calculated for GL24h glulam.
General calculation principles,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

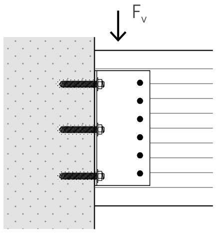
- Install the SKR-CE screw anchors two at a time, starting from the top, dowelling alternate rows.

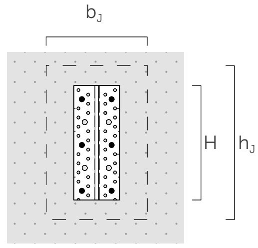
General calculation principles, see page 8.

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	b_J	h_J	Ø7,5	$R_{v,k\ timber}$	Ø8 x 110	$R_{v,d\ concrete}$
[mm]	[mm]	[mm]	[pcs Ø x L]	[kN]	[pcs]	[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	b_J	h_J	Ø12	$R_{v,k\ timber}$	Ø8 x 110	$R_{v,d\ concrete}$
[mm]	[mm]	[mm]	[pcs Ø x L]	[kN]	[pcs]	[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

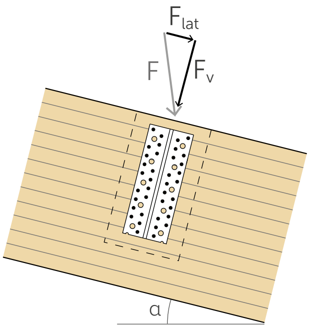
(*) Dimension obtainable from ALUMIDIHT2200.

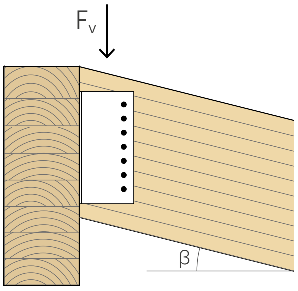
TIMBER-TO-CONCRETE

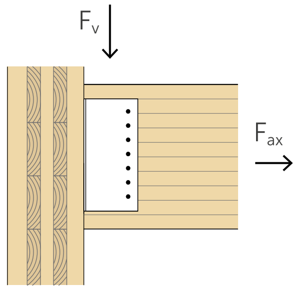
(1) Chemical anchor V-NEX according to ETA-20/0363 with threaded rods (type INA) of minimum steel class 5.8 with h_{ef}= 93 mm: Install the anchors two at a time, starting from the top, dowelling alternate rows.

General calculation principles, see page 8.

APPLICATION EXAMPLES



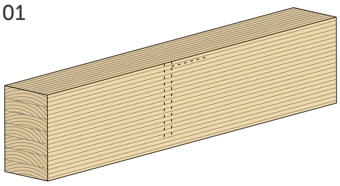




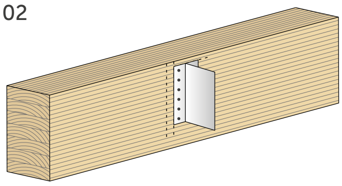
ASSEMBLY

VIDEO

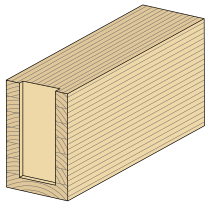
01



02

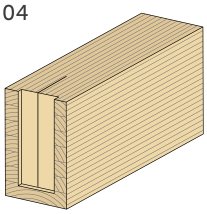


03



ALUMIDI HT WITHOUT HOLES

04



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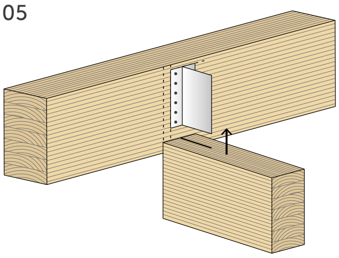

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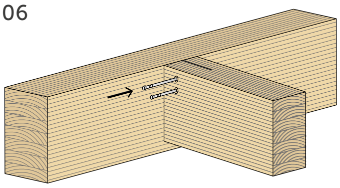

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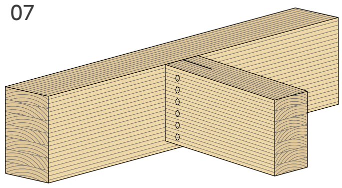
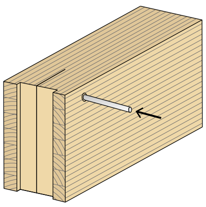


ALUMIDI HT WITHOUT HOLES WITH UPPER COUNTERSINK

04



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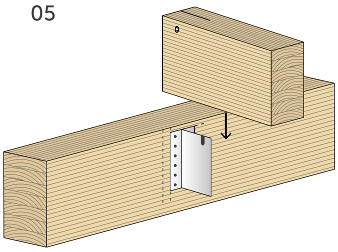

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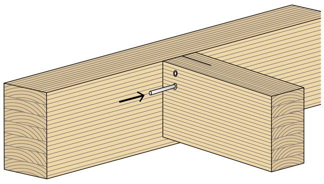

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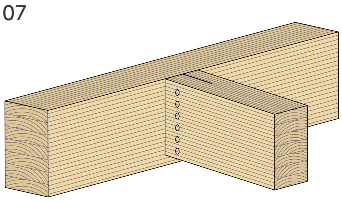
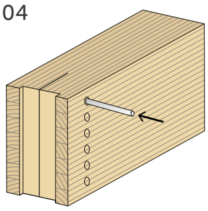
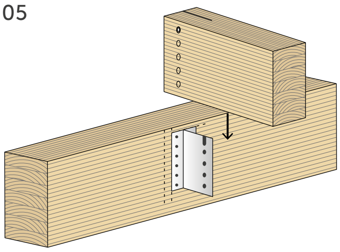


ALUMIDI WITH HOLES

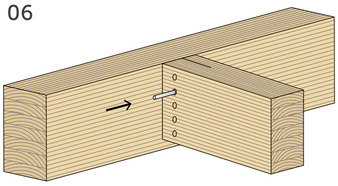
04



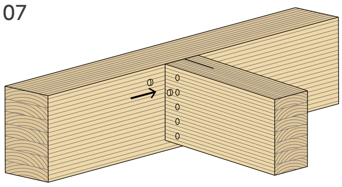
05



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 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.
- 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:

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