TITAN PLATE

EN14595

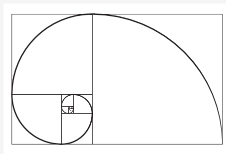
software
myProject
COMING SOON

Plate for shear loads

Bright zinc plated two-dimensional carbon steel perforated plate

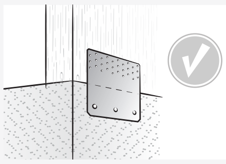
VERSATILE

Suitable for a continuous fixing of both XLAM (Cross Laminated Timber) panels and framed panels to the sub-structure



INNOVATIVE

Designed to offer an improvement solution to the previous technologies; approved by certified international institutions

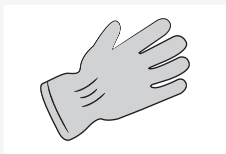


CERTIFIED

Suitability of use guaranteed by CE marking according to European standard EN14545

SITE INSTALLATION

Installation procedure facilitated by the "correct installation" indicator. Assembly realized by using two or three anchors, depending on the design needs



FIELD OF USE

Timber-to-timber and timber -to-concrete shear joints for panels and timber beams

- XLAM (Cross Laminated Timber)
- framed structures (platform frame)
- wood-based panels
- LVL (Laminated Veneer Lumber)
- solid timber
- glulam (Glued Laminated Timber)

PLANAR JOINTS

Ideal to realize continuous connections of XLAM (Cross Laminated Timber) panels and structural frames (platform frame) to the underlying reinforced concrete substructure

VERSATILITY

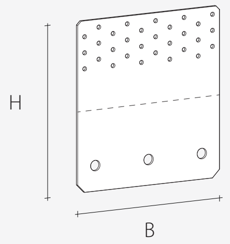
Fastening configurations with two or three anchors, based on the design choices. Installation simple and accurate thanks to the "correct installation" indicator

QUALITY

CE marking ensures the technical suitability of the product. The high strength allows to optimize the number of plates installed, guaranteeing remarkable time saving

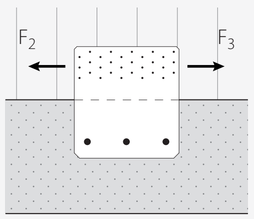
CODES AND DIMENSIONS

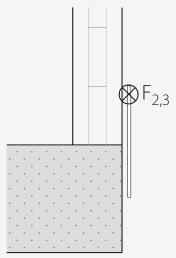
TITAN PLATE TCP



code	type	B [mm]	H [mm]	holes [mm]	n_v Ø5 [pcs]	s [mm]		pcs/box
TCP200	**TCP200**	200	214	Ø13	30	3	•	10

EXTERNAL LOADS



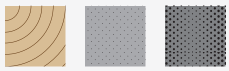


MATERIAL AND DURABILITY

TITAN PLATE: Z275 bright zinc plated DW51D carbon steel.
To be used in Service class 1 and 2 (EN 1995:2008).

FIELD OF USE

Timber to concrete joints
Steel to timber joints

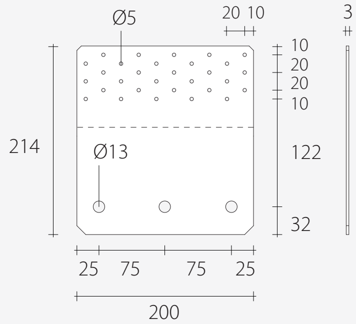


ADDITIONAL PRODUCTS - FASTENERS

type	description	d_1 [mm]	support	p.
LBA	anker nail	4		364
LBS	screw for plates	5		364
AB1	mechanical anchor	12		334
SKR	screw anchor	12		328
VINYLPRO	chemical anchor	M12		346
EPOPLUS	chemical anchor	M12		354

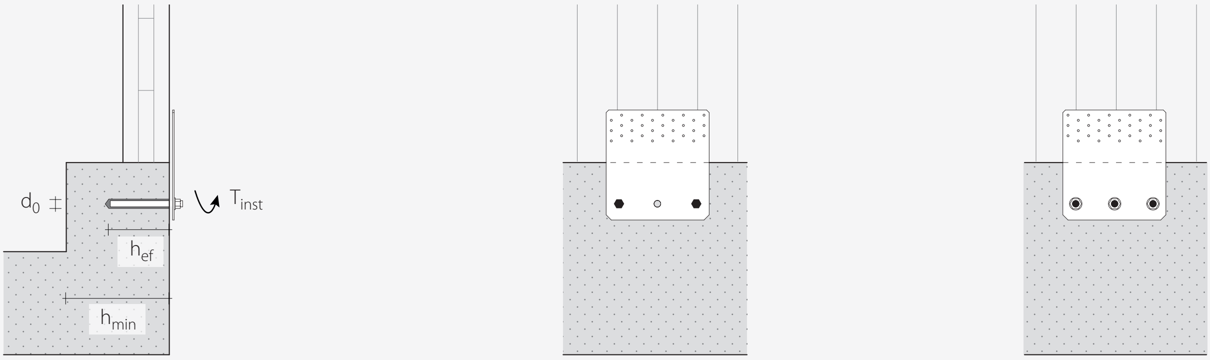
GEOMETRY

TCP200



INSTALLATION ON CONCRETE

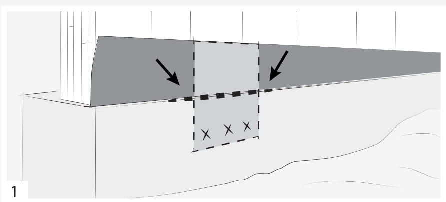
The fixing of the **TITAN TCP** plate to the concrete support must be done by using 2 or 3 anchors depending on the design needs.



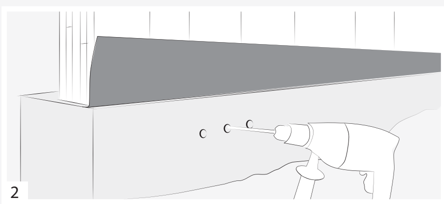
			screwed anchor SKR CE (SKR)	mechanical anchor AB1	chemical anchor VINYLPRO / EPOPLUS
CONCRETE			**Ø12**	**M12**	**M12**
Minimum thickness support	h_{min}	[mm]	130	140	h_{ef} + 30 mm ≥ 100 mm
Hole diameter on concrete	d_0	[mm]	10	12	14
Tightening torque	T_{inst}	[Nm]	80 (50)	50	40

h_{ef} = effective anchorage length in concrete

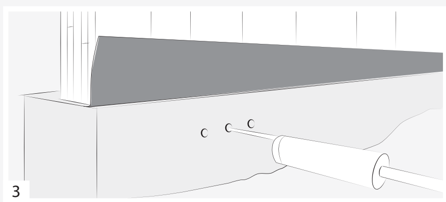
ASSEMBLING ON CONCRETE



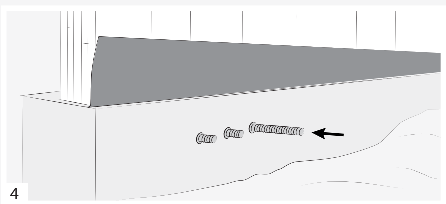
Positioning of the TITAN TCP with the dashed line at the timber-concrete interface and hole marking



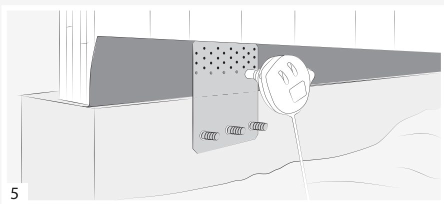
Removal of the TITAN TCP plate and drilling of the concrete support



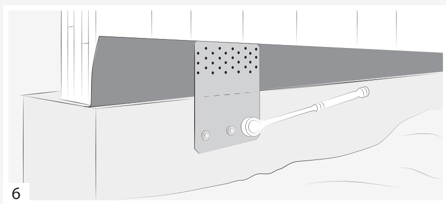
Accurate hole cleaning



Injection of the anchor and insertion of the threaded rods into the holes



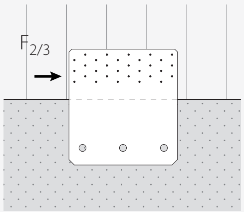
Installation of the TITAN TCP and nailing



Positioning of nuts and washers by adequate tightening

STATIC VALUES - SHEAR JOINT - TIMBER-TO-CONCRETE

TCP 200



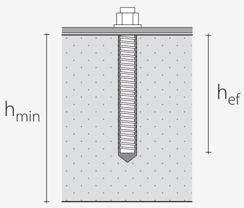
TIMBER STRENGTH $R_{2/3}$

				CHARACTERISTIC VALUES	*ADMISSIBLE VALUES*
configuration on timber	type	holes fasteners Ø5		$R_{2/3,k\ timber}$	*$V_{2/3,\ adm,\ timber}$*
		Ø x L [mm]	$\mathbf{n_V}$ [pcs]	[kN]	*[kg]*
nails	LBA	Ø4,0 x 60	30	**24,9**	*1090*
screws	LBS	Ø5,0 x 50	30	**24,9**	*1090*

CONCRETE STRENGTH $R_{2/3}$

					CHARACTERISTIC VALUES		*ADMISSIBLE VALUES*
configuration on concrete	anchor type	holes fasteners Ø13			$R_{2/3,k\ cls}$		*$V_{2/3,\ adm,\ cls}$*
		Ø x L [mm]	$\mathbf{n_H}$ [pcs]	**steel class**	[kN]	γ_{cls}	*[kg]*
• uncracked concrete • screw anchor	SKR	M12 x min. 100	2	-	**16,1**	1,5	*717*
• uncracked concrete • mechanical anchor	AB1	M12 x 103	2	-	**16,8**	1,5	*747*
• uncracked concrete • chemical anchor	VINYLPRO	M12 x 130	3	5.8	**19,3**	1,5	*856*
• cracked concrete • chemical anchor	EPOPLUS	M12 x 130	3	5.8	**13,7**	1,5	*-*

ANCHOR INSTALLATION PARAMETERS



	ANCHOR TYPE					
	type	**Ø x L** [mm]	**code**	**steel class**	$\mathbf{h_{ef}}$ [mm]	$\mathbf{h_{min}}$ [mm]
M12	**SKR**	**12 x min. 100**	SKR12...	-	64	**200**
	AB1	**M12 x 103**	FE210440	-	70	**200**
	VINYLPRO / EPOPLUS	**M12 x 130**	FE210115 (1)	5.8	108	**200**
		M12 x 130	MGS11288 (2)	8.8	108	**200**

(1) Precut INA threaded rod, with nut and washer

(2) When employing threaded rods that are cut on size, the use of MUT DIN934 nuts and ULS DIN 125 washers is recommended

GENERAL PRINCIPLES

- Characteristic values according to EN 1995:2008.
- Design values can be obtained from characteristic values as follows:

$$R_d = min \begin{cases} \dfrac{R_{2/3,k\ timber} \cdot k_{mod}}{\gamma_m} \\ \dfrac{R_{2/3,k\ cls}}{\gamma_{cls}} \end{cases}$$

Coefficients γ_m and k_{mod} must be taken according to the current Standard adopted for the design. Coefficients γ_{cls} are listed in the table and are in ac cordance with the product certificates.

- For the calculations, a timber density ρk = 350 kg/m3, a concrete grade C 25/30 and no ring gap between the plate hole and the anchor (filled-in holes) have been considered.
- Dimensioning and verification of timber and concrete elements must be carried out separately.
- The strength values of the connection system are valid under the calculation hypotheses listed in the table.
- Admissible values are obtained according to DIN 1052:1988. The strength value is the minimum between the timber strength $V_{adm,timber}$ and the concrete strength $V_{adm,cls}$.

DIMENSIONING OF ALTERNATIVE ANCHORS

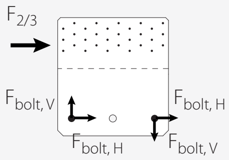
Fixing elements to the concrete support by means of anchors that are not listed in the table, shall be verified according to the load acting on the anchor, which can be evaluated through the k_t. Coefficients k_t vary depending on the position and number of the anchors. The lateral shear load the anchors can be obtained as follows:

$$F_{bolt,V,d} = k_{tV} \cdot F_{2/3,d}$$

$$F_{bolt,H,d} = k_{tH} \cdot F_{2/3,d}$$

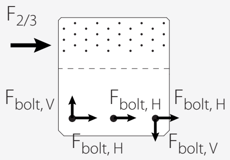
k_{tV} ; k_{tH} = coefficients of distribution
$F_{2/3}$ = shear load on the TITAN plate

2-ANCHOR FIXING



k_{tH}	k_{tV}
0,50	0,98

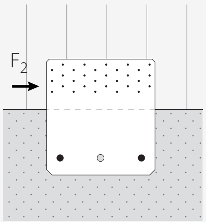
3-ANCHOR FIXING



k_{tH}	k_{tV}
0,33	0,98

The anchor check is satisfied if the design tensile strength, obtained considering the boundary and gropu effects, is greater than the design external load: $R_{bolt,\,d} \geq F_{bolt,\,d}$.

CALCULATION EXAMPLE - TIMBER-TO-CONCRETE JOINT



DESIGN DATA

- F_{2d} = 10,13 kN
- service class = 2
- load duration = instantaneous

PLATE CHOICE

- TITAN TCP200

CONFIGURATION

- uncracked concrete
- fixing on concrete: AB1 M12 x 103 (2 anchors)
- fixing on timber: nails LBA Ø4 x 60

CALCULATION OF THE SHEAR STRENGTH

$$R_d = \min \begin{cases} \dfrac{R_{V\,2/3,k\ timber} \cdot k_{mod}}{\gamma_m} \\ \dfrac{R_{V\,2/3,k\ cls}}{\gamma_{cls}} \end{cases}$$

$R_{V\,2/3,k\ timber}$ = 24,9 kN

$R_{V\,2/3,k\ cls}$ = 16,8 kN (IN)

γ_{cls} = 1,5

EN 1995:2008

k_{mod} = 1,1
γ_m = 1,3

R_d = min { 21,07 ; 11,20 } = 11,20 kN

VERIFICATION

$R_d \geq F_d$: **11,20** > 10,13 kN OK

Italy - NTC 2008

k_{mod} = 1,0
γ_m = 1,5

R_d = min { 16,6 ; 11,20 } = 11,20 kN

VERIFICATION

$R_d \geq F_d$: **11,20** > 10,13 kN OK