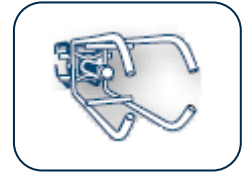


**PLAKA - TITAN**

**Shear dowel for expansion joints**

REF 01.05.01 - Version V01 - 10/08/2020



**Description**

The Titan system is a system designed to transfer a transversal load at the level of the expansion joints. The load transmitted by the dowel is spread into the concrete by mean of a precast reinforcement cage called "TITAN precast reinforcement", that guarantees also a local reinforcement of the concrete.

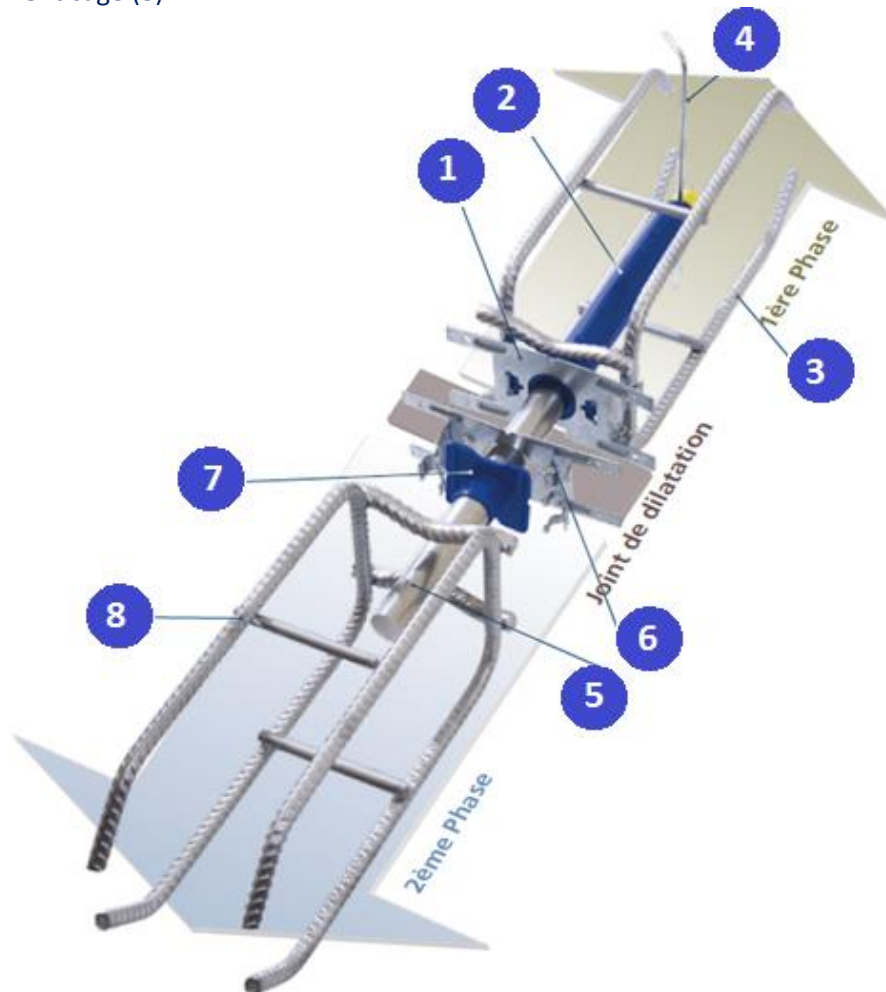
The whole system is composed of diverse elements that are necessary for the good working of the joint.

A round dowel made out of high resistant steel slides into an expansion sleeve

- Round sleeves are used to allow the sliding movement in the axis of the dowel
- Lateral sleeves are used to allow the movement as well along the direction of the dowel as in the lateral direction

The "Titan" system is composed of the following elements ::

- In the first concrete pour : a fixing plate (1), an expansion sleeve (2), a precast reinforcement cage (3) and an adjustment runner (4)
- In the second concrete pour: the shear dowel (5), a fixing plate (6), a centering sleeve (7) and a precast reinforcement cage (8)



Technical Agreement CSTB A.T. 3/09-615

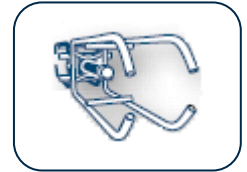
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Shear dowel for expansion joints

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**Application fields**

- Replaces the traditional double bearing structure at the level of the expansion joints
- Replaces a concrete corbel at the level of an expansion joint
- Can be used in combination with pre-slabs
- Can be used at the end of beams and walls
- Connect intermediate structural slabs to diaphragm walls
- For all applications of expansion joints where a shear load has to be carried

**Dimensions and properties**

**1. Shear dowel**



Diameter dowel [mm]	Length L [mm]	Weight [kg]	Yield strength [N/mm <sup>2</sup> ]	Tensile strength [N/mm <sup>2</sup> ]	Steel []	Steel quality []	Reference code []
20	320	0.79	780	935	Galvanized	42Cd4*	TITG020
				850	Stainless	EN4462**	TITI020
22	340	1.04	780	935	Galvanized	42Cd4	TITG022
				850	Stainless	EN4462	TITI022
25	390	1.53	780	935	Galvanized	42Cd4	TITG025
				850	Stainless	EN4462	TITI025
30	470	2.66	780	935	Galvanized	42Cd4	TITG030
			500	700	Stainless	EN4462	TITI030
			780	850			TITI130
40	570	5.64	780	935	Galvanized	42Cd4	TITG040
				850	Stainless	EN4462	TITI140

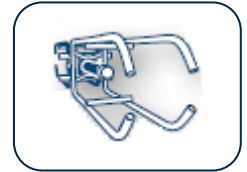
\*Steel quality 42Cd4 (DIN:42CrMo4) is a steel improved by addition of chromium and molybdenum according to EN 10083. Hot-dip galvanization is realized in compliance with the standards, The average minimal thickness is 55 µm. Average chemical analysis (C:0,38/0,45%; Cr:0,90/1,20%; Mo:0,15/0,30%; Mn:0,60/0,90%; Si:0,25% max; P:0,035% max; S:0,035% max)

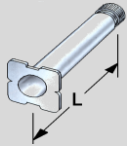
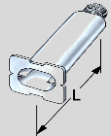
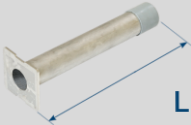
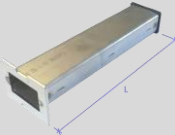
\*\*Steel quality EN4462 (DIN:wr.1.4462) is a high resistant duplex stainless steel with improved characteristics against corrosion according to EN10088-3. Average chemical analysis (C:0,03% max; Si:1,00% max; Mn:2,00% max; Ni:4,50/6,50%; Cr:21,00/23,00%; Mo:2,50/3,50%; N:0,08/0,20%; S:0,02% max; P: 0,03% max). It presents non-zero magnetic properties.

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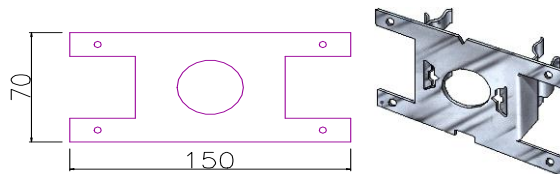
Shear dowel for expansion joints

REF 01.05.01 - Version V01 - 10/08/2020


**2. Expansion sleeve**

Type of sleeve []	φ [mm]	Horizontal opening	Length [mm]	Weight [kg]	Reference code []
 Round plastic sleeve	20	-	180	0,04	TITFR20
	22	-	200	0,04	TITFR22
	25	-	220	0,04	TITFR25
	30	-	270	0,07	TITFR30
	40	-	320	0,13	TITFR40
 Lateral plastic sleeve	20	42	180	0,05	TITFO20
	22	44	200	0,05	TITFO22
	25	46	220	0,08	TITFO25
	30	51	270	0,08	TITFO30
	40	62	320	0,15	TITFO40
 Round sleeve stainless steel 304	20	-	160	0,30	TITFRI20
	22	-	175	0,20	TITFO22
	25	-	196	0,40	TITFO25
	30	-	245	0,50	TITFO30
	40	-	297	0,60	TITFRI40
 Lateral sleeve stainless steel 304	20	42	160	0,25	TITFOI20
	22	44	175	0,30	TITFOI22
	25	47	205	0,35	TITFOI25
	30	52	245	0,40	TITFOI30
	40	65	295	0,60	TITFOI40
Acoustical sleeve*	20	-	130	0,21	HUFRAC

\* For more information about the acoustical sleeve, please refer to the technical datasheet of the acoustical TITAN dowel

**3. Fixing plate**


Type of fixing plate []	φ [mm]	Thickness [mm]	Weight [kg]	Reference code []
Normal fixing plate	20, 22, 25 et 30	1.5	0.10	TITFLR
	40	1.5	0.10	TITFLO40
Lateral fixing plate	20, 22, 25 et 30	1.5	0.10	TITFLO
	40	1.5	0.10	TITFLO40

The fixing plate is made out of steel quality S 235 JR

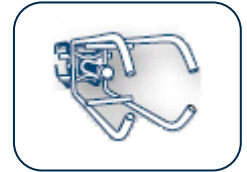
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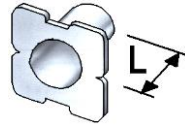
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Shear dowel for expansion joints

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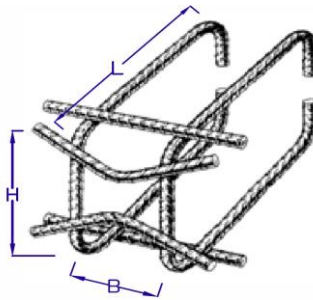


**4. Centering sleeve**

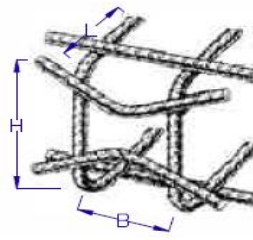


Type of centering sleeve []	$\phi$ [mm]	Length [mm]	Weight [kg]	Reference code []
Plastic centering sleeve	20	23	0,01	TITCC20
	22	23	0,01	TITCC22
	25	23	0,01	TITCC25
	30	23	0,01	TITCC30
	40	23	0,02	TITCC40

**5. TITAN precast reinforcement**



Precast reinforcement for slabs



Precast reinforcement for walls

Type of reinforcement []	$\phi$ [mm]	Length L [mm]	Height H [mm]	Width B [mm]	Diameter stirrups [mm]	Weight [kg]	Reference code []
Standard reinforcement for thin slabs	20 & 22	410	100	110	2 x $\Phi$ 10	1,10	TITRD22100
Standard reinforcement for slabs	20 & 22	300	120	110	2 x $\Phi$ 10	1,10	TITRD22120
	25	300	140	110	2 x $\Phi$ 10	1,13	TITRD25140
	30	260	180	150	2 x $\Phi$ 10 + 2 x $\Phi$ 10	2,05	TITRD30180
	40	300	180	150	2 x $\Phi$ 10 + 2 x $\Phi$ 14	3,00	TITRD40180
Reinforcement for walls	20 & 22	115	120	110	2 x $\Phi$ 10	0,55	TITRV22120
	25	115	120	110	2 x $\Phi$ 10	0,55	TITRV25120
	30	115	140	110	2 x $\Phi$ 10	0,56	TITRV30140
	40	115	140	110	2 x $\Phi$ 10	0,58	TITRV40140

- Steel quality B500B, with BENOR, AFCAB and KOMO certifications
- Stainless steel quality 304 for the bearing reinforcement bars (moustache-shaped)

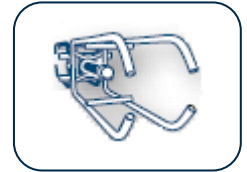
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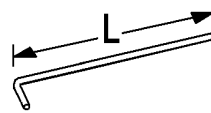
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**6. Adjustment runner**



Type of adjustment runner []	$\phi$ [mm]	Length L [mm]	Weight [kg]	Reference code []
Adjustment runner in galvanized steel	4	200	0,01	TITCR
Adjustment runner in stainless steel 304	4	200	0,01	TITCRI