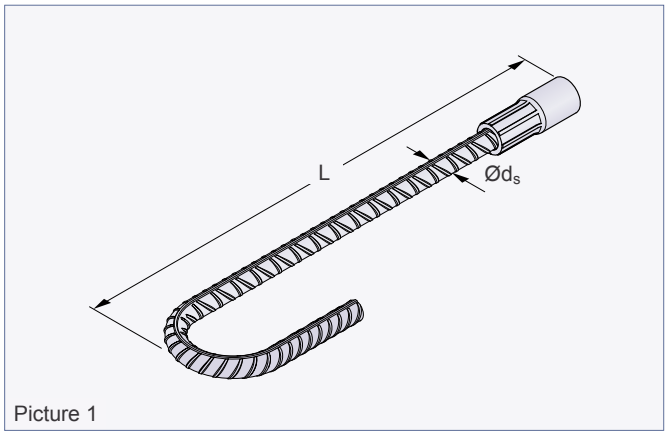
PHILIPPGROUP

PHILIPP Stick anchor

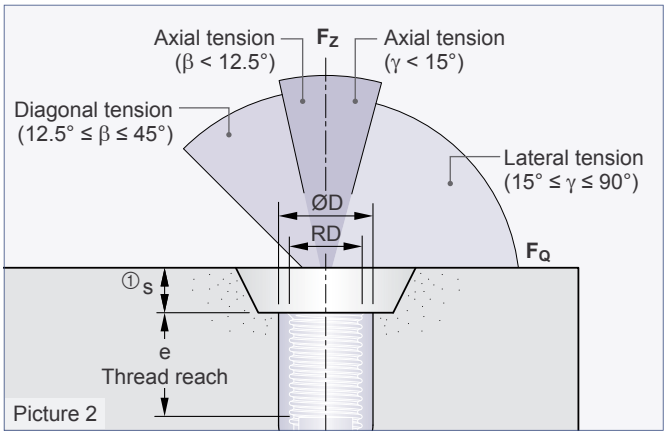
VB3-T-006-en - 01/16

Installation and Application Instruction

PHILIPP Stick anchor



Picture 1



Picture 2

The Stick anchor is part of the PHILIPP Transport anchor system and complies with the “Safety rules for transport anchors and systems for precast concrete units” (German Regulation BGR 106).

The use of Stick transport anchors requires the compliance with this Installation Instruction as well as the General Installation Instruction. The Installation and Application Instructions for the belonging PHILIPP lifting devices (Lifting loop with threaded end, Adapter for lateral tension, “Wirbelstar”, “Lifty”) as well as the data sheets of the belonging PHILIPP accessories (Plastic nailing plates, Retaining caps etc.) must be also followed.
The anchor may only be used in combination with the mentioned PHILIPP lifting devices.
Stick anchors are designed for the transport of precast concrete units only. Multiple use within the transport chain (from production to installation of the unit) means no repeated usage. A repeated usage is only allowed (e.g. ballasts for cranes) if it complies with the German approval (DIBt No.: Z-30.3-6).

Table 1: Dimensions

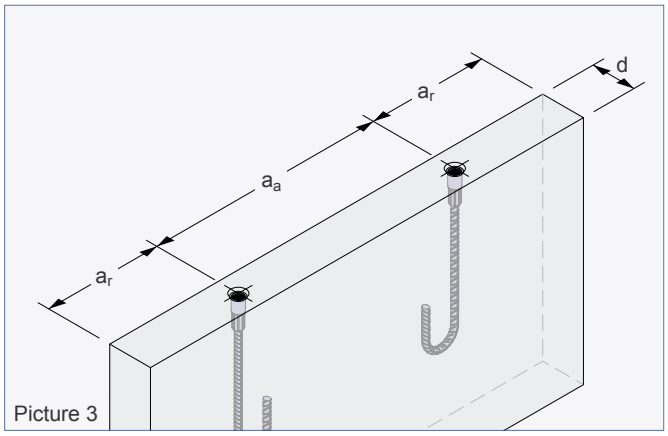
Ref.-No. **bright zinc plated**	Ref.-No. **stainless steel**	Type	Dimensions RD	ØD [mm]	L [mm]	e [mm]	Ød$_s$ [mm]	Weight [kg/100 pcs.]
67M12ST	77M12STVA	RD 12	12	15.0	180	22	8	11.4
67M14ST	77M14STVA	**Type RD 14 of the threaded transport anchor system is no longer available**					10	24.2
67M16ST	77M16STVA	RD 16	16	21.0	310	27	12	40.0
67M18ST	77M18STVA	**Type RD 18 of the threaded transport anchor system is no longer available**					14	60.0
67M20ST	77M20STVA	RD 20	20	27.0	380	35	16	85.0
67M24ST	77M24STVA	RD 24	24	31.0	490	43	16	110.0
67M30ST	77M30STVA	RD 30	30	39.5	630	56	20	319.0
67M36ST	77M36STVA	RD 36	36	47.0	790	68	25	460.0
67M42ST	77M42STVA	RD 42	42	54.0	860	75	28	580.0

① Mind the embedding depth of the corresponding nailing plate and retaining cap (Picture 2).

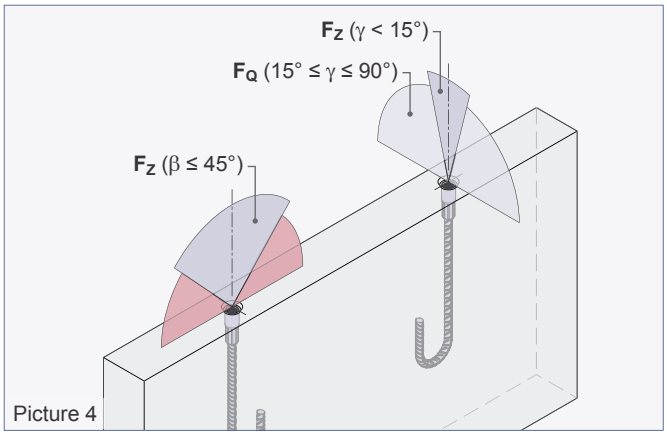
Materials

The Stick anchor consists of a straight reinforcement bar B500B with crimped-on insert. The threaded inserts are made of special high precision steel tubes and are galvanised according to common standards. If the surface of a concrete element has to fulfil special conditions (e.g. no stream of rust) the insert can be delivered in stainless steel alternatively.

Bearing capacities



Picture 3



Picture 4

Element thicknesses, centre and edge distances

The installation and position of Stick anchors in precast concrete units require minimum element dimensions and centre distances for a safe load transfer.

Table 2 shows the minimum thickness d of a unit to cover all load directions (axial, diagonal and lateral).

Table 2: Permissible load bearing capacities

Load class	Element thicknesses and edge distances			perm. F if f_{cc} **15 N/mm²**	
				Axial tension / diagonal tension perm. F_Z 0°- 45°	**Lateral tension** perm. F_Q
	d [mm]	a_a [mm]	a_r [mm]	[kN]	[kN]
12	60	300	150	5.0	2.5
14	60	400	200	8.0	4.0
16	80	400	200	12.0	6.0
18	100	500	250	16.0	8.0
20	100	550	275	20.0	10.0
24	120	600	300	25.0	12.5
30	140	650	350	40.0	20.0
36	200	800	400	63.0	31.5
42	240	1000	500	80.0	40.0

To determine the correct type please refer also to our General Installation Instruction.
The weight of 1.0 t corresponds to 10.0 kN.

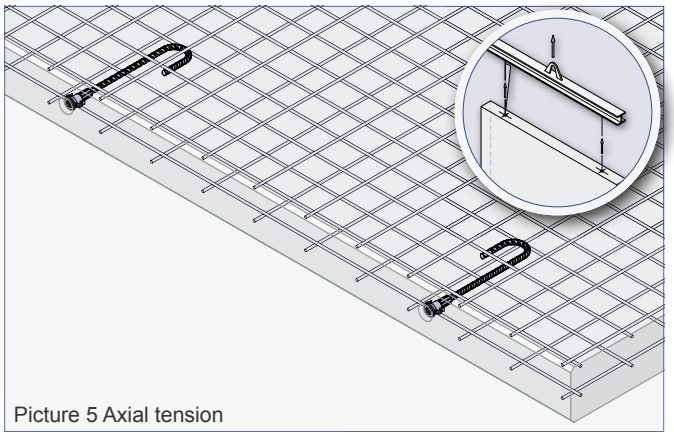
On lateral tension Stick anchors have only half of the capacity compared to axial loading. However, this is not a limitation as during tilt-up only half of the weight has to be lifted (please refer to the General Installation Instruction).

Reinforcement

Reinforcement / axial tension

On use of Stick anchors precast units must be reinforced with a minimum reinforcement (Table 3 and 4). This minimum reinforcement can be replaced by a comparable steel bar reinforcement. At the first time of lifting the concrete must have a minimum strength f_{cc} of **15 N/mm²**. The user is personally responsible for further transmission of load into the concrete unit.

Existing static or constructive reinforcement can be taken into account for the minimum reinforcement according to Table 3.



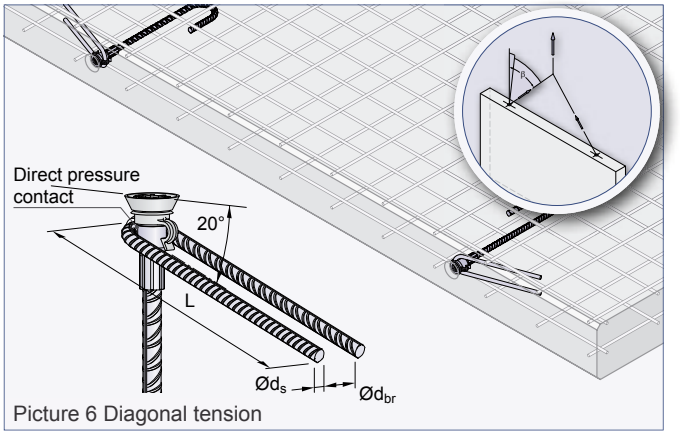
Picture 5 Axial tension

Table 3: Minimum reinforcement

Load class	Mesh reinforcement (square) [mm²/m]
12	131
14	131
16	131
18	188
20	188
24	188
30	188
36	188
42	188

Additional reinforcement for diagonal tension

If the Stick anchor is used under diagonal tension $\beta > 12.5°$ an additional reinforcement according to Table 4 is required. Here the reinforcement for diagonal tension is placed contrarily to the tensile direction (Picture 6) and must have direct pressure contact to the anchor insert in the peak of its bending.



Picture 6 Diagonal tension

Position of the direct pressure contact between insert and additional reinforcement must be within the thread reach of the insert.

Table 4 shows possibilities to use appropriate steel diameters if the inclination is less than 30°. Decisive for the choice of the stirrups are the existing diagonal inclinations during the transport chain until the final mounting of the precast element.

Table 4: Additional reinforcement for diagonal tension (B500B) (required if $\beta > 12.5°$)

Load class	if $12.5° \le \beta \le 30°$			if $12.5° \le \beta \le 30°$		
	Ød$_s$ [mm]	L [mm]	Ød$_{br}$ [mm]	Ød$_s$ [mm]	L [mm]	Ød$_{br}$ [mm]
12	6	150	24	6	150	24
14	6	200	24	6	200	24
16	8	200	32	6	250	24
18	8	250	32	8	200	32
20	8	300	32	8	250	32
24	10	300	40	8	300	32
30	12	400	48	10	350	40
36	14	550	56	12	450	48
42	16	600	64	14	600	56

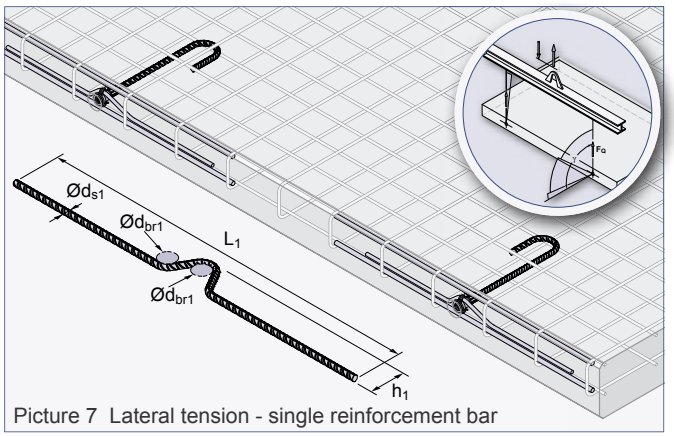
Reinforcement

Additional reinforcement for lateral tension

If an anchor is loaded by lateral tension and the inclination is $\gamma \geq 15°$ an additional reinforcement is required (Table 5 or Table 6). The reinforcement for lateral tension can be done as a single reinforcement bar (Picture 7) or double reinforcement bar (Picture 8). There must be direct pressure contact between the insert of the transport anchor and the reinforcement in the peak of the bending. Lateral forces on Stick anchors are only possible with wall thicknesses d according to Table 2.

The reinforcement for lateral tension is installed in the front side of the wall contrary to the load direction. Tilting of walls can cause diagonal and lateral tension at the same time (Picture 8 and 9). In this case only the reinforcement for lateral tension is required (reverse reinforcement or double reinforcement bar). The diagonal tension is already covered by using this reinforcement.

During mounting the tilt-up or turn-over of a unit requires lateral reinforcement (single reinforcement bar according to Picture 7 or reverse reinforcement for lateral tension according to Picture 9). The double reinforcement bar for lateral tension (Picture 8) covers standard lifting directions. With lateral tension the mesh reinforcement (Table 2) must be applied as a mesh cap. In addition to the mesh cap longitudinal reinforcement must be installed as shown in Table 5 or 6.

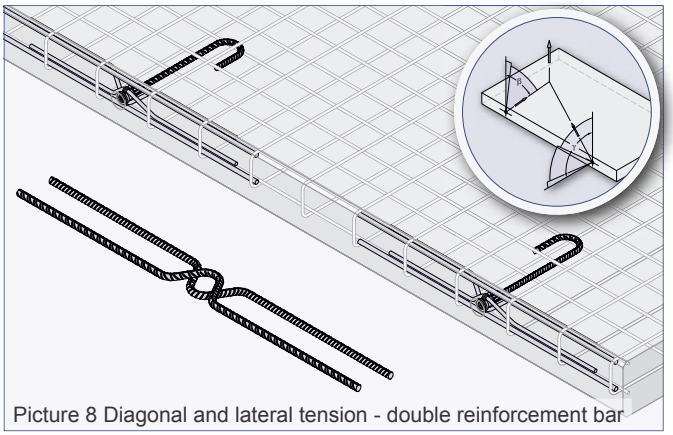


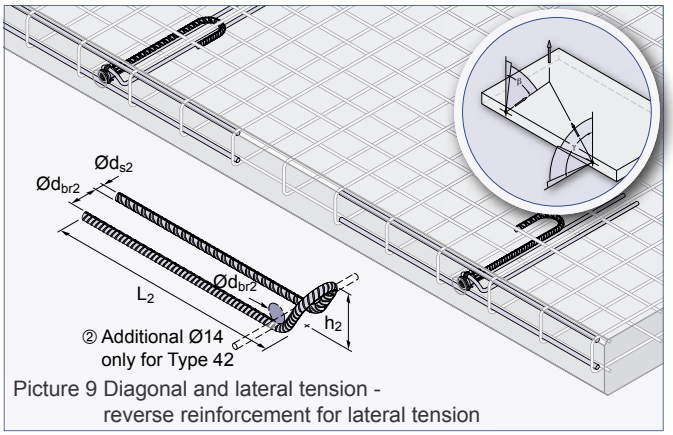
Picture 7 Lateral tension - single reinforcement bar

Table 5: Reverse reinforcement for lateral tension (B500B) (required if $\gamma \geq 15°$)

Load class	Ød$_{s1}$ [mm]	h$_1$ [mm]	L$_1$ [mm]	Ød$_{br1}$ [mm]	Longitudinal reinforcement Ø × length [mm]
12 ①	6	49	500	24	Ø10 × 850
14 ①	6	49	700	24	Ø10 × 850
16	8	49	600	32	Ø10 × 850
18	8	55	750	32	Ø12 × 850
20	10	64	800	40	Ø12 × 850
24	12	75	800	48	Ø12 × 850
30	12	92	1000	48	Ø16 × 1000
36	14	118	1000	56	Ø16 × 1000
42	16	143	1200	64	Ø16 × 1000

① Minimum element thickness of 80 mm is required.


Picture 8 Diagonal and lateral tension - double reinforcement bar



Picture 9 Diagonal and lateral tension - reverse reinforcement for lateral tension

Table 6: Reverse reinforcement for lateral tension (material B500B) (required if $\gamma \geq 15°$)

Load class	Ød$_{S2}$ [mm]	L$_2$ [mm]	h$_2$ [mm]	Ød$_{br2}$ [mm]	Longitudinal reinforcement Ø × length [mm]
12	6	270	35	24	Ø10 × 850
14	6	350	42	24	Ø10 × 850
16	8	420	49	32	Ø10 × 850
18	8	460	55	32	Ø12 × 850
20	10	490	64	40	Ø12 × 850
24	12	520	75	48	Ø12 × 850
30	12	570	92	48	Ø16 × 1000
36	14	690	118	56	Ø16 × 1000
42 ②	16	830	143	64	Ø16 × 1000

② Additional Ø14, length = 60 cm (see Picture 9)

Notes: