PHILIPPGROUP

PHILIPP Capped end anchor

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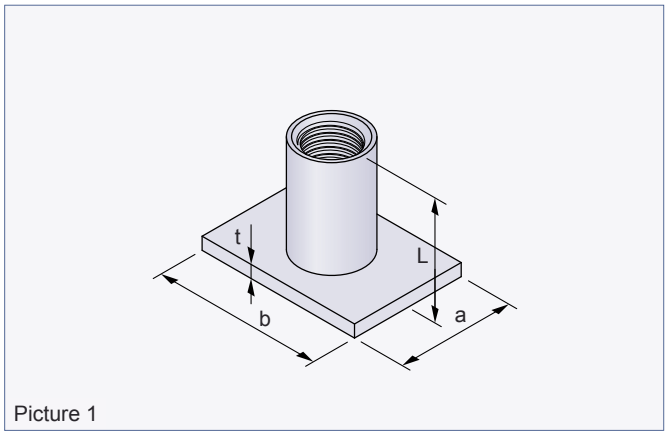
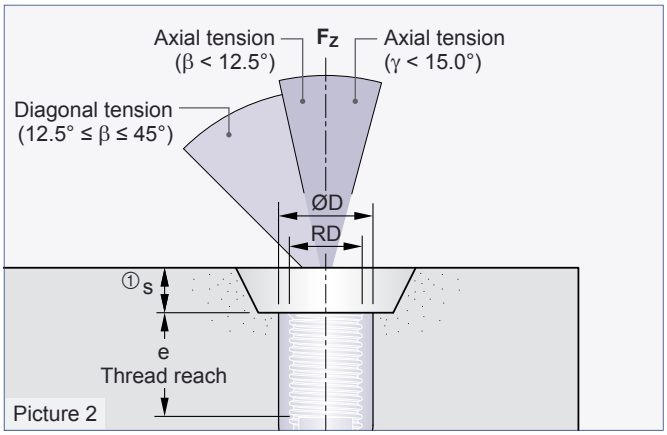
Installation and Application Instruction

PHILIPP Capped end anchor



Picture 1



Picture 2

The Capped end 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 Capped end anchors requires the compliance with this Installation Instruction as well as the General Installation Instruction. The Installation and Application Instructions for the appropriate PHILIPP lifting devices (Lifting loop with threaded end, Adapter for lateral tension, “Wirbelstar”, “Lifty”) the data sheets of the appropriate PHILIPP accessories (Plastic nailing plates, Retaining caps etc.) must be followed as well.
The Capped end anchor may only be used in combination with the mentioned PHILIPP lifting devices.
Capped end 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							Weight
			RD	ØD [mm]	L [mm]	e [mm]	a [mm]	b [mm]	t [mm]	[kg/100 pcs.]
71FL12	77FL12VA	RD 12	12	15.0	30	22	25	35	4	4.5
71FL14	77FL14VA	RD 14	14	18.0	33	25	35	35	4	7.0
71FL16	77FL16VA	RD 16	16	21.0	35	27	35	50	4	11.0
71FL18	77FL18VA	RD 18	18	24.0	44	34	45	60	5	17.5
71FL20	77FL20VA	RD 20	20	27.0	47	35	60	60	5	24.0
71FL24	77FL24VA	RD 24	24	31.0	54	43	60	80	5	33.0
71FL30	77FL30VA	RD 30	30	39.5	72	56	80	100	6	68.0
71FL36	77FL36VA	RD 36	36	47.0	84	68	100	130	6	113.0
71FL42	77FL42VA	RD 42	42	54.0	98	75	130	130	8	178.0
71FL52	77FL52VA	RD 52	52	67.0	119	100	130	150	10	288.0

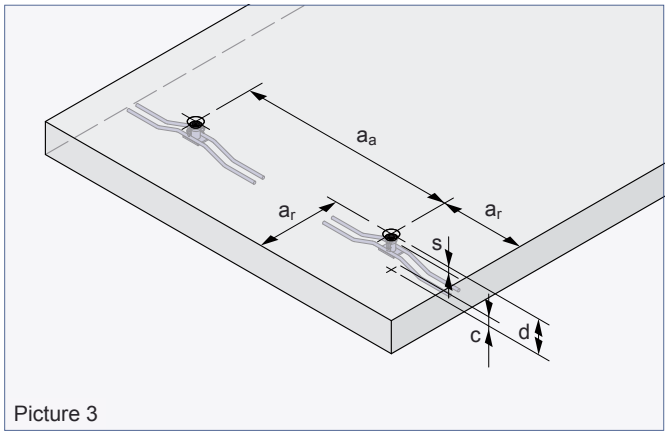
① Mind the embedding depth of the corresponding nailing plate and retaining cap (Picture 2).

Materials

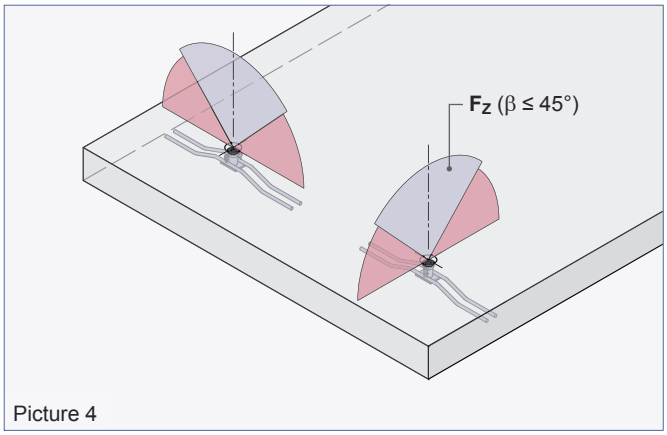
Capped end anchors consist of a steel plate with a welded threaded insert. The threaded inserts are made of special high precision steel tubes and are galvanised according to common standards.

Alternatively the insert and the steel plate can be delivered in stainless steel.

Bearing capacities



Picture 3



Picture 4

Element thicknesses, centre and edge distances

The installation and position of Capped end anchors in precast concrete units require minimum element and centre distances for a safe load transfer.
Table 2 shows the minimum thickness d of a unit to cover the load directions axial and diagonal.
Capped end anchors can only be used for axial and diagonal tension. Lateral tension is not allowed.

If the Capped end anchor is recessed installed in the concrete element (e.g. by a plastic nailing plate) the dimension d must be increased by the amount s (Picture 3).

$c \geq c_{nom}$ acc. to DIN EN 1992-1-1

Table 2: Permissible load bearing capacities

Load class	Element thicknesses, centre and edge distances			perm. F if f_{cc} **15 N/mm²** **Axial tension / diagonal tension** perm. F_Z 0°- 45°
	d [mm]	a_a [mm]	a_r [mm]	[kN]
12	70	350	180	5.0
14	80	350	180	8.0
16	85	500	250	12.0
18	95	600	300	16.0
20	100	600	300	20.0
24	115	800	400	25.0
30	140	1000	500	40.0
36	160	1300	650	63.0
42	175	1300	650	80.0
52	215	1500	750	125.0

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

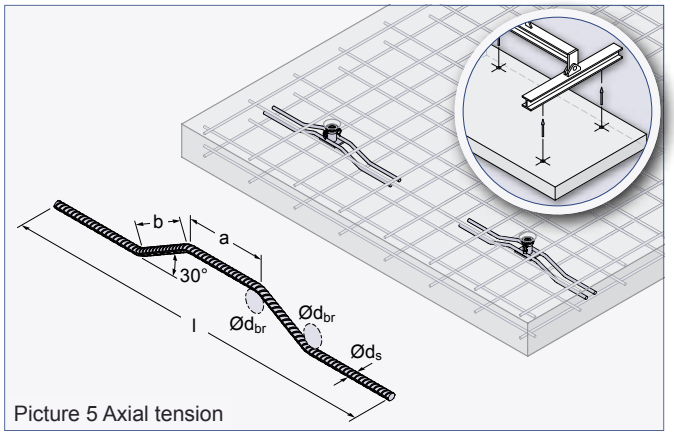
Reinforcement

Main reinforcement / Axial tension

On use of Capped end anchors precast units must be reinforced with a minimum reinforcement (Table 3). The mesh 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.

Additionally, for both axial and diagonal tension a reverse reinforcement is required to the surface reinforcement (acc. to Table 3 Picture 5). This reverse reinforcement is placed over the plate of the anchor. The contact between the reverse reinforcement and the plate has to be ensured in an appropriate way.



Picture 5 Axial tension

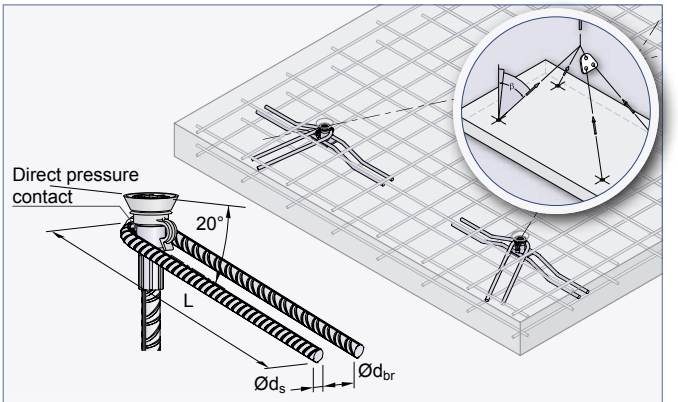
Table 3: Minimum reinforcement / reverse reinforcement

Load class	Mesh reinforcement (square)	Reverse reinforcement					
		$Ød_s$	$Ød_{br}$	l	a	b	Number
	[mm²/m]	[mm]	[mm]	[mm]	[mm]	[mm]	[pcs.]
12	131	6	24	250	60	60	2
14	131	6	24	360	60	70	2
16	131	8	32	420	90	70	2
18	188	8	32	530	90	80	2
20	188	8	32	640	90	80	2
24	188	10	40	640	90	100	2
30	221	12	48	830	90	110	2
36	221	14	56	1140	140	120	2
42	513	16	64	1250	140	120	2
52	513	20	140	1530	140	150	2

Lateral tension is not allowed within the whole transport chain. This applies also to a diagonal tension with an angle β greater than 45°!

Additional reinforcement for diagonal tension

If the Capped end anchor is used under diagonal tension β > 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 (material B500B) (required if **β > 12.5°**)

Load class	if 12.5° ≤ β ≤ 45°			if 12.5° ≤ β ≤ 30°		
	$Ød_s$	L	$Ød_{br}$	$Ød_s$	L	$Ød_{br}$
	[mm]	[mm]	[mm]	[mm]	[mm]	[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
52	20	750	140	16	700	67