PHILIPPGROUP

Capped end anchor

VB3-T-009-en - 03/25 - PDF

Installation and Application Instruction

Our products from the division
BUILDING SOLUTIONS

SERVICES

» On-site tests -> we ensure that your requirements are properly covered by our planning.

» Test reports -> for your safety and documentation.

» Trainings -> the knowledge of your employees from planning and production is enhanced by our experts on site, online or via webinar.

» Planning support -> latest design software, planning documents, CAD data and much more can be downloaded any time from www.philipp-group.de.

HIGH DEMANDS ON PRODUCT SAFETY AND PRACTICALITY

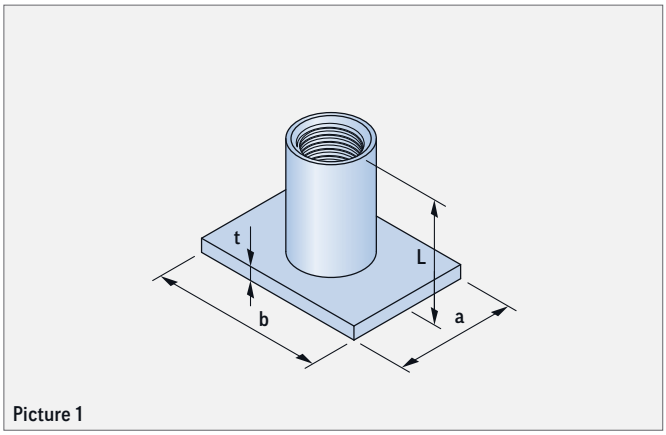
» Close cooperation with notified bodies and - if necessary - approval of our solutions.

TECHNICAL DEPARTMENT

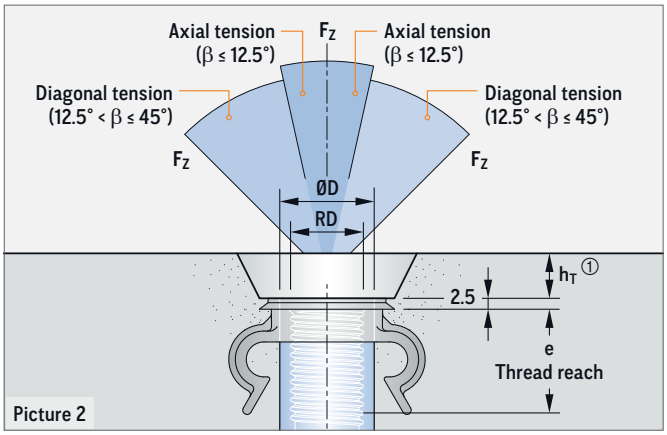
» Our expert-team will support you at any time during your planning phase with detailed advice.

CONTENT

GENERAL PRODUCT INFORMATION



Picture 1



Picture 2

The Capped end anchor is used for installation in slab-like elements. It is part of the PHILIPP Transport anchor system and complies with the VDI/BV-BS Guideline "Lifting inserts and lifting systems for precast concrete elements" (VDI/BV-BS 6205).

The use of Capped end anchors requires the compliance with this Installation and Application Instruction as well as the General Installation and Application Instruction. Both, the instructions for the belonging PHILIPP lifting devices and data sheets of the necessary PHILIPP fixation elements must be followed also. The 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. The Capped end anchor is not specified for a repeated usage (e.g. ballasts for cranes) or a permanent fixation.

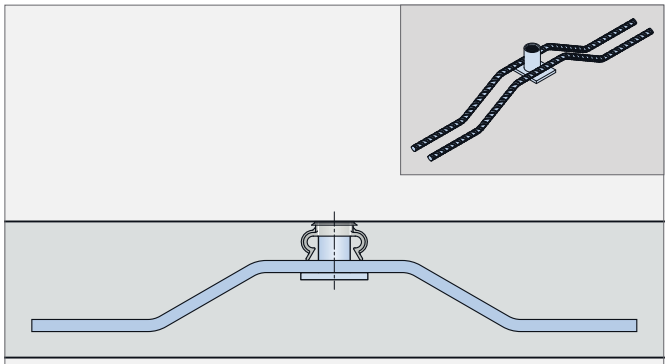
EC-DECLARATION OF CONFORMITY

The EC Declaration of Conformity (DoC) of the Capped end anchor can be downloaded from our website www.philipp-group.de or is available on request.

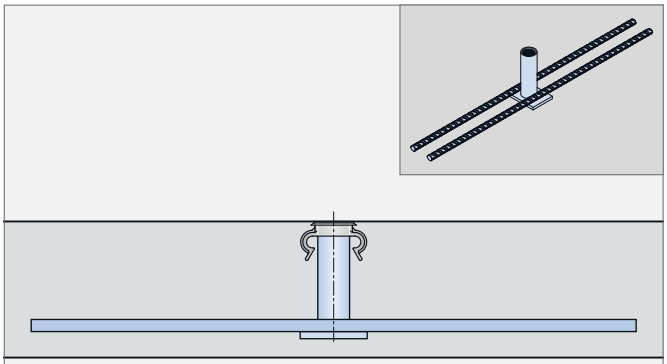
TABLE 1: CAPPED END ANCHOR

Ref. no. ② galvanised	Type	Dimensions RD	ØD (mm)	L (mm)	e (mm)	a (mm)	b (mm)	t (mm)
71FL12	RD 12	12	15.0	30	22	25	35	4
71FL12L				50				
71FL16	RD 16	16	21.0	35	27	35	50	4
71FL16L				70				
71FL20	RD 20	20	27.0	47	35	60	60	5
71FL20L				80				
71FL24	RD 24	24	31.0	54	43	60	80	5
71FL24L				100				
71FL30	RD 30	30	39.5	72	56	80	100	6
71FL30L				120				
71FL36	RD 36	36	47.0	84	68	100	130	6
71FL36L				140				
71FL42	RD 42	42	54.0	98	75	130	130	8
71FL42L				160				
71FL52	RD 52	52	67.0	119	100	130	150	10
71FL52L				200				

① Mind the embedding depth h_T of the corresponding Recess former and Sealing cap (picture 2).
② Also available in version stainless steel (ref. no. 77FL__VA resp. 77FL__LVA).



Picture 3 Bent anchorage reinforcement (71FL__)



Picture 4 Straight anchorage reinforcement (71FL__L)

ASSIGNMENT OF THE ANCHORAGE REINFORCEMENT

The Capped end anchors are available in two installation heights for each load class. This enables the use and installation of different versions of the required anchorage reinforcement. If the Capped end anchors are used in a shorter version (standard length), the bent version of the anchorage reinforcement is required (picture 3). With the use of the new, longer version only a straight anchorage reinforcement (without bending) is required (picture 4) .

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.
This galvanisation protects the anchor temporarily from the storage at the producer site to the final installation in the concrete element.

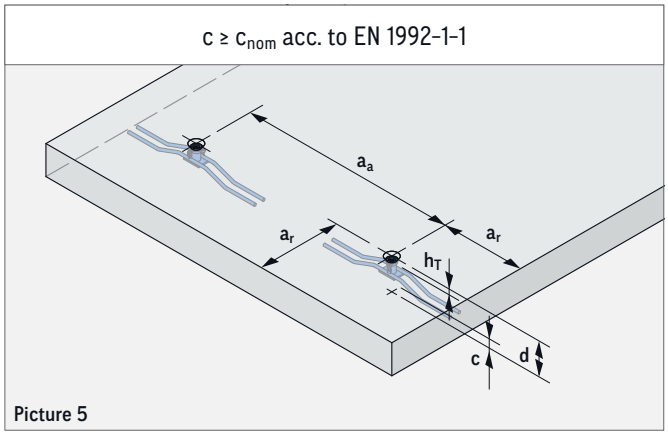
CORROSION

The Capped end anchor can also be supplied in stainless steel in order to protect the surface of the concrete element against corrosion (stream of rust or similar) or other damages caused by corrosion. Here, both the plate and the socket are made of stainless steel.

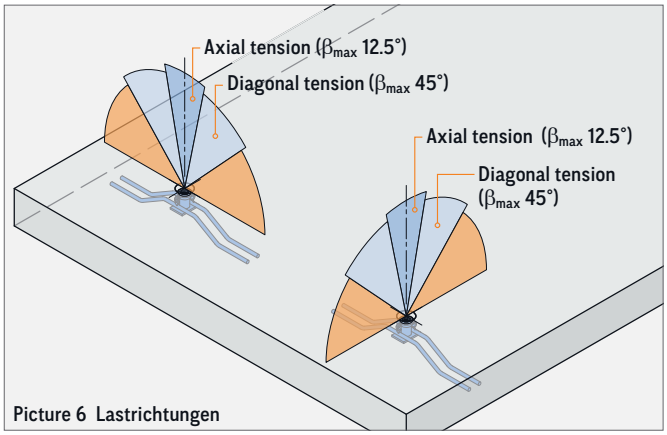
TABLE 2: ASSIGNMENT OF THE ANCHORAGE REINFORCEMENT

Ref. no.	bent	straight
71FL12	●	-
71FL12L	-	●
71FL16	●	-
71FL16L	-	●
71FL20	●	-
71FL20L	-	●
71FL24	●	-
71FL24L	-	●
71FL30	●	-
71FL30L	-	●
71FL36	●	-
71FL36L	-	●
71FL42	●	-
71FL42L	-	●
71FL52	●	-
71FL52L	-	●

BEARING CAPACITIES



Picture 5



Picture 6 Lastrichtungen

ELEMENT THICKNESSES, CENTRE AND EDGE DISTANCES

The installation and position of Capped end anchors in precast concrete units require minimum element dimensions and centre/edge distances for a safe load transfer. If the Capped end anchor is installed in a recessed position (e. g. by using plastic or steel nailing plates resp. recess formers) the minimum required element thickness d must be increased by the thickness h_T of the recess former.

CONCRETE STRENGTH

At the first time of lifting the concrete must have a minimum strength f_{cc} acc. to table 3. Concrete strengths f_{cc} are cube strengths at the time of the first lifting.

TABLE 3: PERMISSIBLE LOAD BEARING CAPACITIES

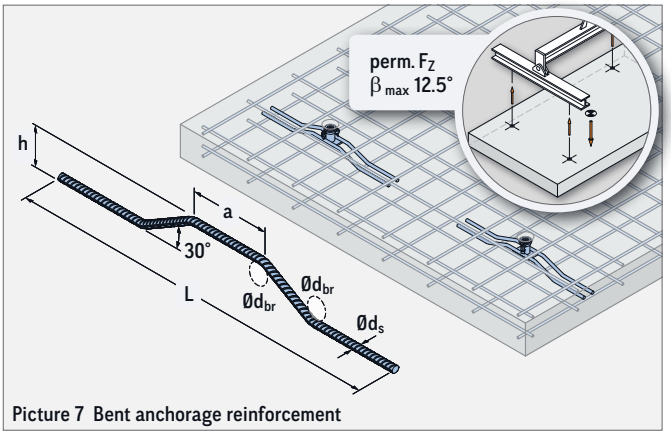
Load class	Min. element thickness Min. centre distance Min. edge distance			perm. F at f_{cc} ≥ 15 N/mm²				perm. F at f_{cc} ≥ 20 N/mm²			
				Axial tension β_{max} 12.5°		Diagonal tension β_{max} 45°		Axial tension β_{max} 12.5°		Diagonal tension β_{max} 45°	
	d (mm)	a_a (mm)	a_r (mm)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
12	70	380	190	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
16	90	600	300	9.5	12.0	11.6	12.0	11.0	12.0	12.0	12.0
20	100	720	360	14.8	18.1	15.6	20.0	17.1	20.0	18.0	20.0
24	120	880	440	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
30	140	1040	520	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
36	160	1180	590	63.0	55.8	63.0	63.0	63.0	63.0	63.0	63.0
42	180	1280	640	80.0	72.2	80.0	80.0	80.0	80.0	80.0	80.0
52	220	1440	720	106.1	105.0	123.0	116.5	122.5	121.3	125.0	125.0

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

REINFORCEMENT

MINIMUM REINFORCEMENT / AXIAL TENSION

For the use of Capped end anchors precast units must be reinforced with a minimum reinforcement. This can be found in the tables of the corresponding load cases. This minimum reinforcement can be replaced by a comparable steel bar reinforcement. The user is personally responsible for further transmission of load into the concrete unit.

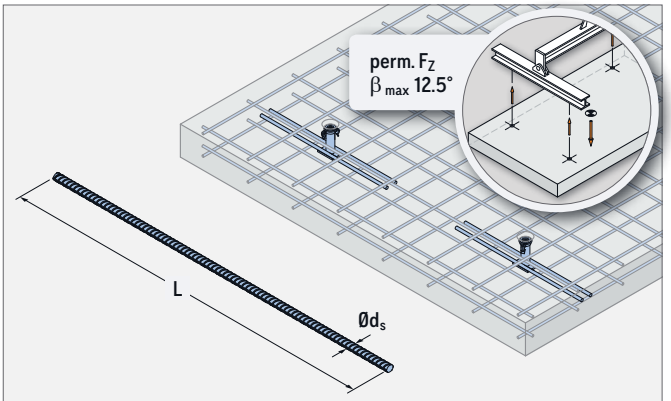


Picture 7 Bent anchorage reinforcement

EXISTING REINFORCEMENT

Existing static or constructive reinforcement can be taken into account for the minimum reinforcement for the respective load case..

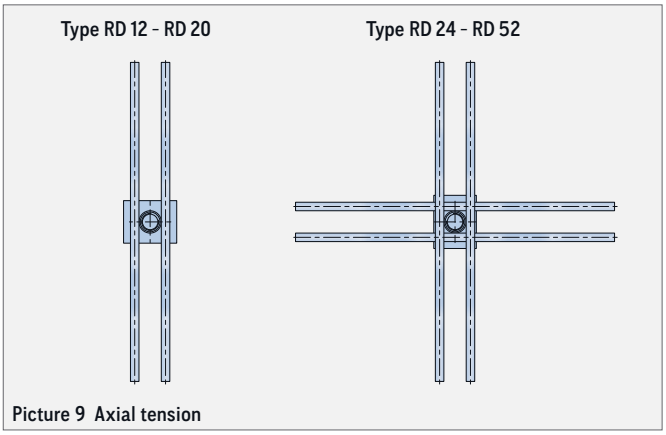
In addition to the surface reinforcement, an anchorage reinforcement is required for both axial and diagonal tension. This reinforcement is placed over the plate of the Capped end anchor and must be arranged as shown in picture 9. Here, the contact between the anchorage reinforcement and the plate has to be ensured in an appropriate way.



Picture 8 Straight anchorage reinforcement

TABLE 4: MINIMUM REINFORCEMENT / ANCHORAGE REINFORCEMENT

Load class	Mesh reinforcement (square)	Anchorage reinforcement					
	(mm²/m)	Number (pcs.)	$Ød_s$ (mm)	L (mm)	a (mm)	h (mm)	$Ød_{br}$ (mm)
12	1 × #257	2	8	250	60	32	32
16	1 × #257	2	8	400	90	47	32
20	2 × #257	2	10	500	90	48	40
24	2 × #335	4	12	600	90	63	48
30	2 × #424	4	14	700	140	68	56
36	2 × #424	4	16	800	140	78	64
42	2 × #524	4	20	840	170	90	140
52	2 × #524	4	20	900	170	111	140



Picture 9 Axial tension

LATERAL TENSION

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

REINFORCEMENT

ADDITIONAL REINFORCEMENT FOR DIAGONAL TENSION

If the Capped end anchor is used under diagonal tension β_{max} 45° an additional reinforcement according to table 5 is required. Here, the reinforcement for diagonal tension is placed contrarily to the tensile direction (picture 10 or 11) and must have direct pressure contact to the anchor insert in the peak of its bending. The installation of the rebars for diagonal tension can be done in an angle of 0° to 20° to the concrete surface. If an installation angle of 0° is given the transport anchor has to be installed in a recessed position (e.g. by using a Nailing plate) in order to reach the minimum required concrete cover.

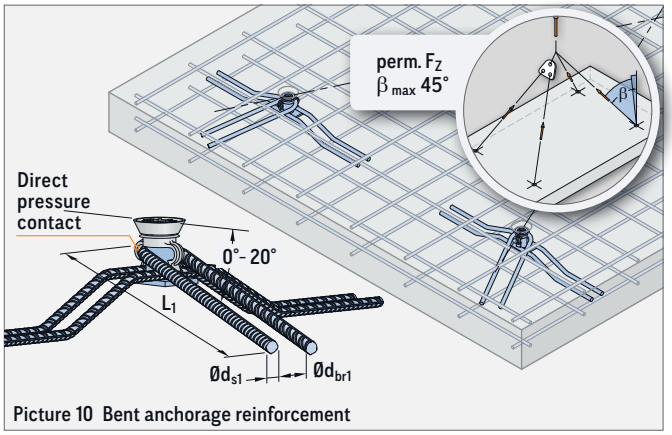
Table 5 shows possibilities to use appropriate steel diameters if the inclination is less than 30°. Decisive for the choice of the stirrups are the existing diagonal inclinations during the transport chain until the final mounting of the precast element.

TABLE 5: ADDITIONAL REINFORCEMENT FOR DIAGONAL TENSION (REQUIRED IF β > 12.5°)

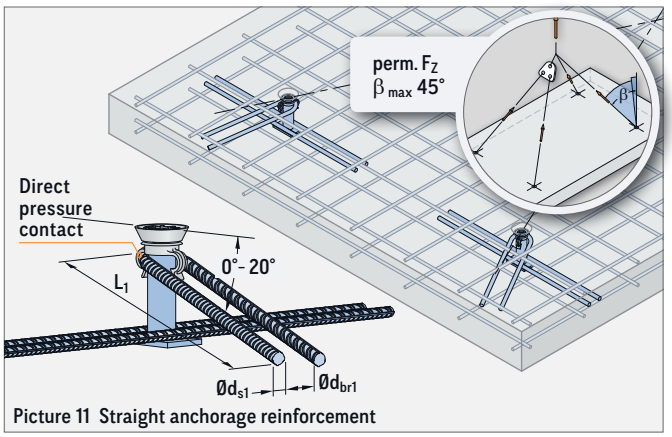
Load class	at β_{max} 30°			at β_{max} 45°		
	$Ød_{s1}$ (mm)	L_1 (mm)	$Ød_{br1}$ (mm)	$Ød_{s1}$ (mm)	L_1 (mm)	$Ød_{br1}$ (mm)
12	6	150	24	6	150	24
16	6	250	24	8	200	32
20	8	250	32	8	250	32
24	8	350	32	10	300	40
30	10	350	40	12	420	48
36	12	350	48	14	400	56
42	14	400	56	16	450	64
52	16	500	70	20	500	140

NOTES FOR THE DIAGONAL TENSION REINFORCEMENT

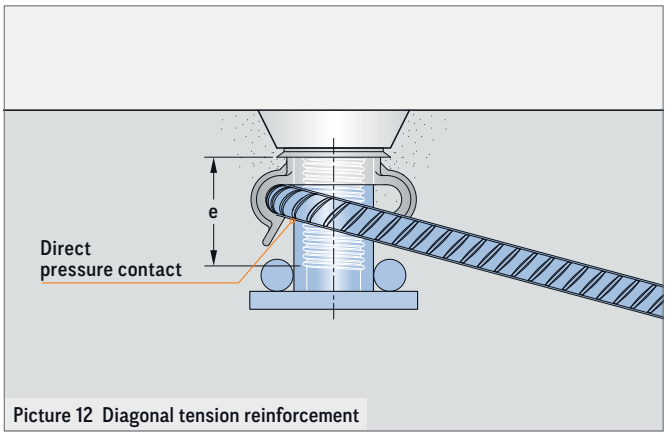
With pressure contact to the anchor insert the additional reinforcement for diagonal tension has to be installed. The position of the direct pressure contact must be within the thread reach e of the insert (see picture 12). This is ensured by using the Marking ring with clip (74KR__CLIP).



Picture 10 Bent anchorage reinforcement

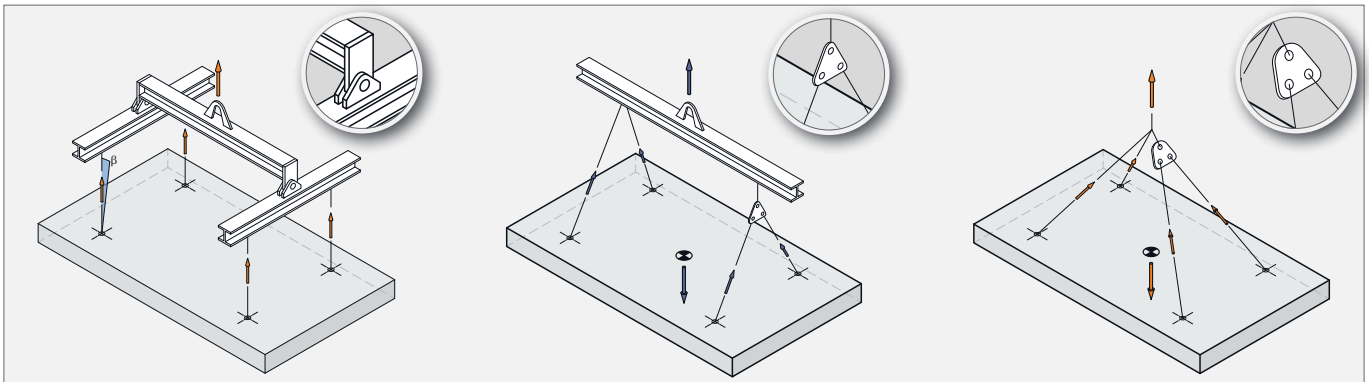


Picture 11 Straight anchorage reinforcement

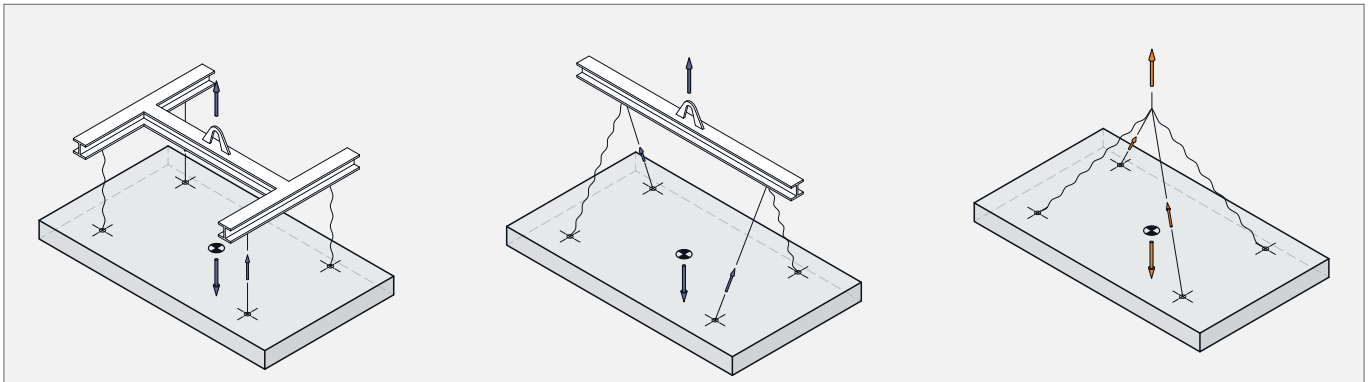


Picture 12 Diagonal tension reinforcement

ADMISSIBLE LOAD CASES



Picture 13 Lifting legs of admissible load cases with n = **4 anchors**



Picture 14 Lifting legs of admissible load cases with n = **2 anchors**

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