PHILIPPGROUP

PHILIPP Capped end anchor

VB3-T-009-en - 10/19 - PDF

Installation and Application Instruction

Transport and mounting systems for prefabricated building

Technical department

Our staff will be pleased to support your planning phase with suggestions for the installation and use of our transport and mounting systems for precast concrete construction.

Special designs

Customized to your particular needs.

Practical tests on site

We ensure that our concepts are tailored precisely to your requirements.

Inspection reports

For documentation purposes and your safety.

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Software solutions

The latest design software, animated videos and CAD libraries can always be found under www.philipp-gruppe.de.

Engineering contact

Phone: +49 (0) 6021 / 40 27-318
Fax: +49 (0) 6021 / 40 27-340
E-mail: technik@philipp-gruppe.de

Sales contact

Phone: +49 (0) 6021 / 40 27-300
Fax: +49 (0) 6021 / 40 27-340
E-mail: vertrieb@philipp-gruppe.de




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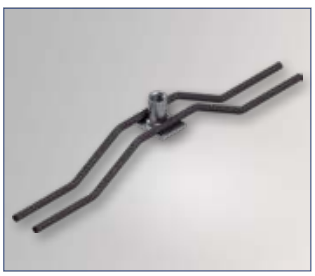
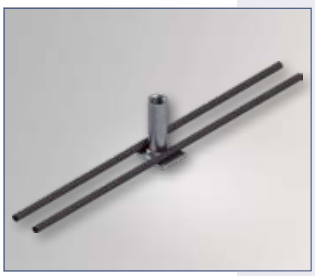
Content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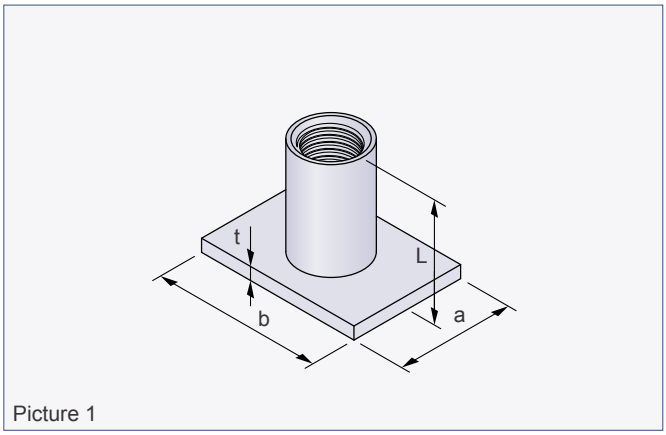
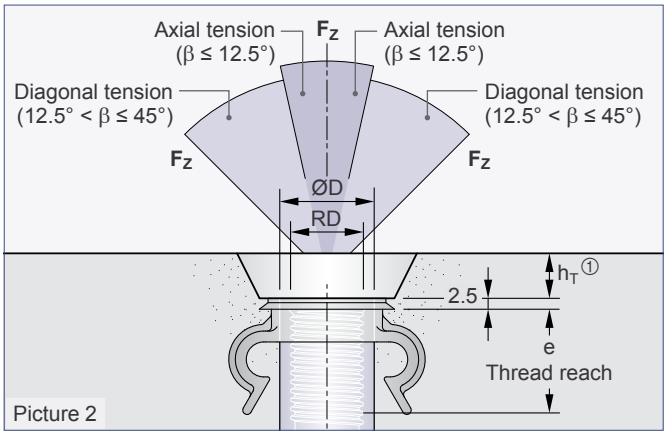
PHILIPP Capped end anchor



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 insert 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 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.

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

Table 1: Capped end anchor

Ref.-no. ② **galvanised**	Type	Dimensions RD	ØD [mm]	L [mm]	e [mm]	a [mm]	b [mm]	t [mm]	Weight [kg/100 pcs.]
71FL12	RD 12	12	15.0	30	22	25	35	4	4.5
71FL12L				50					5.8
Type RD 14 of the threaded transport anchor system is no longer available									
71FL16	RD 16	16	21.0	35	27	35	50	4	11.0
71FL16L				70					16.0
Type RD 18 of the threaded transport anchor system is no longer available									
71FL20	RD 20	20	27.0	47	35	60	60	5	24.0
71FL20L				80					31.5
71FL24	RD 24	24	31.0	54	43	60	80	5	33.0
71FL24L				100					46.0
71FL30	RD 30	30	39.5	72	56	80	100	6	68.0
71FL30L				120					90.0
71FL36	RD 36	36	47.0	84	68	100	130	6	113.0
71FL36L				140					149.0
71FL42	RD 42	42	54.0	98	75	130	130	8	178.0
71FL42L				160					231.0
71FL52	RD 52	52	67.0	119	100	130	150	10	288.0
71FL52L				200					394.0

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).

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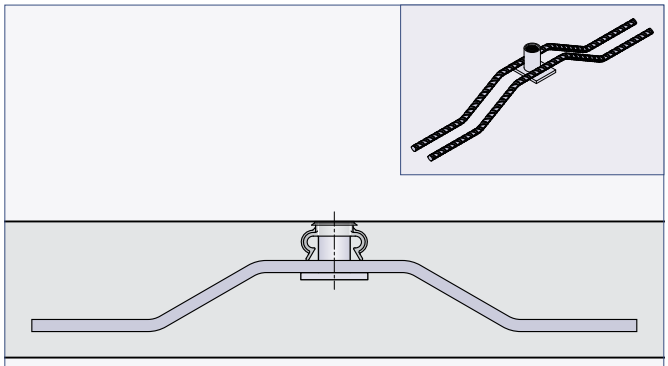
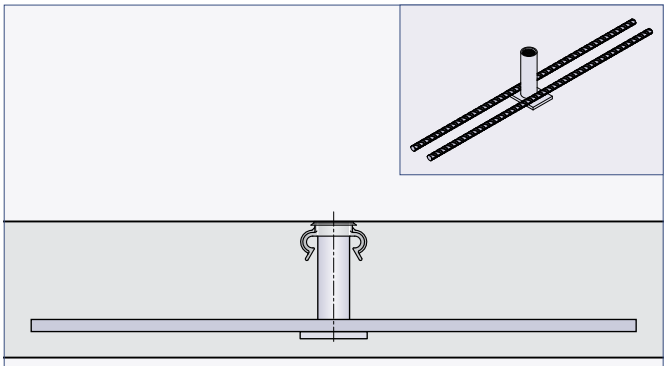
General notes



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) and thus saves time and money by its easier installation.

Materials

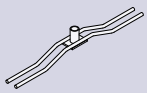
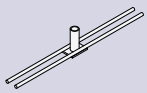
Capped end anchors consist of a steel plate with a welded threaded insert. The threaded inserts are made of special high precision steel tubes and are galvanised according to common standards.

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

Corrosion protection

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	-	●
71FL14	●	-
71FL16	●	-
71FL16L	-	●
71FL18	●	-
71FL20	●	-
71FL20L	-	●
71FL24	●	-
71FL24L	-	●
71FL30	●	-
71FL30L	-	●
71FL36	●	-
71FL36L	-	●
71FL42	●	-
71FL42L	-	●
71FL52	●	-
71FL52L	-	●

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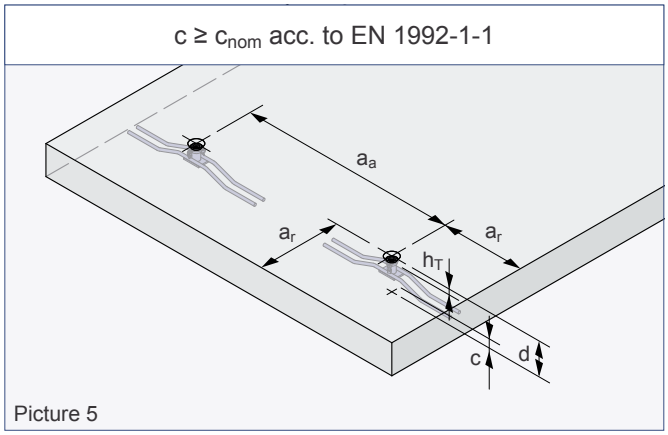
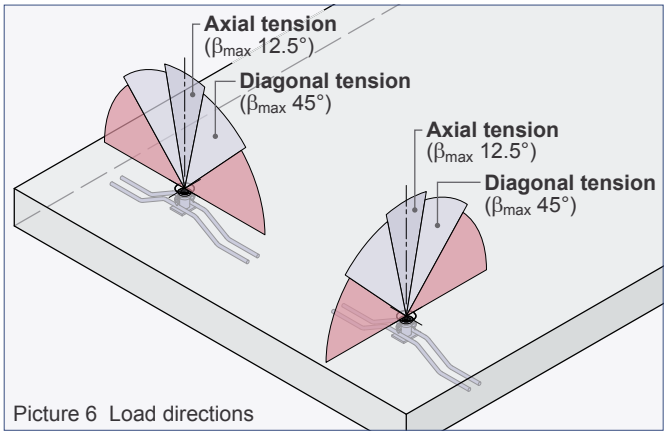
Bearing capacities



Picture 5



Picture 6 Load directions

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 $f_{cc} \geq 15$ N/mm²				perm. F at $f_{cc} \geq 20$ 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
14	80	500	250	7.6	-	8.0	-	8.0	-	8.0	-
16	90	600	300	9.5	12.0	11.6	12.0	11.0	12.0	12.0	12.0
18	95	660	330	12.1	-	13.6	-	14.0	-	15.7	-
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 Instruction.
- The weight of 1.0 t corresponds to 10.0 kN.

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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.

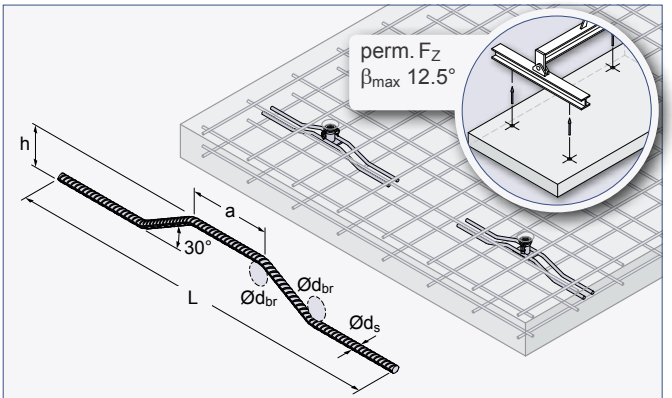
Existing static or constructive reinforcement can be taken into account for the minimum reinforcement for the respective load case.

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.

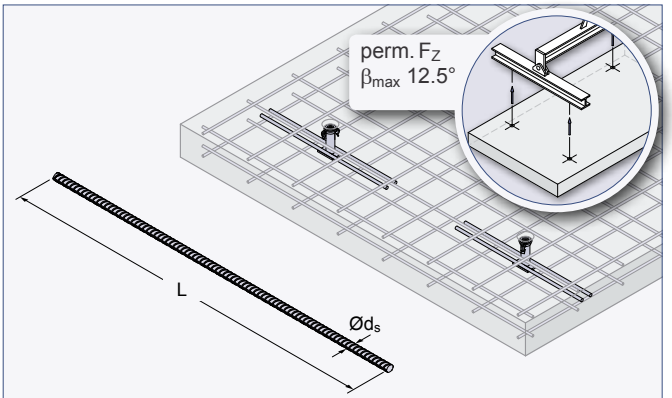
Table 4: Minimum reinforcement / anchorage reinforcement

Load class	Mesh reinforcement (square)	Anchorage reinforcement					
		Number	$Ød_s$	L	a	h	$Ød_{br}$
	[mm²/m]	[pcs.]	[mm]	[mm]	[mm]	[mm]	[mm]
12	1 × #257	2	8	250	60	32	32
14	1 × #257	2	8	330	90	39	32
16	1 × #257	2	8	400	90	47	32
18	2 × #257	2	10	450	90	46	40
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

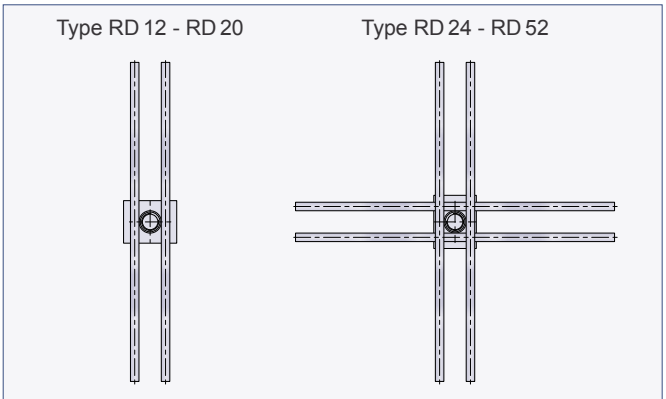
Lateral tension is not allowed within the whole transport chain. This also applies to a diagonal tension with angle β more than 45° (see picture 6)!



Picture 7 Bent anchorage reinforcement



Picture 8 Straight anchorage reinforcement



Picture 9 Axial tension

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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.

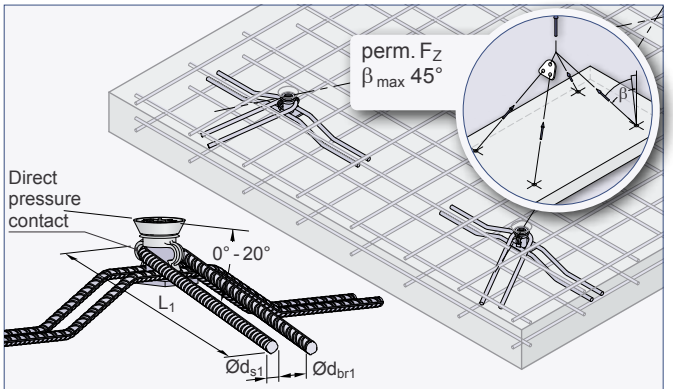
Table 5 shows possibilities to use appropriate steel diameters if the inclination is less than 30°. Decisive for the choice of the stirrups are the existing diagonal inclinations during the transport chain until the final mounting of the precast element.

Table 5: Additional reinforcement for diagonal tension (required if β > 12.5°)

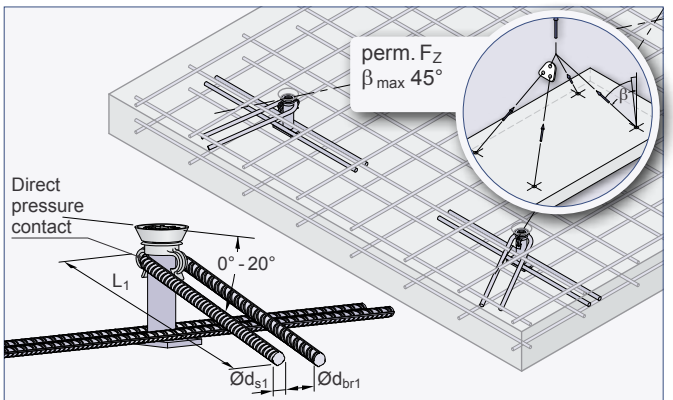
Load class	at β_{max} 30°			at β_{max} 45°		
	$Ød_{s1}$ [mm]	L_1 [mm]	$Ød_{br1}$ [mm]	$Ød_{s1}$ [mm]	L_1 [mm]	$Ød_{br1}$ [mm]
12	6	150	24	6	150	24
14	6	200	24	8	190	32
16	6	250	24	8	200	32
18	8	240	32	8	240	32
20	8	250	32	8	250	32
24	8	350	32	10	300	40
30	10	350	40	12	420	48
36	12	350	48	14	400	56
42	14	400	56	16	450	64
52	16	500	70	20	500	140

Notes for the diagonal tension reinforcement

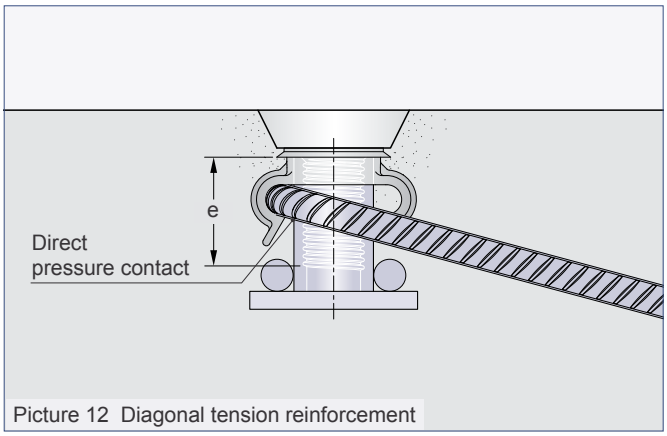
With pressure contact to the anchor insert the additional reinforcement for diagonal tension has to be installed. Position of the direct pressure contact must be within the thread reach e of the insert (see picture 12). This is warranted by using the Marking ring with clip (74KR__CLIP).



Picture 10 Bent anchorage reinforcement



Picture 11 Straight anchorage reinforcement



Picture 12 Diagonal tension reinforcement

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Notes:

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Sustainable
solutions

PHILIPPGROUP

PHILIPP GmbH
Lilienthalstrasse 7-9
D-63741 Aschaffenburg
Phone: +49 (0) 6021 / 40 27-0
Fax: +49 (0) 6021 / 40 27-440
info@philipp-group.de

PHILIPP GmbH
Roßlauer Strasse 70
D-06869 Coswig/Anhalt
Phone: +49 (0) 34903 / 6 94-0
Fax: +49 (0) 34903 / 6 94-20
info@philipp-group.de

PHILIPP GmbH
Sperberweg 37
D-41468 Neuss
Phone: +49 (0) 2131 / 3 59 18-0
Fax: +49 (0) 2131 / 3 59 18-10
info@philipp-group.de

PHILIPP ACON Hydraulic GmbH
Hinter dem grünen Jäger 3
D-38836 Dardesheim
Phone: +49 (0) 39422 / 95 68-0
Fax: +49 (0) 39422 / 95 68-29
info@philipp-group.de

PHILIPP Vertriebs GmbH
Leogangerstraße 21
A-5760 Saalfelden / Salzburg
Phone +43 (0) 6582 / 7 04 01
Fax +43 (0) 6582 / 7 04 01 20
info@philipp-gruppe.at

10/19

For more information visit our website: www.philipp-gruppe.de