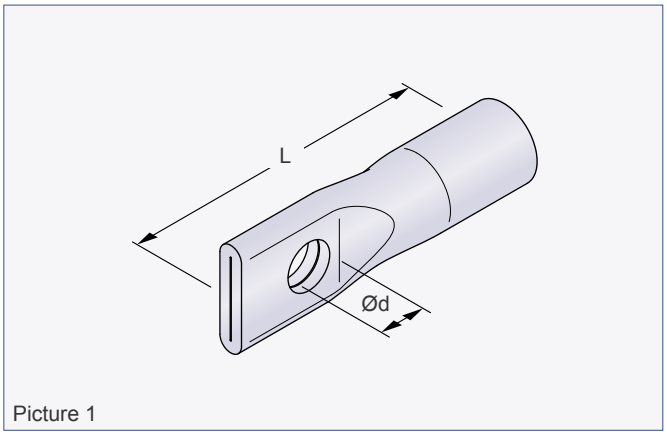
PHILIPPGROUP

PHILIPP Lifting insert with crimped end

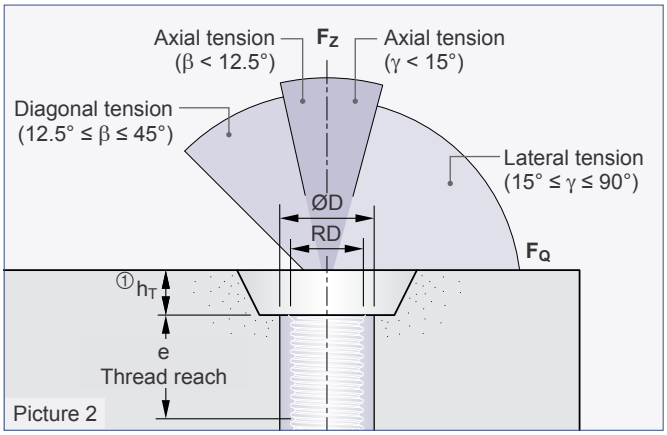
VB3-T-012-en - 01/18

Installation and Application Instruction

PHILIPP Lifting insert with crimped end



Picture 1



Picture 2

The Lifting insert with crimped end 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 Lifting inserts with crimped end 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 KH etc.) must be followed also. The anchor may only be used in combination with the mentioned PHILIPP lifting devices. Lifting inserts with crimped end 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. This Installation and Application Instruction does not specify a repeated usage (e.g. ballasts for cranes) or a permanent fixation.

Table 1: Dimensions

Ref.-No. **bright zinc plated**	Ref.-No. **stainless steel**	Type	Dimensions RD	ØD [mm]	L [mm]	e [mm]	Ød [mm]	Weight [kg/100 pcs.]
71Ö12	77Ö12VA	RD 12	12	15.0	60	22	10.0	3.0
71Ö14	77Ö14VA	**Type RD 14 of the threaded transport anchor system is no longer available**						6.0
71Ö16	77Ö16VA	RD 16	16	21.0	77	27	13.0	10.0
71Ö18	77Ö18VA	**Type RD 18 of the threaded transport anchor system is no longer available**						14.0
71Ö20	77Ö20VA	RD 20	20	27.0	92	35	15.0	20.0
71Ö24	77Ö24VA	RD 24	24	31.0	105	43	18.0	25.0
71Ö30	77Ö30VA	RD 30	30	39.5	145	56	22.5	63.0

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

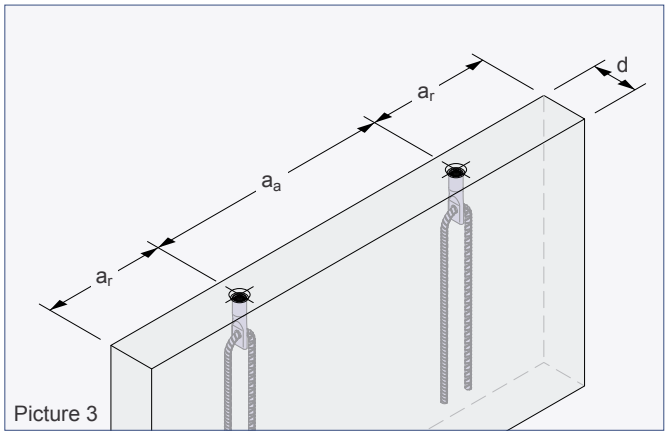
Material

Lifting inserts with crimped end are made of a special high precision steel. The end of the insert is crimped in order to avoid the penetration of concrete. A U-shaped stirrup acc. to Table 3 is led through the cross hole to transfer the loads into the element (s. Picture 6). The Lifting inserts with crimped end are galvanised acc. to common standards. This galvanisation protects the anchor temporarily from the storage at the producer site to the final installation in the concrete element.

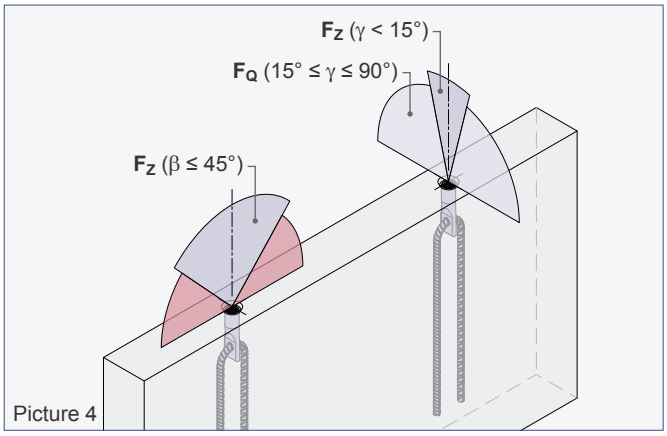
If the surface of a concrete element has to fulfil special conditions (e.g. no stream of rust) the Lifting insert with crimped end can be delivered in stainless steel SS 316 alternatively.

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

Bearing capacities



Picture 3



Picture 4

Element thicknesses, centre and edge distances

The installation and position of Lifting inserts with crimped end in precast concrete units require minimum element dimensions and 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 ②	300	150	5.0	2.5
14	70 ②	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

② With lateral tension a minimum unit thickness of 80 mm is required.
- 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.

With lateral tension the Lifting insert with crimped end has only half of the load bearing capacity compared to axial loading.

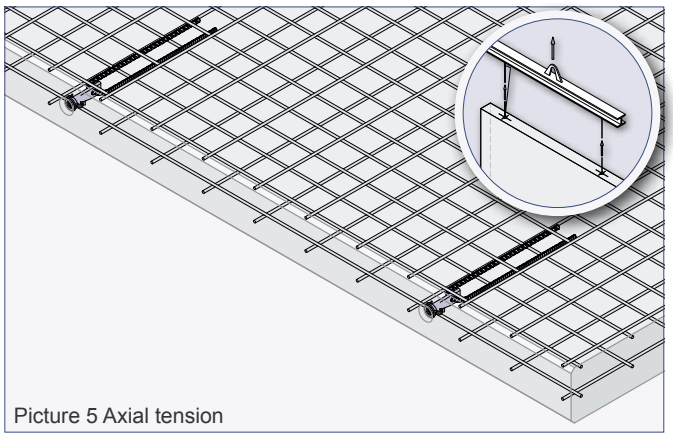
However, this is not a limitation because during tilt-up only half of the weight has to be lifted (please refer to the General Installation Instruction).

Reinforcement

Main reinforcement / Axial tension

When using Lifting inserts with crimped end precast units must be reinforced with a minimum reinforcement (Table 3). 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.

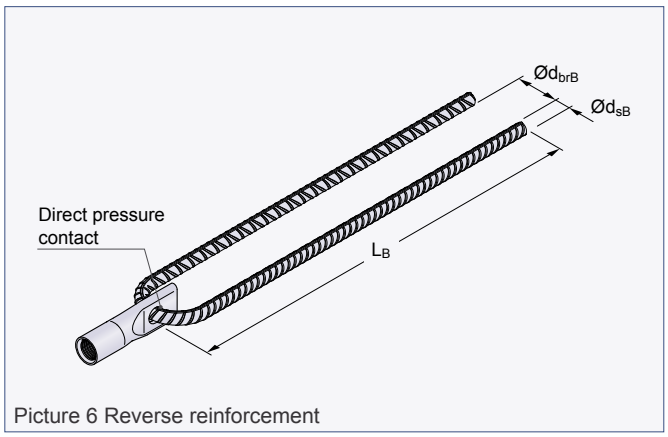
Existing static or constructive reinforcement can be taken into account for the minimum reinforcement according to Table 3.



Picture 5 Axial tension

Table 3: Minimum reinforcement

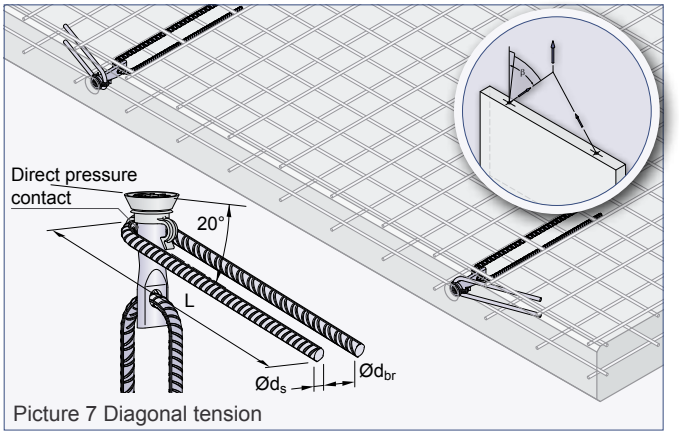
Load class	Mesh reinforcement (square) [mm²/m]	Reverse reinforcement (B500B)			
		$Ød_{sB}$ [mm]	$Ød_{brB}$ [mm]	L_B [mm]	Cut length [mm]
12	131	6	24	240	490
14	131	8	32	280	570
16	131	10	40	330	670
18	188	10	40	420	850
20	188	12	48	440	890
24	188	14	56	480	970
30	188	16	64	650	1320



Picture 6 Reverse reinforcement

Additional reinforcement for diagonal tension

If the Lifting insert with crimped end 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 7) and must have direct pressure contact to the anchor insert in the peak of its bending.



Picture 7 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.

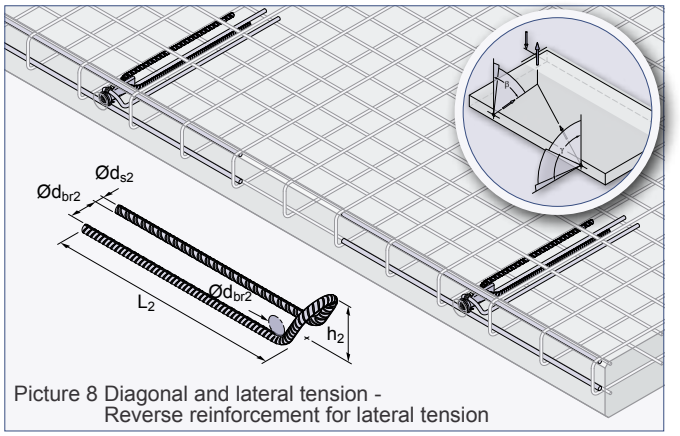
Table 4: Additional reinforcement for diagonal tension (material B500B) (required if $\beta > 12.5°$)

Load class	if $12.5° \le \beta \le 45°$			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

Reinforcement

Additional reinforcement for lateral tension

If an anchor is loaded by lateral tension where the inclination is $\gamma \geq 15°$ an additional reinforcement is required (Table 5). This reinforcement for lateral tension is installed in the front side of the element contrarily to the tensile direction (Picture 8) and must have direct pressure contact to the Lifting insert with crimped end in the peak of its bending. Lateral forces on Lifting insert with crimped end are only possible with wall thicknesses d acc. to Table 2. Tilting of walls can cause diagonal and lateral tension at the same time (Picture 8). The reinforcement for lateral tension covers this load direction as well as diagonal tension. During mounting the turn-over or tilt-up of the unit requires attention regarding the position of the reinforcement. With lateral tension the mesh reinforcement (Table 3) must be applied as a mesh cap. In addition to the mesh cap longitudinal reinforcement must be installed as shown in Table 5.



Picture 8 Diagonal and lateral tension - Reverse reinforcement for lateral tension

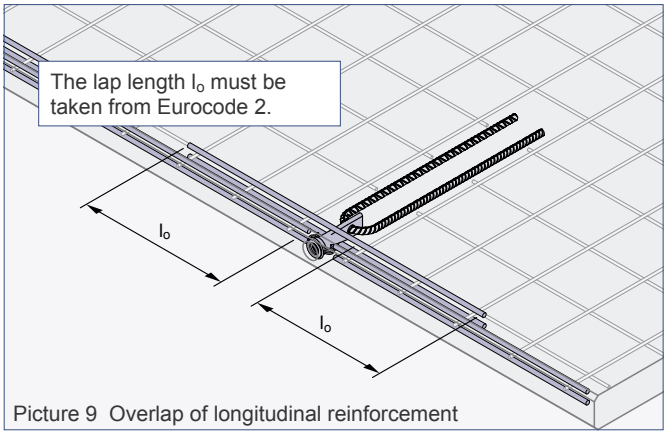
Table 5: Reverse reinforcement for lateral tension (material B500B) (required if $\gamma \geq 15°$)

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

① Minimum element thickness of 80 mm is required.

Note for reinforcement in thin elements

In thin elements (single mesh) it might be necessary to cut the longitudinal reinforcement close to the insert (counter brace) in order to have enough concrete cover in this area.



Picture 9 Overlap of longitudinal reinforcement

Notes