PHILIPPGROUP

Lifting insert with cross hole

VB3-T-011-en - 07/25 - 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

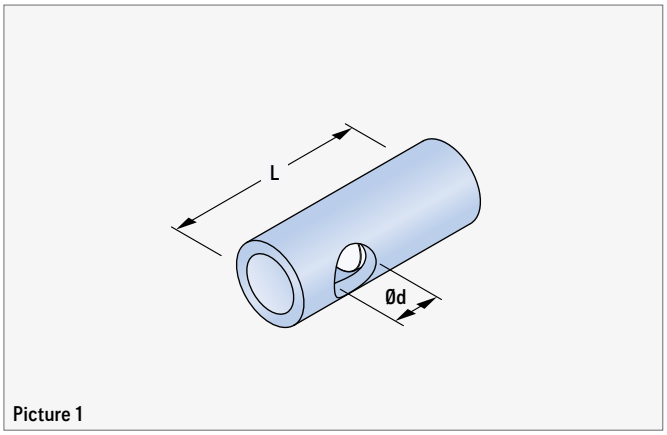
- Close cooperation with notified bodies and - if necessary - approval of our solutions.

TECHNICAL DEPARTMENT

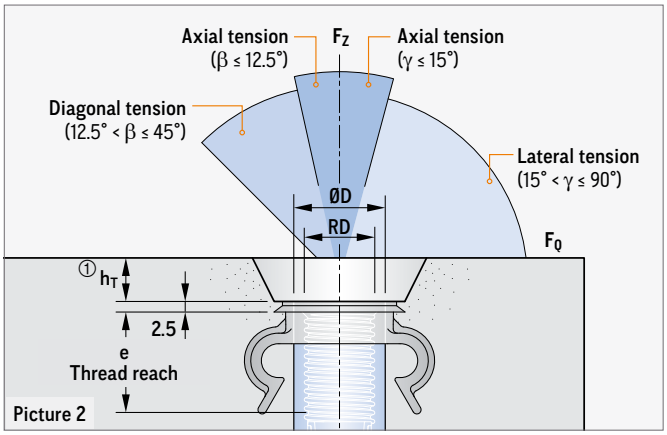
- Our expert-team will support you at any time during your planning phase with detailed advice.

CONTENT

GENERAL PRODUCT INFORMATION



Picture 1



Picture 2

The Lifting insert with cross hole 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 cross hole requires the compliance with this Installation and Application Instruction as well as the General Installation and Application Instruction. The Application Instructions for the belonging PHILIPP lifting devices PHILIPP accessories must be followed also. The anchor may only be used in combination with the mentioned PHILIPP lifting devices. Lifting inserts with cross hole 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.

EC-DECLARATION OF CONFORMITY

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

TABLE 1: DIMENSIONS

Ref. no. ② galvanised	Type	Dimensions RD	ØD (mm)	L (mm)	e (mm)	Ød (mm)
71HM12	RD 12	12	15.0	40	22	8
71HM16	RD 16	16	21.0	55	27	13
71HM20	RD 20	20	27.0	67	35	16
71HM24	RD 24	24	31.0	77	43	18
71HM30	RD 30	30	39.5	105	56	23
71HM36	RD 36	36	47.0	125	68	27
71HM42	RD 42	42	54.0	145	75	32
71HM52	RD 52	52	67.0	195	100	40

① Mind the embedding depth h_T of the corresponding recess former (picture 2).
② Also available in version stainless steel (ref. no. 77HM__VA).

GENERAL NOTES

MATERIALS

Lifting inserts with cross hole are made of a special high precision steel. An internal sealing cap closes the threaded part of the insert in order to avoid the infiltration of concrete. A U-shaped stirrup acc. to table 2 is led through the cross hole to transfer the loads into the element (s. picture 4). The Lifting inserts with cross hole 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.

CORROSION

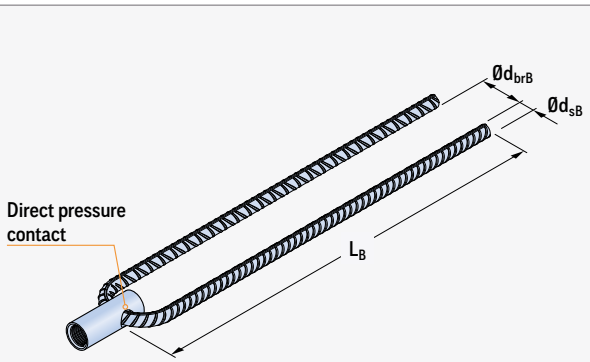
If the surface of a concrete element has to fulfil special conditions (e.g. no stream of rust) the Lifting insert with crosss hole can be delivered in stainless steel alternatively.

CONCRETE STRENGTH

With the time of the first lift of the unit the concrete strength must have a minimum f_{cc} according to the tables of the respective load case. Given concrete strengths f_{cc} are cube compressive strengths at the time of the first lifting.

ELEMENT THICKNESSES, CENTRE AND EDGE DISTANCES

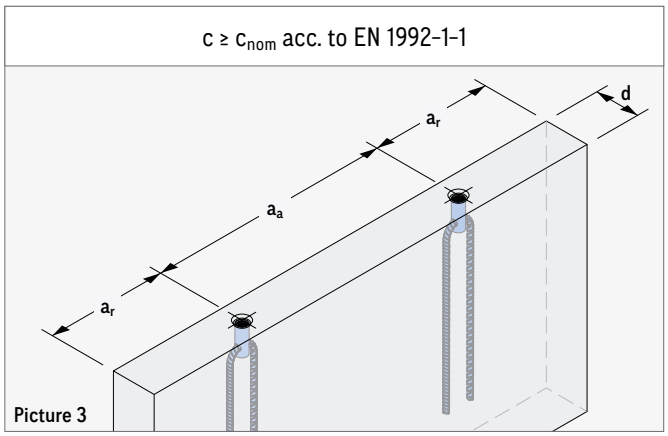
The installation and position of Lifting inserts with cross hole in precast concrete units require minimum thickness d, minimum centre distance a_a and minimum edge distance a_r (s. picture 3). The values can be found in the corresponding load case tables.



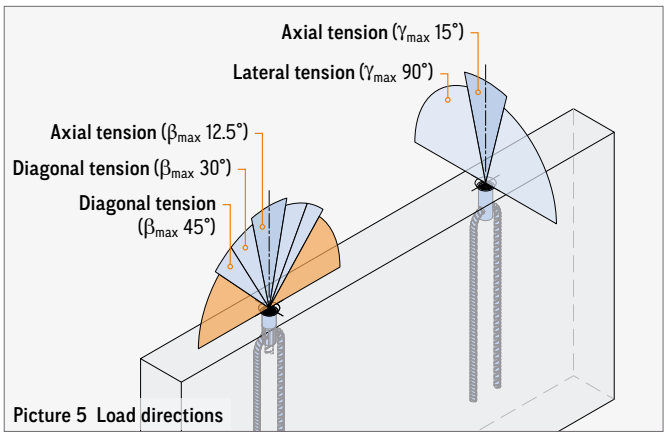
Picture 4 Reverse reinforcement

TABLE 2: REVERSE REINFORCEMENT

Load class	Reverse reinforcement (B500B)			
	Ød$_{sB}$ (mm)	Ød$_{brB}$ (mm)	L_B (mm)	Cut length (mm)
12	6	24	240	490
16	10	40	330	670
20	12	48	440	890
24	14	56	480	970
30	16	64	650	1320
36	20	140	820	1670
42	25	175	900	1830
52	28	196	1300	2640



Picture 3



Picture 5 Load directions

REINFORCEMENT

MINIMUM REINFORCEMENT

In use of Lifting inserts with cross hole precast units must be reinforced with a minimum reinforcement. Depending on the load case this can differ and is specified in the tables of the respective load case. 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.

REINFORCEMENT INSTRUCTIONS FOR THIN ELEMENTS

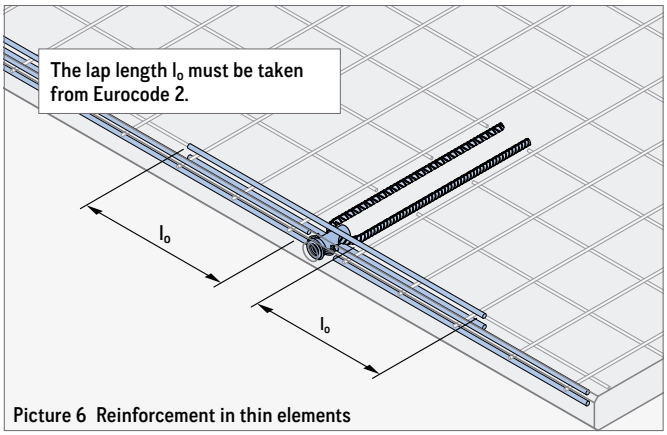
In thin elements (single mesh) it might be necessary to cut the longitudinal reinforcement close to the insert (counter brace) in order to have enough concrete cover in this area.

ADD. REINFORCEMENT FOR DIAGONAL AND LATERAL TENSION

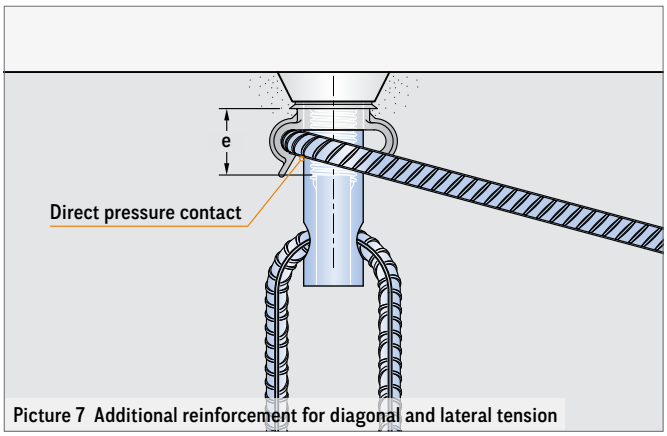
Additional reinforcement for diagonal and lateral tension has to be installed with pressure contact to the anchor insert. The position of the direct pressure contact must be within the thread reach e of the insert (see picture 7). By using the Marking ring with clip (ref. no. 74KR_CLIP) this position is guaranteed.

EXISTING REINFORCEMENT

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

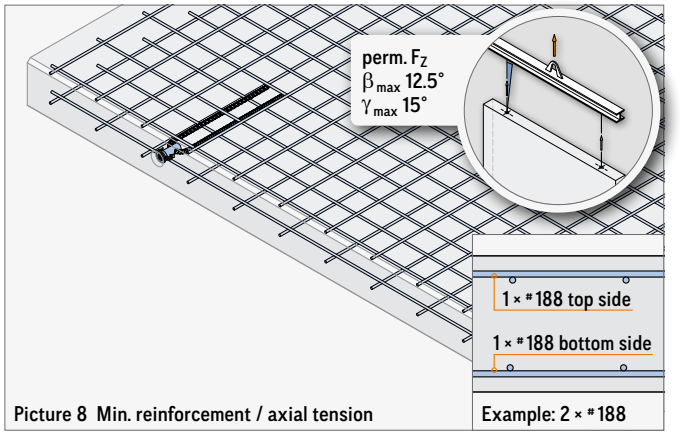


Picture 6 Reinforcement in thin elements



Picture 7 Additional reinforcement for diagonal and lateral tension

PERMISSIBLE LOAD BEARING CAPACITIES AND BOUNDARY CONDITIONS: AXIAL TENSION



Picture 8 Min. reinforcement / axial tension

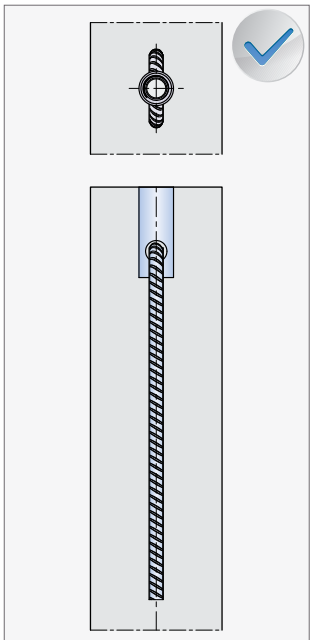
Example: 2 × #188

TABLE 3: AXIAL TENSION AT $f_{cc} \geq 15$ N/mm²

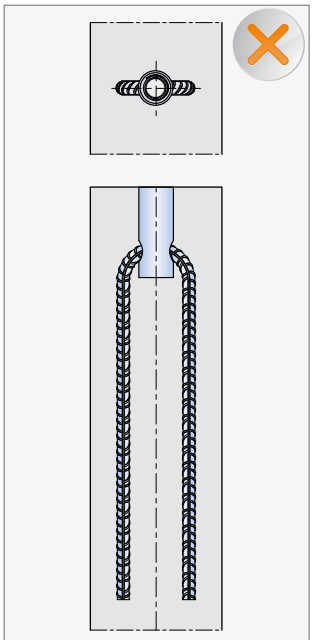
Load class	Minimum element thicknesses, centre distances and edge distances			β_{max} 12.5° / γ_{max} 15° perm. F_Z	Mesh reinforcement (square)
	d (mm)	a_a (mm)	a_r (mm)	(kN)	(mm²/m)
12	60	300	150	5.0	1 × #188
16	80	400	200	12.0	1 × #188
20	100	550	275	20.0	2 × #188
24	120	600	300	25.0	2 × #188
30	140	650	350	40.0	2 × #188
36	200	800	400	63.0	2 × #188
42	240	1000	500	80.0	2 × #188
52	275	1200	600	125.0	2 × #188

POSITION OF REVERSE REINFORCEMENT

When installing the lifting insert with cross hole, the position of the reverse reinforcement shall be observed. Make sure that this is positioned parallel to the concrete element surface (picture 9a).



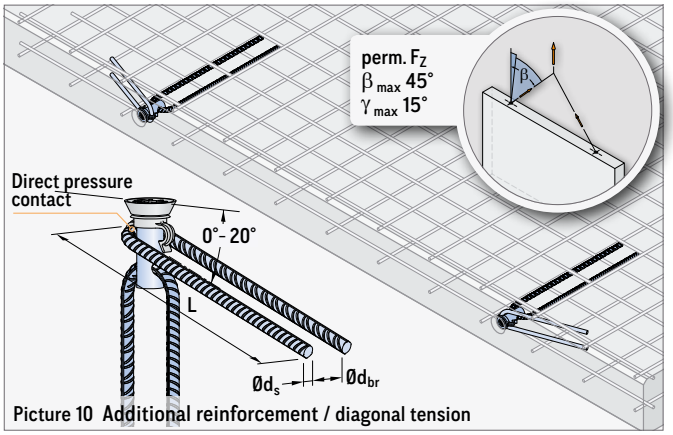
Picture 9a Correct position



Picture 9b Wrong position

PERMISSIBLE LOAD BEARING CAPACITIES AND BOUNDARY CONDITIONS: DIAGONAL TENSION

If the Lifting insert with cross hole is used under diagonal tension $\beta > 12.5°$ an additional reinforcement according to table 2 is required. Here the reinforcement for diagonal tension is placed contrarily to the tensile direction (picture 10) and must have direct pressure contact to the anchor insert in the peak of its bending. The installation of the reinforcement for diagonal tension can be done in an angle of 0° up to 20° to the concrete surface. With an installation angle of 0°, the transport anchor must be installed in a recessed position (e. g. by using a recess former), as this is the only way to ensure the required concrete cover for the bond.



Picture 10 Additional reinforcement / diagonal tension

TABLE 4: DIAGONAL TENSION IF $f_{CC} \geq 15$ N/mm²

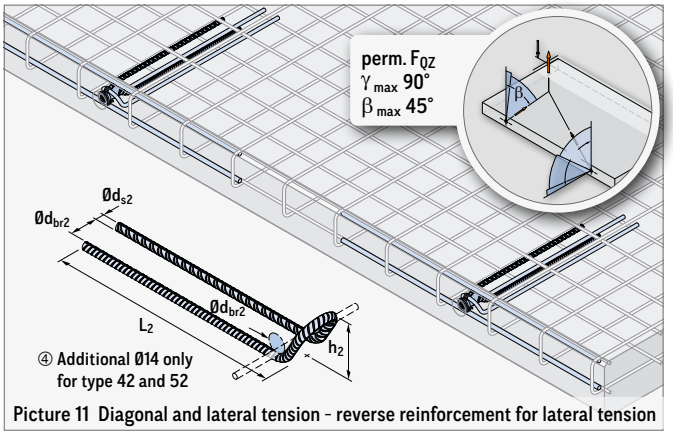
Load class	Minimum element thicknesses, centre distances and edge distances			β_{max} 30° / γ_{max} 15°					β_{max} 45° / γ_{max} 15°				
				perm. F_Z	Additional reinforcement				perm. F_Z	Additional reinforcement			
					Mesh reinforcement (square)	Add. reinforcement for diagonal tension				Mesh reinforcement (square)	Add. reinforcement for diagonal tension		
	d (mm)	a_a (mm)	a_r (mm)	(kN)	(mm²/m)	$Ød_s$ (mm)	L (mm)	$Ød_{br}$ (mm)	(kN)	(mm²/m)	$Ød_s$ (mm)	L (mm)	$Ød_{br}$ (mm)
12	60	300	150	5.0	1 × #188	6	150	24	5.0	1 × #188	6	150	24
16	80	400	200	12.0	1 × #188	6	250	24	12.0	1 × #188	8	200	32
20	100	550	275	20.0	2 × #188	8	250	32	20.0	2 × #188	8	300	32
24	120	600	300	25.0	2 × #188	8	300	32	25.0	2 × #188	10	300	40
30	140	650	350	40.0	2 × #188	10	350	40	40.0	2 × #188	12	400	48
36	200	800	400	63.0	2 × #188	12	450	48	63.0	2 × #188	14	550	56
42	240	1000	500	80.0	2 × #188	14	600	56	80.0	2 × #188	16	600	64
52	275	1200	600	125.0	2 × #188	16	700	67	125.0	2 × #188	20	750	140

PERMISSIBLE LOAD BEARING CAPACITIES AND BOUNDARY CONDITIONS: LATERAL TENSION

If the Lifting insert with cross hole is used under lateral tension $\gamma > 15°$ an additional reinforcement according to table 5 is required. This reinforcement for lateral tension is positioned at the front of the component in the opposite direction to the tensile force (picture 11) and has pressure contact with the Lifting insert with cross hole in the peak of its bending.

Lateral forces on Lifting inserts with cross hole 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 11). 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 5) must be applied as a double-bended mesh. In addition to the double-bended mesh a longitudinal reinforcement must be installed as shown in table 5.

On lateral tension the Lifting insert with cross hole has 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 and Application Instruction).



Picture 11 Diagonal and lateral tension - reverse reinforcement for lateral tension

TABLE 5: LATERAL TENSION IF $f_{cc} \geq 15$ N/mm²

Load class	Minimum element thicknesses, centre distances and edge distances			perm. F_Z	γ_{max} 90° / β_{max} 45° Lateral tension reinforcement						
					Mesh reinforcement (square)	Reverse reinforcement for lateral tension (B500B)				Longitudinal reinforcement (B500B)	
	d (mm)	a_a (mm)	a_r (mm)	(kN)	③ (mm²/m)	$Ød_{S2}$ (mm)	L_2 (mm)	h_2 (mm)	$Ød_{br2}$ (mm)	Ø (mm)	length (mm)
12	80	300	150	2.5	1 × #188	6	270	35	24	Ø10	850
16	80	400	200	6.0	1 × #188	8	420	49	32	Ø10	850
20	100	550	275	10.0	2 × #188	10	490	64	40	Ø12	850
24	120	600	300	12.5	2 × #188	12	520	75	48	Ø12	850
30	140	650	350	20.0	2 × #188	12	570	92	48	Ø16	1000
36	200	800	400	31.5	2 × #188	14	690	118	56	Ø16	1000
42 ④	240	1000	500	40.0	2 × #188	16	830	143	64	Ø16	1000
52 ④	275	1200	600	62.5	2 × #188	20	930	174	140	Ø20	1200

③ The mesh reinforcement shall be done as a double-bended mesh or by using similar rebars.
④ Additional Ø14, length = 600 mm required (see picture 11).

PHILIPPGROUP

HEADQUARTERS
Lilienthalstraße 7-9
63741 Aschaffenburg
+49 6021 40 27-0
info@philipp-gruppe.de

PRODUCTION AND LOGISTICS
Hauptstraße 204
63814 Mainaschaff
+49 6021 40 27-0
info@philipp-gruppe.de

OFFICE COSWIG
Roßlauer Straße 70
06869 Coswig / Anhalt
+49 34903 6 94-0
info@philipp-gruppe.de

OFFICE NEUSS
Sperberweg 37
41468 Neuss
+49 2131 3 59 18-0
info@philipp-gruppe.de

OFFICE TANNHEIM
Robert-Bosch-Weg 12
88459 Tannheim / Allgäu
+49 8395 8 13 35-0
info@philipp-gruppe.de

PHILIPP VERTRIEBS GMBH
Pfaffing 36
5760 Saalfelden / Salzburg
+43 6582 7 04 01
info@philipp-gruppe.at

PHILIPP POLSKA SPÓŁKA Z O.O.
ul. Wojska Polskiego 1
47-220 Kędzierzyn-Koźle / Opole
+48 503 353 816
polska@philipp-gruppe.de

HEADQUARTERS Aschaffenburg

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