

PHILIPP GROUP

PHILIPP Cast-in lifting hoop



VB3-T-040-en - 11/16

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.

■ On-site service

Our engineers will be pleased to instruct your technicians and production personnel at your plant, to advise on the installation of precast concrete parts and to assist you in the optimisation of your production processes.

■ High safety level when using our products

Close cooperation with federal materials testing institutes (MTIs), and official approvals for the use of our products and solutions whenever necessary.

■ Software solutions

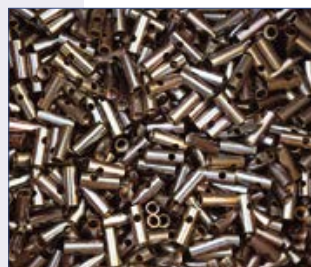
The latest design software, animated videos and CAD libraries can always be found under www.philipp-gruppe.de.

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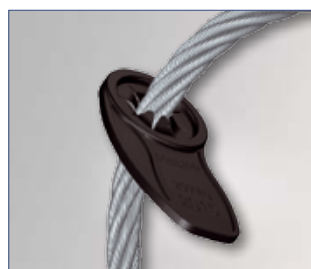
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Content

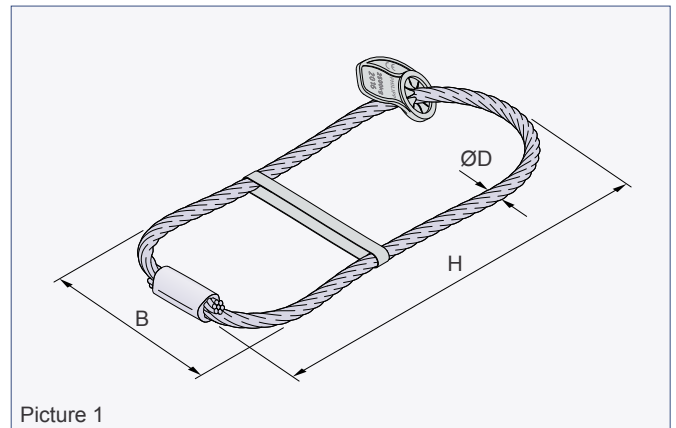
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PHILIPP Cast-in lifting hoop

The Cast-in lifting hoop is part of the PHILIPP Transport anchor system and complies with the VDI/BV-BS Guideline "Lifting anchors and lifting insert systems for precast concrete elements" (VDI/BV-BS 6205). The use of Cast-in lifting hoops require the compliance with this Installation and Application Instruction as well as the General Installation Instruction.

Cast-in lifting hoops are designed for the transport of pre-cast concrete units only. Multiple use within the transport chain (from production to installation of the unit) means no repeated usage. A repeated use (e.g. ballasts for cranes) is not allowed.



Picture 1

Table 1: Dimensions

| Ref.-No. bright | Ref.-No.: galvanised | Load class | Colour code | H ① [mm] | B ① [mm] | ØD ② [mm] | Weight [kg/100 pcs.] |
|--------------------|-------------------------|------------|---------------|-------------|-------------|--------------|-------------------------|
| - | 442008 | 0.8 | Pure white | 235 | 95 | 6.0 | 8.5 |
| - | 442012 | 1.2 | Flame red | 235 | 95 | 7.0 | 11.0 |
| - | 442016 | 1.6 | Light pink | 235 | 100 | 8.0 | 14.5 |
| - | 442020 | 2.0 | Pastel green | 270 | 115 | 9.0 | 21.5 |
| - | 442025 | 2.5 | Jet black | 310 | 135 | 10.0 | 30.5 |
| 441040 | 442040 | 4.0 | Emerald green | 340 | 150 | 12.0 | 49.5 |
| 441052 | 442052 | 5.2 | Curry | 365 | 165 | 14.0 | 72.5 |
| 441063 | 442063 | 6.3 | Light blue | 380 | 180 | 16.0 | 99.5 |
| 441080 | 442080 | 8.0 | Silver grey | 440 | 205 | 18.0 | 144.5 |
| 441100 | 442100 | 10.0 | Claret violet | 515 | 245 | 20.0 | 208.0 |
| 441125 | 442125 | 12.5 | Sulfur yellow | 570 | 270 | 22.0 | 279.5 |
| 441160 | 442160 | 16.0 | Blue lilac | 605 | 286 | 24.0 | 394.5 |
| 441200 | 442200 | 20.0 | Beige | 730 | 345 | 28.0 | 589.0 |
| 441250 | 442250 | 25.0 | Clay brown | 780 | 375 | 32.0 | 826.0 |

① Dimensions H and B are standard values and can vary depending on the position of the fixation strap.

② Rope diameter ØD is a standard value and can vary depending on the wire rope construction.

Cast-in lifting hoops with higher safe working loads (from 280 kN up to 990 kN) are described in a separate data sheet. Depending on the individual application it might be necessary to contact our technical department before use.



For special solutions please contact our technical department under +49 (0) 60 21 / 40 27-318 or by e-mail to technik@philipp-group.de.

General information

Materials

The Cast-in lifting hoop consists of a steel wire rope both ends are bounded together by a ferrule and forms a hoop. They are available in bright (type 4.0 up to 25.0) and galvanised quality.

Marking

In order to identify the types of the Cast-in lifting hoop visually they are marked with a coloured tag. This tag must also be visible at the segment sticking out after concreting. With its fins the tag guarantees an easy fixing to this part of the Cast-in lifting hoop sticking out of the element.

Following data are given on the tag:

- Manufacturer (PHILIPP)
- CE mark ①
- Bearing capacity (e.g. 2500 kg)
- Year of manufacturing (e.g. 2016)
- Illustration of the installation dimensions



① The EC Declaration of Conformity (DoC) of the Cast-in lifting hoop is available on request or can be downloaded from our website www.philipp-group.de.



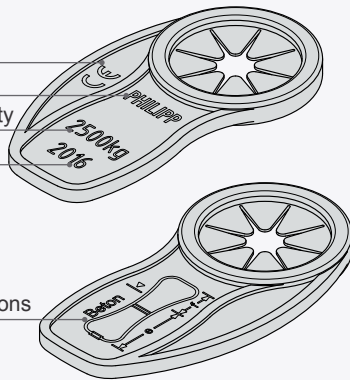
CE mark

Manufacturer

Max. load bearing capacity

Year of manufacturing

Installation dimensions



Picture 2

Corrosion

For concrete with an increased chlorine equivalent the use of a Cast-in lifting hoop with aluminium ferrule is not recommended. For this application a Cast-in lifting hoop with a steel ferrule is more suitable and can be delivered by PHILIPP on request.

An increased chlorine equivalent exists if the values given in the German standards DIN EN 206-1 and DIN 1045-2 are exceeded.



The aluminium ferrule used with Cast-in lifting hoops must not be placed near-surface of the concrete element. The concrete cover for the ferrule has to be determined using following equation.

$$C_{\text{Ferrule}} \geq 1.2 \cdot C_{\text{min}}$$

(DIN EN 1992-1-1 part 4 a. Tab. 4.4N)
(DIN EN 1992-1-1/NA Tab. NA.4.4)

Storage of Cast-in lifting hoops

Cast-in lifting hoops shall be stored in a clean, dry and aerated area, without contact to acids, bases or corrosive elements.

Concrete

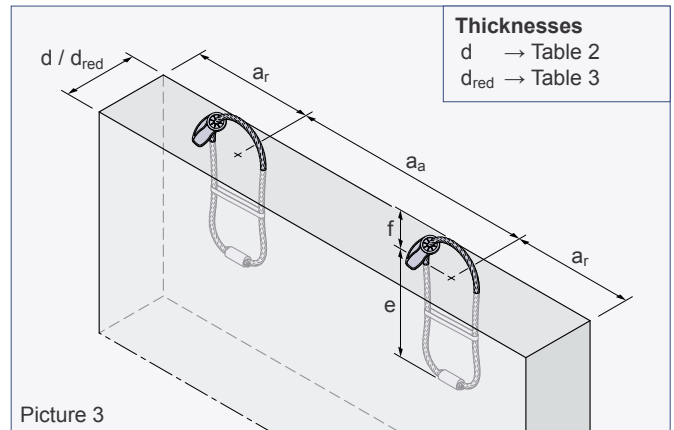
All concrete strengths given in tables 2, 3 and 5 are cube strengths at the time of the first lifting.

Cast-in lifting hoops in beams and concrete elements similar to walls

Element thicknesses, centre and edge distances

The installation and position of Cast-in lifting hoops in pre-cast concrete elements require minimum dimensions and centre/edge distances for a safe load transfer. Given unit thickness d in table 2 covers axial and diagonal loading. Reduced unit thicknesses d_{red} are valid for a concrete strength f_{cc} of **30 N/mm²** and higher.

When the Cast-in lifting hoop is installed it must be considered that the values e and f comply with table 2.



Permissible load directions

Cast-in lifting hoops can be used only for axial and diagonal tension $\beta \leq 30^\circ$.



Lateral tension is not allowed within the whole transport chain! This also applies to a diagonal tension with angle β more than 30° !

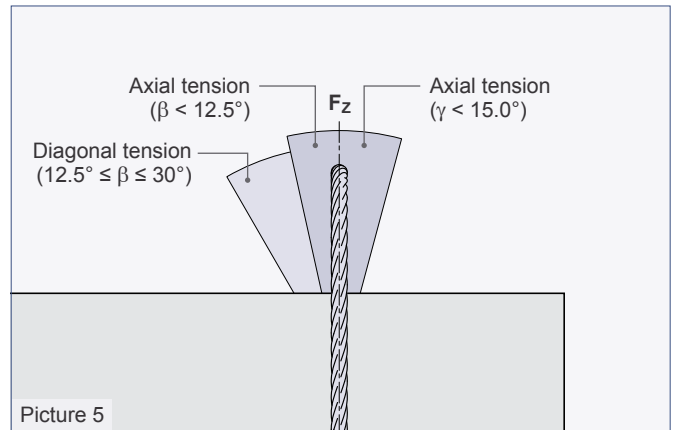
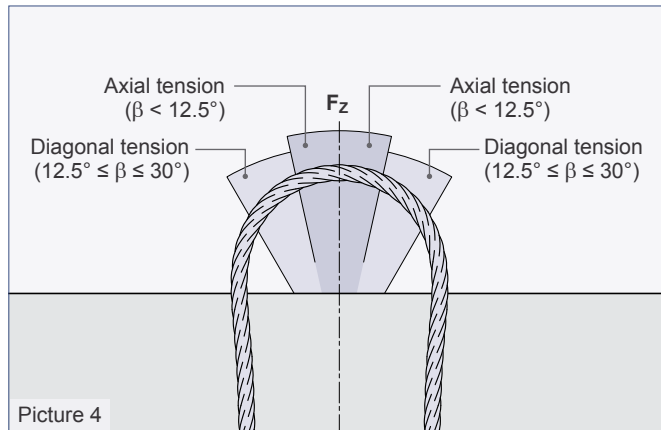


Table 2: Permissible load bearing capacities for thickness d for concrete strengths f_{cc} 15 / 20 / 25 N/mm²

| Load class | Element thicknesses, centre and edge distances | | | Embedded depth | | Perm. F | | | | | |
|------------|--|---------------|---------------|----------------|-------------|---|--|---|--|---|--|
| | | | | | | if f_{cc} 15 N/mm ² | | if f_{cc} 20 N/mm ² | | if f_{cc} 25 N/mm ² | |
| | d [mm] | a_a [mm] | a_r [mm] | e [mm] | f [mm] | Axial tension perm. F_z 0°- 12.5° [kN] | Diagonal tension perm. F_z 12.5°-30° [kN] | Axial tension perm. F_z 0°- 12.5° [kN] | Diagonal tension perm. F_z 12.5°-30° [kN] | Axial tension perm. F_z 0°- 12.5° [kN] | Diagonal tension perm. F_z 12.5°-30° [kN] |
| 0.8 | 80 | 600 | 300 | 150 | 85 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 1.2 | 90 | 640 | 320 | 160 | 75 | 12.0 | 11.8 | 12.0 | 12.0 | 12.0 | 12.0 |
| 1.6 | 100 | 660 | 330 | 165 | 70 | 13.2 | 11.8 | 15.3 | 12.4 | 16.0 | 13.8 |
| 2.0 | 110 | 800 | 400 | 200 | 70 | 15.9 | 12.9 | 18.4 | 14.9 | 20.0 | 16.6 |
| 2.5 | 120 | 920 | 460 | 230 | 80 | 21.2 | 18.6 | 24.4 | 21.5 | 25.0 | 24.1 |
| 4.0 | 200 | 960 | 480 | 240 | 100 | 32.9 | 26.6 | 38.0 | 30.8 | 40.0 | 34.4 |
| 5.2 | 250 | 1040 | 520 | 260 | 105 | 43.5 | 35.2 | 50.2 | 40.7 | 52.0 | 45.5 |
| 6.3 | 300 | 1120 | 560 | 280 | 100 | 62.0 | 51.0 | 63.0 | 58.9 | 63.0 | 63.0 |
| 8.0 | 380 | 1280 | 640 | 320 | 120 | 75.4 | 61.1 | 80.0 | 70.6 | 80.0 | 78.9 |
| 10.0 | 460 | 1560 | 780 | 390 | 125 | 100.0 | 81.6 | 100.0 | 94.2 | 100.0 | 100.0 |
| 12.5 | 560 | 1680 | 840 | 420 | 150 | 125.0 | 125.0 | 125.0 | 125.0 | 125.0 | 125.0 |
| 16.0 | 620 | 1800 | 900 | 450 | 155 | 149.4 | 125.0 | 160.0 | 139.7 | 160.0 | 156.2 |
| 20.0 | 680 | 2200 | 1100 | 550 | 180 | 178.0 | 144.2 | 200.0 | 166.5 | 200.0 | 186.2 |
| 25.0 | 750 | 2320 | 1160 | 580 | 200 | 223.8 | 228.1 | 250.0 | 250.0 | 250.0 | 250.0 |

- To determine the correct type please refer also to our General Installation Instruction.

- The weight of 1.0 t corresponds to 10.0 kN.

Cast-in lifting hoops in beams and concrete elements similar to walls

Table 3: Permissible bearings for thicknesses d_{red} for concrete strengths f_{cc} 30 / 35 / 45 N/mm²

| Load class | Element thicknesses, centre and edge distances | | | Embedded depth | | Perm. F | | | | | |
|------------|--|------------|------------|----------------|----------|--|---|--|---|--|---|
| | | | | | | if f_{cc} 30 N/mm ² | | if f_{cc} 35 N/mm ² | | if f_{cc} 45 N/mm ² | |
| | d_{red} [mm] | a_a [mm] | a_r [mm] | e [mm] | f [mm] | Axial tension perm. F_z 0°- 12.5° [kN] | Diagonal tension perm. F_z 12.5°-30° [kN] | Axial tension perm. F_z 0°- 12.5° [kN] | Diagonal tension perm. F_z 12.5°-30° [kN] | Axial tension perm. F_z 0°- 12.5° [kN] | Diagonal tension perm. F_z 12.5°-30° [kN] |
| 0.8 | 60 | 600 | 300 | 150 | 85 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| 1.2 | 60 | 640 | 320 | 160 | 75 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| 1.6 | 80 | 660 | 330 | 165 | 70 | 14.7 | 12.0 | 15.9 | 12.9 | 16.0 | 14.6 |
| 2.0 | 90 | 800 | 400 | 200 | 70 | 18.2 | 14.7 | 19.6 | 15.9 | 20.0 | 18.0 |
| 2.5 | 100 | 920 | 460 | 230 | 80 | 21.8 | 21.3 | 23.6 | 23.0 | 25.0 | 25.0 |
| 4.0 | 150 | 960 | 480 | 240 | 100 | 34.0 | 27.5 | 36.7 | 29.7 | 40.0 | 33.7 |
| 5.2 | 190 | 1040 | 520 | 260 | 105 | 45.4 | 36.8 | 49.0 | 39.7 | 52.0 | 45.0 |
| 6.3 | 220 | 1120 | 560 | 280 | 100 | 63.0 | 61.6 | 63.0 | 63.0 | 63.0 | 63.0 |
| 8.0 | 270 | 1280 | 640 | 320 | 120 | 72.6 | 61.6 | 78.4 | 63.5 | 80.0 | 72.0 |
| 10.0 | 330 | 1560 | 780 | 390 | 125 | 98.0 | 79.4 | 100.0 | 85.8 | 100.0 | 97.2 |
| 12.5 | 390 | 1680 | 840 | 420 | 150 | 125.0 | 125.0 | 125.0 | 125.0 | 125.0 | 125.0 |
| 16.0 | 430 | 1800 | 900 | 450 | 155 | 139.1 | 125.0 | 150.3 | 125.0 | 160.0 | 138.0 |
| 20.0 | 480 | 2200 | 1100 | 550 | 180 | 169.9 | 137.6 | 183.5 | 148.6 | 200.0 | 168.5 |
| 25.0 | 530 | 2320 | 1160 | 580 | 200 | 250.0 | 250.0 | 250.0 | 250.0 | 250.0 | 250.0 |

- To determine the correct type please refer also to our General Installation Instruction.
- The weight of 1.0 t corresponds to 10.0 kN.
- Permissible load bearing capacities for a concrete strength of f_{cc} 40 N/mm² can be interpolated.

Reinforcement

For the installation of Cast-in lifting hoops in elements similar to panels and beams a minimum reinforcement near surface acc. to table 4 is needed.

This minimum reinforcement can be replaced by comparable reinforcement bars. Should it be necessary to cut single bars for the installation of Cast-in lifting hoops these have to be replaced by bars of the same diameter, strength and enough lap length according to EC 2.

At the first time of lifting the concrete must have a minimum strength f_{cc} acc. to table 2 and table 3. The user is personally responsible for further transmission of load into the concrete unit.



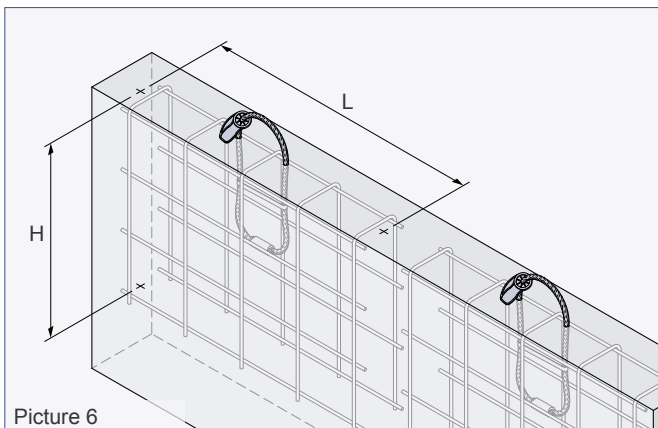
Existing static or constructive reinforcement can be taken into account for the minimum reinforcement according to table 4.

Table 4: Minimum reinforcement near surface

| Load class | Mesh reinforcement (square) [mm ² /m] | L [mm] | H ② [mm] |
|------------|--|--------|----------|
| 0.8 | 1 × 188 (in centre) | 600 | 710 |
| 1.2 | 1 × 188 (in centre) | 640 | 720 |
| 1.6 | 2 × 188 | 660 | 725 |
| 2.0 | 2 × 188 | 800 | 760 |
| 2.5 | 2 × 188 | 920 | 790 |
| 4.0 | 2 × 188 ① | 960 | 800 |
| 5.2 | 2 × 188 ① | 1040 | 820 |
| 6.3 | 2 × 188 ① | 1120 | 840 |
| 8.0 | 2 × 188 ① | 1280 | 880 |
| 10.0 | 2 × 188 ① | 1560 | 950 |
| 12.5 | 2 × 257 ① | 1680 | 1080 |
| 16.0 | 2 × 524 ① | 1800 | 1390 |
| 20.0 | 2 × 524 ① | 2200 | 1490 |
| 25.0 | 2 × 524 ① | 2320 | 1520 |

① Mesh reinforcement must be done as a mesh cap.

② Required H at f_{cc} 15 N/mm². H can be reduced, if the required anchorage length of the reinforcement acc. to EC 2 will be chosen longer than the embedded depth e.



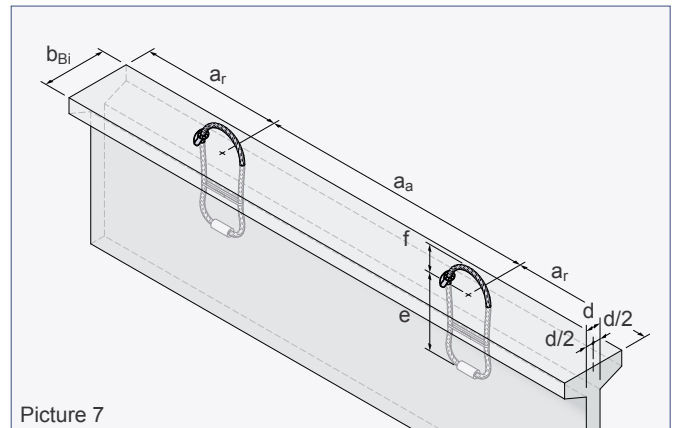
Picture 6

Cast-in lifting hoops for narrow beams

Element thicknesses, centre and edge distances

The installation and position of Cast-in lifting hoops in narrow beams require minimum dimensions and centre/edge distances for a safe load transfer. Thicknesses given in table 5 cover the axial and diagonal tension and can be used only for the parallel installation of Cast-in lifting hoops (Picture 7).

When installing the Cast-in lifting hoop it must be considered that the values e and f comply with table 5.



Picture 7

Table 5: Permissible load bearing capacities

| Load class | Element thicknesses, centre and edge distances | | | | Embedded depth | | Perm. F | |
|------------|--|------------------|---------------|---------------|----------------|-------------|--|--|
| | | | | | | | if f_{cc} 25 N/mm ² Axial tension / diagonal tension perm. F_z 0°-30° [kN] | if f_{cc} 30 N/mm ² Axial tension / diagonal tension perm. F_z 0°-30° [kN] |
| | d [mm] | b_{Bi} [mm] | a_a [mm] | a_r [mm] | e [mm] | f [mm] | | |
| 16.0 | 120 | ≥ 400 | 2000 | 1400 | 450 | 165 | 160.0 | 160.0 |
| 20.0 | 120 | ≥ 400 | 2000 | 1400 | 550 | 180 | 200.0 | 200.0 |
| 25.0 | 120 | ≥ 400 | 2000 | 1400 | 600 | 200 | 246.5 | 250.0 |

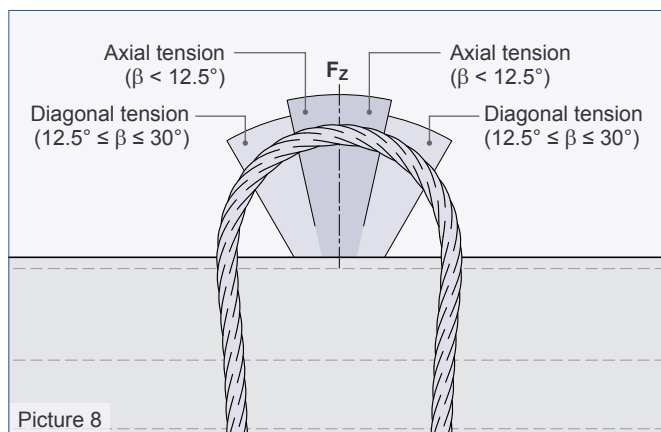
- To determine the correct type please refer also to our General Installation Instruction.
- The weight of 1.0 t corresponds to 10.0 kN.

Permissible load directions

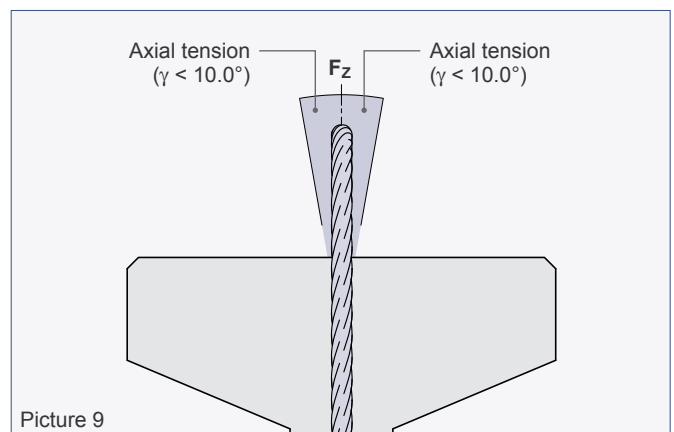
Cast-in lifting hoops can only be used for axial and diagonal tension up to 30°.



Lateral tension is not allowed within the whole transport chain! This also applies to a diagonal tension with angle β more than 30°!



Picture 8



Picture 9

Cast-in lifting hoops for narrow beams

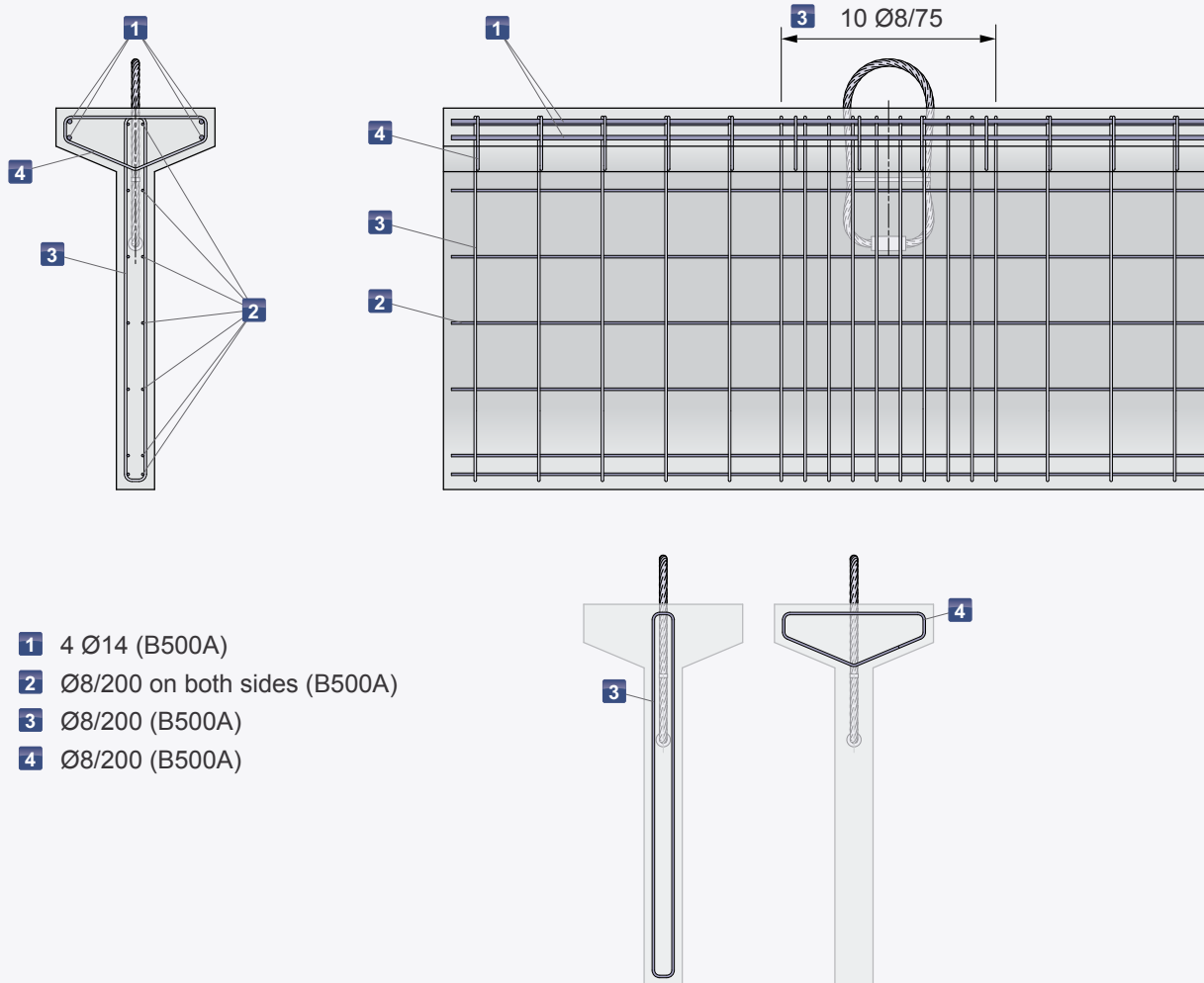
Reinforcement

For the installation of Cast-in lifting hoops in beams the pre-cast elements must be reinforced with a minimum reinforcement (Picture 10). Should it be necessary to cut single bars for the installation of Cast-in lifting hoops these have to be replaced by bars of the same diameter, strength and enough lap length according to EC 2. At the first time of lifting the concrete must have a minimum strength f_{cc} of **25 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 10.



Picture 10 Reinforcement

Installation / Safety

Installation

If Cast-in lifting hoops are installed in an open side of a mould (Picture 11) it must be fixed carefully to the reinforcement so that the embedded depth is guaranteed.

For the installation on a side of the mould a slot hole is needed (Picture 12). After installation of the Cast-in lifting hoop the slot hole must be closed accurately in order to avoid the Cast-in lifting hoop to be moved in a false position. In order to guarantee the position of the Cast-in lifting hoop during concreting and compacting it must be fixed to the reinforcement. It might be necessary to add some more steel bars to ensure the right position. Here attention has to be paid not to place those steel bars directly on the ferrule of the hoop.



Welding or other strong heat influences on the lifting hoops are not allowed.

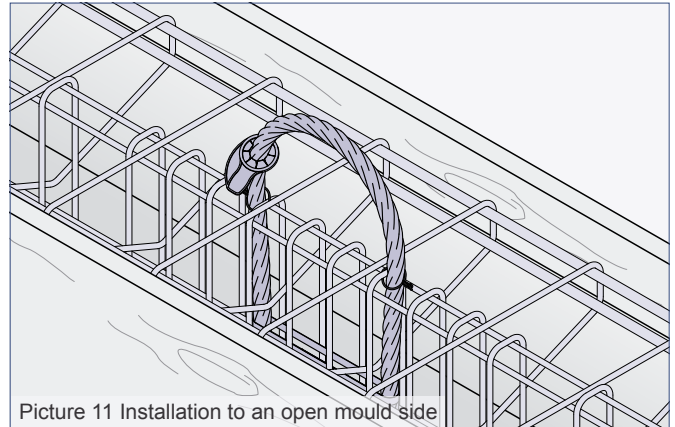
Safety notices

By using too small, too large or sharp-edged hooks the life-time of the lifting device will be reduced. The transition radii of used hooks must be at least 1.75 times of the wire rope diameter of the Cast-in lifting hoop (Picture 13).

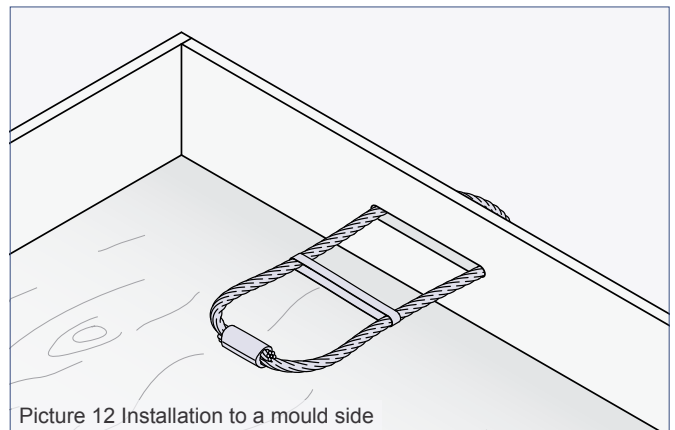
Using a shackle the pin must be at least 3.5 times of the wire rope diameter of the Cast-in lifting hoop (Picture 14).

During use of Cast-in lifting hoops the following must be considered:

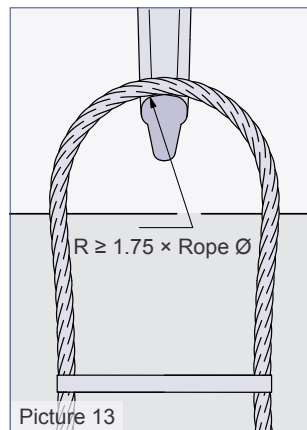
- The use of damaged Cast-in lifting hoops with broken strands, contusions, kinks and corrosion pits is not allowed.
- Contact of Cast-in lifting hoops with acids and alkalis must be avoided.
- Misuse of Cast-in lifting hoops because of wrong load directions must be also avoided.
- Lever arms caused by rotating, tilting and swinging which result in local blow-out failures in the concrete or broken wire ropes are inadmissible!



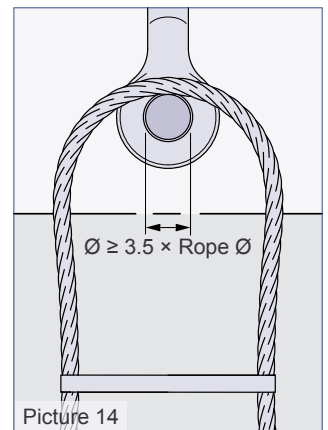
Picture 11 Installation to an open mould side



Picture 12 Installation to a mould side



Picture 13



Picture 14



In order to guarantee the correct transition radii we recommend to use our special Wire protection pulley. This is available in six dimensions for all our Cast-in lifting hoops from 0.8 up to 99.0 to. For more details please refer to the separate data sheet of the Wire protection pulley.



Safety

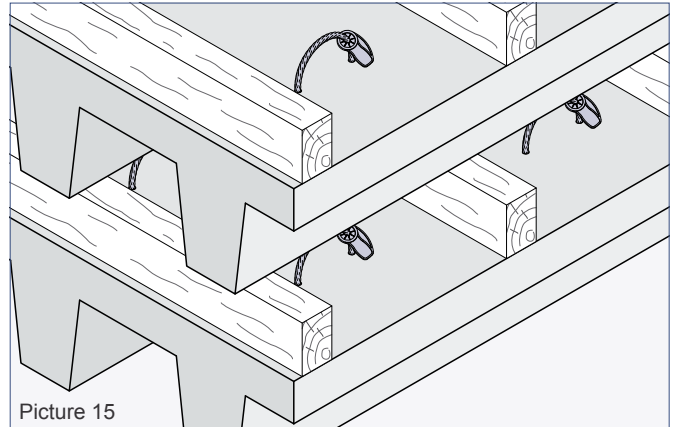
Storage of the precast units

During storage of the concrete units please make sure that the Cast-in lifting hoops are not bent in any way. This can be guaranteed by using a spacer (e.g. a squared timber) between the concrete elements.

An outdoor storage of the concrete units can lead to corrosion and as a result to a reduction of the bearing capacity.



If a significant corrosion appears to the installed Cast-in lifting hoops they cannot be used for lifting anymore.



Our customers trust us to deliver. We do everything in our power to reward their faith and we start each day intending to do better than the last. We provide strength and stability in an ever-changing world.

Welcome to the PHILIPP Group

Sustainable
solutions



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