

PHILIPPGROUP

PHILIPP Cast-in lifting box



VB3-V-078-en - 03/20 - PDF

Installation 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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Content

- PHILIPP Cast-in lifting box Page 4
 - Description Page 5
 - Dimensions Page 5
- General planning notes Page 6
 - Materials Page 6
 - Element thicknesses, anchor spacings and edge distances Page 6
 - Concrete compressive strength Page 6
 - Reinforcement Page 6
 - Load directions Page 6
 - Bearing capacities Page 6
 - Storage of the Cast-in lifting box Page 6
- Cast-in lifting box in wall-like elements Page 7
- Cast-in lifting box in column-like elements Page 8
- Cast-in lifting box in beam-like elements Page 10
- Marking Page 12
- Installation Page 13
- Preparation for applications safety instructions Page 14



The Cast-in lifting box



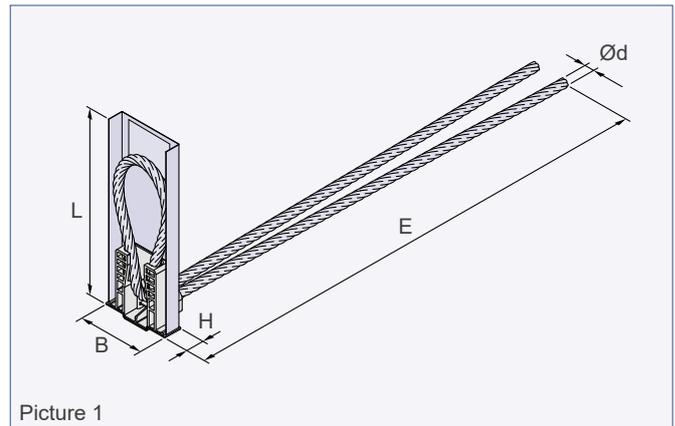
Your benefits at a glance:

- New transport anchors with load capacity up to 4 t
- Transport anchor systems with outstanding price performance ratio
- Easy and simple mounting directly at formworks. No need of recess or openings
- No need of special lifting devices in factory or on-site
- Time-efficient handling: fold out the loop and ready for transportation
- The flexible open wire ropes enabled transportation of very slim concrete elements thanks to reduced space requirement and are perfect for components like narrow beams and walls
- High quality and safety standard

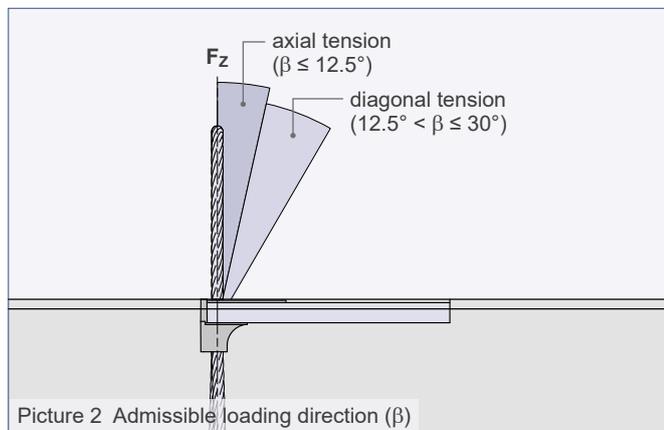


The Cast-in lifting box

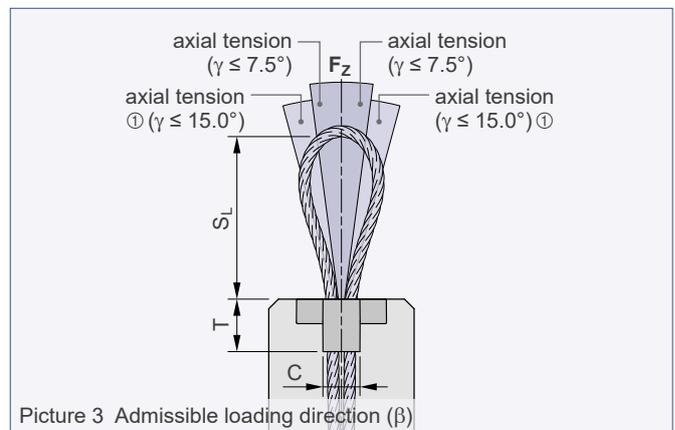
The Cast-in lifting box is part of the PHILIPP Transport anchor system which complies with the VDI/BV-BS Guideline "Transport anchors and transport anchor systems for precast concrete elements" (VDI/BV-BS 6205). The use of Cast-in lifting box requires compliance with this Installation Instruction as well as the General Installation Instruction. Cast-in lifting box is designed for transport of precast concrete units only. Multiple fastening of the ropes during the transport chain (from manufacturing to encasing in concrete units) doesn't count to repeated usage. A repeated use (e.g. ballasts for cranes) is not allowed.



Picture 1



Picture 2 Admissible loading direction (β)



Picture 3 Admissible loading direction (β)
① only for the usage on a tilt up table!

Table 1: Dimensions

Ref.-no.	Type	Dimensions								Weight [kg/pc.]
		H [mm]	B [mm]	L [mm]	S_L ② [mm]	E ② [mm]	T [mm]	C [mm]	$\varnothing d$ ③ [mm]	
44DAHB040	AS 4.0	25	90	255	175	650	56	40	12	1.16

② Dimensions S_L and E are standard values and can vary depending on the situation.

③ Rope diameter $\varnothing d$ is a standard value and can vary depending on the wire rope construction.

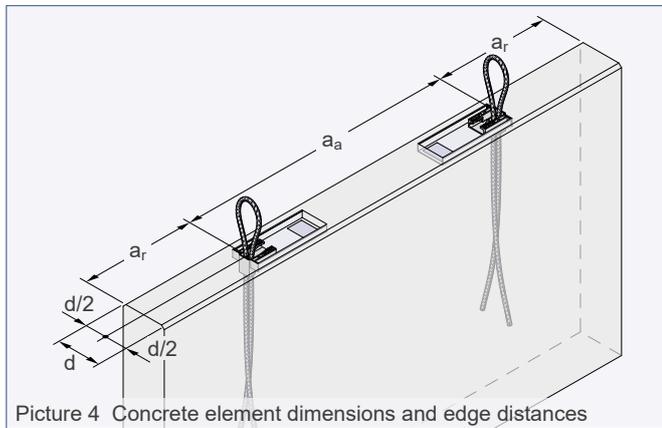
General information

Materials

The cast-in lifting box consists of a metal recess box and a plastic bracket with a galvanized, angled wire rope loop, which will be folded out for lifting. This galvanisation is aimed at protecting the anchor temporarily during storage till the final installation in concrete elements.

Element thicknesses, anchor spacing and edge distances

The installation and positioning of Lifting box in precast concrete elements require minimum element thickness, anchor spacing and edge distances to ensure a safe load transfer. These values can be found in the tables for the individual cases of application.



Concrete compressive strength

The concrete must have a minimum strength f_{cc} by the first load application acc. to table 2, 3 and table 5. Compressive strengths f_{cc} are strength of concrete cubes at the first lifting.

Reinforcement

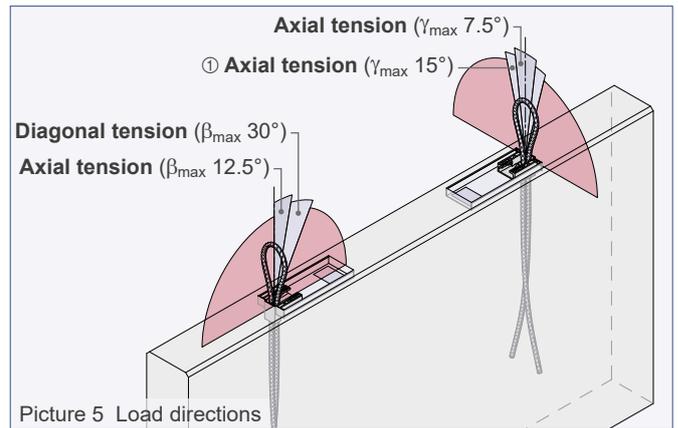
Cast-in lifting box requires a minimum reinforcement according to table 3, 4 or 6. This minimum reinforcement guarantees a safe load transfer in concrete elements. The user is personally responsible for further load transmissions taking place in concrete units.



Existing static or constructive reinforcement can be counted as part of the minimum reinforcement.

Load directions

During transport of the concrete elements only a diagonal tension on the anchors up to β_{max} 30° as well as a lateral tension up to γ_{max} 7.5° are admissible! A lateral tension on the concrete elements up to γ_{max} 15° is admissible in combination with a tilting table by the first lifting. A diagonal tension on the anchors of $\beta > 30^\circ$ as well as a lateral tension $\gamma > 15^\circ$ are not admissible!



① only in combination with a tilting table!

Bearing capacities

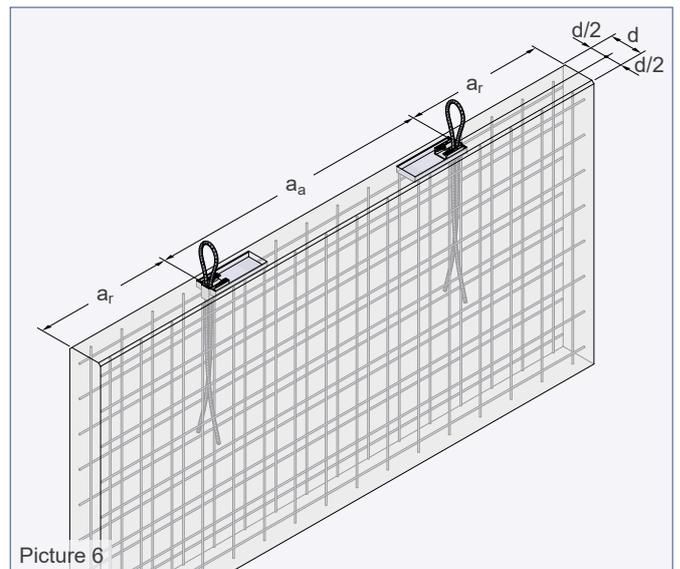
Details of the load bearing capacities and conditions regarding to concrete compressive strengths are given in tables 2, 4 and 6.

Storage of the Cast-in lifting box

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

Lifting box in wall-like elements

In case of installation in wall-like elements, the minimal dimensions of the concrete element as well as edge distances and minimum anchor spacing have to comply with data given in table 2. Data of required reinforcement are given in table 2 as well.

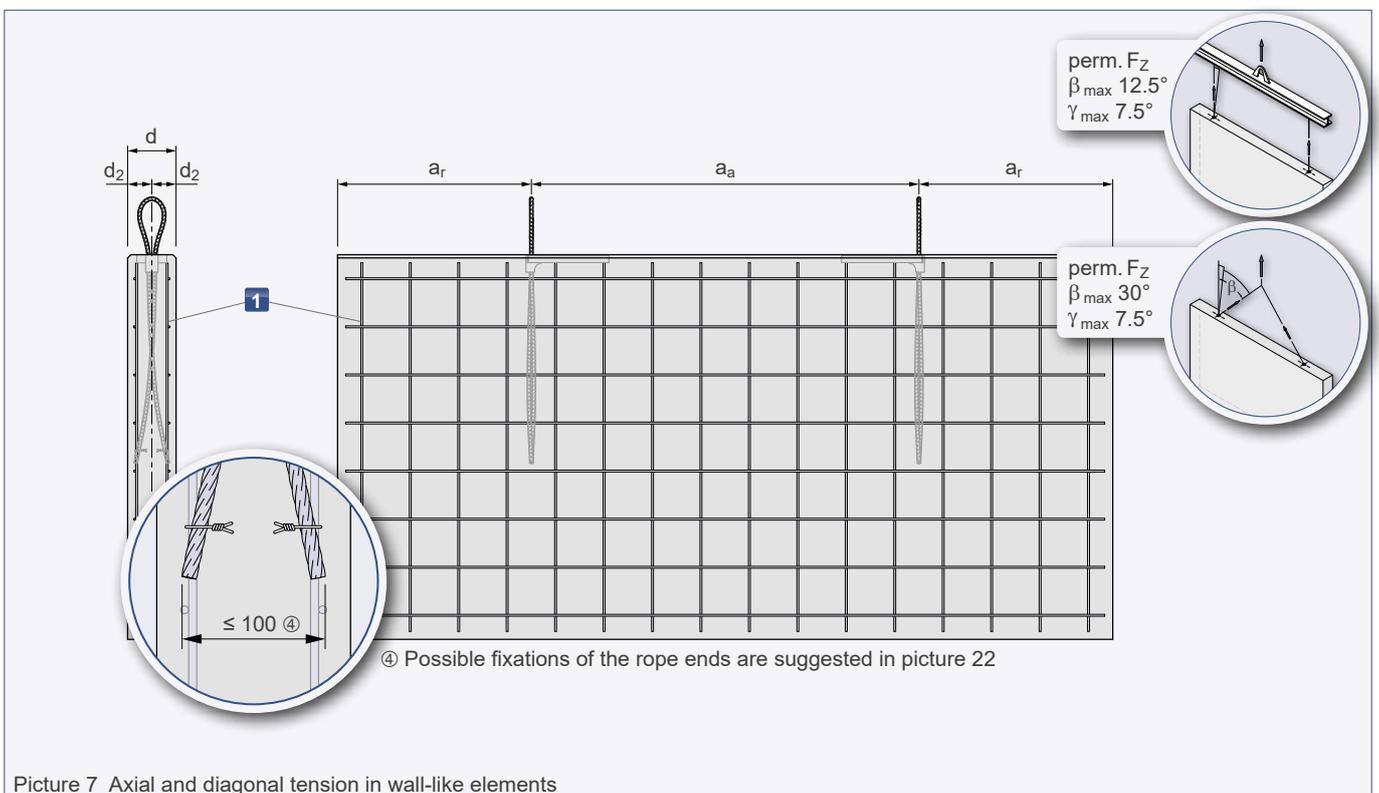


Picture 6

Table 2: Axial and diagonal tension in wall-like elements

Load class	Min. element thickness min. anchor spacing and edge distances			$\beta_{max} 30^\circ / \gamma_{max} 7.5^\circ$ ①	Mesh reinforcement (square) [mm ² /m]
	d [mm]	a _a [mm]	a _r [mm]	allow. F _Z f _{cc} ≥ 15 N/mm ² [kN]	
4.0	150	1200	600	40.0	2 × #188

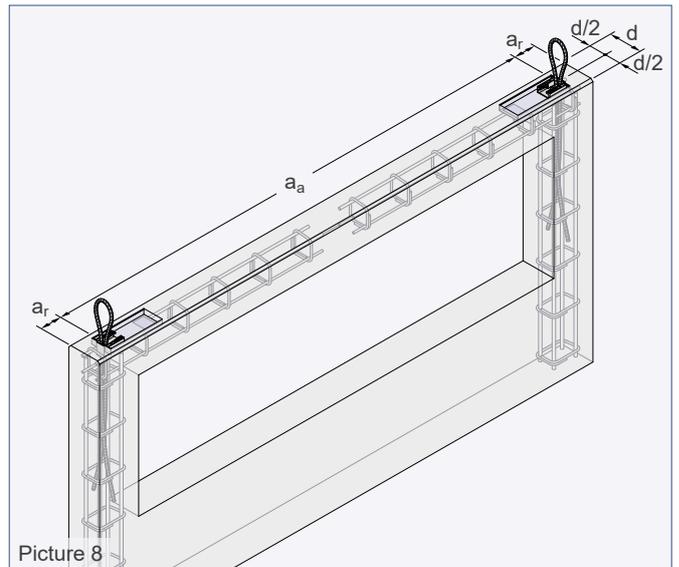
① In combination with a tilting table is a sling angle of $\gamma_{max} 15^\circ$ possible!



Picture 7 Axial and diagonal tension in wall-like elements

Cast-in lifting box in column-like elements

In case of installation in wall-like elements, the minimal dimensions of the concrete element as well as edge distances and minimum anchor spacing have to comply with data given in table 3. Data of required reinforcement are given in table 2 as well.

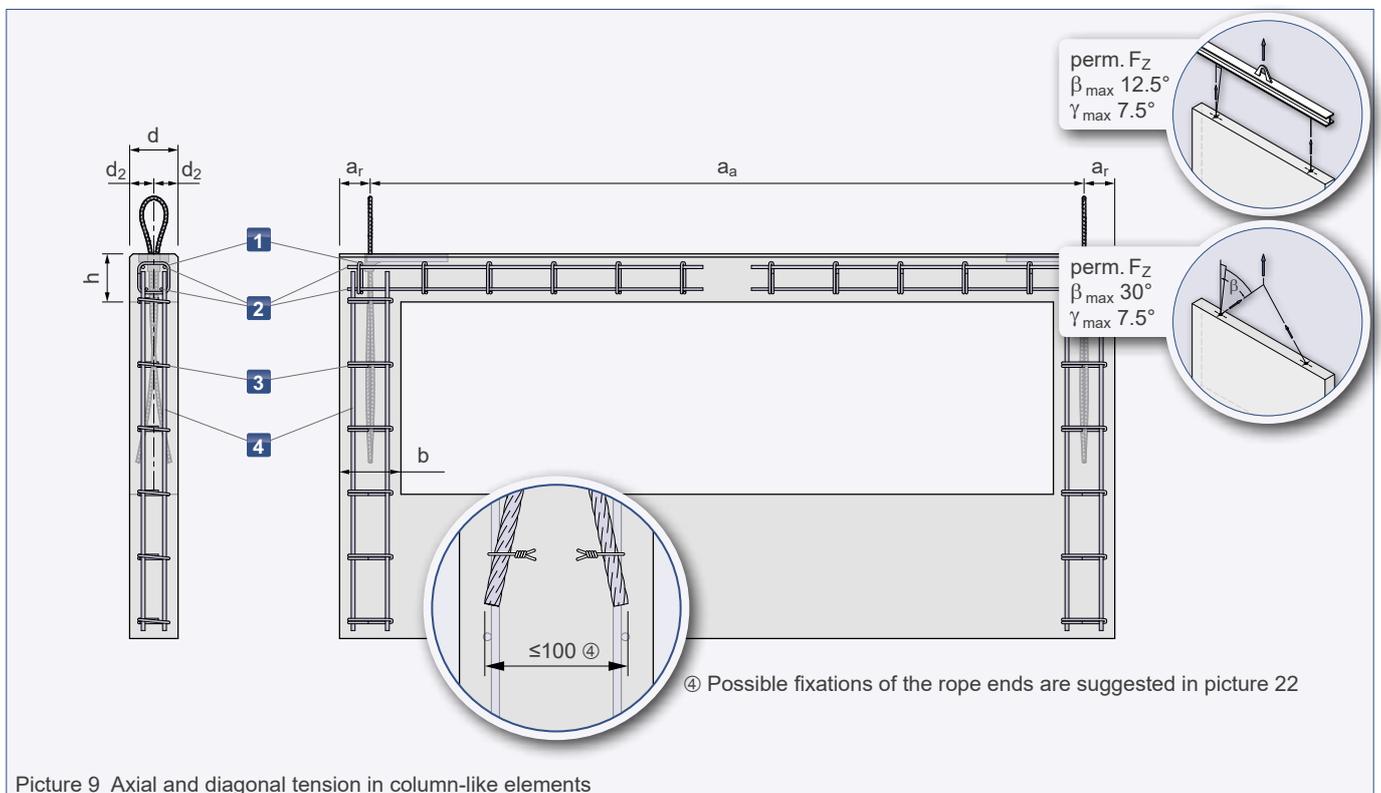


Picture 8

Table 3: Axial and diagonal tension in column-like elements

Load class	Min. element thickness min. centre and edge distances					$\beta_{\max} 30^\circ / \gamma_{\max} 7.5^\circ$ ①	
	d [mm]	a _a [mm]	a _r [mm]	h [mm]	b [mm]	allow. F _Z f _{cc} ≥ 15 N/mm ² [kN]	allow. F _Z f _{cc} ≥ 17.5 N/mm ² [kN]
4.0	150	1530	95	150	190	39.8	40.0

① In combination with a tilting table is a sling angle of $\gamma_{\max} 15^\circ$ possible!



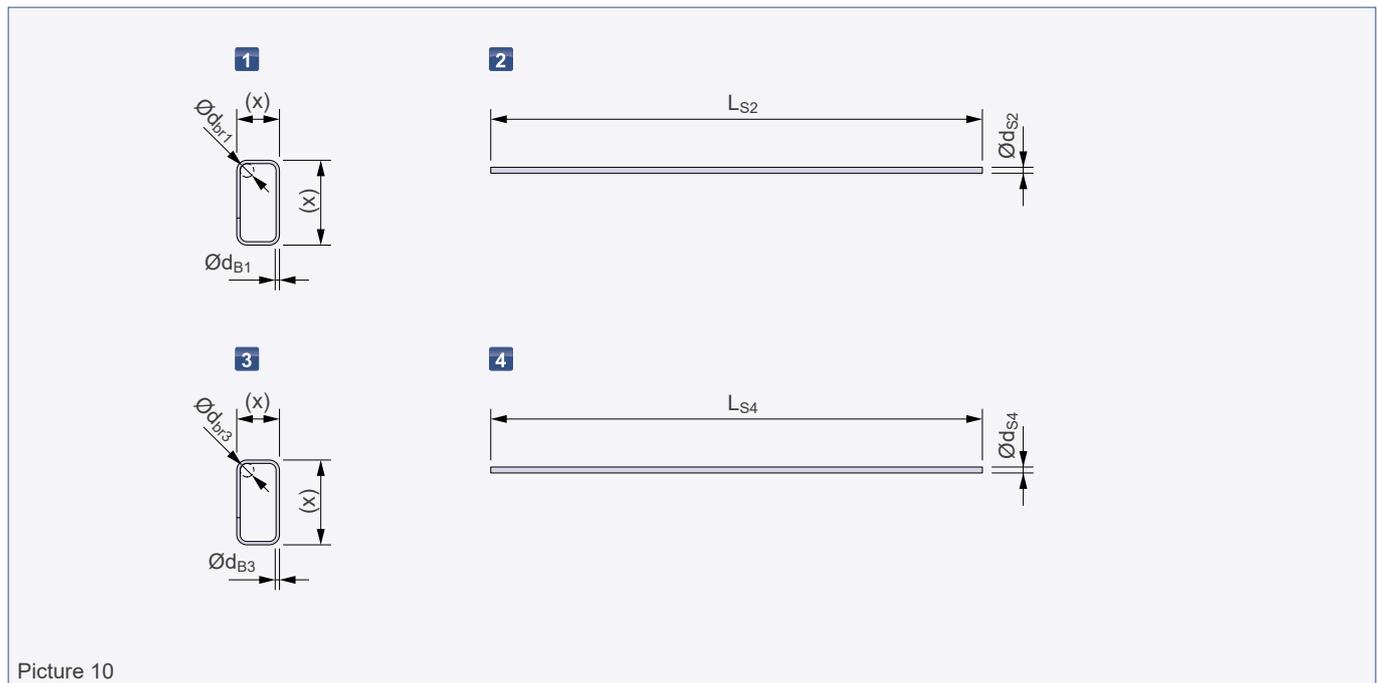
Picture 9 Axial and diagonal tension in column-like elements

Cast-in lifting box in column-like elements

Table 4: Reinforcement

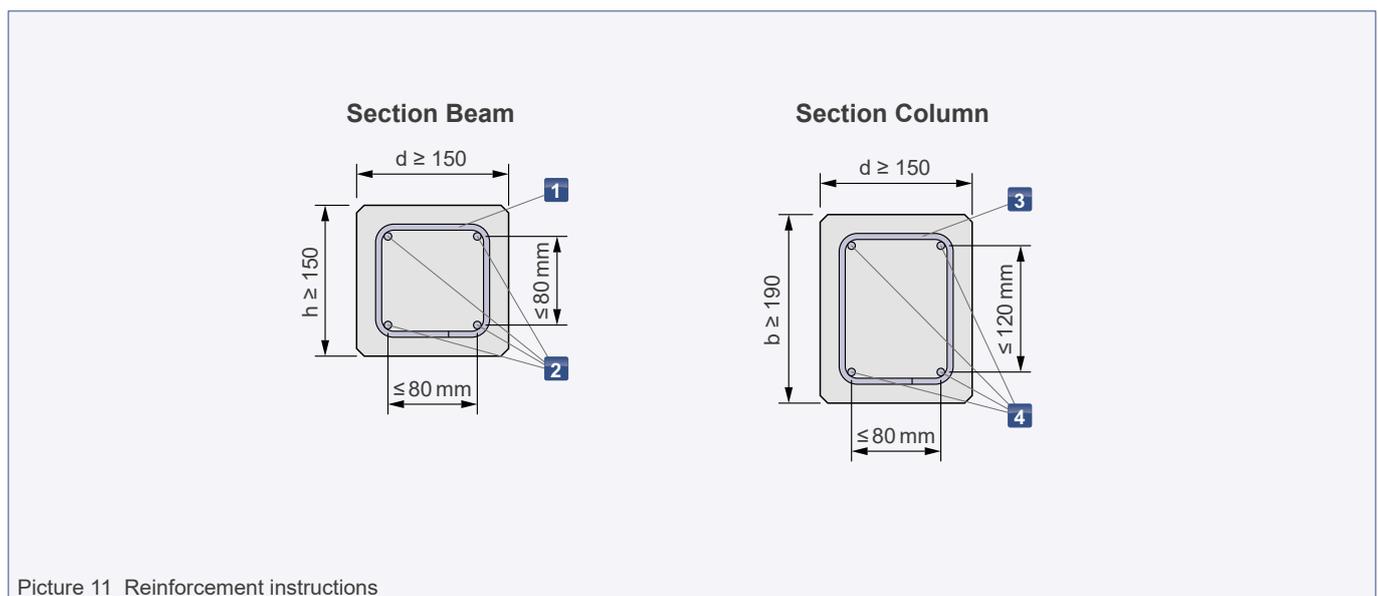
Load class	Beam				Column			
	1 ⑤		2		3 ⑤		4	
	Stirrup (B500A/B)		Longitudinal reinforcement (B500A/B)		Stirrup (B500A/B)		Longitudinal reinforcement (B500A/B)	
	$\varnothing d_{B1}$ [mm]	$\varnothing d_{br1}$ [mm]	$\varnothing d_{S2}$ [Quantity × mm]	L_{S2} [mm]	$\varnothing d_{B3}$ [mm]	$\varnothing d_{br3}$ [mm]	$\varnothing d_{S4}$ [Quantity × mm]	L_{S4} [mm]
4.0	$\varnothing 8 / 200$	$\varnothing 32$	$4 \times \varnothing 10$	1100	$\varnothing 8 / 200$	$\varnothing 32$	$4 \times \varnothing 12$	1250

⑤ The stirrups 1 + 3 can be replaced by equal amounts of mesh reinforcements. This requirement is fulfilled e.g. by a mesh reinforcement type Q257 A (equal 2.57 cm²/m). Existing reinforcement can be counted as part of the required amount.



Picture 10

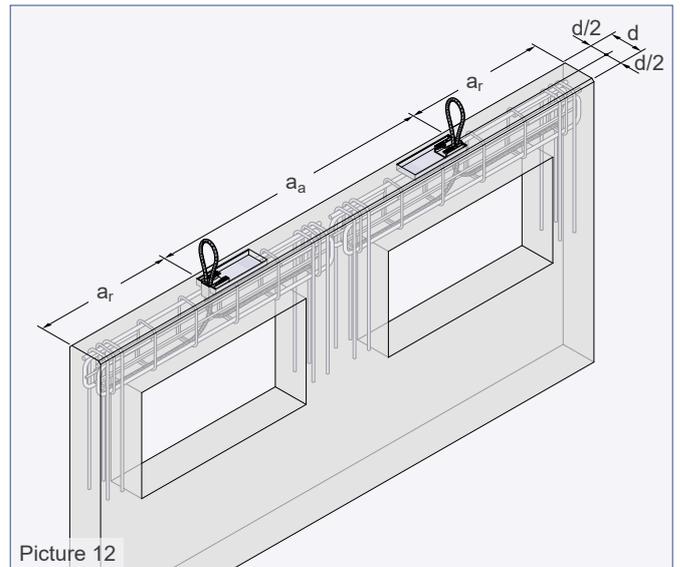
The (x) marked data are related to individual concrete element dimensions



Picture 11 Reinforcement instructions

Cast-in lifting box in beam-like elements

In case of installation in wall-like elements, the minimal dimensions of the concrete element as well as edge distances and minimum anchor spacing have to comply with data given in table 5. Data of required reinforcement are given in table 2 as well.



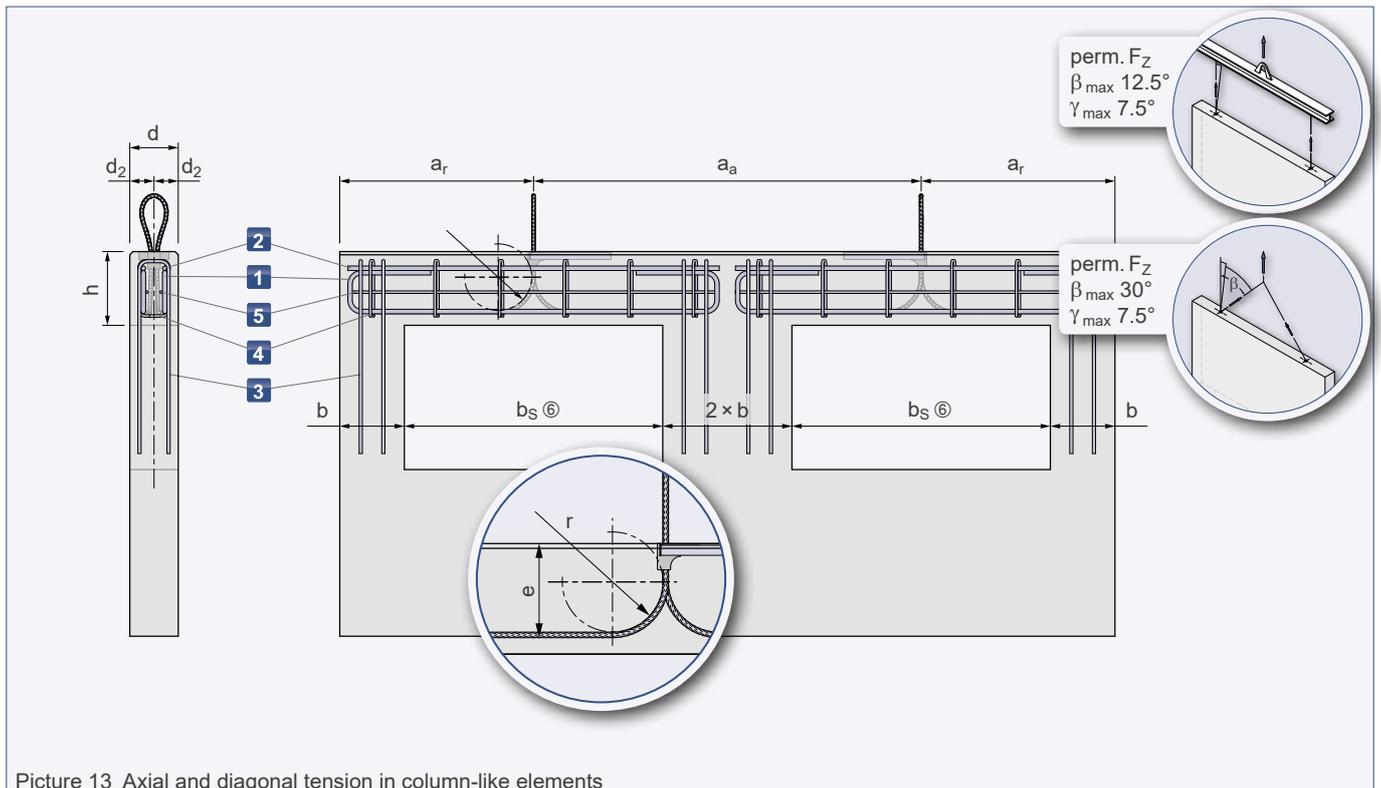
Picture 12

Table 5: Axial and diagonal tension in beam-like elements

Load class	Min. element thickness min. anchor spacing and edge distances						Anchoring of the wire rope			$\beta_{\max} 30^\circ / \gamma_{\max} 7.5^\circ$ ① allow. F_Z		
	d [mm]	a_a [mm]	a_r [mm]	b [mm]	b_S ⑥ [mm]	h [mm]	e [mm]	r_{\min} [mm]	r_{\max} [mm]	$f_{cc} \geq 15 \text{ N/mm}^2$ [kN]	$f_{cc} \geq 17.5 \text{ N/mm}^2$ [kN]	$f_{cc} \geq 20 \text{ N/mm}^2$ [kN]
4.0	150	1200	600	200	≤ 800	200	160	72	110	19.0	20.5	21.9
		1350	675	275	≤ 800	320	280		220	32.5	35.1	35.1

① In combination with a tilting table is a sling angle of $\gamma_{\max} 15^\circ$ possible!

⑥ Up from $b_S > 800$ mm the user is personally responsible for further load transfer in the element



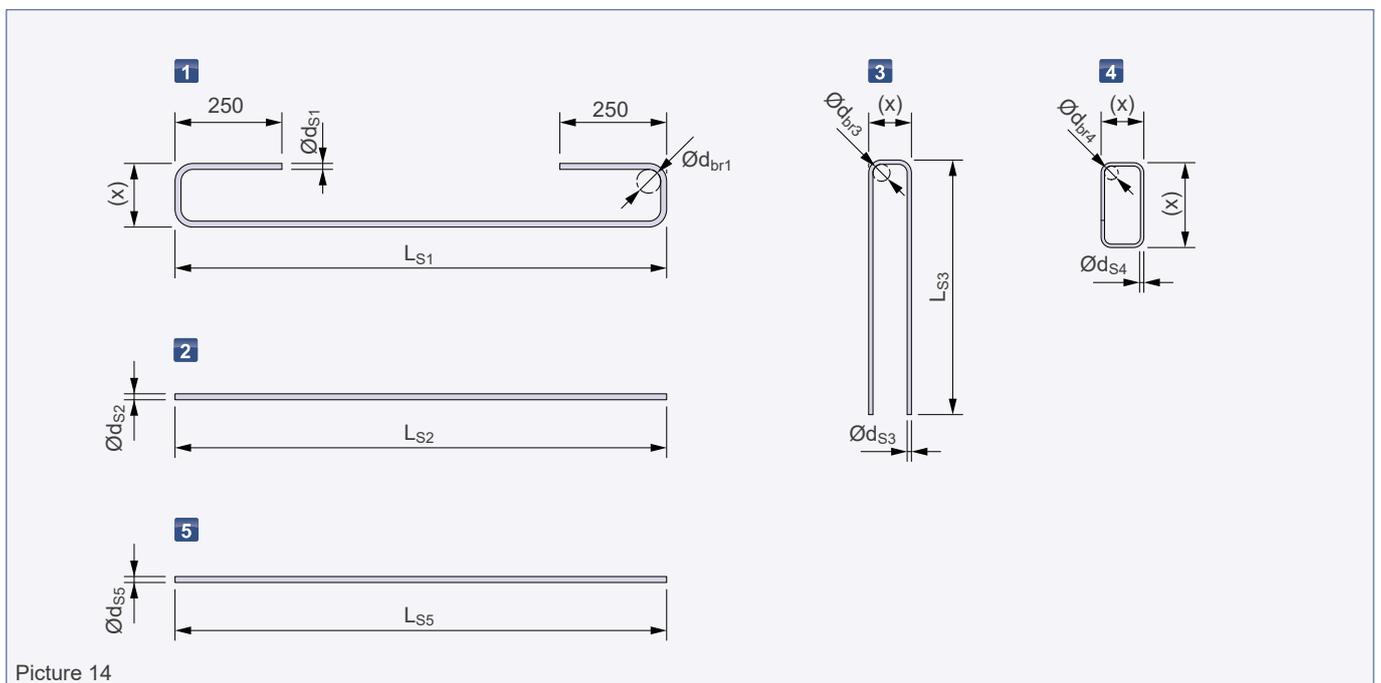
Picture 13 Axial and diagonal tension in column-like elements

Cast-in lifting box in beam-like elements

Table 6: Reinforcement

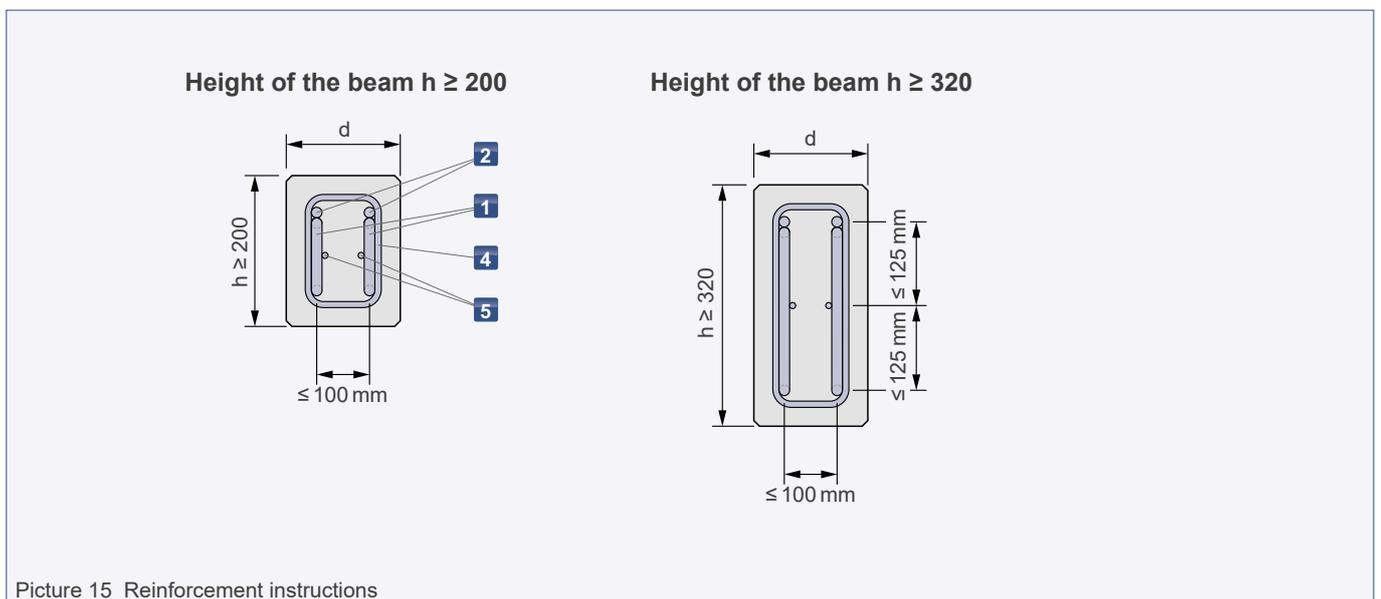
Load class	Height of the beam h [mm]	1 Loop (B500A/B)			2 Longitudinal reinforcement (B500A/B)		3 U-bar (B500A/B)			4 ⑦ Stirrup (B500A/B)		5 Longitudinal reinforcement (B500A/B)	
		$\varnothing d_{S1}$ [Quantity × mm]	L_{S1} [mm]	$\varnothing d_{br1}$ [mm]	$\varnothing d_{S2}$ [Quantity × mm]	L_{S2} [mm]	$\varnothing d_{S3}$ [Quantity × mm]	L_{S3} [mm]	$\varnothing d_{br3}$ [mm]	$\varnothing d_{S4}$ [mm]	$\varnothing d_{br4}$ [mm]	$\varnothing d_{S5}$ [mm]	L_{S5} [mm]
4.0	≥ 200	2 × Ø14	1150	56	2 × Ø12	1150	4 × Ø10	600	40	Ø8 / 100	40	Ø8	1150
	≥ 320	2 × Ø12	1300	48	2 × Ø10	1300	2 × Ø12	700	48	Ø8 / 200	48	Ø8	1300

⑦ The stirrups 4 can be replaced by equal amounts of mesh reinforcements.
 This requirement is fulfilled by e.g. using a mesh reinforcement:
 - at a beam height $h \geq 200$: Type Q424 A (equals 4,24 cm²/m)
 - at a beam height $h \geq 320$: Type Q257 A (equals 2,57 cm²/m)
 Existing reinforcement can be counted as part of the required reinforcements.



Picture 14

The (x) marked data are related to individual concrete element dimensions



Picture 15 Reinforcement instructions

General information

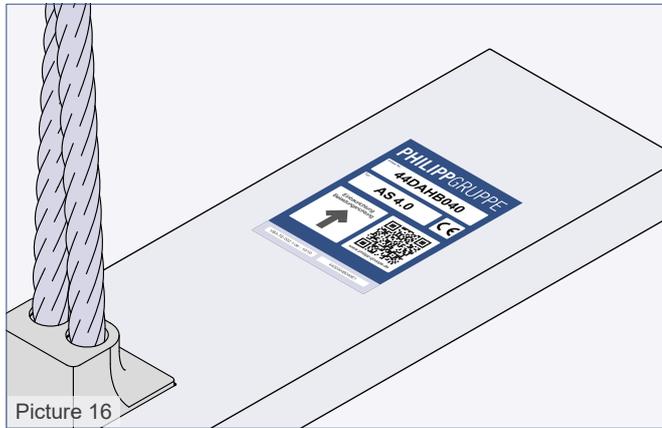
Marking

The Cast-in lifting box is marked with a label both outside and inside (visible even during application) the box. The inner label must be visible even after being embedded in concrete.

Following data are given on the tag:

Visible before casting (installation)

- Manufacturer (PHILIPP)
- Reference number
- Type (AS 4.0)
- CE mark ®
- Installation direction (arrow)
- QR code (Installation and Application Instruction)

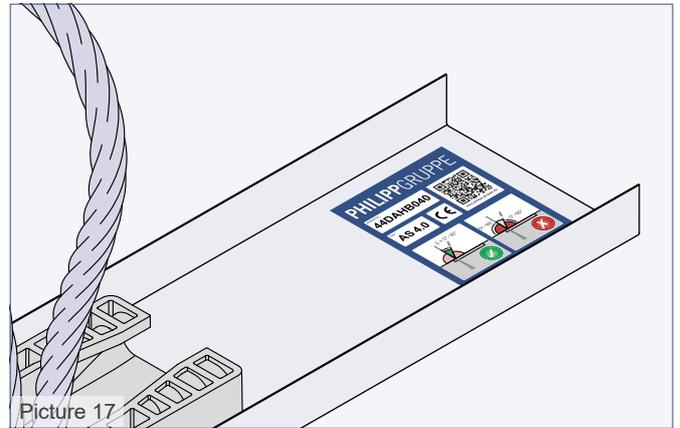


® The EC Declaration of Conformity (DoC) of Cast-in lifting box is available on request or can be downloaded from our website www.philipp-group.de.



Visible after installation (transport)

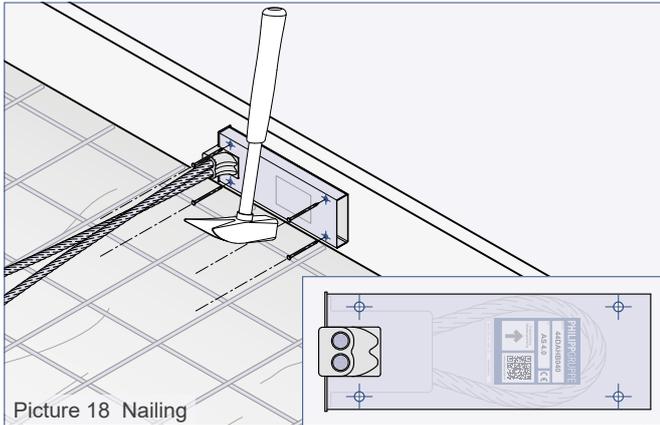
- Manufacturer (PHILIPP)
- Reference number
- Type (AS 4.0)
- CE mark ®
- QR code (Installation and Application Instruction)
- Permissible load directions



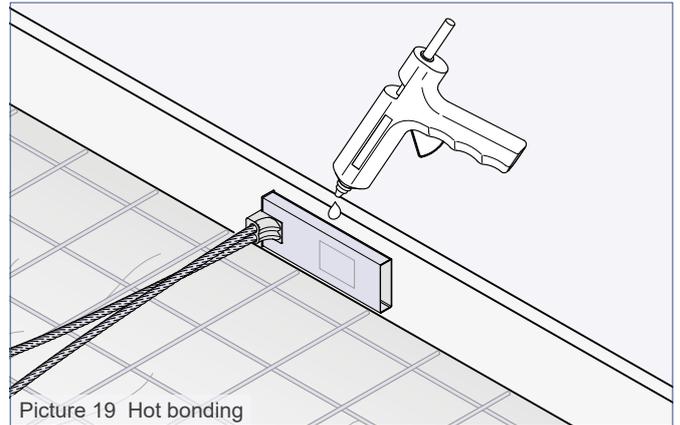
Installation

The Cast-in lifting box can be installed by nailing or hot bonding on the formwork. Therefore, attention should be given to the marking of lifting direction (of later load on anchors). The arrow on the marking should point to the middle of the panel (centre of gravity) Picture 21. In case of an installation of the Cast-in lifting box by nailing, recommend-

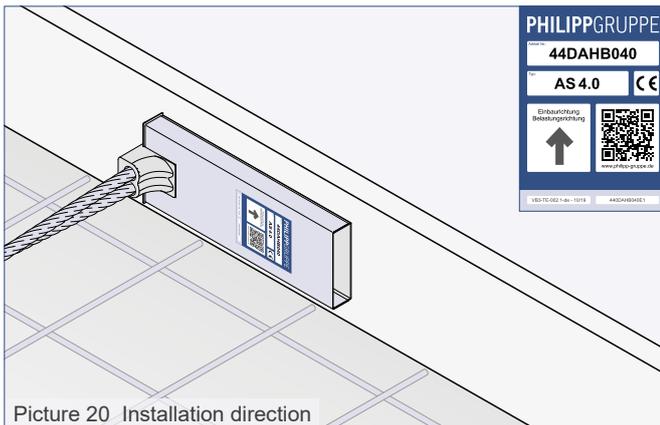
ed nailing points are given in picture 18 in order to avoid damages on the wire rope inside the box. The ends of the wire ropes should be fixed to the existing reinforcement in order to avoid changes in position of the wire ropes during concreting. If necessary, more steel bars can be added to ensure a right position.



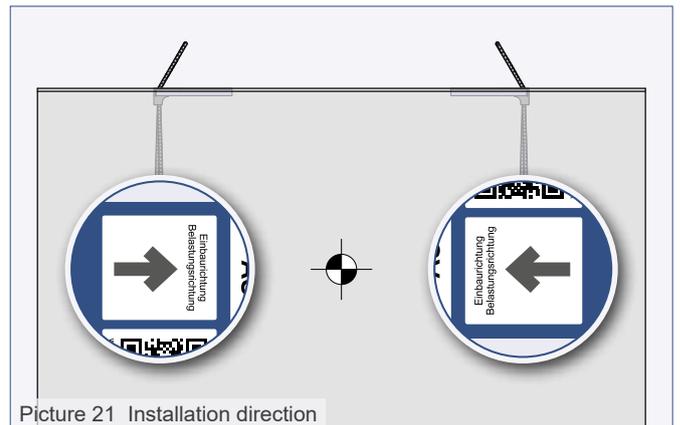
Picture 18 Nailing



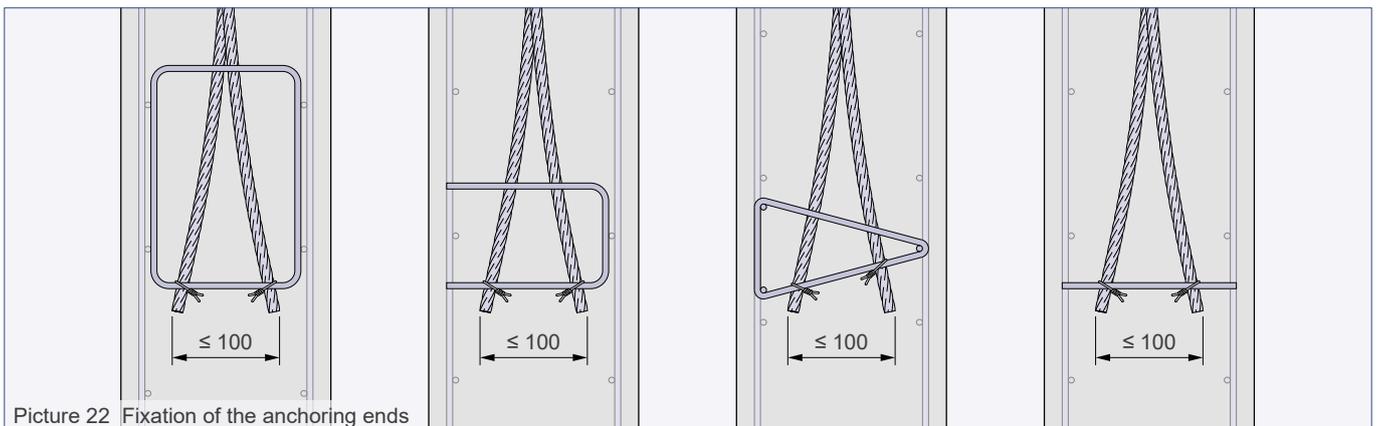
Picture 19 Hot bonding



Picture 20 Installation direction



Picture 21 Installation direction



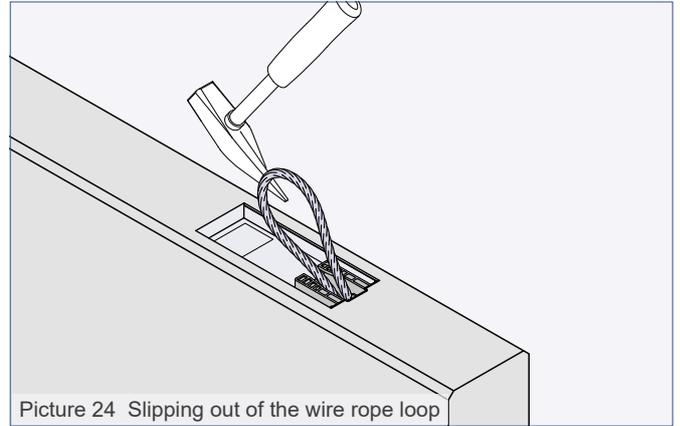
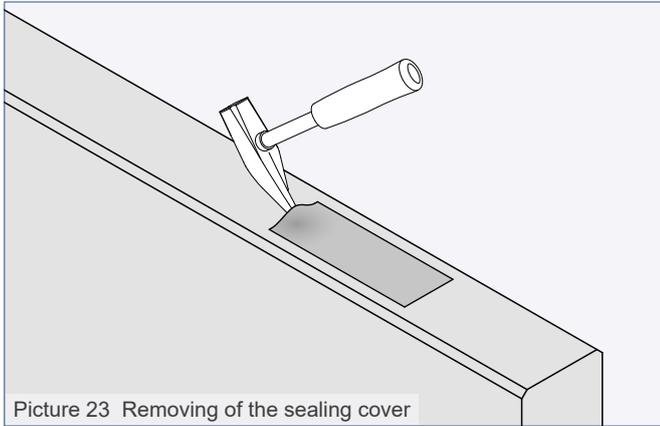
Picture 22 Fixation of the anchoring ends

Preparation for application / safety instructions

Preparation for application

One end of the plastic cover of the embedded box must be removed. The whole cover can be removed easily afterwards

After that the lifting loop in the Cast-in lifting box can be folded out for lifting.

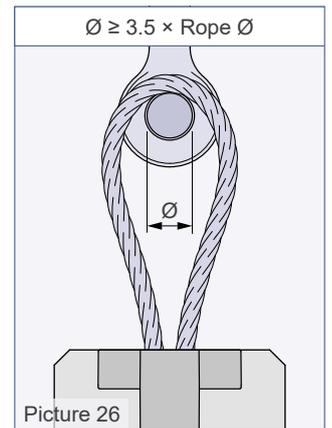
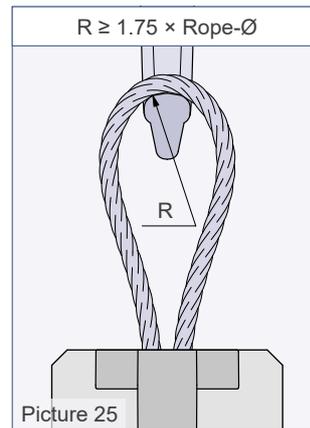


Safety instructions

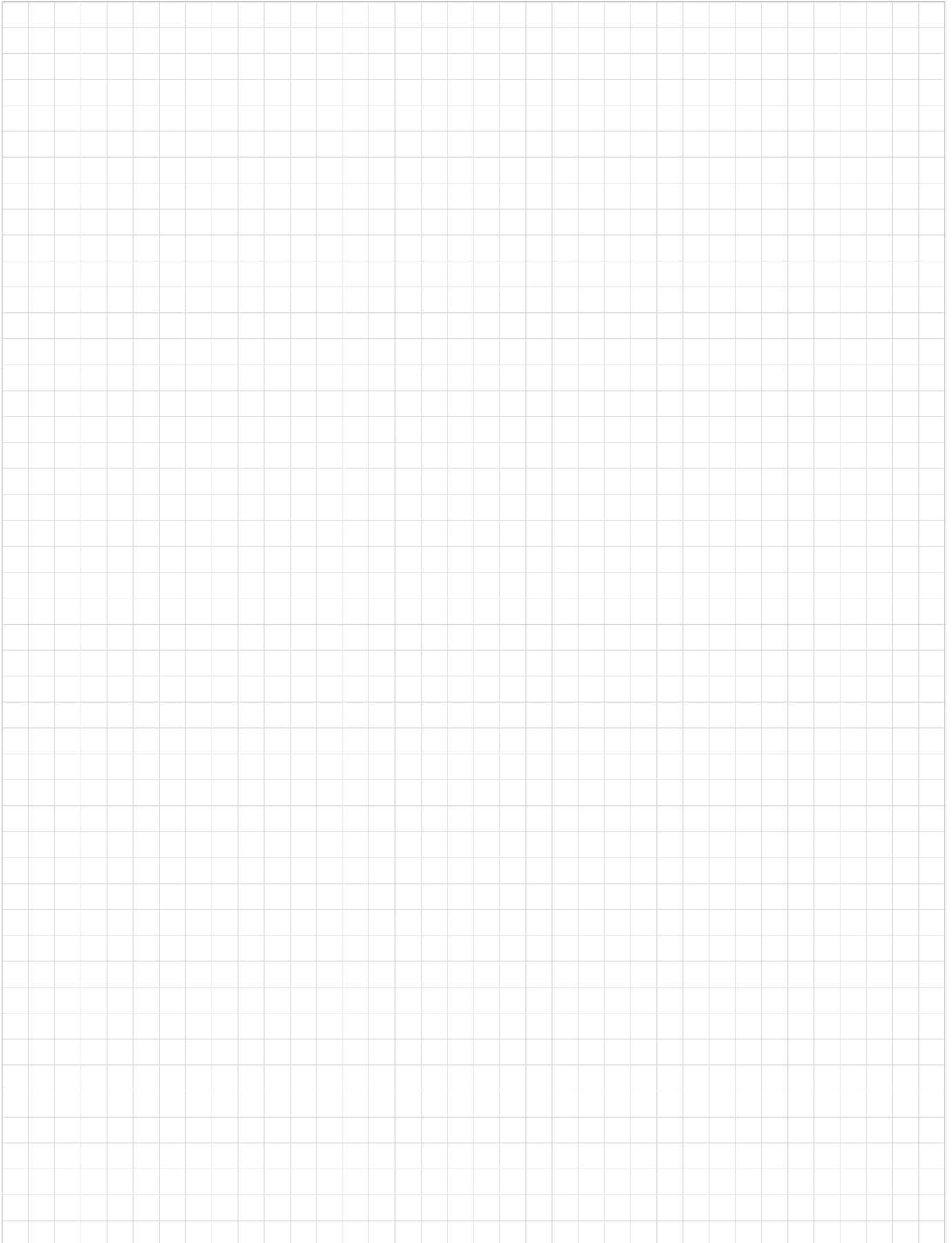
Wire rope lifting loops are prone to be damaged by using hooks, which are too small, too large or with a sharp edge. The rounding off radii of hooks must be 1.75 times as large as the diameter of the wire rope (Picture 25). The pin diameter of a shackle must be at least 3.5 times of the wire rope diameter (Picture 26).

The following points need to be taken into consideration while using the Cast-in lifting box:

- The use of damaged wire ropes with broken strands, contusions, kinks and corrosion pits is not allowed.
- Contact of wire ropes with acids and alkalis must be avoided.
- Misuse because of incorrect load directions must be avoided.
- Leverage caused by rotating, tilting and swinging which can result local concrete blow-out failures or damages on wire ropes are inadmissible!



 Welding or other strong thermal influences on the wire ropes are not allowed.

Notes:

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

PHILIPPGROUP



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