PHILIPPGROUP

PHILIPP Double-wall transport anchor

VB3-T-051-en - 01/16

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.

Engineering contact

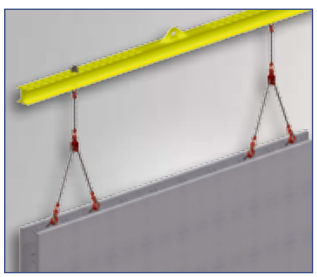
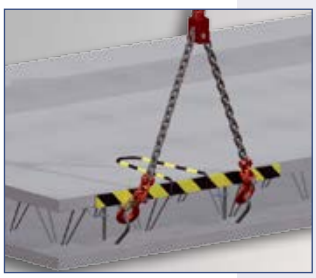
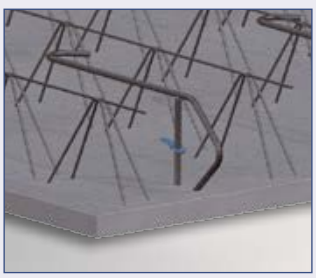
Phone: +49 (0) 6021 / 40 27-318
Fax: +49 (0) 6021 / 40 27-340
E-mail: technik@philipp-gruppe.de

Sales contact

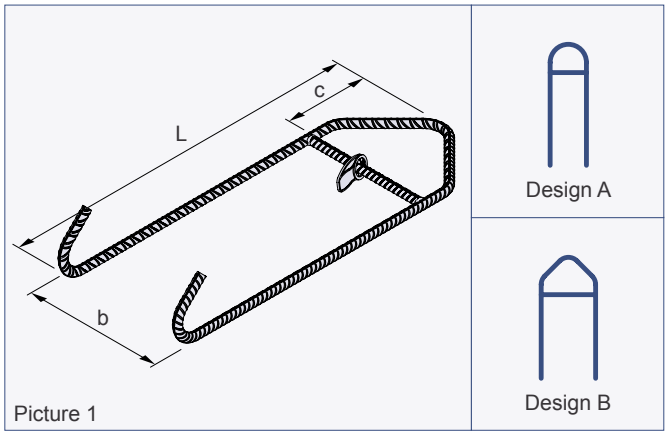
Phone: +49 (0) 6021 / 40 27-300
Fax: +49 (0) 6021 / 40 27-340
E-mail: vertrieb@philipp-gruppe.de



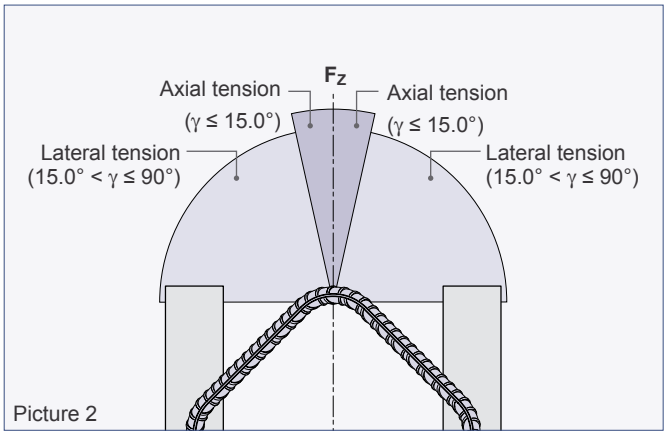

Content

System description



Picture 1



Picture 2

Double-wall transport anchors are part of the PHILIPP Transport anchor system and meet the needs of the German employer's liability insurance association for the building industry (BG BAU). The use of Double-wall transport anchors requires the compliance with this Installation Instruction as well as the General Installation Instruction. Double-wall transport anchors are designed for the transport (axial and lateral tension) as well as the tilt-up (lateral tension) of concrete panels.

Diagonal tension is limited to $\beta \leq 30°$ (Picture 5). As rigging hardware a standard crane hook can be used. This must be attached directly to the bended part on the top of the anchor. A rigging at the crossbar of the anchor (strut) is not allowed.
The user is personally responsible for further transmission of load into the concrete unit.

Table 1: Dimensions

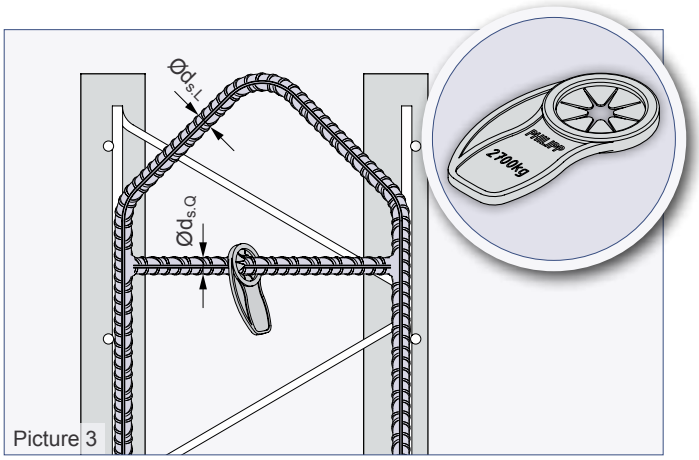
Ref.-No.	Load class	Design	Dimensions				
			L [mm]	b [mm]	Ød$_{s.L}$ [mm]	Ød$_{s.Q}$ [mm]	c [mm]
58HW27120600-1	2.7	A	600	120	14	14	88
58HW27130600-1	2.7	A	600	130	14	14	93
58HW27140600-1	2.7	A	600	140	14	14	98
58HW27150600-1	2.7	A	600	150	14	14	108
58HW27160600-1	2.7	A	600	160	14	14	108
58HW27170600-1	2.7	B	600	170	14	14	113
58HW27180600-1	2.7	B	600	180	14	14	118
58HW27190600-1	2.7	B	600	190	14	14	123
58HW27200600-1	2.7	B	600	200	14	14	128
58HW27210600-1	2.7	B	600	210	14	14	133
58HW27220600-1	2.7	B	600	220	14	14	138
58HW27230600-1	2.7	B	600	230	14	14	143

Material

The Double-wall transport anchor consists of a bended reinforcement bar B500B with a one side welded crossbar B500B as strut. Its diameter is Ø14 mm of the longitudinal reinforcement bar (Ød$_{s.L}$) as well as the crossbar (Ød$_{s.Q}$).
In order to simplify the installation both ends of the anchor are bended in 135° (Picture 1).

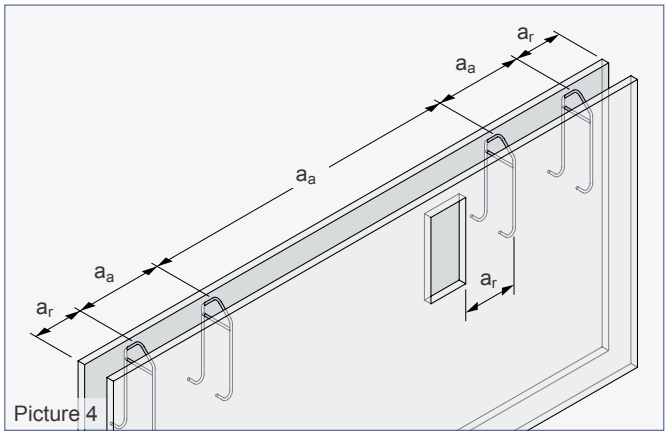
Marking

All Double-wall transport anchors have a coloured tag in order to show the bearing capacity. This tag must be still visible after concreting the two layers of the double wall.

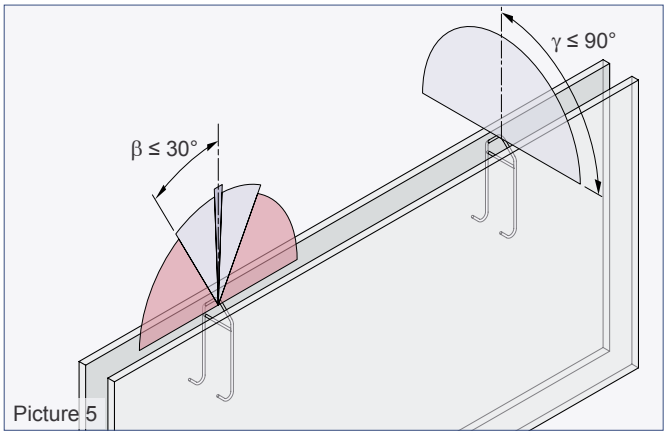


Picture 3

Installation conditions



Picture 4



Picture 5

Centre and edge distances

Picture 4 shows the minimal edge and centre distances. Edge distances given in table 2 are also valid as distances to openings (e.g. windows) in the panel.

Table 2: Edge and centre distances

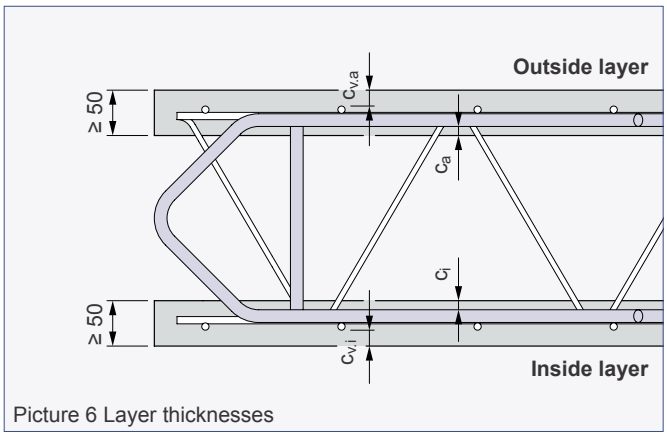
Edge distance a_r [mm]	Centre distance a_a [mm]
≥ 400	≥ 600

Layer thicknesses

The position and installation of Double-wall transport anchors in precast concrete units require minimum layer dimensions for a safe load transfer. Depending on the concrete cover to the inner and outer face of the double wall the thickness of each layer must be chosen according to table 3.

Table 3: Layer thicknesses

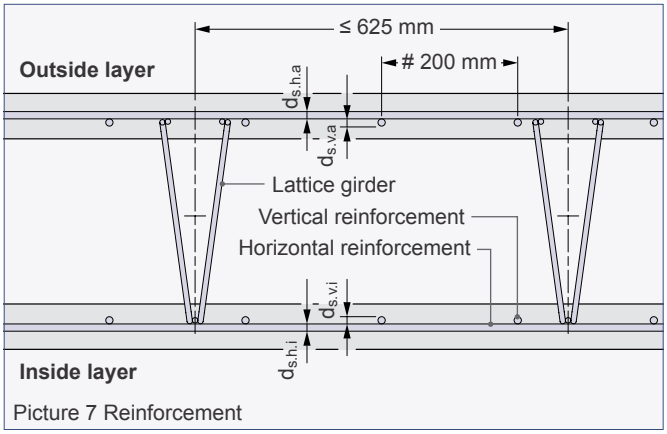
Minimum layer thickness [mm]	Nominal cover (outer face) $c_{v.a}$ / $c_{v.i}$ [mm]	Concrete cover (inner face) c_a / c_i [mm]
50	20	> 10
60	30	
65	40	
75	50	



Picture 6 Layer thicknesses

Reinforcement

When using Double-wall transport anchors the outside and inner layer of the double wall must be reinforced with a minimum reinforcement Ø8 mm / 200 mm ($d_{s.h.a}$ / $d_{s.h.i}$ / $d_{s.v.a}$ / $d_{s.v.i}$) crosswise. Furthermore both layers must by connected to each other with lattice girders (according to national approvals or ETAs). Maximum distance between the lattice girders is ≤ 625 mm.



Picture 7 Reinforcement

Bearing capacities / Weight of elements / Application

Bearing capacities

At the first time of lifting both layers of the double wall must have a minimum concrete strength according to table 4. With this concrete strength the bearing capacity for axial and diagonal tension is (≤ 30°) 2700 kg. For lateral tension the Double-wall transport anchors have half of the axial bearing capacity with a concrete strength f_{cc} of 19 N/mm. 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 Instruction).

Concrete

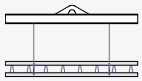
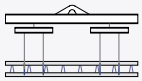
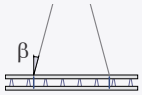
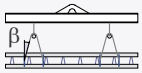
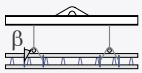
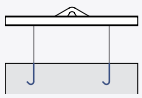
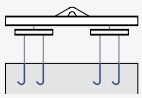
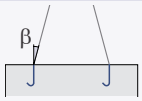
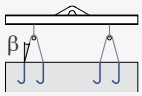
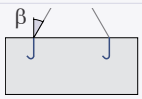
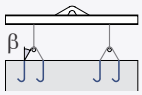
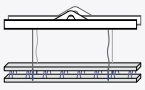
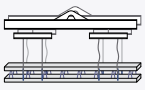
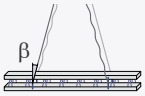
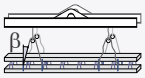
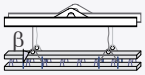
Concrete strengths f_{cc} given in table 4 are tested of concrete cubes at the time of first lifting.

Table 4: Bearing capacities

perm. F if f_{cc} **15 N/mm²**		perm. F if f_{cc} **19 N/mm²**
Axial tension / diagonal tension perm. F_Z 0°- 30° [kN]	**Lateral tension** perm. F_Q [kN]	**Lateral tension** perm. F_Q [kN]
27.0	11.7	13.5

The weight of 1.0 t corresponds to 10.0 kN.

Table 5: Maximum element weights

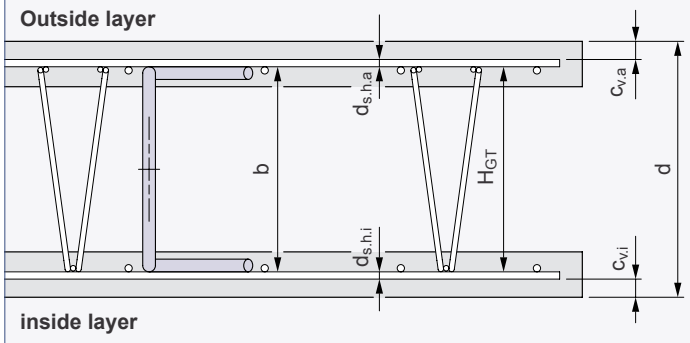
	Load case (mould adhesion not considered)		**2 load bearing anchors** symmetric to centre of gravity max. element weight G ① if f_{cc} **15 N/mm²** [t]	if f_{cc} **19 N/mm²** [t]		**4 load bearing anchors** symmetric to centre of gravity with compensation rig max. element weight G ① if f_{cc} **15 N/mm²** [t]	if f_{cc} **19 N/mm²** [t]
Tilt-up	Lateral tension ② (γ = 90°, β = 0°, cross beam required)		3.60	4.15		7.20	8.30
	Diagonal/lateral tension ② (γ = 90°, β = 15°)		3.48	4.01		6.96	8.02
	Diagonal/lateral tension ② (γ = 90°, β = 30°)		3.11	3.60		6.22	7.20
Transport	Axial tension (β = 0°, cross beam required) with tilt-up table		4.15	4.15		8.30	8.30
	Diagonal tension (β = 15°)		4.01	4.01		8.02	8.02
	Diagonal tension (β = 30°)		3.60	3.60		7.20	7.20
	Lateral tension ② (γ = 90°, β = 0°, cross beam required)		1.80	2.07		3.60	4.15
	Diagonal/lateral tension ② (γ = 90°, β = 15°)		1.74	2.00		3.48	4.01
	Diagonal/lateral tension ② (γ = 90°, β = 30°)		1.55	1.80		3.11	3.60

① The given element weights G are valid for a dynamic (hoisting) coefficient of 1.3 according to DIN 15018 for a hoisting velocity of v = 90 m/min.

② For lateral tension a steel angle (S235 / min. 50×50×6 / L = 250 mm) must be installed as a corner guard (to protect the edge of the layer). The angle must be secured against falling down.

Installation

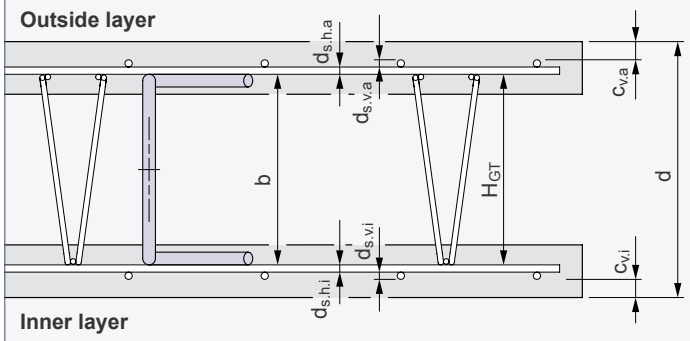
Calculation of the required anchor sizes (common formula: Anchor width b = height of lattice girder H_{GT})



$$b = d - c_{v.i} - c_{v.a} - d_{s.h.i} - d_{s.h.a}$$

b = Width of Double-wall transport anchor
d = Thickness of double wall
$c_{v.i}$ = Nominal cover (inside layer)
$c_{v.a}$ = Nominal cover (outside layer)
$d_{s.h.i}$ = Diameter horizontal reinforcement (inside layer)
$d_{s.h.a}$ = Diameter horizontal reinforcement (outside layer)

Picture 8 **Horizontal reinforcement** is placed in layers **outside**



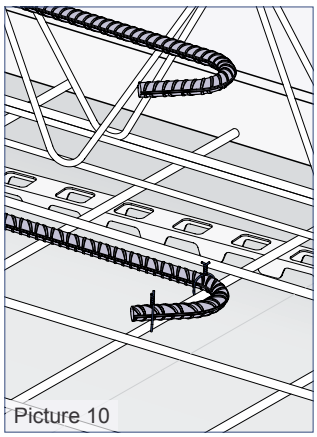
$$b = d - c_{v.i} - c_{v.a} - d_{s.h.i} - d_{s.h.a} - d_{s.v.i} - d_{s.v.a}$$

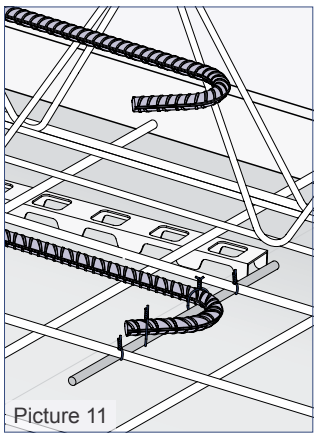
b = Width of Double-wall transport anchor
d = Thickness of double wall
$c_{v.i}$ = Nominal cover (inside layer)
$c_{v.a}$ = Nominal cover (outside layer)
$d_{s.h.i}$ = Diameter horizontal reinforcement (inside layer)
$d_{s.h.a}$ = Diameter horizontal reinforcement (outside layer)
$d_{s.h.i}$ = Diameter vertical reinforcement (inside layer)
$d_{s.h.a}$ = Diameter vertical reinforcement (outside layer)

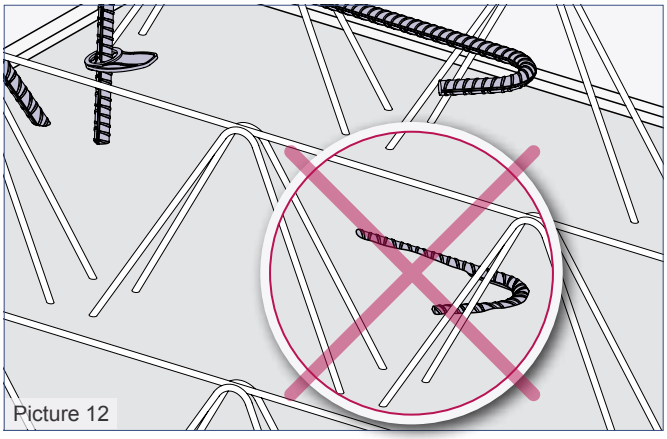
Picture 9 **Horizontal reinforcement** is placed in layers **inside**

Installation of Double-wall transport anchors

The Double-wall transport anchor must be installed flush to the top edge of the wall. For concreting the anchor must be fixed to its position. This can be done by connecting it to the lower transverse reinforcement or an additional mounting rebar.


Picture 10


Picture 11


Picture 12

After vibrating of the layers a visual inspection is required. If the minimum concrete cover on the inner side of the layer is not reached, the concrete cover in the anchor area must be increased accordingly.

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

PHILIPP GROUP

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

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

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