

# PHILIPPGROUP

## PHILIPP Double-wall transport anchor



VB3-T-051-en - 08/21 - PDF

## Installation and Application Instruction

## Transport and mounting systems for prefabricated building

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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.

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### ■ High safety level when using our products

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### ■ Software solutions

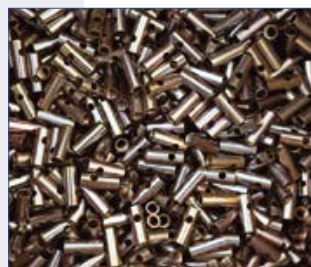
The latest design software, animated videos and CAD libraries can always be found under [www.philipp-gruppe.de](http://www.philipp-gruppe.de).

### ■ Engineering contact

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

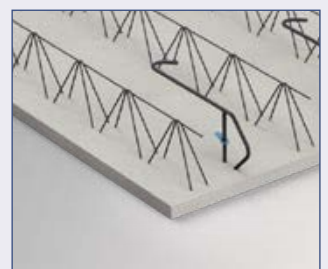
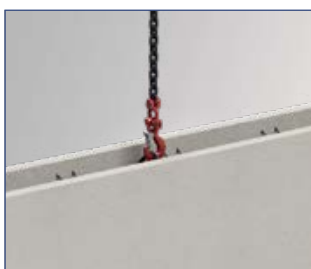
### ■ Sales contact

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

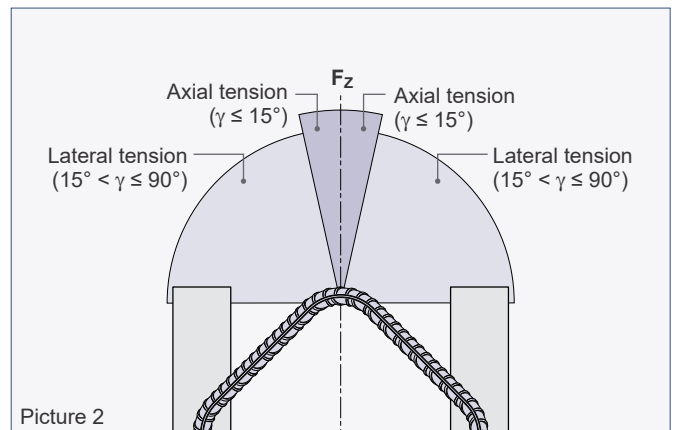
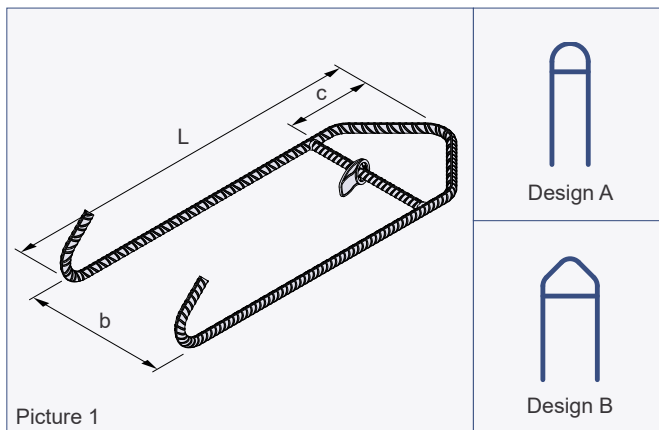


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## System description



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 and Application 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  $\beta \leq 30^\circ$  (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**

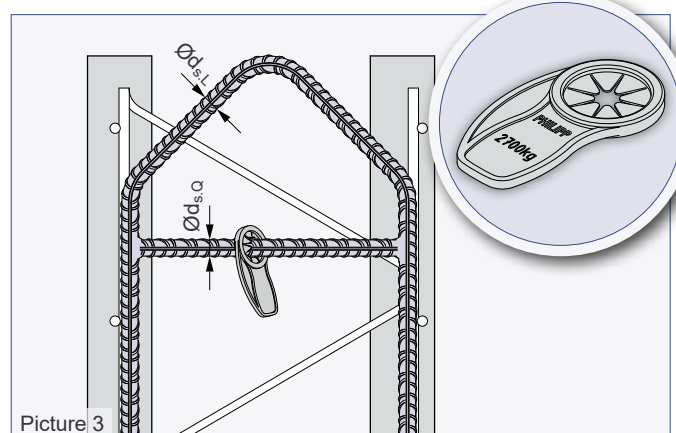
Ref.-No.	Type	Design	Dimensions				
			L [mm]	b [mm]	$\varnothing d_{s,L}$ [mm]	$\varnothing d_{s,Q}$ [mm]	c [mm]
58HW27120600-1	HW 2.7	A	600	120	14	14	88
58HW27130600-1	HW 2.7	A	600	130	14	14	93
58HW27140600-1	HW 2.7	A	600	140	14	14	98
58HW27150600-1	HW 2.7	A	600	150	14	14	108
58HW27160600-1	HW 2.7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

## Material

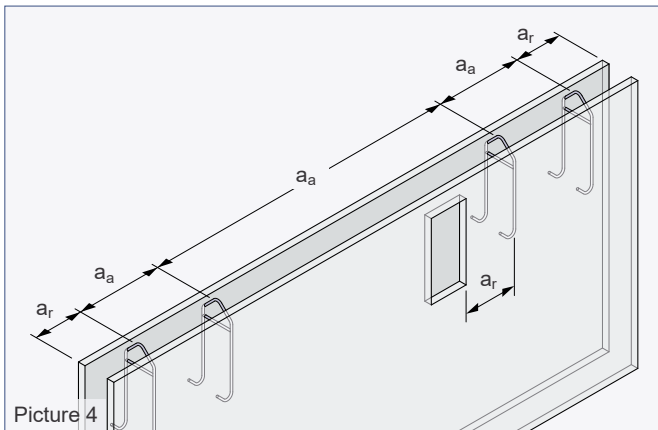
The Double-wall transport anchor consists of a bended reinforcement bar B500B with a welded crossbar B500B as strut. Its diameter is  $\varnothing 14$  mm of the longitudinal reinforcement bar ( $\varnothing d_{s,L}$ ) as well as the crossbar ( $\varnothing d_{s,Q}$ ). In order to simplify the installation both ends of the anchor are bended in  $135^\circ$  (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.



**Installation conditions**

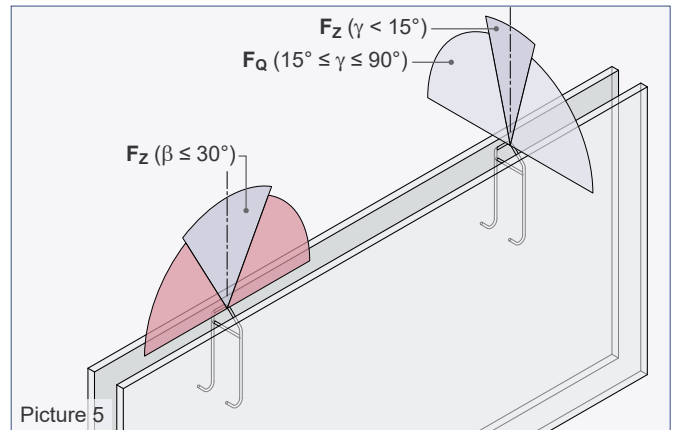


**Centre and edge distances**

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.

**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.

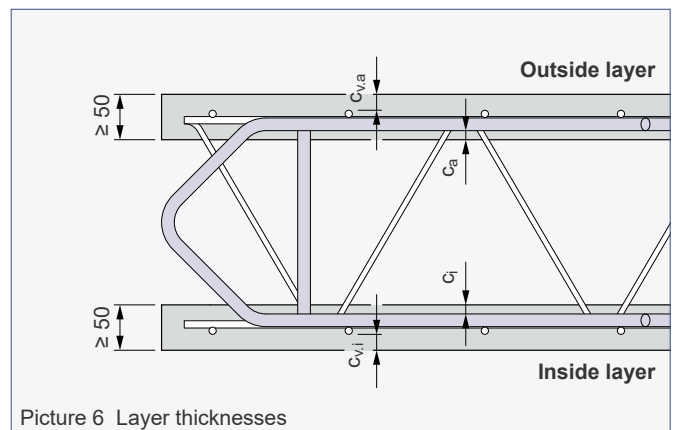


**Table 2: Edge and centre distance**

Edge distance $a_r$ [mm]	Centre distance $a_a$ [mm]
$\geq 400$	$\geq 600$

**Table 3: Layer thicknesses**

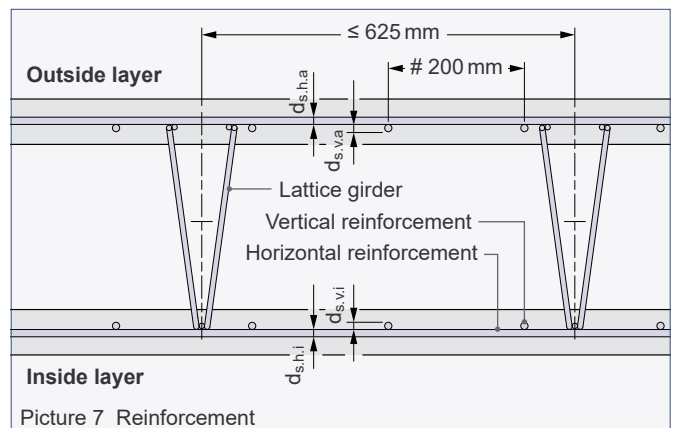
Minimum layer thickness [mm]	Nominal cover (outer face) $c_{v,a} / c_{v,i}$ [mm]	Concrete cover (inner face) $c_a / c_i$ [mm]
50	20	$> 10$
60	30	
65	40	
75	50	



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  $\varnothing 8 \text{ mm} / 200 \text{ mm}$  ( $d_{s,h,a} / d_{s,h,i} / d_{s,v,a} / d_{s,v,i}$ ) crosswise. Furthermore both layers must be connected to each other with lattice girders (according to national approvals or ETAs). Maximum distance between the lattice girders is  $\leq 625 \text{ mm}$ .



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 ( $\leq 30^\circ$ ) 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<sup>2</sup>. 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 strength

With the first lift of the concrete unit the concrete strength must have a minimum  $f_{cc}$  acc. to table 5.

**Table 4: Bearing capacities**

if $f_{cc}$ 15 N/mm <sup>2</sup>		if $f_{cc}$ 19 N/mm <sup>2</sup>	
Axial tension / diagonal tension	Lateral tension	Lateral tension	
perm. $F_Z$	perm. $F_Q$	perm. $F_Q$	
$\beta_{max}$ 30° / $\gamma_{max}$ 15°	$\gamma_{max}$ 90° / $\beta_{max}$ 12,5°	$\gamma_{max}$ 90° / $\beta_{max}$ 12,5°	
[kN]	[kN]	[kN]	
27,0	11,7	13,5	

The weight of 1.0 t corresponds to 10.0 kN.

Given concrete strengths  $f_{cc}$  are cube compressive strengths at the time of the first lifting.

**Table 5: Maximum element weights**

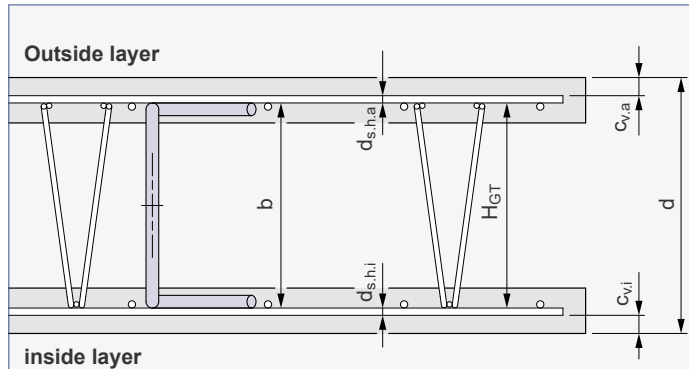
	Load case (mould adhesion not considered)	2 load bearing anchors symmetric to centre of gravity		4 load bearing anchors symmetric to centre of gravity with compensation rig			
		max. element weight $G$ ①		max. element weight $G$ ①			
		if $f_{cc}$ 15 N/mm <sup>2</sup> [t]	if $f_{cc}$ 19 N/mm <sup>2</sup> [t]	if $f_{cc}$ 15 N/mm <sup>2</sup> [t]	if $f_{cc}$ 19 N/mm <sup>2</sup> [t]		
Tilt-up	Lateral tension ② ( $\gamma = 90^\circ$ , $\beta = 0^\circ$ , cross beam required)		3,60	4,15		7,20	8,30
	Diagonal/lateral tension ② ( $\gamma = 90^\circ$ , $\beta = 15^\circ$ )		3,48	4,01		6,96	8,02
	Diagonal/lateral tension ② ( $\gamma = 90^\circ$ , $\beta = 30^\circ$ )		3,11	3,60		6,22	7,20
Transport	Axial tension ( $\beta = 0^\circ$ , cross beam required) with tilt-up table		4,15	4,15		8,30	8,30
	Diagonal tension ( $\beta = 15^\circ$ )		4,01	4,01		8,02	8,02
	Diagonal tension ( $\beta = 30^\circ$ )		3,60	3,60		7,20	7,20
	Lateral tension ② ( $\gamma = 90^\circ$ , $\beta = 0^\circ$ , cross beam required)		1,80	2,07		3,60	4,15
	Diagonal/lateral tension ② ( $\gamma = 90^\circ$ , $\beta = 15^\circ$ )		1,74	2,00		3,48	4,01
	Diagonal/lateral tension ② ( $\gamma = 90^\circ$ , $\beta = 30^\circ$ )		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 EN 13001 / DIN 15018 for a hoisting velocity of  $v = 90$  m/min.

② For lateral tension a steel angle (S235 / min. 50x50x6 /  $L = 250$  mm) must be installed as a corner guard (to protect the edge of the layer). The angle must be secured against falling down.

## Installation

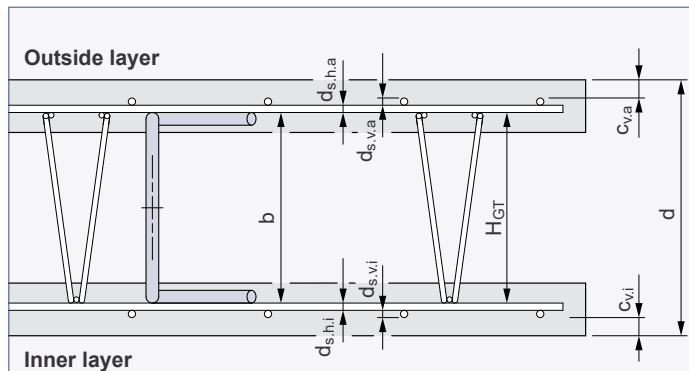
Calculation of the required anchor sizes (common formula: Anchor width  $b = \text{height of lattice girder } H_{GT}$ )



Picture 8 Horizontal reinforcement is placed in layers outside

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

- $b$  = 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)



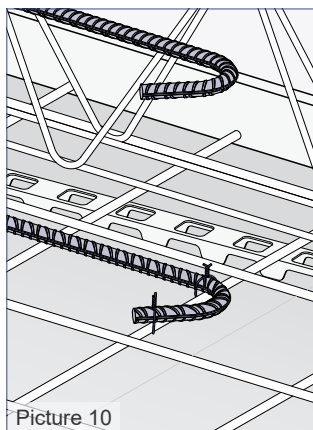
Picture 9 Horizontal reinforcement is placed in layers inside

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

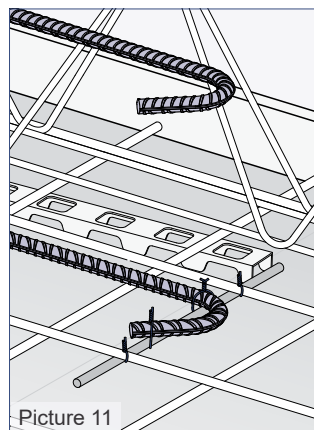
- $b$  = Width of Double-wall transport anchor
- $d$  = Thickness of double wall
- $c_{v,i}$  = Nominal cover (inside layer)
- $c_{v,a}$  = Nominal cover (outside layer)
- $d_{s,h,i}$  = Diameter horizontal reinforcement (inside layer)
- $d_{s,h,a}$  = Diameter horizontal reinforcement (outside layer)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

## Installation of Double-wall transport anchors

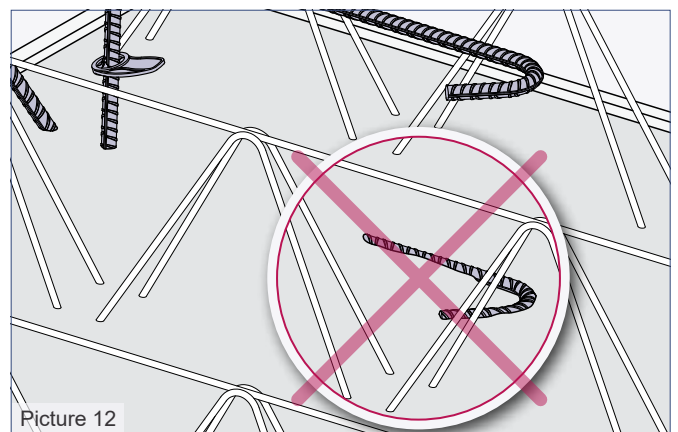
The Double-wall transport anchor must be installed flush to the top edge of the wall. For concreting the anchor must be fixed to its position. This can be done by connecting it to the lower transverse reinforcement or an additional mounting rebar.



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

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### PHILIPP GmbH

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

### PHILIPP GmbH

Sperberweg 37  
D-41468 Neuss  
Phone: + 49 (0) 2131 / 3 59 18-0  
Fax: + 49 (0) 2131 / 3 59 18-10  
info@philipp-group.de

### PHILIPP ACON Hydraulic GmbH

Hinter dem grünen Jäger 3  
D-38836 Dardesheim  
Phone: + 49 (0) 39422 / 95 68-0  
Fax: + 49 (0) 39422 / 95 68-29  
info@philipp-group.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

For more information visit our website: [www.philipp-group.de](http://www.philipp-group.de)