

Spherical head anchor - with offset



Installation and Application Instruction

Our products from the division BUILDING SOLUTIONS

SERVICES

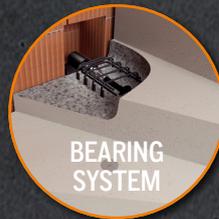
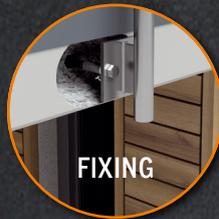
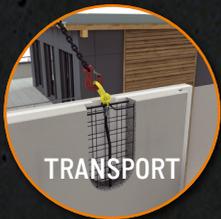
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- » Test reports -> for your safety and documentation.
- » Trainings -> the knowledge of your employees from planning and production is enhanced by our experts on site, online or via webinar.
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- » Close cooperation with notified bodies and - if necessary - approval of our solutions.

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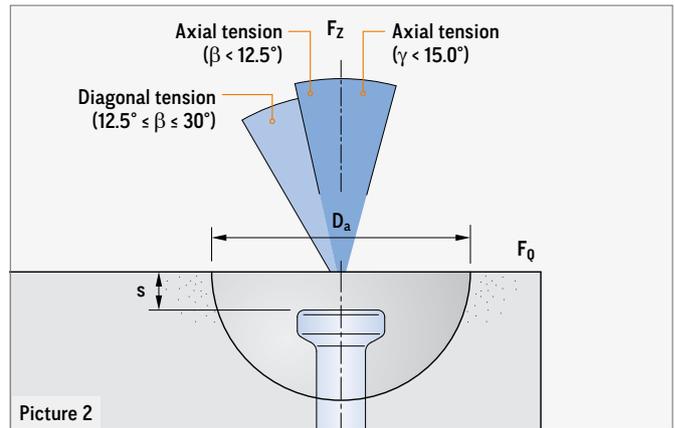
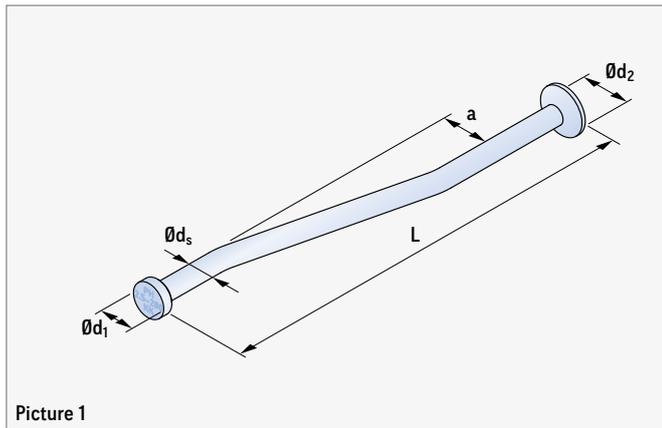


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PHILIPP Spherical head anchor - with offset

GENERAL PRODUCT INFORMATION



A Spherical head anchor with offset balances an inclination of reinforced concrete sandwich panels during lifting and mounting. It 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 Spherical head transport anchors requires the compliance with this Installation Instruction and Application Instruction as well as the General Installation and Application Instruction. The Application Instruction for the belonging PHILIPP lifting device (Spherical head Lifting clutch) as well as the data sheet of the belonging PHILIPP accessories (recess formers) must be followed also. The anchor may only be used in combination with the mentioned PHILIPP lifting devices.

Spherical head anchors 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 transport anchor is not specified for a repeated usage (e.g. ballasts for cranes).



EC DECLARATION OF CONFORMITY

The EC Declaration of Conformity (DoC) of the Spherical head anchor with offset can be downloaded from our website www.philipp-group.de or is available on request.



TABLE 1: DIMENSIONS

Ref. no.	Type	Dimensions						
		L (mm)	a (mm)	Øds (mm)	Ød1 (mm)	Ød2 (mm)	s (mm)	Da (mm)
81-025-268GK	KK 2.5	268	50	14	25	35	11	74
81-050-466GK	KK 5.0	466	60	20	36	50	15	94
81-075-664GK	KK 7.5	664	70	24	46	60	15	118
81-100-664GK	KK 10.0	664	70	28	46	70	15	118
81-150-825GK	KK 15.0	825	80	34	69	85	15	160
81-200-986GK	KK 20.0	986	80	38	69	98	15	160

GENERAL NOTES

MATERIALS

Spherical head anchors consist of a conforming to standards round steel bar with a forged head at both ends. The anchor can be supplied also in electro-galvanised, hot-dip galvanised and stainless steel material.

APPLICATION

Spherical head anchors can be used ideally to lift sandwich panels. Table 2 shows the bearing capacities for this application.

CORROSION

If concrete elements with installed Spherical head anchors are stored outside for a longer time (contact with rain or humidity causes moisture insight the recesses) corrosion may reduce the bearing capacity of the Spherical head anchor. Therefore the anchor may fail under load. In addition, marks on the concrete surface caused by corrosion may appear.

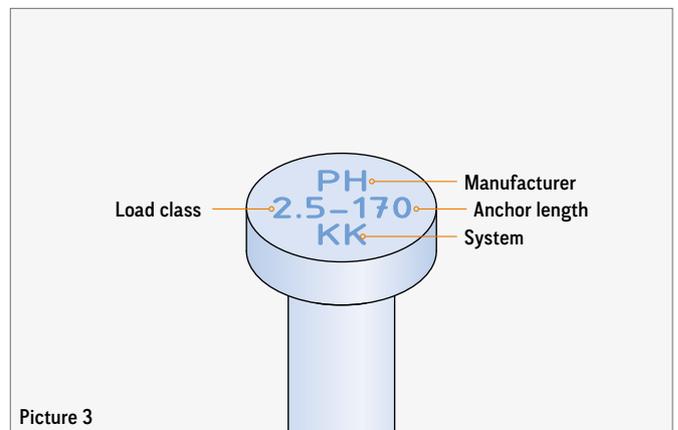
CONCRETE STRENGTH

Concrete strengths f_{cc} given in table 2 are based on concrete cube strengths at the time of first lifting.

MARKING

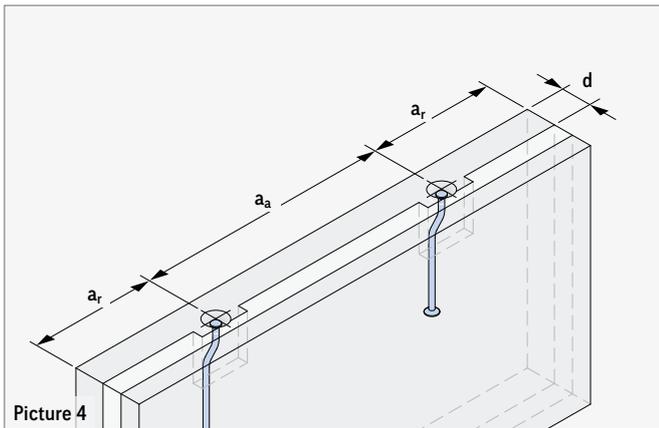
In order to distinguish the different sizes of Spherical head anchors a marking is given.

- » Marking on anchor head
 - › Manufacturer (PH)
 - › Load class (e. g. 2.5)
 - › Anchor length (e. g. 170)
 - › System (KK)
- » Marking on anchor foot
 - › CE-marking
 - › Material (e. g. A4 for stainless steel SS316)

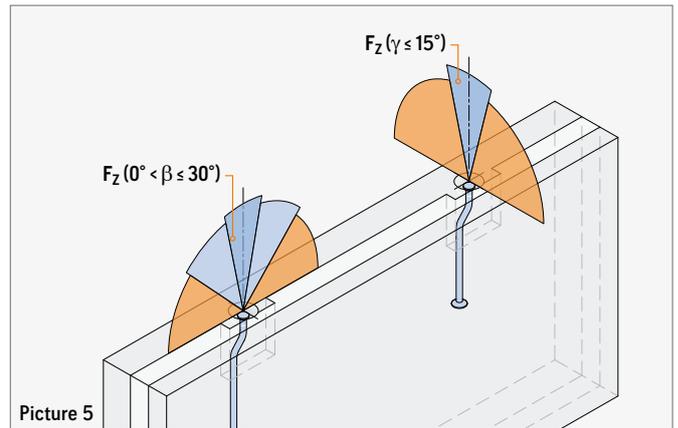


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BEARING CAPACITIES



Picture 4



Picture 5

ELEMENT THICKNESSES, CENTRE AND EDGE DISTANCES

The position and installation of Spherical head transport anchors in precast concrete units require minimum element dimensions and distances for a safe load transfer. Table 2 shows the minimum thickness d of a unit to cover the load directions axial and diagonal tension $\beta \leq 30^\circ$.



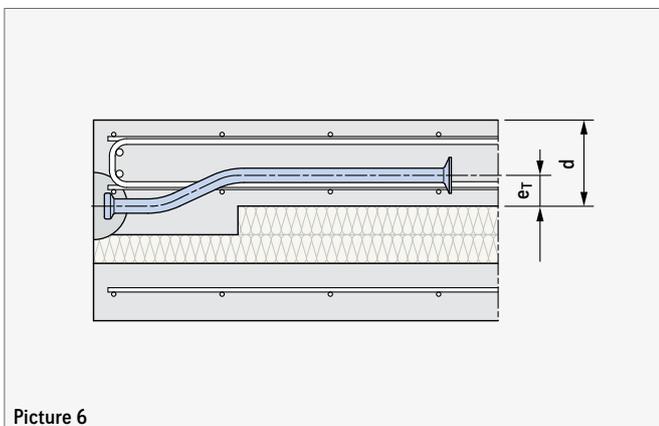
LATERAL TENSION

Lateral tension ($\gamma > 15^\circ$) is not permitted within the whole transport chain! This also applies to a diagonal tension with angle β more than 30° !

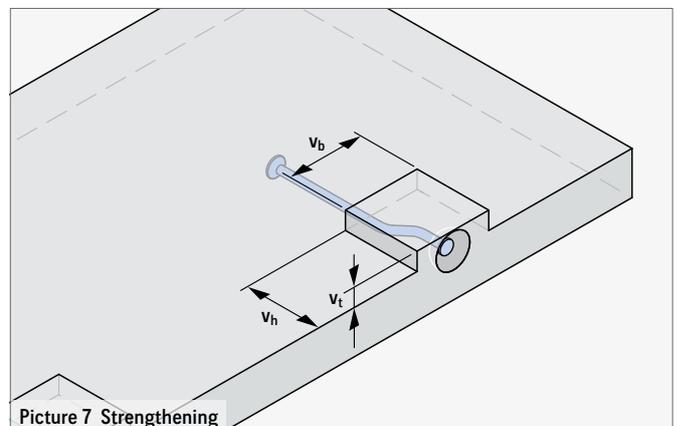
TABLE 2: PERMISSIBLE LOAD BEARING CAPACITIES

Load class	Element thicknesses and edge / centre distances				Strengthening			perm. F if $f_{cc} 15 \text{ N/mm}^2$		perm.F if $f_{cc} 25 \text{ N/mm}^2$		perm.F if $f_{cc} 35 \text{ N/mm}^2$	
								Axial tension perm. F_z $0^\circ - 12.5^\circ$	Diagonal tension perm. F_z $12.5^\circ - 30^\circ$	Axial tension perm. F_z $0^\circ - 12.5^\circ$	Diagonal tension perm. F_z $0^\circ - 30^\circ$	Axial tension perm. F_z $0^\circ - 12.5^\circ$	Diagonal tension perm. F_z $0^\circ - 30^\circ$
	d (mm)	e_T (mm)	a_a (mm)	a_r (mm)	v_t (mm)	v_b (mm)	v_h (mm)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
2.5	100	50	275	550	40	200	150	24	24.6	25	25	25	25
5.0	120	60	385	770	40	200	200	39.9	36.5	50	47.1	50	50
7.5	160	80	475	950	40	200	200	66.6	56.9	75	72.7	75	72.7
10.0	160	80	535	1070	40	200	200	77.5	62.5	100	80.7	100	95.5
15.0	240	120	625	1250	40	300	200	146.2	95.8	150	123.7	150	146.3
20.0	240	120	775	1550	40	300	200	164.5	105.3	200	136	200	160.9

To determine the correct load class please refer also to our General Installation and Application Instruction. The weight of 1.0 t corresponds to 10.0 kN



Picture 6

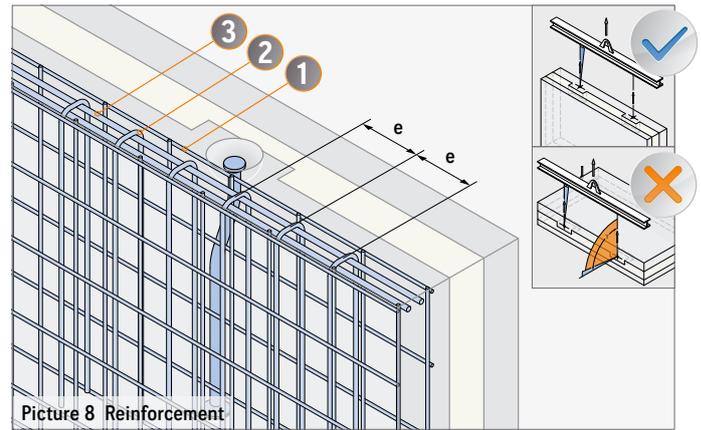


Picture 7 Strengthening

REINFORCEMENT

MINIMUM REINFORCEMENT (AXIAL TENSION)

For the installation of Spherical head anchors with offset the precast elements must be reinforced with a minimum surface reinforcement (table 3). This minimum surface reinforcement can be replaced by a comparable steel bar reinforcement.



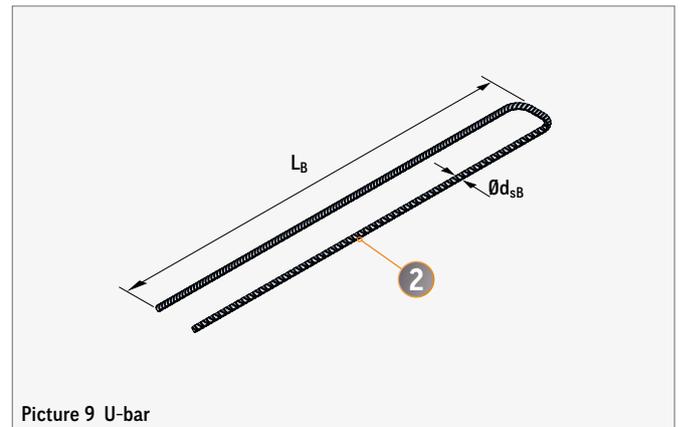
Picture 8 Reinforcement

EXISTING REINFORCEMENT

Existing static or constructive reinforcement can be taken into account for the minimum reinforcement according to table 3

An additional reinforcement (according to table 3, picture 8), consisting of U-bars and longitudinal bars, to the existing reinforcement near surface is necessary.

The user is personally responsible for the further load transfer into the concrete unit.



Picture 9 U-bar

CENTRE OF GRAVITY

The Spherical head anchor with offset must be installed above the centre of gravity, in order to avoid a tipping of the concrete unit during lifting.

TABLE 3: MINIMUM REINFORCEMENT

Load class	1	2			3	
	Mesh reinforcement (square) (mm ² /m)	Number (pcs.)	Ød _{sB} (mm)	L _B (mm)	e (mm)	Longitudinal reinforcement (B500A) Quantity and Ø (mm)
2.5	2 × 188	6	Ø 8	600	100	2 Ø 10
5.0	2 × 188	6	Ø 8	600	125	2 Ø 10
7.5	2 × 188	6	Ø 10	1000	125	2 Ø 14
10.0	2 × 188	6	Ø 10	1000	125	2 Ø 14
15.0	2 × 257	6	Ø 10	1000	125	2 Ø 14
20.0	2 × 377	6	Ø 10	1000	125	2 Ø 14

① The first U-Bar in the anchor area should be placed as close as possible to the anchor.

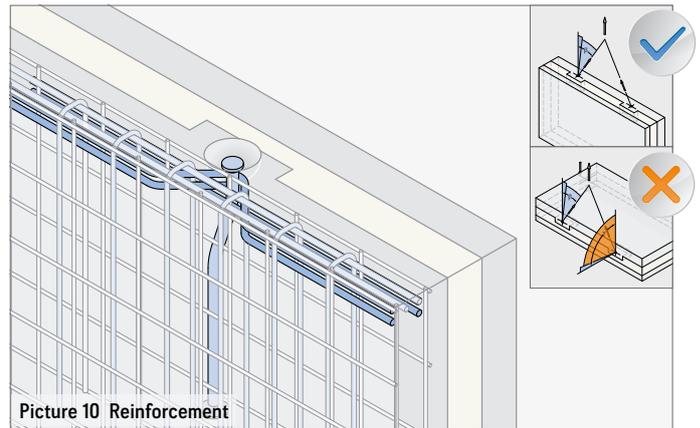
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REINFORCEMENT

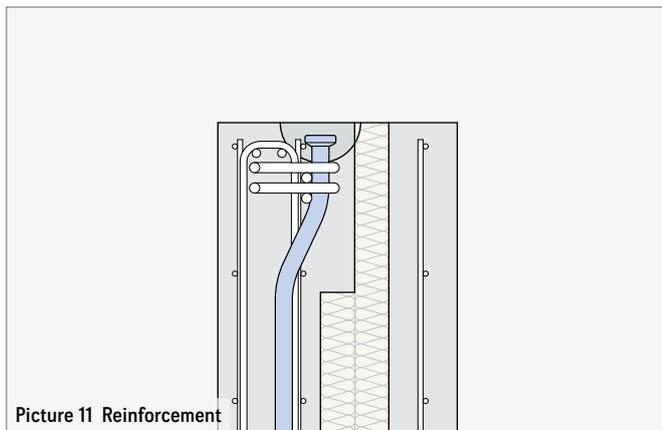
ADDITIONAL REINFORCEMENT FOR DIAGONAL TENSION

If the Spherical head transport anchor is used under diagonal tension ($\beta \geq 12.5^\circ$) an additional reinforcement is required. This consists of a reverse reinforcement and a longitudinal bar (see table 4).

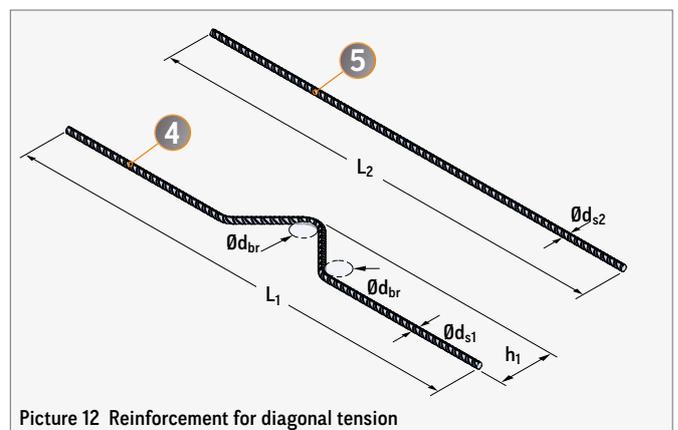
Here, a direct contact between the additional reinforcement and the Spherical head anchor has to be ensured.



Picture 10 Reinforcement



Picture 11 Reinforcement



Picture 12 Reinforcement for diagonal tension

TABLE 4: ADDITIONAL REINFORCEMENT FOR DIAGONAL TENSION (REQUIRED IF $\beta \geq 12.5^\circ$)

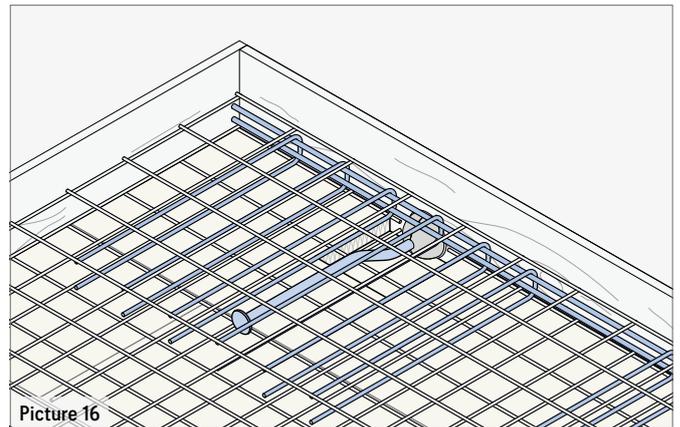
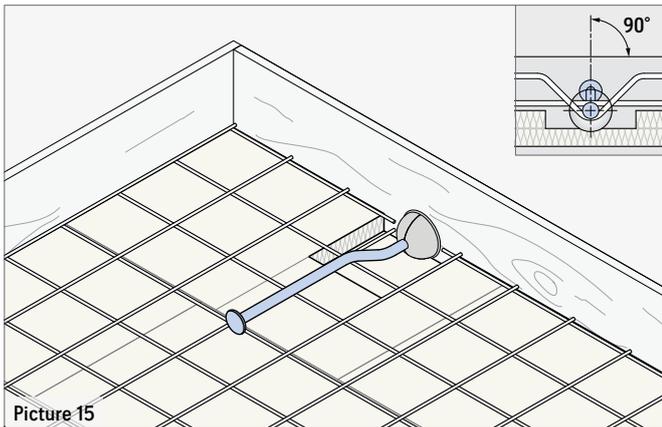
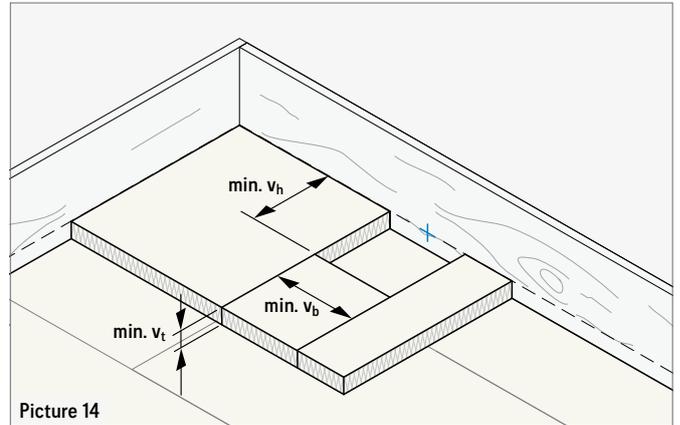
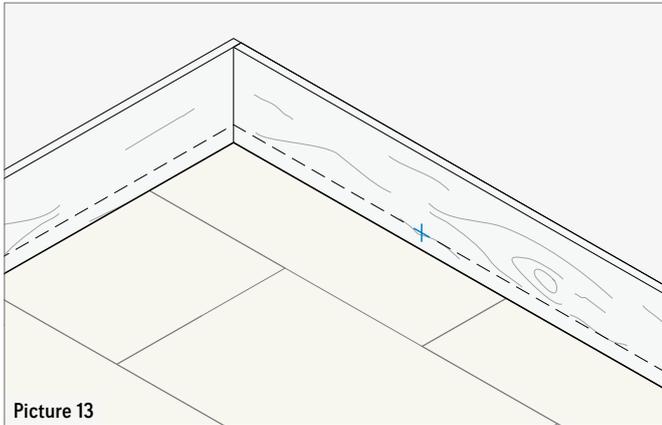
Load class	④ Reverse reinforcement (B500A)					⑤ Longitudinal reinforcement (B500A)		
	Number (pcs.)	$\varnothing d_{s1}$ (mm)	L_1 (mm)	$\varnothing d_{br}$ (mm)	h (mm)	Number (pcs.)	$\varnothing d_{s2}$ (mm)	L_2 (mm)
2.5	1	Ø 12	900	Ø 48	105	1	Ø 12	900
5.0	2					2		
7.5	3					3		
10.0	3					3		
15.0	4					4		
20.0	5					5		

INSTALLATION

INSTALLATION OF THE TRANSPORT ANCHOR

The Spherical head transport anchors with offset have to be fixed to the formwork by using suitable recess formers (rubber, steel or magnetic) in order to create recesses needed for the Spherical

head lifting clutch. The direction of the offset of the transport anchor must be installed always right-angled to the surface of the bearing layer.



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