

Spherical head anchor for tubes and shafts



Installation and Application Instruction

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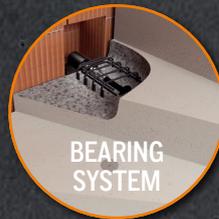
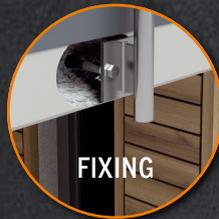
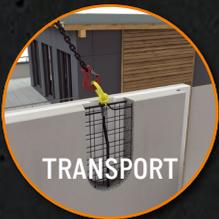
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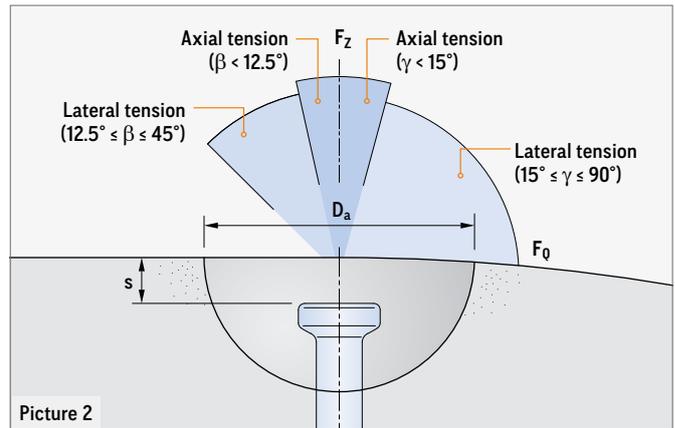
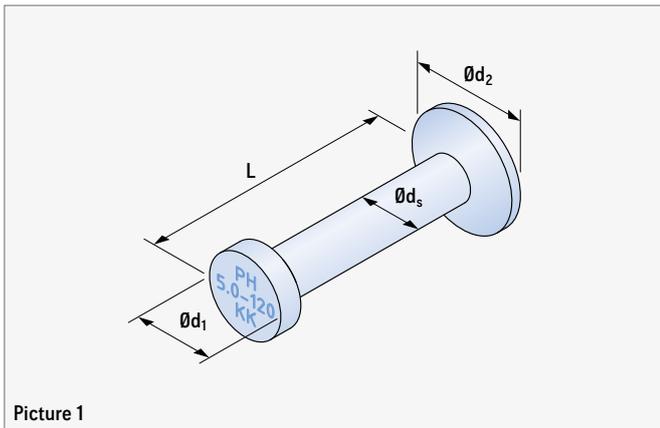


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PHILIPP Spherical head anchor for tubes and shafts

GENERAL PRODUCT INFORMATION



The Spherical head anchor 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 anchors requires the compliance with this Installation Instruction as well as the General Installation and Application Instruction. The Application Instructions for the belonging lifting device as well as for the accessories. The anchor may only be used in combination with 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 Installation and Application Instruction does not specify a repeated usage (e.g. ballasts for cranes) or a permanent fixation.

TABELLE 1: LOAD CLASSES AND DIMENSIONS

Ref. no.	Type	Dimensions					
		L (mm)	Ød _s (mm)	Ød ₁ (mm)	Ød ₂ (mm)	s (mm)	D _a (mm)
81-050-075	KK 5.0	75	20	36	50	15	94
81-050-085		85	20	36	50	15	94
81-050-095		95	20	36	50	15	94
81-050-110		110	20	36	50	15	94
81-050-120		120	20	36	50	15	94
81-075-085	KK 7.5	85	24	46	60	15	118
81-075-095		95	24	46	60	15	118
81-075-100		100	24	46	60	15	118
81-075-120		120	24	46	60	15	118
81-075-140		140	24	46	60	15	118
81-075-165	KK 10.0	165	24	46	60	15	118
81-100-115		115	28	46	70	15	118
81-100-120		120	28	46	70	15	118
81-100-135		135	28	46	70	15	118
81-100-150		150	28	46	70	15	118
81-100-170	KK 15.0	170	28	46	70	15	118
81-100-200		200	28	46	70	15	118
81-100-250		250	28	46	70	15	118
81-150-140		140	34	69	85	15	160
81-150-165		165	34	69	85	15	160
81-150-200	KK 20.0	200	34	69	85	15	160
81-150-300		300	34	69	85	15	160
81-200-165		165	39	69	98	15	160
81-200-200		200	39	69	98	15	160
81-200-250		250	39	69	98	15	160
81-200-340		340	39	69	98	15	160

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

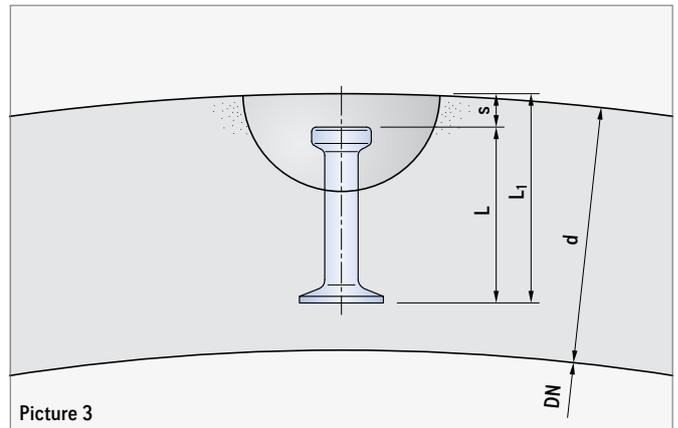
BEARING CAPACITIES

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 or stainless steel material.

APPLICATION

According to this instruction Spherical head anchors can be used to lift tubes and shafts. Table 2 shows the bearing capacities for this application.



Picture 3

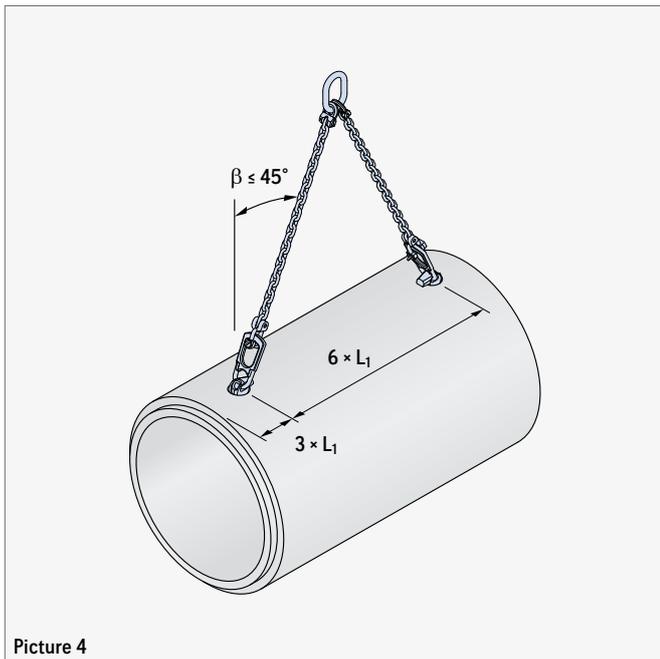
TABLE 2: PERMISSIBLE LOADS IN TUBES AND SHAFTS FOR AXIAL, DIAGONAL TENSION AND LATERAL TENSION

Ref. no.	Nominal diameter tube	Minimum tube wall thickness	Perm. F								
			if $f_{cc} 35 \text{ N/mm}^2$			if $f_{cc} 45 \text{ N/mm}^2$			if $f_{cc} 55 \text{ N/mm}^2$		
DN (mm)	d (mm)	Axial tension perm. F_z 0° - 12.5° (kN)	Diagonal tension perm. F_z 12.5° - 45° (kN)	Lateral tension perm. F_0 15° - 90° (kN)	Axial tension perm. F_z 0° - 12.5° (kN)	Diagonal tension perm. F_z 12.5° - 45° (kN)	Lateral tension perm. F_0 15° - 90° (kN)	Axial tension perm. F_z 0° - 12.5° (kN)	Diagonal tension perm. F_z 12.5° - 45° (kN)	Lateral tension perm. F_0 15° - 90° (kN)	
81-050-075	≥ 500	115	26.8	21.4	40.5	30.4	24.3	45.9	33.6	26.9	50.0
81-050-085		125	31.5	25.2	47.7	35.8	28.6	50.0	39.5	31.6	50.0
81-050-095		135	36.5	29.2	50.0	41.4	33.1	50.0	45.8	36.6	50.0
81-050-110		150	44.5	35.6	50.0	50.0	40.4	50.0	50.0	40.8	50.0
81-050-120		160	50.0	40.1	50.0	50.0	40.8	50.0	50.0	40.8	50.0
81-075-085	≥ 1200	125	31.3	25.0	47.3	35.5	28.4	53.6	39.2	31.4	59.3
81-075-095		135	36.3	29.0	54.8	41.1	32.9	62.2	45.5	36.4	68.7
81-075-100		140	38.9	31.1	58.7	44.1	35.3	66.6	48.7	39.0	73.6
81-075-120		160	49.8	39.8	75.0	56.4	45.2	75.0	62.4	49.9	75.0
81-075-140		180	61.6	49.2	75.0	69.8	55.8	75.0	75.0	59.2	75.0
81-075-165	205	75.0	59.2	75.0	75.0	59.2	75.0	75.0	59.2	75.0	
81-100-115	≥ 1400	155	46.7	37.4	70.6	52.9	42.4	80.0	58.5	46.8	88.4
81-100-120		160	49.5	39.6	74.8	56.1	44.9	84.8	62.0	49.6	93.8
81-100-135		175	58.2	46.6	88.0	66.0	52.8	99.8	73.0	58.4	100.0
81-100-150		190	67.4	54.0	100.0	76.5	61.2	100.0	84.5	67.6	100.0
81-100-170		210	80.4	64.3	100.0	91.2	71.3	100.0	100.0	71.3	100.0
81-100-200	240	100.0	71.3	100.0	100.0	71.3	100.0	100.0	71.3	100.0	
81-100-250	290	100.0	71.3	100.0	100.0	71.3	100.0	100.0	71.3	100.0	
81-150-140	≥ 1400	180	60.9	48.8	92.1	69.1	55.3	104.4	76.4	61.1	115.5
81-150-165		205	76.8	61.4	116.0	87.0	69.6	131.5	96.2	77.0	145.4
81-150-200		240	100.8	80.7	150.0	114.3	91.5	150.0	126.4	101.1	150.0
81-150-300		340	150.0	122.5	150.0	150.0	122.5	150.0	150.0	122.5	150.0
81-200-165	≥ 1400	205	76.4	61.1	115.5	86.7	69.3	130.9	95.8	76.6	144.8
81-200-200		240	100.5	80.4	151.8	113.9	91.1	172.1	125.9	100.7	190.3
81-200-250		290	138.4	110.7	200.0	156.9	125.5	200.0	173.5	138.8	200.0
81-200-340		380	200.0	140.0	200.0	200.0	140.0	200.0	200.0	140.0	200.0

The weight of 1.0 t corresponds to 10.0 kN.

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APPLICATION



Picture 4



Picture 5

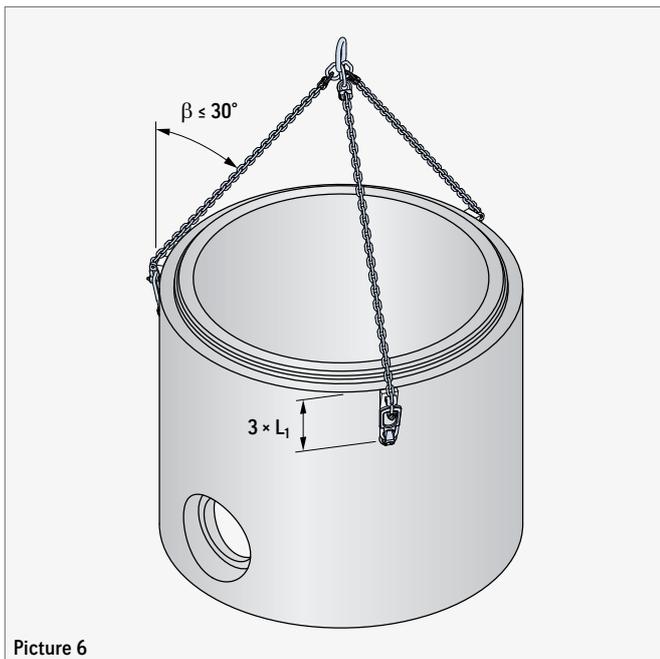
CENTRE AND EDGE DISTANCES, THICKNESSES OF THE TUBES

The position and installation of Spherical head anchors in precast concrete units require minimum element dimensions and centre 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 ($\beta = 0^\circ$ up to 45°) and lateral tension.

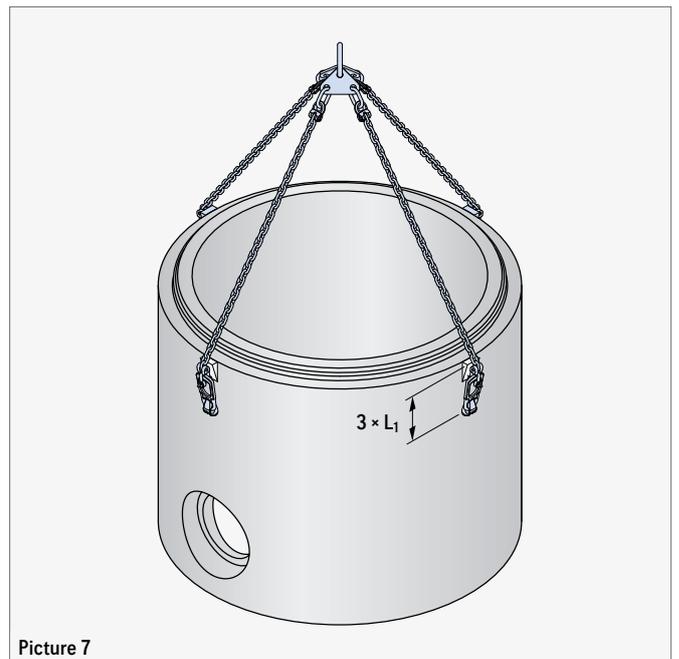
The minimum edge distance of the Spherical head transport anchor a_r is $\min. 3 \times L_1$ ($L_1 = L + s$) and the minimum distance between each Spherical head transport anchor a_a is $\min. 6 \times L_1$.

SPHERICAL HEAD TRANSPORT ANCHORS IN SHAFTS

Shafts and manholes are transported with three or four Spherical head anchors depending on the weight of the shaft. Here, the anchors are installed laterally in the wall (Picture 6). When using four load bearing anchors a balancer (compensation rig) must be used (Picture 7). To prevent damages to the upper concrete edge an inclination angle of $\beta \leq 30^\circ$ must not be exceeded (Picture 6). We recommend to protect the edge from spalling. The permissible lateral forces according to table 2 are valid. For the edge and centre distances the values specified in the previous chapter are applied accordingly.



Picture 6



Picture 7

REINFORCEMENT

REINFORCEMENT

For the usage of Spherical head anchors a minimum mesh reinforcement, double-layer, crosswise, 304 mm²/m is required.

At the first time of lifting the concrete must have a minimum strength of f_{cc} **35 N/mm²**. Should it be necessary to cut single bars for the installation of Spherical head anchors these have to be replaced by bars of the same diameter, strength and enough lap length according to EN 1992-1-1. The user is personally responsible for further transmission of load into the concrete unit.

CONCRETE

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

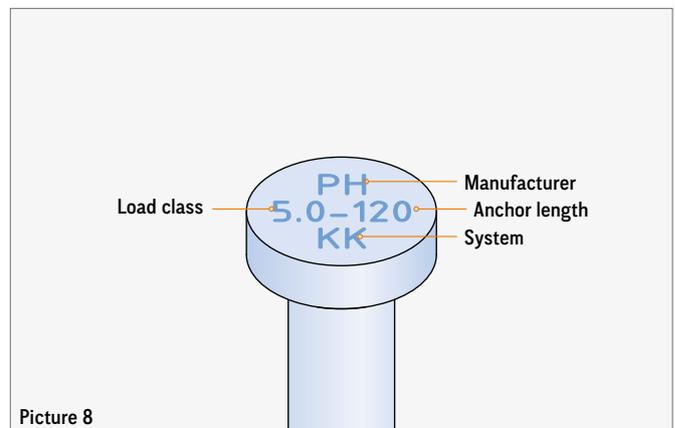
CORROSION

If the 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.

MARKING

In order to distinguish the different sizes of Spherical head anchors a marking with load class and length is given on the head of the anchor.

- » Marking on anchor head
 - > Manufacturer (PH)
 - > Load class (e. g. 2.0)
 - > Anchor length (e. g. 120)
 - > System (KK)
- » Marking on anchor foot
 - > CE marking
 - > Material (e. g. A4 for stainless steel SS316)



NO MANIPULATION!

Manipulations and weldings on Spherical head transport anchors are not permitted.

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