

Power System SL



Installation and Application Instruction

Our products from the division BUILDING SOLUTIONS

SERVICES

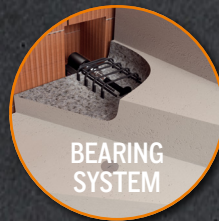
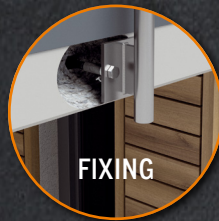
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- » Close cooperation with notified bodies and - if necessary - approval of our solutions.

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- » Our expert-team will support you at any time during your planning phase with detailed advice.



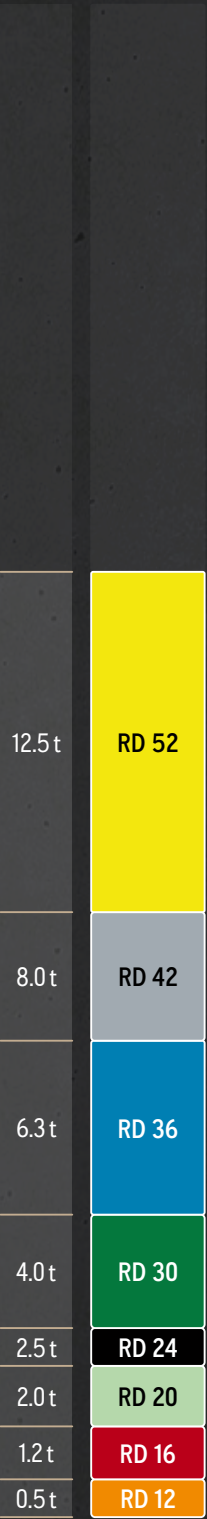
CONTENT

THE PHILIPP POWER SYSTEM SL	Page	4
Types, load bearing capacities and colour coding	Page	4
SYSTEM OVERVIEW	Page	5
POWER SYSTEM SL	Page	6
Features	Page	6
Combination	Page	6
Your benefits at a glance:	Page	6
GENERAL NOTES	Page	7
System description	Page	7
Load class system	Page	7
Materials	Page	7
Element thicknesses, centre and edge distances	Page	7
Concrete strength	Page	7
Marking of the Power System SL	Page	8
Selection Guide for transport anchors	Page	8
NOTES ON REINFORCEMENT	Page	9
Single-layer reinf., thin elements, add. reinf. for diagonal and lateral tension	Page	9
THREADED TRANSPORT ANCHOR SL- STRAIGHT TAIL	Page	10
THREADED TRANSPORT ANCHOR SL- STRAIGHT TAIL - WALL-LIKE ELEMENTS	Page	11
Axial tension	Page	11
Diagonal tension	Page	12
Lateral tension	Page	13
ELONGATION FOR THREADED TRANSPORT ANCHOR SL	Page	14
Calculation of the elongation length	Page	15
Load directions	Page	15
Installation	Page	16
LIFTY SL	Page	17
Application	Page	17
Safety notices, replacement criteria and inspection service	Page	18
Wear measurements	Page	19
ACCESSORIES	Page	20
Marking ring SL with clip	Page	20
Plastic recess former SL	Page	21
Key for Plastic recess former SL	Page	22
Sealing cap SL (stainless steel)	Page	23
Plastic recess former KHN	Page	24
Outside cap	Page	25

THREADED TRANSPORT ANCHOR SYSTEMS

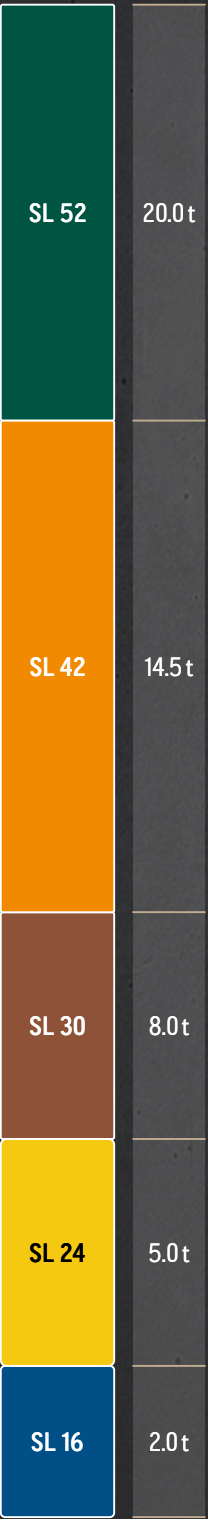
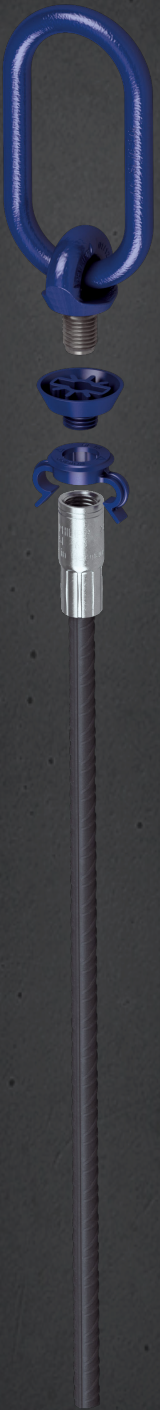
TYPES, LOAD BEARING CAPACITIES AND COLOUR CODING

System RD
(standard)



Example: Type RD 16 (1.2 t)

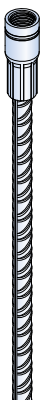
Power System SL
(heavy-duty left-hand)



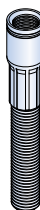
Example: Type SL 16 (2.0 t)

SYSTEM OVERVIEW

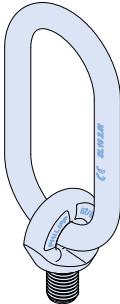
THREADED TRANSPORT ANCHOR SL - STRAIGHT TAIL PAGE 10

Type	Load class	Ref. no.	
SL 16	2.0	67M16SL	
SL 24	5.0	67M24SL	
SL 30	8.0	67M30SL	
SL 42	14.5	67M42SL	
SL 52	20.0	67M52SL	

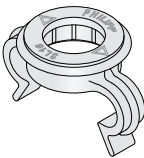
ELONGATION FOR THREADED TRANSPORT ANCHOR SL PAGE 14

Type	Load class	Ref. no.	
SL 16	2.0	67AVL16___SL	
SL 24	5.0	67AVL24___SL	
SL 30	8.0	67AVL30___SL	
SL 42	14.5	67AVL42___SL	
SL 52	20.0	67AVL52___SL	

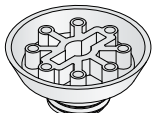
LIFTY SL PAGE 17

Type	Ref. no.	
SL 16	62LISL16	
SL 24	62LISL24	
SL 30	62LISL30	
SL 42	62LISL42	
SL 52	67M52SL	

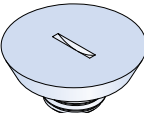
MARKING RING SL WITH CLIP PAGE 20

Type	Ref. no.	
SL 16	74KR16SLCLIP	
SL 24	74KR24SLCLIP	
SL 30	74KR30SLCLIP	
SL 42	74KR42SLCLIP	
SL 52	74KR52SLCLIP	

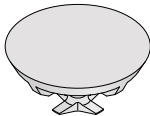
PLASTIC RECESS FORMER SL PAGE 21

Type	Ref. no.	
SL 16	72KHN16SL	
SL 24	72KHN24SL	
SL 30	72KHN30SL	
SL 42	72KHN42SL	
SL 52	72KHN52SL	


STAINLESS STEEL SEALING CAP SL PAGE 23

Type	Ref. no.	
SL 16	72ASKHNSL16VA-S	
SL 24	72ASKHNSL24VA-S	
SL 30	72ASKHNSL30VA-S	
SL 42	72ASKHNSL42VA-S	
SL 52	72ASKHNSL52VA-S	

SEALING CAP KHN (PLASTIC) PAGE 24

Type	Ref. no.	
16	72ASKHN040	
24	72ASKHN055	
30	72ASKHN070	
42	72ASKHN096	
52		

OUTSIDE RETAINING CAP PAGE 25

Type	Ref. no.	
16	72ASS16	
24	72ASS24	
30	72ASS30	
42	72ASS42	
52	72ASS52	

POWER SYSTEM SL

The Power System SL is an optimized transport anchor system and combines the Threaded transport anchor SL, the lifting device Lifty SL and the corresponding Recess formers as well as Sealing caps.

In contrast to the standard Threaded transport anchor system RD the Power System SL consists of only five types (load classes), which have significantly higher bearing capacities compared to the standard RD system. To avoid a mix-up with the standard RD system, the Power System SL has a left-hand thread.

FEATURES

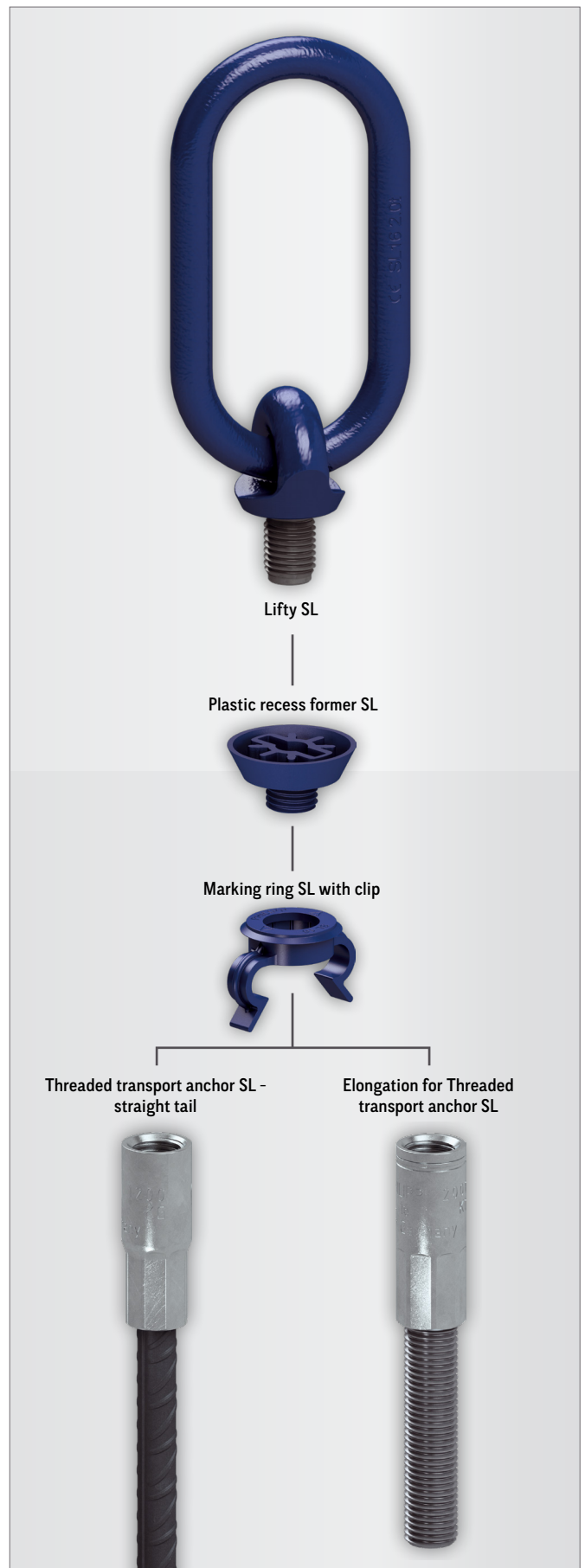
- » Stand-alone transport anchor system with higher load-bearing capacities
- » Matching system components with consistent colour coding

COMBINATIONS

- » Lifting devices SL
 - › Lifty SL
- » Recess formers SL
 - › Plastic recess former SL
- » Sealing caps
 - › Sealing cap (plastic)
 - › Sealing cap (stainless steel) SL
 - › Externalcap
- » Marking ring SL with clip
- » Transport anchors SL
 - › Threaded transport anchor SL
 - › Elongation for Threaded transport anchor SL

YOUR BENEFITS AT A GLANCE:

- » Higher load capacities with comparable anchor dimensions
- » Maximum safety due to mistake-free left-hand thread
- » Simplified design
- » Thinner dimensions of precast units possible
- » One lifting device for all load directions and applications
- » Optimized storage because of smaller product range



GENERAL NOTES

The Power System SL is part of the PHILIPP Transport anchor system and complies with the VDI/BV-BS Guideline "Lifting inserts and lifting systems for precast concrete elements" (VDI/BV-BS 6205).

The use of Power System SL requires the compliance with this Installation and Application Instruction as well as the General Installation and Application Instruction. The anchor may only be used in combination with the mentioned PHILIPP Lifty SL. PHILIPP Transport anchors SL 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.

SYSTEM DESCRIPTION

The Power System SL consists of a cast-in anchor and a lifting device (Lifty SL). The Threaded transport anchor SL must be fixed either with the recess former SL. By means of the Lifty SL, which is screwed to the anchor set in concrete, the precast element is lifted and installed. Both the geometry of the Lifty SL and the Threaded transport anchors SL are suitable for any load direction.

THE LOAD CLASS SYSTEM

All components of the Power System SL are classified by load classes. A mix-up is not possible, as the Lifty SL cannot be screwed to anchors of another load class. Additionally, the load classes are colour-coded.

MATERIALS

The Threaded transport anchor SL consists of a straight reinforcement bar B500B with crimped-on insert. All threaded inserts are made of special high precision steel tubes and are galvanized according to common standards. This galvanization protects the anchor temporarily from the storage at the producer site to the final installation in the concrete element.

The Lifty SL consists of a forged ring bolt with thread and a welded chain link.

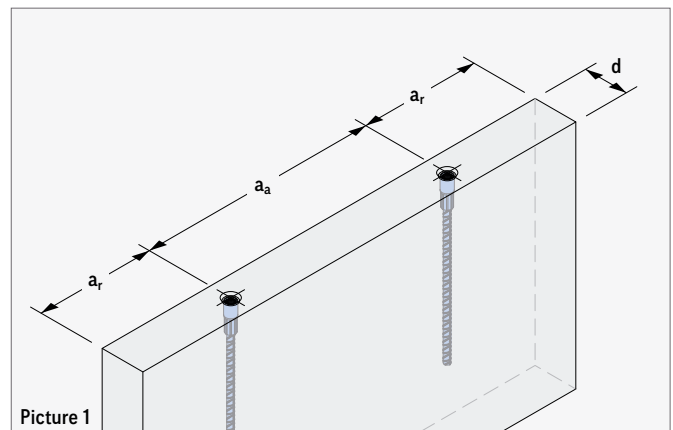
The Elongation for Threaded transport anchor SL consists of a threaded rod with a crimped-on insert. These threaded inserts are made of special high precision steel tubes and are galvanised according to common standards. This galvanisation protects the anchor temporarily, from the storage at the producer site to the final installation in the concrete element.

ELEMENT THICKNESSES, CENTRE AND EDGE DISTANCES

The installation and positioning of the Threaded transport anchor SL in precast concrete elements requires compliance with minimum component thicknesses d , minimum center distances a_a and minimum edge distances a_r (s. picture 1) to ensure safe load transfer. The values can be found in the corresponding load tables.

CONCRETE STRENGTH

At the first time of lifting the concrete must have a minimum strength f_{cc} in accordance with the tables for the respective load case. Concrete strengths f_{cc} are cube strengths at the time of the first lifting.



EG-KONFORMITÄTSERKLÄRUNG

The EC Declaration of Conformity (DoC) of the Threaded transport anchor SL, Lifty SL and Elongation for Threaded transport anchor SL can be downloaded from our website www.philipp-group.de or is available on request.



GENERAL NOTES

MARKING OF THE POWER SYSTEM SL

LIFTING DEVICE:

- » Colour code (colour painted)
- » Manufacturer (PHILIPP)
- » CE mark
- » Type (system / load class)
- » Bearing capacity (e.g. 2.0 t)
- » Year of production (back side)

MARKING RING:

- » Colour code
- » Manufacturer (PHILIPP)
- » Type (system / load class)

TRANSPORT ANCHOR:

- » Manufacturer (PHILIPP)
- » CE mark
- » Type (system / load class)
- » Max. load bearing capacity (e.g. 2000 KG)

SELECTION GUIDE FOR TRANSPORT ANCHORS

STEP 1:

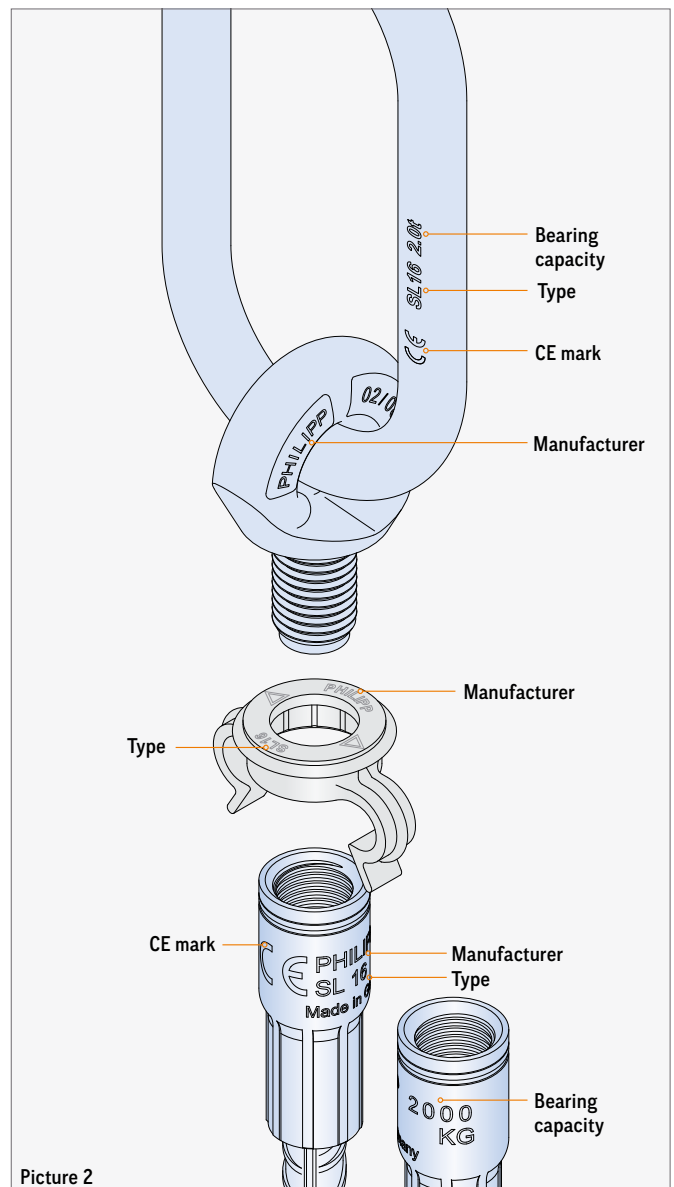
For each element thickness the maximum possible threaded transport anchor size depending on the load case are given in table 1.

TABLE 1: ELEMENT THICKNESSES AND MAX. ANCHOR SIZES
FOR $f_{cc} \geq 15 \text{ N/mm}^2$ / $f_{cc} \geq 25 \text{ N/mm}^2$

Element thickness d (mm)	Axial tension $\beta_{\max} 12.5^\circ$ $\gamma_{\max} 15^\circ$	Transport anchor (type)		Lateral tension $\beta_{\max} 45^\circ$ $\gamma_{\max} 90^\circ$
		Diagonal tension $\beta_{\max} 30^\circ$ $\gamma_{\max} 15^\circ$	$\beta_{\max} 45^\circ$ $\gamma_{\max} 15^\circ$	
80	SL 16	SL 16	SL 16	SL 16
100	SL 24	SL 24	SL 24	SL 24
120	SL 30	SL 30	SL 30	SL 30
140				
160	SL 42	SL 42	SL 42	SL 42
180				
200	SL 52	SL 52	SL 52	SL 52
220				
240				

STEP 2:

Details of the load-bearing capacities and boundary conditions as a function of the concrete strength are given in the tables for the individual load cases.



Picture 2

NOTES ON REINFORCEMENT

REINFORCEMENT

When using the Power system SL precast units must be reinforced with a minimum reinforcement. This can vary depending on the load case and can be found in the reinforcement tables for the individual load cases. The user is personally responsible for further transfer of load into the concrete unit.



EXISTING REINFORCEMENT!

Existing static or constructive reinforcement can be taken into account for the minimum reinforcement of the corresponding load case.

SINGLE-LAYER REINFORCEMENT

In order to ensure a central anchor position in the element, the mesh reinforcement has to be cut in this area (see picture 3) in case of a single-layer reinforcement.



LOAD DIRECTIONS!

The installation of a single-layer reinforcement requires for all subsequent loads (e.g. within a transport chain) the attention of the load directions.

REINFORCEMENT INSTRUCTIONS FOR THIN ELEMENTS

In thin elements it might be necessary to cut the longitudinal reinforcement close to the insert (counter brace) in order to have enough concrete cover in this area. Best position for the longitudinal reinforcement should be below the crimping (s. picture 4).

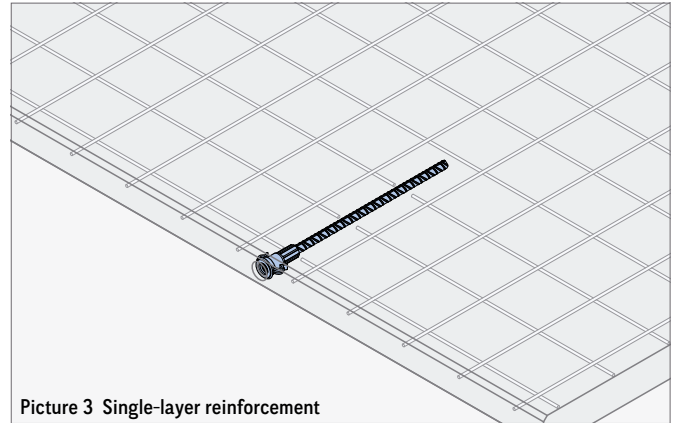


PRESSURE CONTACT!

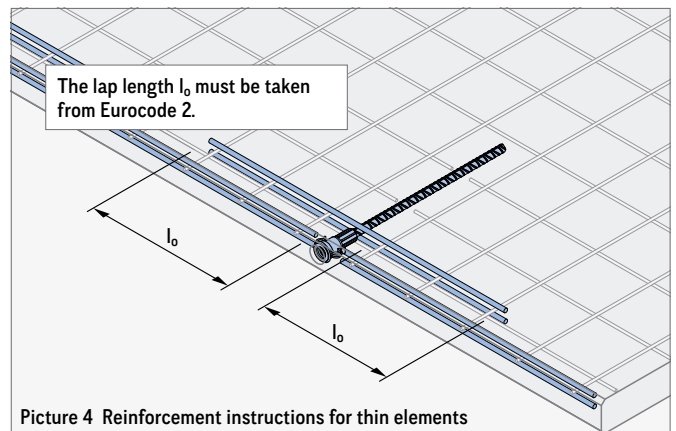
In general, the area of pressure contact between the additional reinforcement and the insert must lie within the thread reach e of the insert.

ADD. REINFORCEMENT FOR DIAGONAL OR LATERAL TENSION

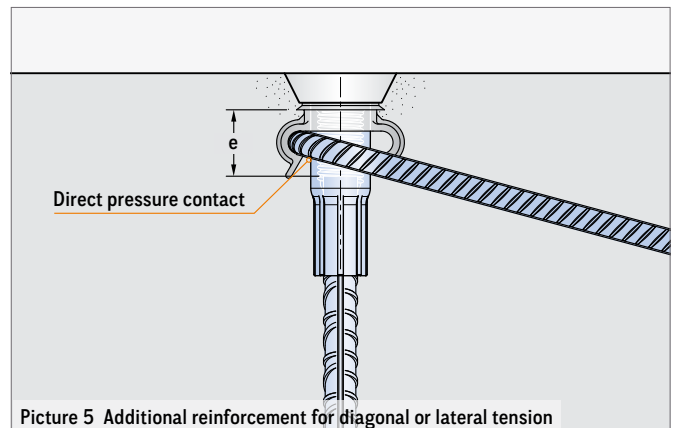
Additional reinforcement for diagonal or lateral tension has to be installed with pressure contact to the anchor insert. The position of the direct pressure contact must be within the thread reach e of the insert (see picture 5). By using the Marking ring with clip (74KR_SLCLIP) this position is guaranteed.



Picture 3 Single-layer reinforcement

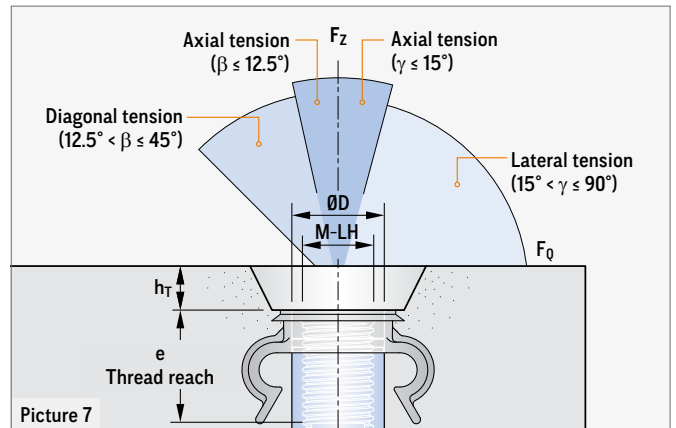
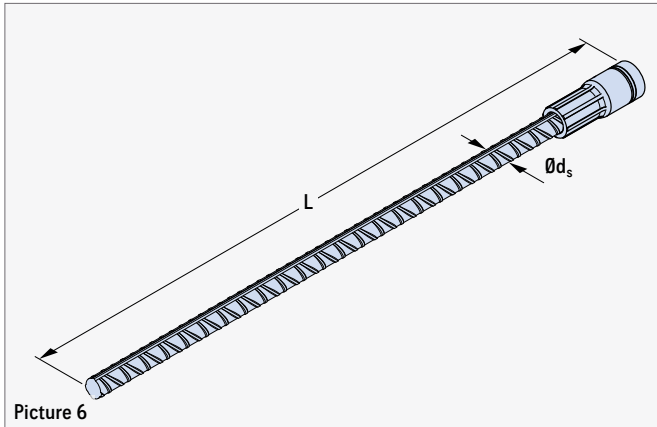


Picture 4 Reinforcement instructions for thin elements



Picture 5 Additional reinforcement for diagonal or lateral tension

THREADED TRANSPORT ANCHOR SL - STRAIGHT TAIL

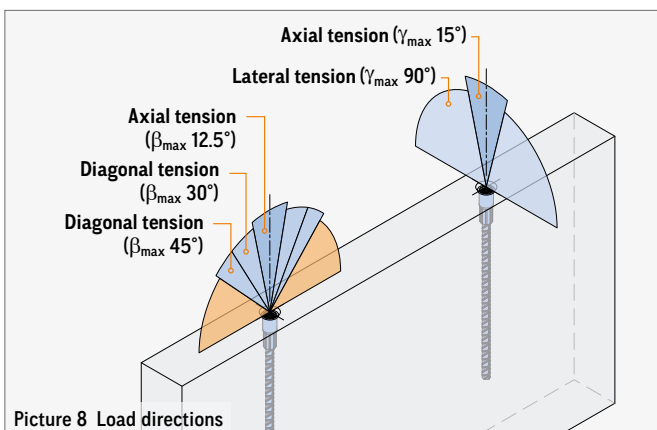


The Threaded transport anchor SL is used for a face-sided installation in wall-like concrete elements. It is part of the PHILIPP Transport anchor system SL and complies with the VDI/BV-BS Guideline

"Lifting inserts and lifting systems for precast concrete elements" (VDI/BV-BS 6205). This transport anchor is not specified for a repeated usage (e.g. ballasts for cranes) or a permanent fixation.

TABLE 2: THREADED TRANSPORT ANCHOR SL - STRAIGHT TAIL

Ref. no. galvanised	Type	Load class	Dimensions					
			M-LH	L (mm)	ØD (mm)	Ød _s (mm)	e (mm)	h _T (mm)
67M16SL	SL 16	2.0	16	455	21.0	12	27	10
67M24SL	SL 24	5.0	24	580	31.0	20	43	10
67M30SL	SL 30	8.0	30	750	39.5	25	56	10
67M42SL	SL 42	14.5	42	1100	54.0	32	65	12
67M52SL	SL 52	20.0	52	1200	67.0	40	100	12



! CAPACITY FOR LATERAL TENSION!

Threaded transport anchors SL have a lower load-bearing capacity under lateral tension compared to axial or diagonal tension. This shall be considered in the design. Because only half of the element weight needs to be lifted when installing wall elements manufactured in a horizontal position (see also the General Installation and Application Instructions), it is important to ensure that the lateral bearing capacity is at least half as high as the axial or diagonal capacity.

THREADED TRANSPORT ANCHOR SL - STRAIGHT TAIL • WALL-LIKE ELEMENTS • AXIAL TENSION

When using Transport anchors SL under axial tension β_{\max} 12.5° / γ_{\max} 15° precast units must be reinforced with a minimum reinforcement (table 3). This minimum reinforcement can be replaced by a comparable steel bar reinforcement.

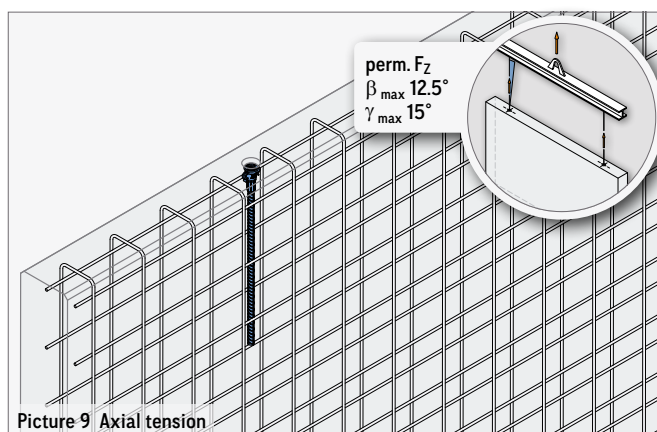


TABLE 3: AXIAL TENSION FOR $f_{cc} \geq 15 \text{ N/mm}^2 / 25 \text{ N/mm}^2$

Load class	Min. element thicknesses min. centre distances and min. edge distances			$\beta_{\max} 12.5^\circ / \gamma_{\max} 15^\circ$		
				perm. F_Z		Mesh reinforcement (square) (mm ² /m)
	d (mm)	a _a (mm)	a _r (mm)	f _{cc} ≥ 15 N/mm ² (kN)	f _{cc} ≥ 25 N/mm ² (kN)	
2.0	80 ①	930	465	20.0	20.0	1 × #188 ①
	100					2 × #188 ②
	120					
5.0	100	1180	590	50.0	50.0	2 × #188 ②
	120					
	140					
	160					
8.0	120	1520	760	76.1	80.0	2 × #188 ②
	140			79.8		
	160			80.0		
	180					
14.5	160	2230	1115	145.0	145.0	2 × #188 ②
	180					
	200					
	220					
20.0	240	2430	1215	181.7	200.0	2 × #257 ②
	200					

The weight of 1.0 t corresponds to 10.0 kN.

① For an element thickness of 80 mm only a single-layer reinforcement Q188 in central position is required.

② The reinforcement shall be formed as a double-bended mesh reinforcement or with equivalent stirrups.

THREADED TRANSPORT ANCHOR SL - STRAIGHT TAIL • WALL-LIKE ELEMENTS • DIAGONAL TENSION

If the Threaded transport anchor SL is used under diagonal tension $\beta > 12.5^\circ$ an additional reinforcement according to table 4 is required. Here, the reinforcement for diagonal tension is placed contrarily to the tensile direction (picture 10) and must have direct pressure contact to the anchor insert in the peak of its bending.

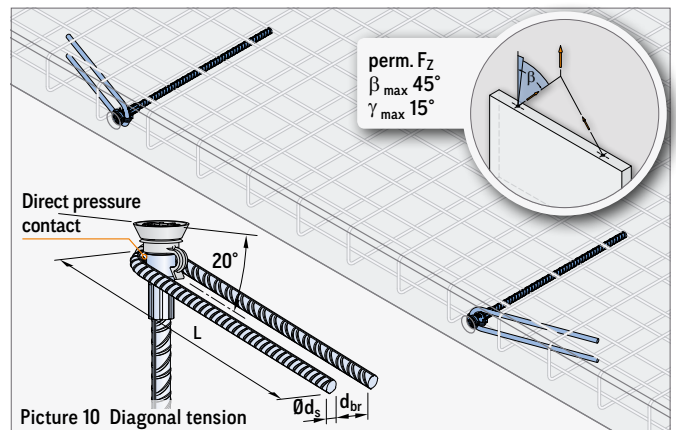


TABLE 4: DIAGONAL TENSION FOR $f_{cc} \geq 15 \text{ N/mm}^2 / 25 \text{ N/mm}^2$

Load class	Min. element thicknesses min. centre distances and min. edge distances			$\beta_{\max} 30^\circ / \gamma_{\max} 15^\circ$						$\beta_{\max} 45^\circ / \gamma_{\max} 15^\circ$						
				perm. F_z		Additional reinforcement for diagonal tension				perm. F_z		Additional reinforcement for diagonal tension				
				f_{cc} $\geq 15 \text{ N/mm}^2$	f_{cc} $\geq 25 \text{ N/mm}^2$	Mesh reinforcement (square)	Reinforcement for diagonal tension (B500B)			f_{cc} $\geq 15 \text{ N/mm}^2$	f_{cc} $\geq 25 \text{ N/mm}^2$	Mesh reinforcement (square)	Reinforcement for diagonal tension (B500B)			
	d (mm)	a _a (mm)	a _r (mm)	(kN)	(kN)	(mm ² /m)	Ød _s (mm)	L (mm)	Ød _{br} (mm)	(kN)	(kN)	(mm ² /m)	Ød _s (mm)	L (mm)	Ød _{br} (mm)	
2.0	80	930	465	16.2	19.2	1 × #188 ①	10	300	24	16.2	19.2	1 × #188 ①	10	300	24	
	100			16.3		2 × #188 ②				16.3		2 × #188 ②				
	120			16.5		16.5										
5.0	100	1180	590	42.5	42.5	2 × #188 ②	12	550	34	42.5	42.5	2 × #188 ②	12	550	34	
	120															
	140															
8.0	160	1520	760	61.5	66.4	2 × #188 ②	16	700	41	61.5	66.4	2 × #188 ②	16	700	41	
	140															64.5
	160															66.4
	180															
14.5	160	2230	1115	116.0	116.0	2 × #188 ②	20	1000	64 ④	116.0	116.0	2 × #188 ②	20	1000	64	
	180															
	200															
	220															
20.0 ③	240															
20.0 ③	200	2430	1215	148.4	191.6	2 × #257 ②	20	1000	100 ④	104.9	135.5	2 × #257 ②	20	1000	100	

The weight of 1.0 t corresponds to 10.0 kN.

① For an element thickness of 80 mm only a single-layer reinforcement Q188 in central position is required.

② The reinforcement shall be formed as a double-bended mesh reinforcement or with equivalent stirrups.

③ For type SL 52 B500A and B500B is possible.

④ Cracks in the area of bending of the rebar are not allowed!

THREADED TRANSPORT ANCHOR SL - STRAIGHT TAIL • WALL-LIKE ELEMENTS • LATERAL TENSION

If a Threaded transport anchor is loaded by lateral tension with an inclination of $\beta > 15^\circ$ an additional reinforcement is required (table 5). The reinforcement for lateral tension can be done as a single (picture 11) or double reinforcement bar (picture 12). There must be direct pressure contact between the insert of the transport anchor and the reinforcement in the peak of the bending. The reinforcement for lateral tension is installed in the front side of the wall contrarily to the load direction.

Tilting of walls can cause diagonal and lateral tension at the same time (picture 12). In this case only the reinforcement for lateral

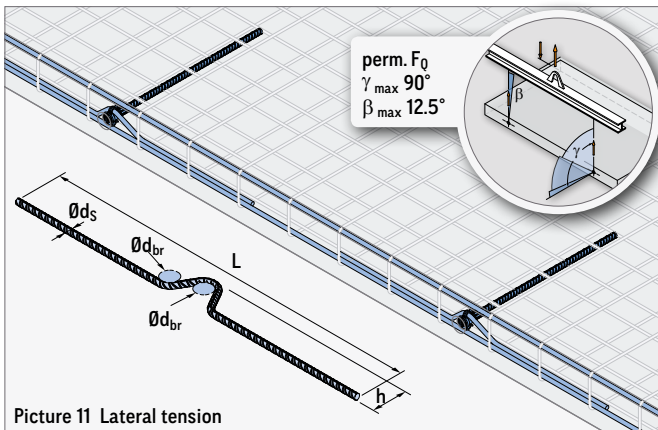
tension is required as a double reinforcement bar. The diagonal tension is already covered by using this reinforcement.

If a tilt-up or turn-over is done during mounting, the position of the lateral reinforcement must be noticed (only with single reinforcement bar acc. to picture 11).

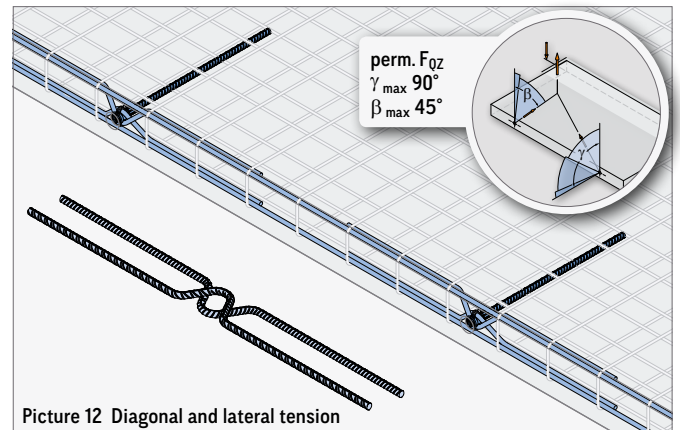


AXIAL- / DIGITAL- / LATERAL TENSION!

Der Hinweis (page 10) zu den unterschiedlichen Axial-, Schräg- und Querkzugtragfähigkeiten ist zu beachten!



Picture 11 Lateral tension



Picture 12 Diagonal and lateral tension

TABLE 5: LATERAL TENSION FOR $f_{cc} \geq 15 \text{ N/mm}^2 / 25 \text{ N/mm}^2$

Load class	Min. element thicknesses min. centre distances and min. edge distances			$\beta_{\max} 45^\circ / \gamma_{\max} 90^\circ$							
				perm. F_z		Additional reinforcement for lateral tension					
				f_{cc} $\geq 15 \text{ N/mm}^2$	f_{cc} $\geq 25 \text{ N/mm}^2$	Mesh reinforcement (square)	Reinforcement for lateral tension (B500B)			Longitudinal reinforcement (B500B)	
	d (mm)	a _a (mm)	a _r (mm)	(kN)	(kN)	(mm ² /m)	$\emptyset d_s$ (mm)	L (mm)	h (mm)	$\emptyset d_{br}$ (mm)	Quantity $\times \emptyset$ / Length (mm)
2.0	80	930	465	5.4	7.0	1 \times #188 ①	10	300	40	24	2 \times \emptyset 10 / 930
	100			7.7	10.0	2 \times #188 ②			50		
	120			10.3	13.3				60		
5.0	100	1180	590	10.6	13.7	2 \times #188 ②	12	550	57	34	2 \times \emptyset 12 / 1180
	120			13.8	17.8				67		
	140			17.5	22.6				77		
	160			21.6	27.9				87		
8.0	120	1520	760	15.9	20.5	2 \times #188 ②	16	700	76	41	2 \times \emptyset 14 / 1520
	140			20.3	26.2				86		
	160			25.1	32.4				96		
	180			30.3	39.2				106		
14.5	160	2230	1115	27.4	35.3	2 \times #188 ②	20	1000	107	64 ④	2 \times \emptyset 14 / 2230
	180			33.1	42.7				117		
	200			39.6	51.1				127		
	220			46.3	59.8				137		
	240			53.8	69.4				147		
20.0 ③	200	2430	1215	29.5	45.7	2 \times #257 ②	20	1000	120	100 ④	2 \times \emptyset 14 / 2800

The weight of 1.0 t corresponds to 10.0 kN.

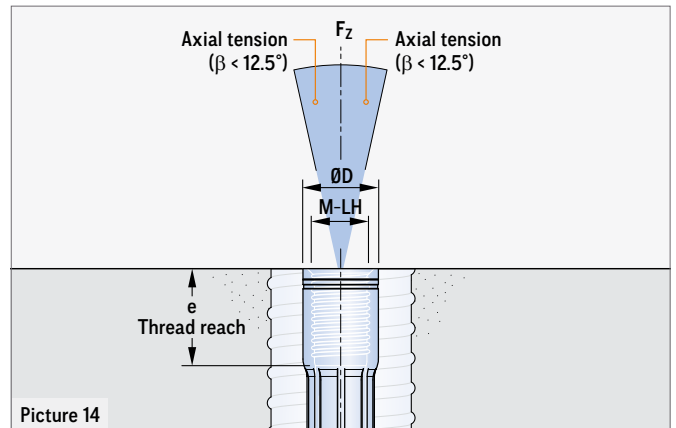
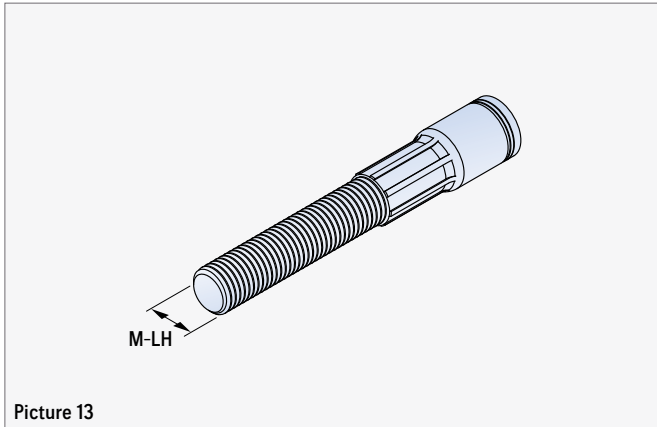
① For an element thickness of 80 mm only a single-layer reinforcement Q188 in central position is required.

② The reinforcement shall be formed as a double-bended mesh reinforcement or with equivalent stirrups.

③ For type SL 52 B500A and B500B is possible.

④ Cracks in the area of bending of the rebar are not allowed!

ELONGATION FOR THREADED TRANSPORT ANCHOR SL



The Threaded transport anchor elongation SL is designed especially for the transport of precast cubicles with additional attached roof slabs. The elongation is screwed through a recess in the roof slab in the transport anchor of the cubicle. The Threaded transport anchor elongation SL is part of the PHILIPP Transport anchor system and complies with the VDI/BV-BS Guideline "Lifting anchors and lifting systems for precast concrete elements" (VDI/BV-BS 6205). The use of Threaded transport anchor elongation SL requires the compliance with this Installation and Application Instruction as well as the General Installation and Application Instruction.

The elongation may only be used in combination with the mentioned PHILIPP Lifty SL. Threaded transport anchor elongation SL is 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. The elongation is not specified for a repeated usage (e.g. ballasts for cranes) or a permanent fixation.

TABLE 6: DIMENSIONS - ELONGATION FOR THREADED TRANSPORT ANCHOR SL

Ref. no. galvanised ⑤	Type	perm. F 0° - 12.5° (kN)	Dimensions				
			M-LH	ØD (mm)	L _{V,min} (mm)	e (mm)	e _{A,min} (mm)
67AVL16___SL	SL 16	20.0	16	21.0	55	27	20
67AVL24___SL	SL 24	50.0	24	31.0	85	43	29
67AVL30___SL	SL 30	80.0	30	39.5	105	56	36
67AVL42___SL	SL 42	145.0	42	54.0	135	65	51
67AVL52___SL	SL 52	200.0	52	67.0	175	100	63

⑤ The elongation length L_V (see page 15) has to be added to the reference number.

ELONGATION FOR THREADED TRANSPORT ANCHOR SL

CALCULATION OF THE ELONGATION LENGTH L_V

The elongation length is determined by the height of the additional roof slab, the possible joint (for grouting) and the recess for a Threaded transport anchor SL installation in recessed position (in the cubicle). The dimension $L_{V,min}$ (table 6) must not be less than this.

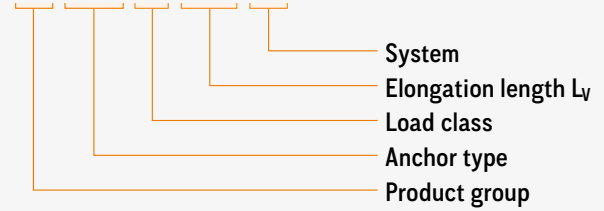
Calculation of the elongation length

$$L_V = h_B + h_F + h_T$$

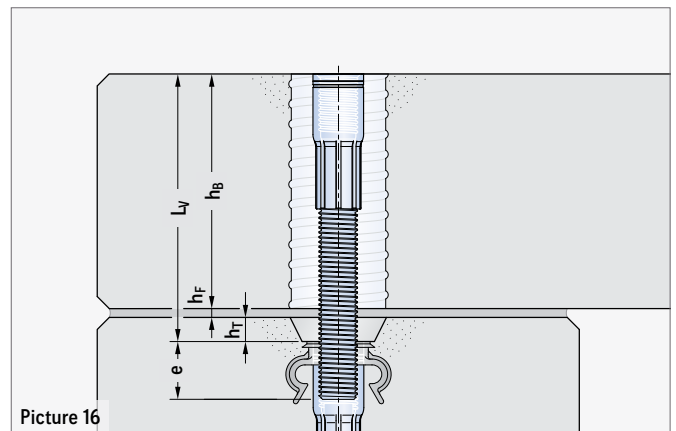
Check of the minimum length

$$L_V \geq L_{V,min} \text{ (see table 7)}$$

67 AVL 16 150 SL



Picture 15 Ref. no.



Picture 16

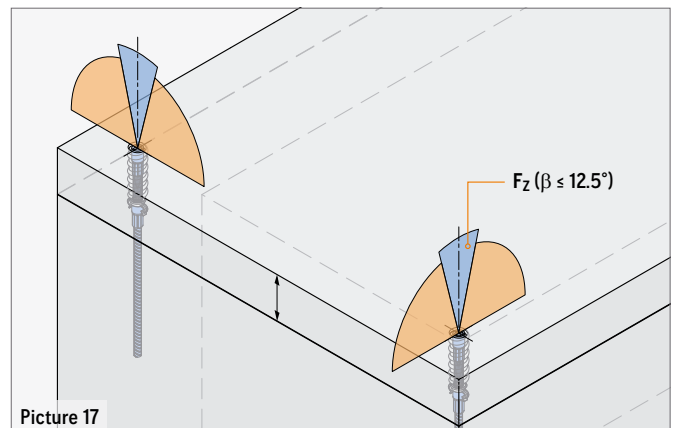
LOAD DIRECTIONS

The Threaded transport anchor elongation SL is only suitable for axial load ($\beta \leq 12.5^\circ$), within the complete transport chain!



DIAGONAL OR LATERAL TENSION

Diagonal or lateral tension is not permissible!



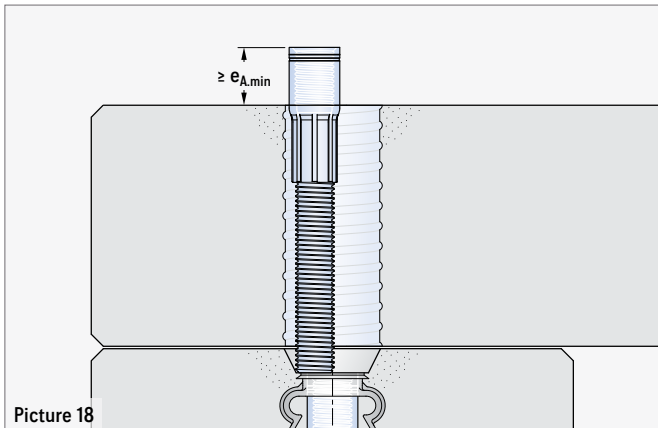
Picture 17

ELONGATION FOR THREADED TRANSPORT ANCHOR SL

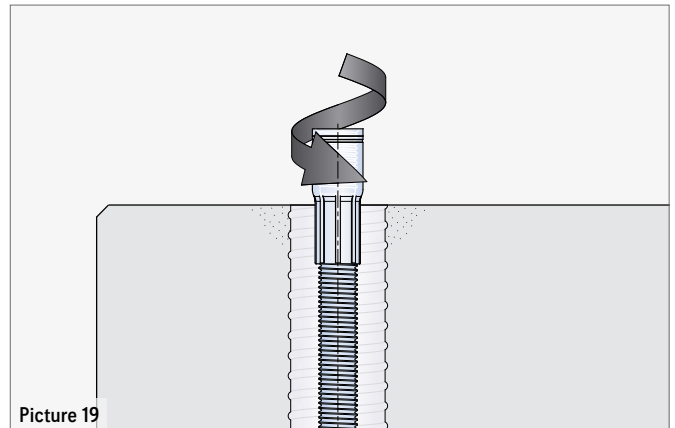
INSTALLATION

Before using the Threaded transport anchor elongation SL please check if the minimum thread reach of the elongation ($e_{A,min}$) can be reached (picture 18). If this is correct, the Threaded transport anchor elongation SL can be screwed in flush to the concrete surface. If the minimum thread reach is not reached ($e_{A,min}$), the Threaded transport anchor elongation SL must be installed in deepened position.

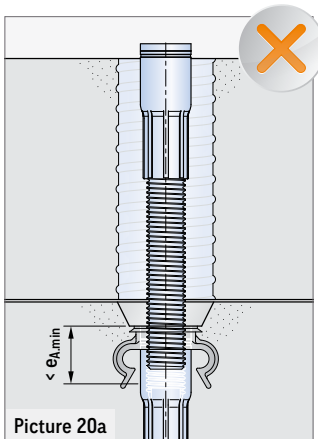
After screwing-in the area all around the Threaded transport anchor elongation SL must be completely grouted with mortar. In order to prevent dirt from penetrating the thread, it is recommended to close the insert (e.g. by using a PHILIPP 72KAS_).



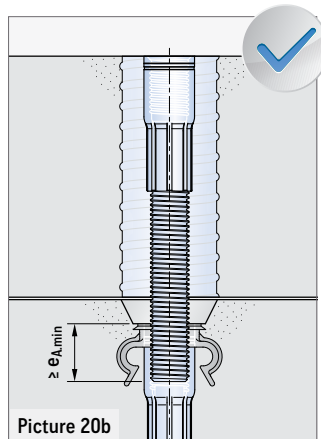
Picture 18



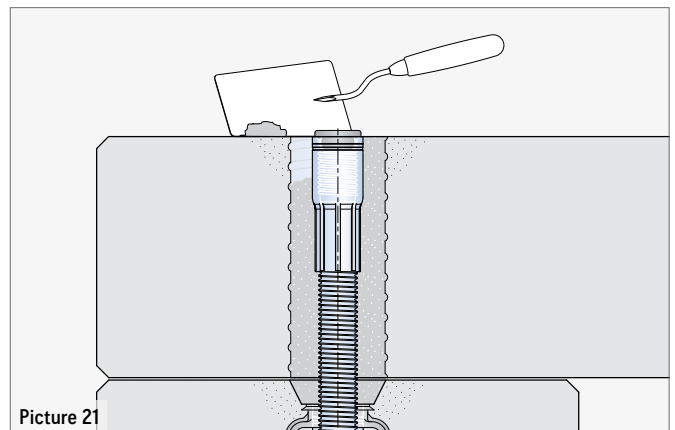
Picture 19



Picture 20a



Picture 20b



Picture 21

LIFTY SL

The Lifty SL is part of the PHILIPP Transport anchor system and complies with the VDI/BV-BS Guideline "Lifting inserts and lifting systems for precast concrete elements" (VDI/BV-BS 6205). The Lifty SL is suitable for axial, diagonal and lateral tension.

TABLE 7: PERMISSIBLE LOAD BEARING CAPACITIES AND DIMENSIONS

Ref. no.	Type	perm. F		Dimensions						Weight (kg/pc.)
		0°- 30° (kN)	0°- 90° (kN)	M-LH	h (mm)	b (mm)	e (mm)	h ₁ (mm)	Ød (mm)	
62LISL16	SL 16	-	20.0	16	150	50	23	38	13	0.52
62LISL24	SL 24	-	50.0	24	162	50	34	53	16	1.05
62LISL30	SL 30	-	80.0	30	177	50	43	72	22	2.32
62LISL42	SL 42	-	145.0	42	241	65	60	92	28	5.22
62LISL52	SL 52	200.0	150.0	52	272	85	73	92	35	7.75

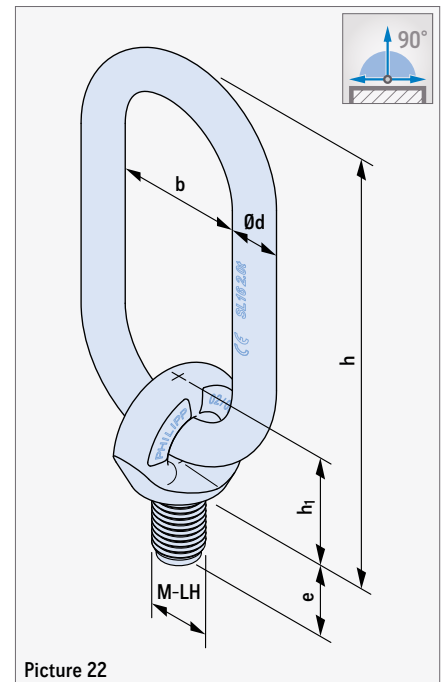
- The weight of 1.0 t corresponds to 10.0 kN.

APPLICATION

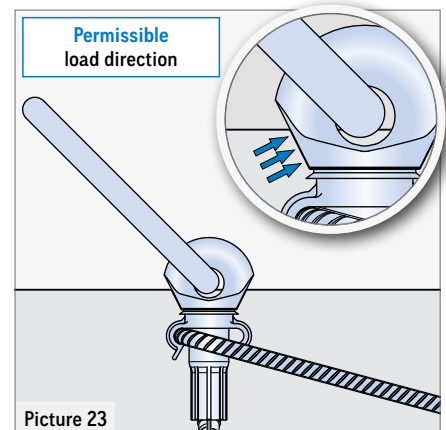
Lifty SL has a metric left-hand thread and is used as a lifting device within the Power System SL. It may only be used for recessed installation using the recess formers 72KHN16SL to 72KHN52SL.

The Lifty SL must be screwed in the Threaded transport anchor tightly until the bottom part of the ringbolt has continuous pressure contact in the recess created before in the concrete unit. Therefore an optimal load transfer into the cast-in anchor is given, as the ring bolt is supported by the concrete in case of loading (picture 23).

During rigging the welded chain link must point to the tensile direction at all time. In order to align the Lifty SL into the correct position it is allowed to screw it back for a half turn at the most.



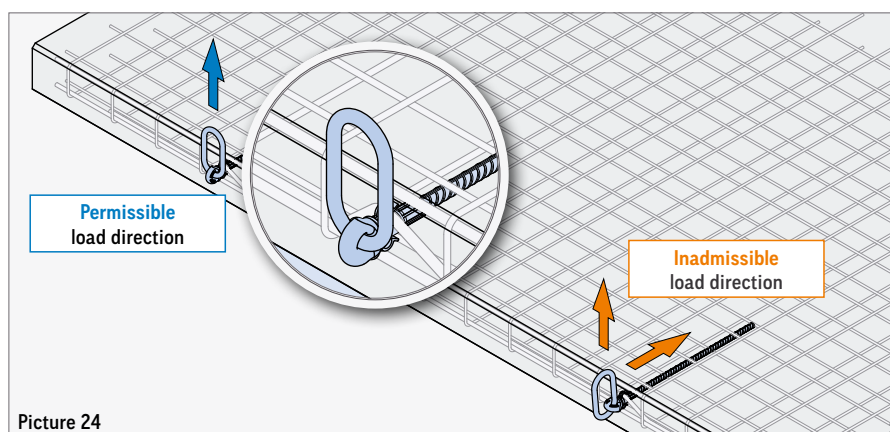
Picture 22



Picture 23

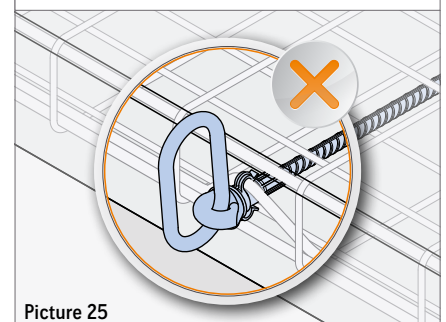
LOAD DIRECTION

Loading the Lifty SL is only admissible in the tension direction of the ring bolt axis according to picture 24.



Picture 24

Loading the Lifty SL right-angled to the ring bolt axis - as shown below - is inadmissible.



Picture 25

SAFETY / INSPECTION



NOTE!

Using only one Lifty SL in order to lift concrete elements attention must be paid that the Lifty is protected against unscrewing (e.g. by means of a retaining or guide rope on the prefabricated element).

SAFETY NOTICE

As each other lifting equipment and lifting device the Lifty SL is subject to an annual inspection according to the German DGUV regulation 109-017, para. 8.2. This inspection has to be done by an expert and lies within the responsibility of the owner. Depending on the working conditions of the Lifty SL inspections might be necessary in a shorter interval instead of only once a year. This might be caused by frequent use, increased wear, corrosion or heat treatment.

In general, the current accident prevention regulations must be observed. The correct hook size and form should be considered in order to extend the durability. If the Lifty SL is loaded with extreme loads (e.g. by an event causing damage) which may have influenced the bearing capacity it must be examined extraordinarily by an expert. The criteria are given in section "Replacement criteria and inspection service".



NO DAMAGING

In order to avoid damaging the Lifty SL caused by lever action the chain link should not be loaded via a sharp edge of a concrete unit (picture 24).



WELDING

Welding or other strong heating influences on the Lifty SL are inadmissible.



REPLACEMENT STATE

The continued use of damaged lifting devices or equipment already met the discard criteria is not permitted!

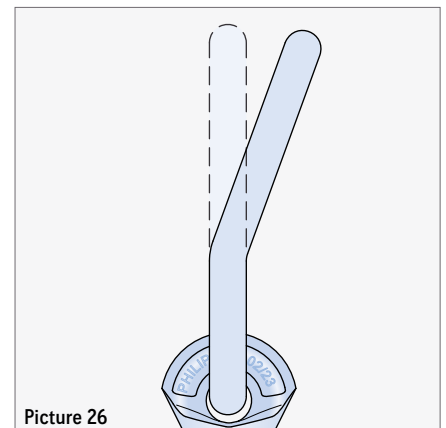
REPLACEMENT CRITERIA AND INSPECTION SERVICE

Der Lifty SL is a lifting device and a subject to an annual inspection (acc. to German regulation DGUV 109-017, para. 8.2). This inspection lies within the responsibility of the owner and has to be done by an expert. In general, the current accident prevention regulations must be observed. The correct hook size and form should be considered in order to extend the durability. The replacement state of the Lifty SL follows the German DGUV regulation 109-017, para. 8.4.

REPLACEMENT STATE OF LIFTY SL

During inspection the following points have to be considered:

- » Breakage of chain link
- » Deformed or bent chain link
- » Pressure marks on chain link caused by rigging hardware
- » Cracks or capacity reducing corrosion pits
- » Damaged thread
- » Twisted threaded bolt
- » Welding or other strong heat influences
- » Marking not readable any more
- » Exceeding or dropping below the permissible test dimensions



Picture 26

SAFETY / INSPECTION

The chain link has to be checked both for any elongation or taper of the diameter (picture 27). The replacement state of Lifty SL is reached when the chain link has a elongation of 5 % or the diameter of the link has a taper of 10 % (see wear measurements in table 8).

TABLE 8: WEAR MEASUREMENTS OF THE CHAIN LINK

Type	T (mm)		T _{max} (mm)		Ød (mm)		d _{min} (mm)	
SL 16	115		121		13		11.7	
SL 24	115		121		16		14.4	
SL 30	115		121		22		19.8	
SL 42	139 ①	160	146 ①	168	26 ①	28	23.4 ①	25.2
SL 52	139 ①	180	146 ①	189	26 ①	35	23.4 ①	31.5

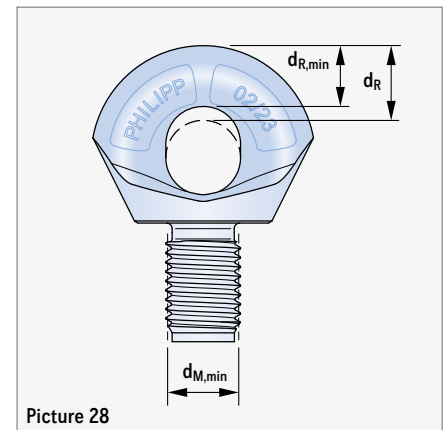
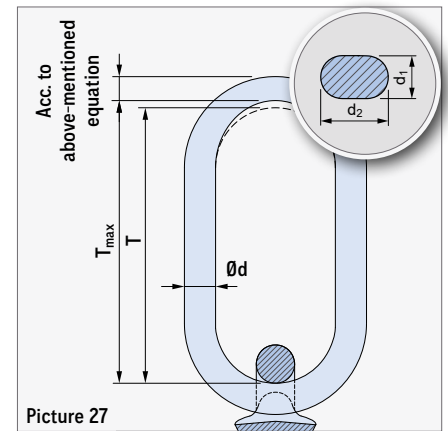
① Design of Lifty SL up to production 12/20 (see chain link, picture 2)

During the inspection of the ring bolt, the wear of the bolt diameter shall be checked. The replacement state for this part is reached when the forged ring bolt has a diminution of 10 % (picture 28 and table 9). The outer diameter of the thread must also be checked acc. to picture 28 and table 9.

TABLE 9: WEAR MEASUREMENTS OF THE RING BOLT

Typ	d _{M,min} (mm)	d _R (mm)	d _{R,min} (mm)
SL 16	15.45	16	14.4
SL 24	23.40	22	19.8
SL 30	29.40	32	28.8
SL 42	41.20	39	35.1
SL 52	51.20	39	35.1

$$\frac{d_1 + d_2}{2} > d_{min}$$



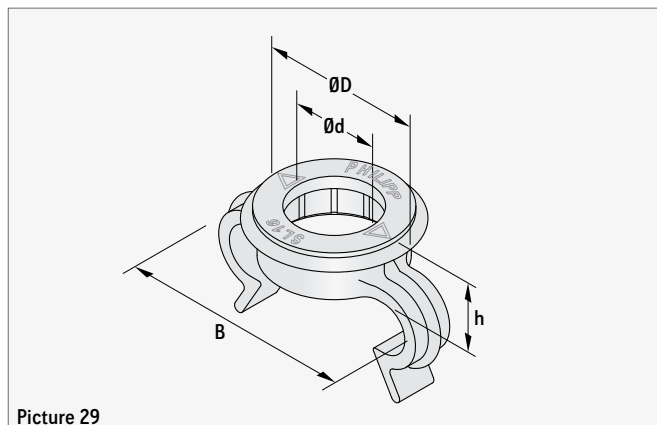
ACCESSOIRES

MARKING RING SL WITH CLIP

It is made of plastic and is used for marking the installed anchor as well as to fix additional reinforcement to the right position of the threaded insert (reinforcement for lateral or diagonal tension, see picture 32).

The Marking ring SL is put over the threaded insert prior the installation of the anchor. Finally, the Threaded transport anchor SL is fixed to the formwork with a Plastic recess former SL.

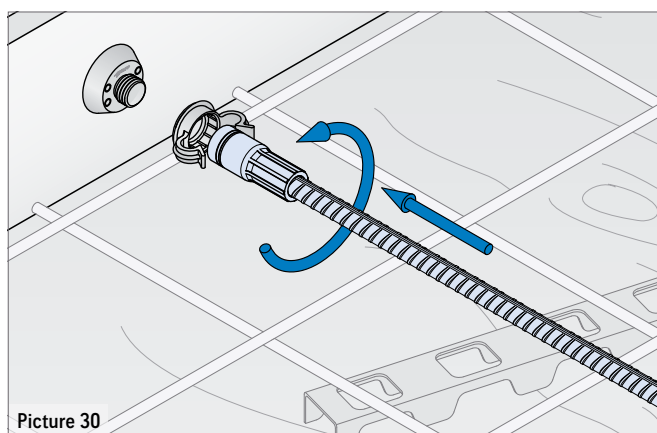
Due to the colour-coded marking a quick and correct classification of the corresponding lifting device is ensured.



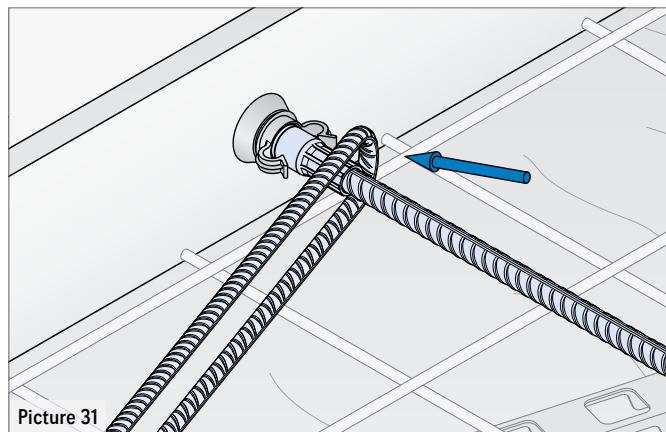
Picture 29

TABLE 10: MARKING RING SL WITH CLIP

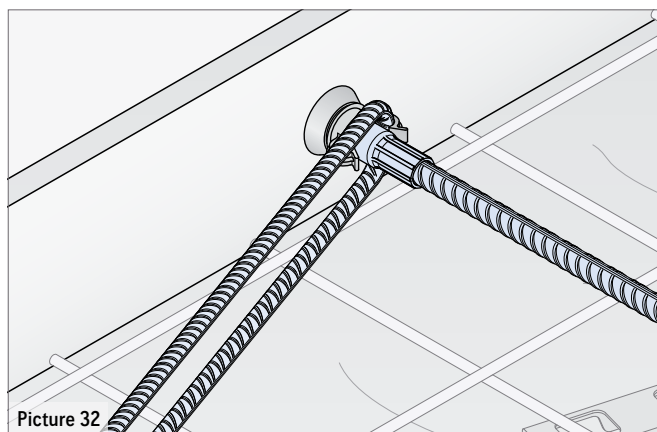
Ref. no.	Type	ØD (mm)	Ød (mm)	B (mm)	h (mm)	Colour code
74KR16SLCLIP	SL 16	31	17	49	10	Signal blue
74KR24SLCLIP	SL 24	41	25	63	10	Signal yellow
74KR30SLCLIP	SL 30	52	31	15	10	Clay brown
74KR42SLCLIP	SL 42	64	43	15	13	Salmon orange
74KR52SLCLIP	SL 52	80	53	15	13	Emerald green



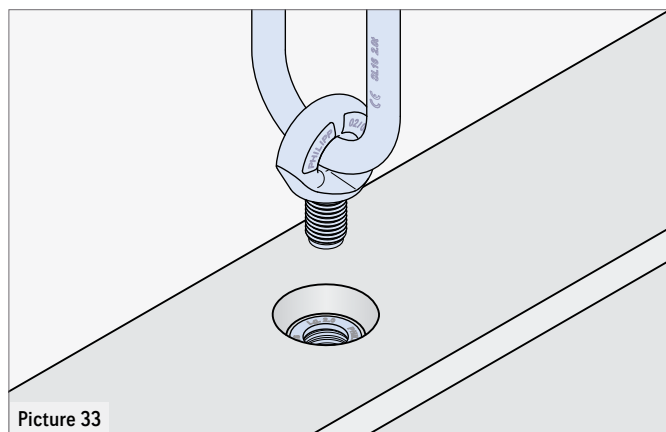
Picture 30



Picture 31



Picture 32

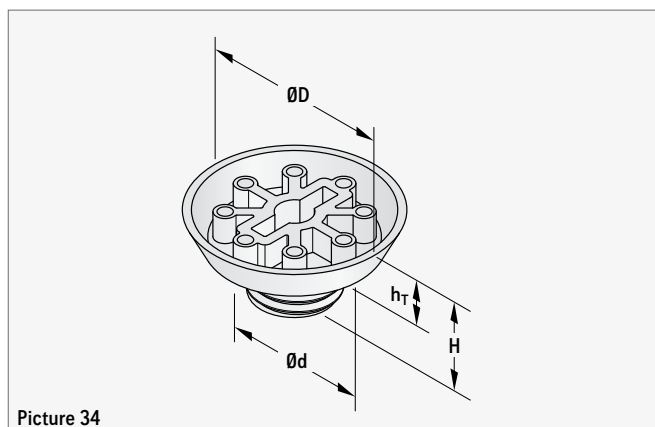


Picture 33

ACCESSOIRES

PLASTIC RECESS FORMER SL

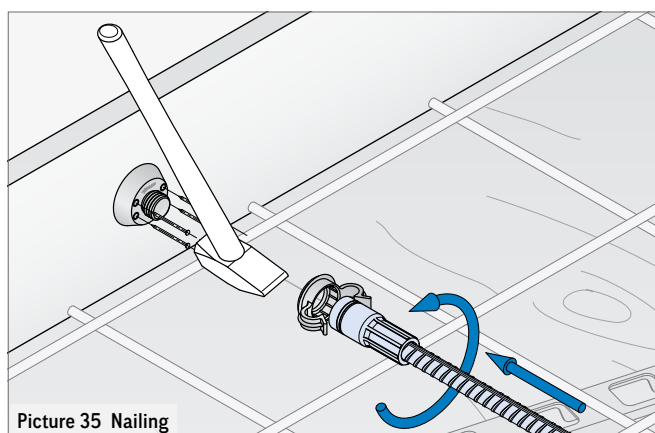
The Plastic recess former SL is used to fix the Threaded transport anchor SL to the formwork. They are nailed easily to the formwork through the indicated nail holes or by hot bonding (see pictures 35 and 36). Finally, the Threaded transport anchor SL can then be screwed on.



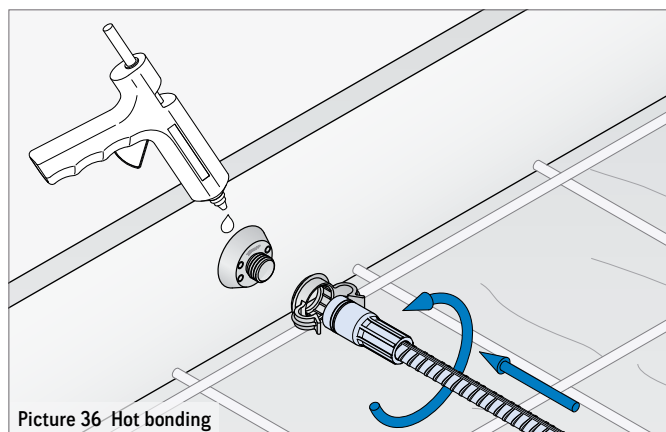
Picture 34

TABLE 11: PLASTIC RECESS FORMER SL

Ref. no.	Type	ØD (mm)	Ød (mm)	H (mm)	h _T (mm)	Colour code
72KHN16SL	SL 16	40	30	20	10	Signal blue
72KHN24SL	SL 24	55	45	25	10	Signal yellow
72KHN30SL	SL 30	70	60	30	10	Clay brown
72KHN42SL	SL 42	96	86	35	12	Salmon orange
72KHN52SL	SL 52	96	86	35	12	Emerald green



Picture 35 Nailing



Picture 36 Hot bonding

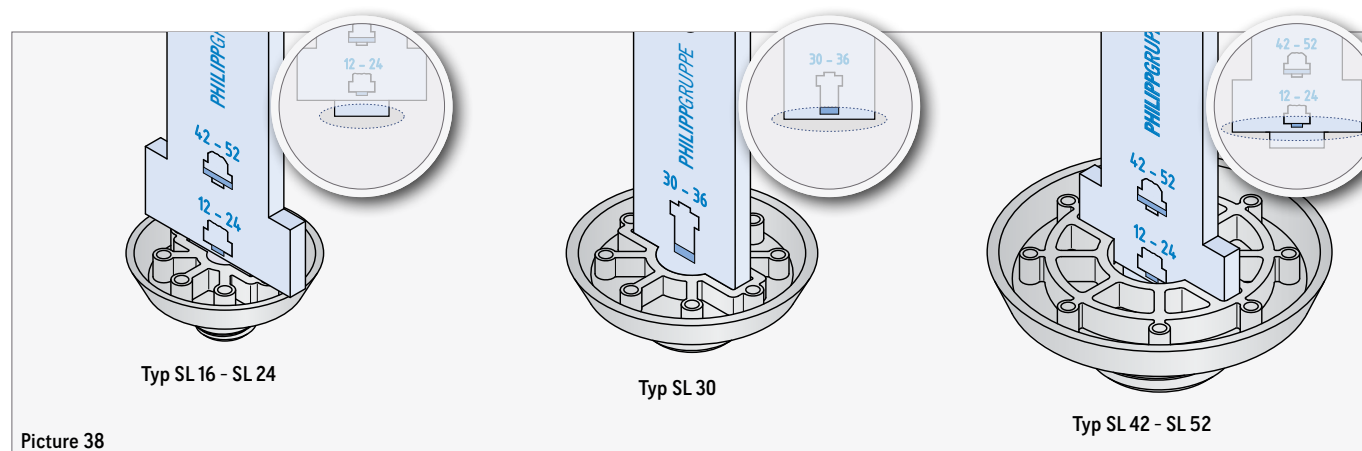
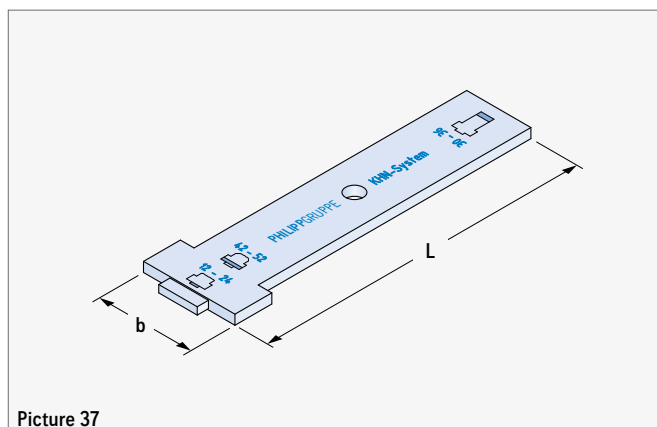
ACCESSORIES

KEY FOR PLASTIC RECESS FORMER

The tool/key is used for an easy unscrewing of the Plastic recess former SL (72KHN___SL) from the transport anchor set in concrete. Due to its special geometry, the tool/key can be used for all sizes of the KHN system.

TABLE 12: KEY FOR PLASTIC RECESS FORMER

Ref. no.	Type	L (mm)	b (mm)
72KHNS	SL 16 - SL 52	200	57



ACCESSORIES

SEALING CAP SL (STAINLESS STEEL)

The Sealing cap SL in stainless steel offers a visual attractive solution to close the recesses surface-flush. It is available with slot or hexagon socket on the visible surface to provide a possibility to unscrew and remove it. The Sealing cap SL in stainless steel closes the recess created by the Plastic recess former SL completely.

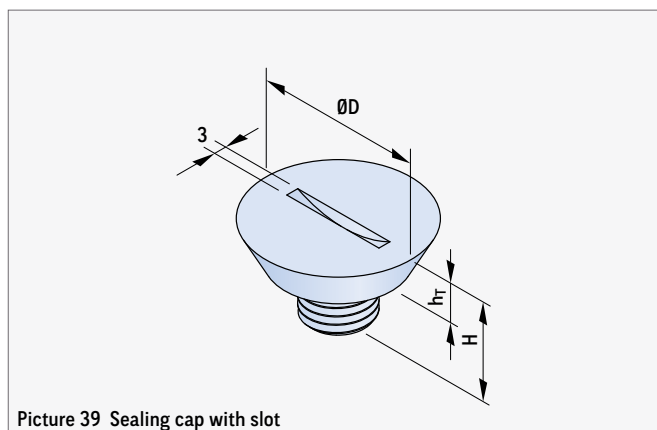


AVOID PENETRATION OF MOISTURE

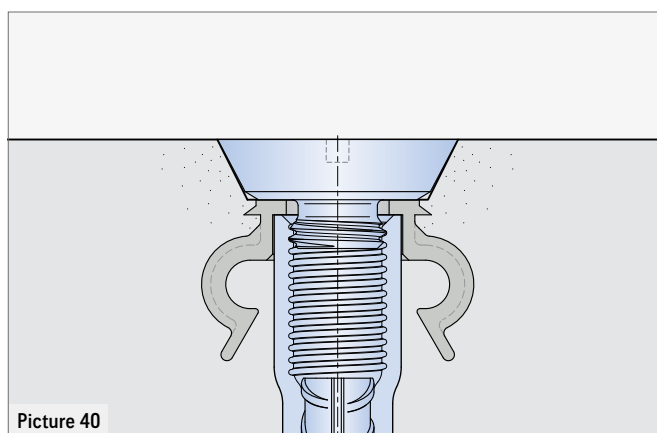
In order to avoid the penetration of moisture the Sealing cap SL in stainless steel should be pasted into the socket with a self-adhesive sealant.

TABLE 13: STAINLESS STEEL SEALING CAP SL

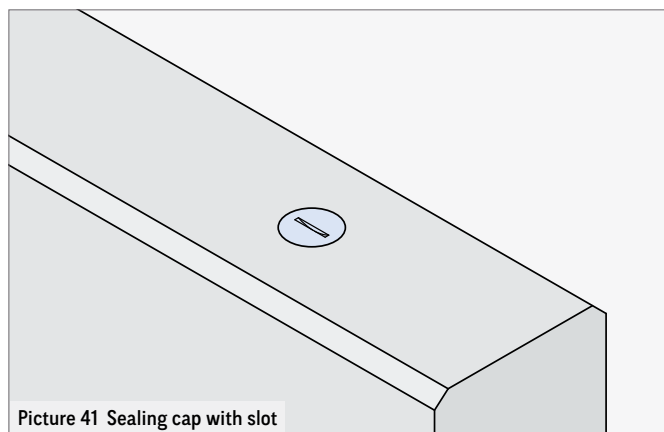
Ref. no.	for Type	ØD (mm)	h _T (mm)	H (mm)
72ASKHNSL16VA-S	SL 16	40	10	20
72ASKHNSL24VA-S	SL 24	55	10	25
72ASKHNSL30VA-S	SL 30	70	10	30
72ASKHNSL42VA-S	SL 42	96	12	35
72ASKHNSL52VA-S	SL 52	96	12	40



Picture 39 Sealing cap with slot



Picture 40

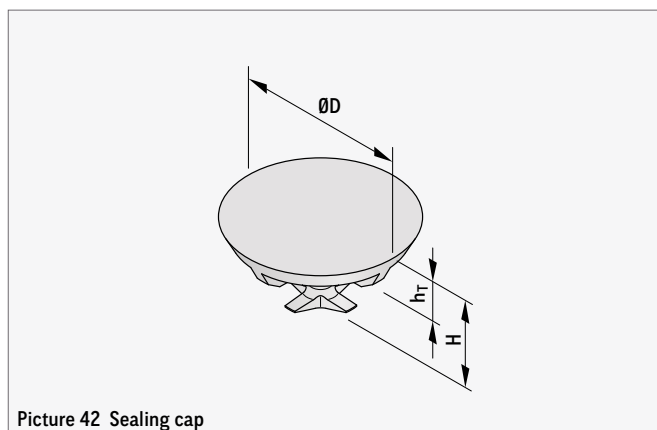


Picture 41 Sealing cap with slot

ACCESSORIES

SEALING CAP KHN (PLASTIC)

The Plastic sealing cap KHN covers the complete range of thread sizes (table 15) with only four types. As the Plastic sealing cap is only pressed into the recess, it has a plane surface with the concrete element. Hence, the Sealing cap in plastic offers a visual attractive solution to close the recesses surface-flush.



Picture 42 Sealing cap

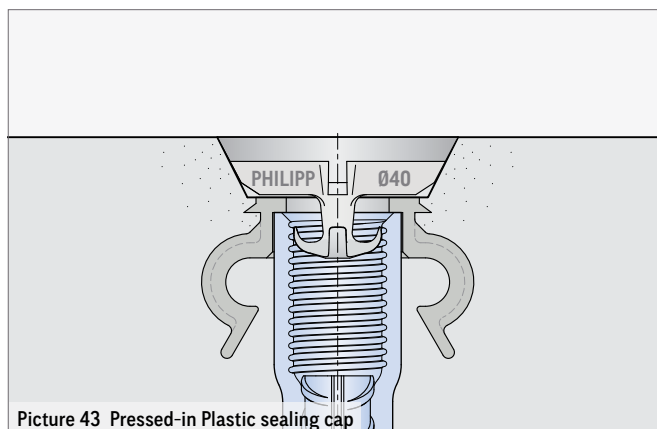


VISUAL CLOSURE

Sealing caps are used exclusively as visual attractive closing of the recesses. In order to avoid damage to the concrete element (e.g. spalling due to frost), the user shall ensure that the Sealing caps are protected against moisture penetration.

TABLE 15: SEALING CAP KHN (PLASTIC)

Ref. no.	for Type	ØD (mm)	h _T (mm)	H (mm)	Colour
72ASKHN040	SL 16	40	10	20	Grey
72ASKHN055	SL 24	55	10	28	Grey
72ASKHN070	SL 30	70	10	40	Grey
72ASKHN096	SL 42	96	12	60	Grey
	SL 52				

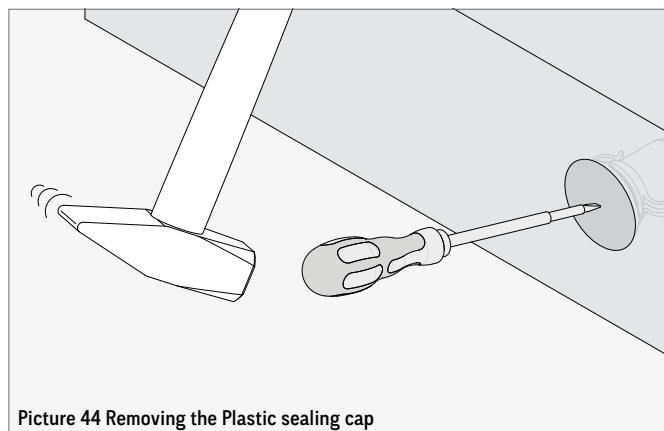


Picture 43 Pressed-in Plastic sealing cap

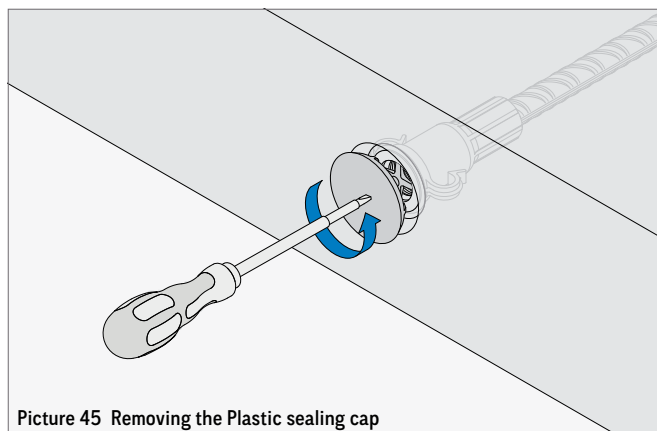
REMOVING THE PLASTIC SEALING CAP

In order to remove the Plastic sealing cap, punch a big screwdriver centrally into it.

Then it can be removed resp. unscrewed.



Picture 44 Removing the Plastic sealing cap



Picture 45 Removing the Plastic sealing cap

ACCESSORIES

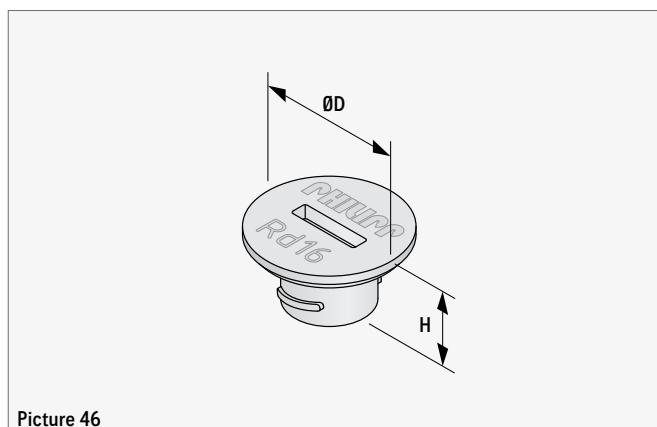
OUTSIDE RETAINING CAP

The grey Outside retaining cap in plastic closes and protects the thread of the insert. Thus, it prevents the penetration of dirt into the insert.

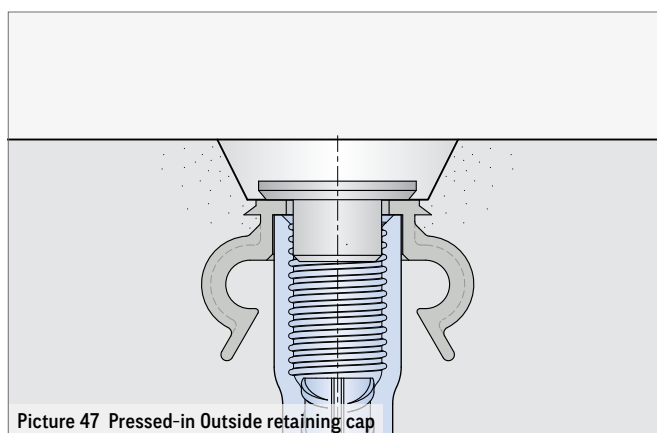
TABLE 16: OUTSIDE RETAINING CAP

Ref. no.	Type	ØD (mm)	H (mm)	Colour
72ASS16	16	25	13	Grey
72ASS24	24	35	17	Grey
72ASS30	30	42	19	Grey
72ASS42	42	60	20	Grey
72ASS52	52	73	22	Grey

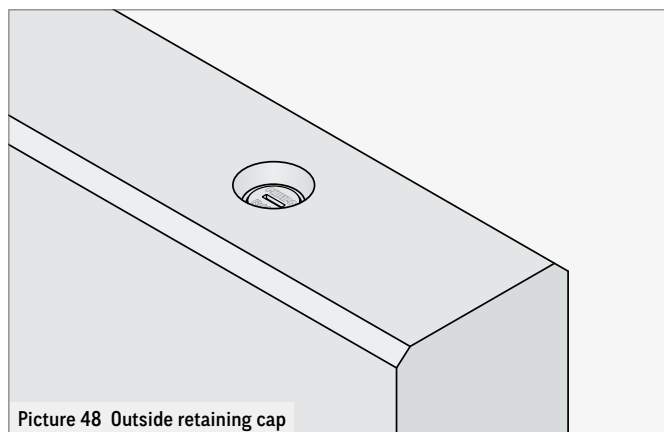
The Outside retaining cap does not close the entire recess but only the threaded insert. As a result, a soiling of the thread is prevented and the system can still be used without any problems. The Outside retaining caps are simply pressed into the threaded insert.



Picture 46



Picture 47 Pressed-in Outside retaining cap



Picture 48 Outside retaining cap

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