

PHILIPPGROUP

PHILIPP Power System SL



VB3-T-028-en - 02/21 - PDF

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

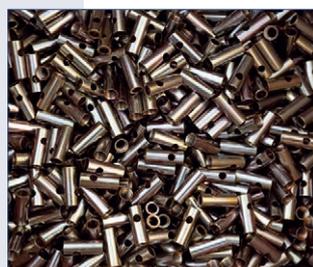
The latest design software, animated videos and CAD libraries can always be found under www.philipp-gruppe.de.

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PHILIPP Power System SL

PHILIPP standard threaded anchor system	max. load bearing capacity (perm. F) [kN]	PHILIPP Power System SL	
RD 12	5.0	20.0	SL 16
RD 14	8.0		
RD 16	12.0		
RD 18	16.0		
RD 20	20.0		
RD 24	25.0	50.0	SL 24
RD 30	40.0		
RD 36	63.0	80.0	SL 30
RD 42	80.0		
RD 52	125.0		
RD 56	150.0	145.0	SL 42
RD 60	200.0		
		200.0	SL 52



The Power System SL is the optimized threaded transport anchor system from PHILIPP.

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

The combination of system components among each other is easy because of the established PHILIPP colour code.

Your benefits at a glance:

- **Higher load capacity** 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



System Overview

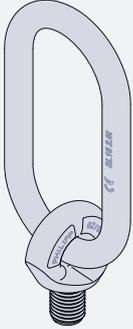
Threaded transport anchor SL - straight tail

Type	Ref. no.	
SL 16	67M16SL	
SL 24	67M24SL	
SL 30	67M30SL	
SL 42	67M42SL	
SL 52	67M52SL	

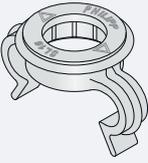
Elongation for Threaded transport anchor SL

Type	Ref. no.	
SL 16	67AVL16___SL	
SL 24	67AVL24___SL	
SL 30	67AVL30___SL	
SL 42	67AVL42___SL	
SL 52	67AVL52S___SL	

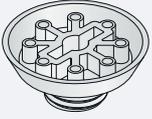
Lifty SL

Type	Ref. no.	
SL 16	62LISL16	
SL 24	62LISL24	
SL 30	62LISL30	
SL 42	62LISL42	
SL 52	62LISL52	

Marking ring SL with clip

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

Plastic recess former SL

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

Stainless steel sealing cap SL

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)

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

Outside retaining cap

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

General notes

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 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.

Anchors and lifting devices

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



Marking of the Power System SL

Lifting device:

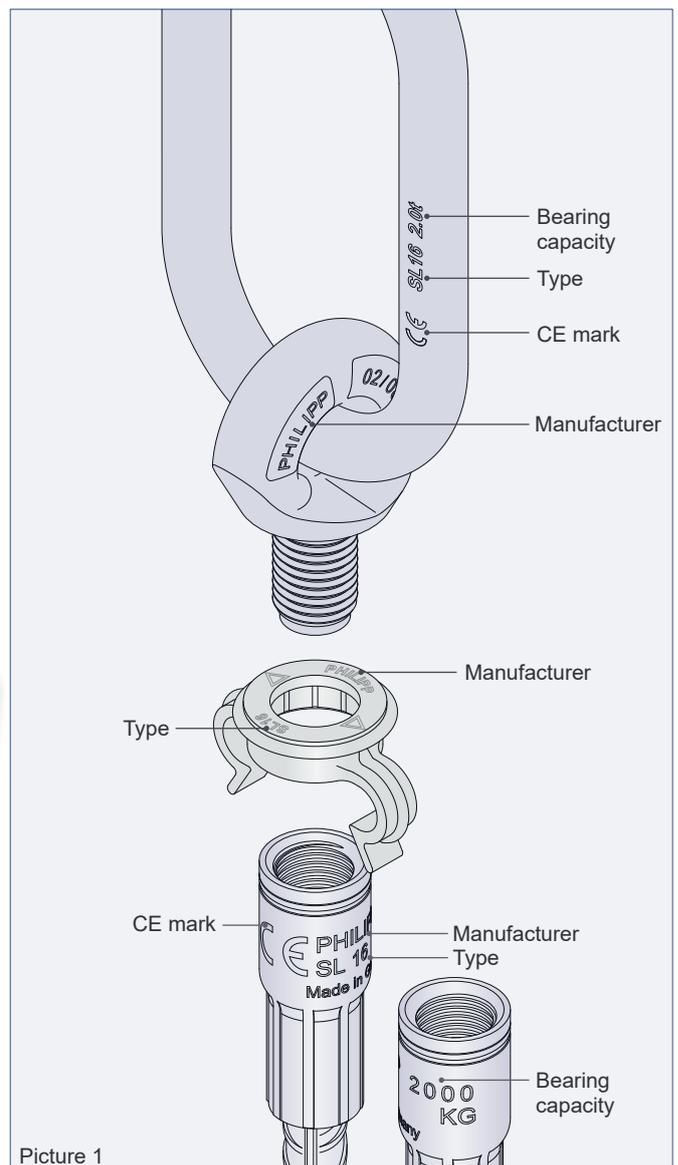
- Colour code (colour painted)
- Manufacturer (PHILIPP)
- CE mark
- Type (system / load class)
- Bearing capacity (e.g. 2.0t)
- Year of production (back side)

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)

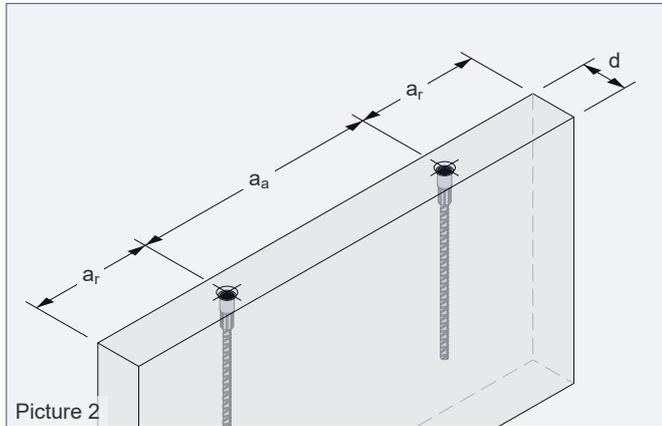


Picture 1

General notes / anchor selection

Element thicknesses, centre and edge distances

The installation and position of Threaded transport anchors SL in precast concrete elements require minimum dimensions and centre/edge distances for a safe load transfer.



Concrete strength

At the first time of lifting the concrete must have a minimum strength f_{cc} acc. to table 3. Concrete strengths f_{cc} are cube strengths at the time of the first lifting.

Selection guide for transport anchors

Step 1:

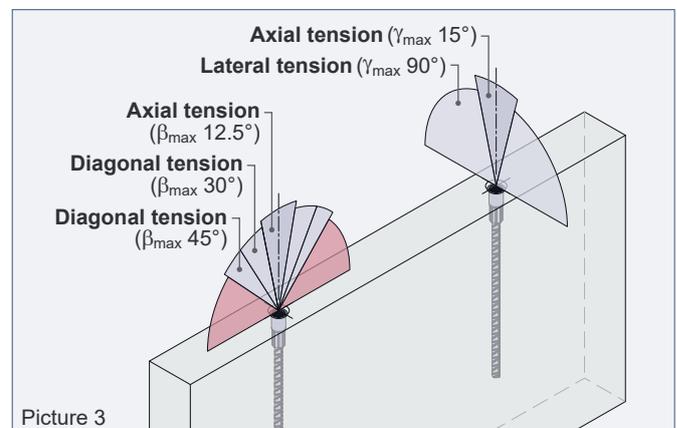
For each element thickness the maximum possible threaded transport anchor size depending on the load case are given in table 1.

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]	Transport anchor [type]			
	Axial tension $\beta_{max} 12.5^\circ$ $\gamma_{max} 15^\circ$	Diagonal tension $\beta_{max} 30^\circ$ $\gamma_{max} 15^\circ$	Diagonal tension $\beta_{max} 45^\circ$ $\gamma_{max} 15^\circ$	Lateral tension $\beta_{max} 45^\circ$ $\gamma_{max} 90^\circ$
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	SL 30	SL 30	SL 30	SL 30
160	SL 42	SL 42	SL 42	SL 42
180	SL 42	SL 42	SL 42	SL 42
200	SL 52	SL 52	SL 52	SL 52
220	SL 52	SL 52	SL 52	SL 52
240	SL 52	SL 52	SL 52	SL 52

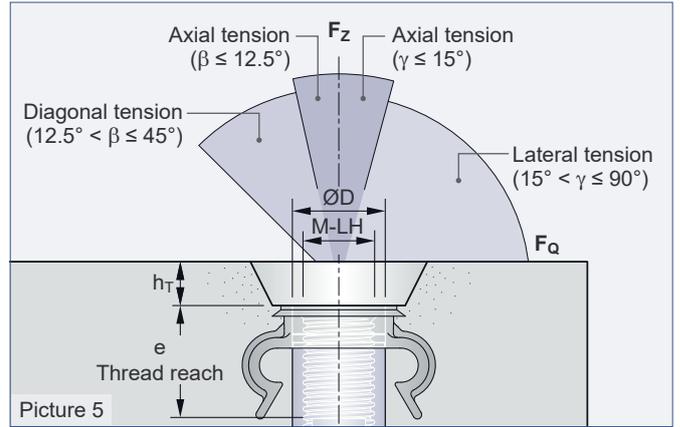
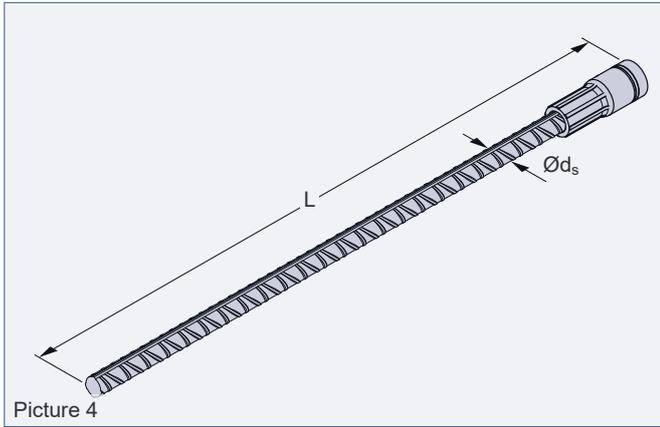
Step 2:

Details of the load-bearing capacities and boundary conditions as a function of the concrete strength are given in table 3.



With lateral tension the Threaded transport anchors SL have only half of the capacity compared to axial loading. 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 and Application Instruction).

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	Dimensions						
		M-LH	L [mm]	ØD [mm]	Ød _s [mm]	e [mm]	h _T [mm]	
67M16SL	SL 16	16	455	21.0	12	27	10	
67M24SL	SL 24	24	580	31.0	20	43	10	
67M30SL	SL 30	30	750	39.5	25	56	10	
67M42SL	SL 42	42	1100	54.0	32	65	12	
67M52SL	SL 52	52	1200	67.0	40	100	12	

Table 3: Permissible bearing capacities of Threaded transport anchor SL – straight tail

Type	Element thicknesses, centre and edge distances			perm. F at f _{cc} 15 N/mm ²								perm. F at f _{cc} 25 N/mm ²			
				Axial tension		Diagonal tension		Lateral tension		Axial tension		Diagonal tension		Lateral tension	
				β _{max} 12.5° γ _{max} 15°	β _{max} 30° γ _{max} 15°	β _{max} 45° γ _{max} 15°	β _{max} 45° γ _{max} 90°	β _{max} 12.5° γ _{max} 15°	β _{max} 30° γ _{max} 15°	β _{max} 45° γ _{max} 15°	β _{max} 45° γ _{max} 90°				
d [mm]	a _a [mm]	a _r [mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]			
SL 16	80	930	465	20.0	16.2	16.2	5.4	20.0	19.2	19.2	7.0				
	100			20.0	16.3	16.3	7.7	20.0	19.2	19.2	10.0				
	120			20.0	16.5	16.5	10.3	20.0	19.2	19.2	13.3				
SL 24	100	1180	590	50.0	42.5	42.5	10.6	50.0	42.5	42.5	13.7				
	120			50.0	42.5	42.5	13.8	50.0	42.5	42.5	17.8				
	140			50.0	42.5	42.5	17.5	50.0	42.5	42.5	22.6				
	160			50.0	42.5	42.5	21.6	50.0	42.5	42.5	27.9				
SL 30	120	1520	760	76.1	61.5	61.5	15.9	80.0	66.4	66.4	20.5				
	140			79.8	64.5	64.5	20.3	80.0	66.4	66.4	26.2				
	160			80.0	66.4	66.4	25.1	80.0	66.4	66.4	32.4				
	180			80.0	66.4	66.4	30.3	80.0	66.4	66.4	39.2				
SL 42	160	2230	1115	145.0	116.0	116.0	27.4	145.0	116.0	116.0	35.3				
	180			145.0	116.0	116.0	33.1	145.0	116.0	116.0	42.7				
	200			145.0	116.0	116.0	39.6	145.0	116.0	116.0	51.1				
	220			145.0	116.0	116.0	46.3	145.0	116.0	116.0	59.8				
	240			145.0	116.0	116.0	53.8	145.0	116.0	116.0	69.4				
SL 52	200	2430	1215	181.7	148.4	104.9	29.5	200.0	191.6	135.5	45.7				

The weight of 1.0 t corresponds to 10.0 kN.

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 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 6) in case of single-layer reinforcement.



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

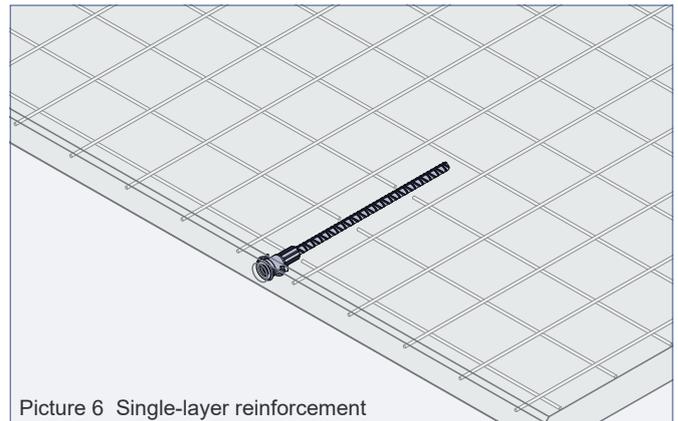
In thin elements it might be necessary to cut the longitudinal reinforcement close to the insert (counter brace) in order to have enough concrete cover in this area. Best position for the longitudinal reinforcement should be below the crimping (see picture 7).



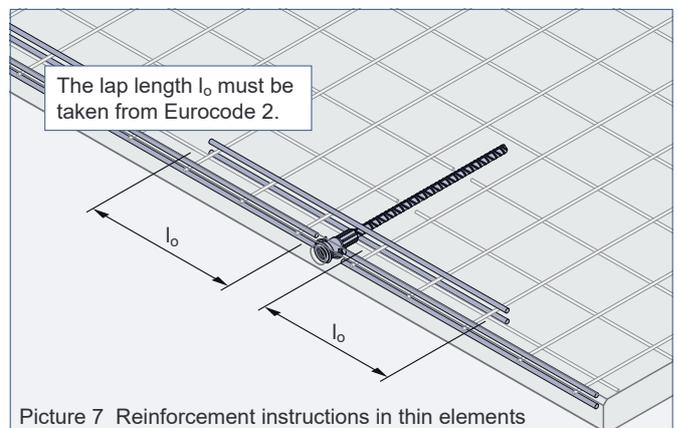
In general, the area of pressure contact between the additional reinforcement and the insert must lie within the thread reach e of the insert.

Add. reinforcement for diagonal and lateral tension

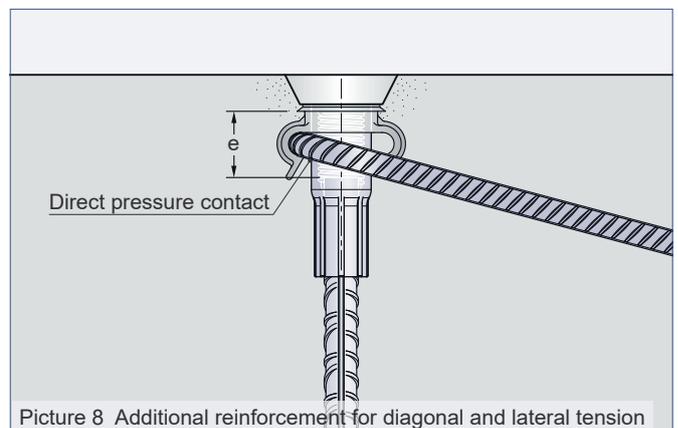
Additional reinforcement for diagonal and lateral tension has to be installed with pressure contact to the anchor insert. The position of the direct pressure contact must be within the thread reach e of the insert (see picture 8). By using the Marking ring with clip (74KR___SLCLIP) this position is guaranteed.



Picture 6 Single-layer reinforcement



Picture 7 Reinforcement instructions in thin elements

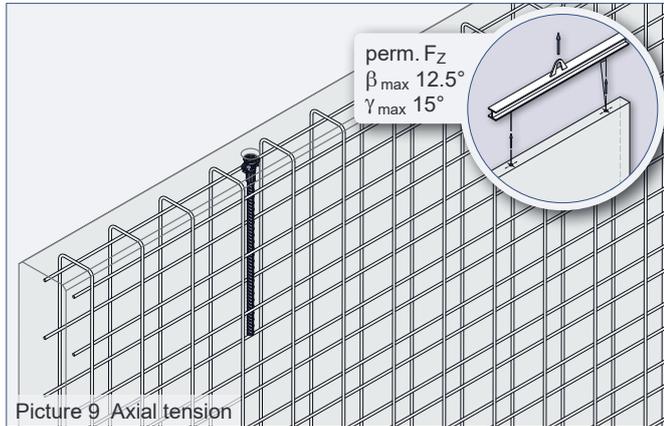


Picture 8 Additional reinforcement for diagonal and lateral tension

Reinforcement

Main reinforcement / axial tension

When using Transport anchors SL precast units must be reinforced with a minimum reinforcement (table 4). This minimum reinforcement can be replaced by a comparable steel bar reinforcement.



Picture 9 Axial tension

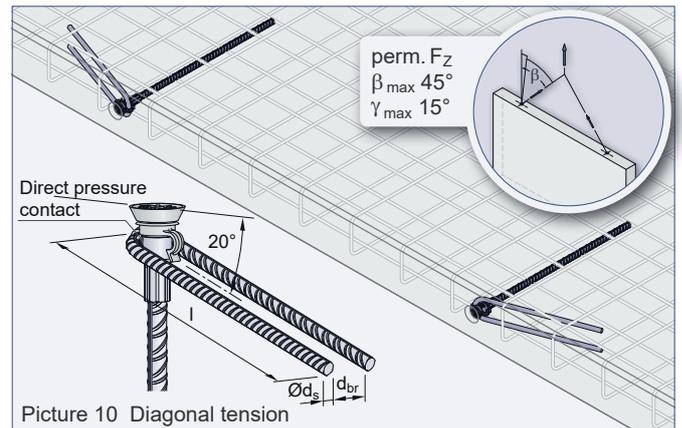
Table 4: Minimum reinforcement

Type	Mesh reinforcement (square) [mm ² /m]
SL 16	188 ^①
SL 24	188
SL 30	188
SL 42	188
SL 52	257

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

Additional reinforcement for diagonal tension

If the Threaded transport anchor SL is used under diagonal tension $\beta > 12.5^\circ$ an additional reinforcement according to table 5 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.



Picture 10 Diagonal tension

Table 5: Additional reinforcement for diagonal tension (B500B)

Type	if $12.5^\circ \leq \beta \leq 45^\circ$		
	Ods [mm]	l [mm]	d_{br} [mm]
SL 16	10	300	24
SL 24	12	550	34
SL 30	16	700	41
SL 42	20	1000	64
SL 52 ^①	20	1000	100

^② For type SL 52 B500A and B500B possible

Reinforcement

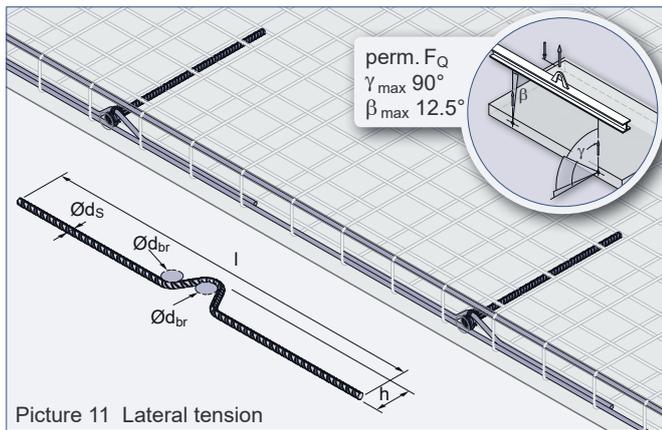
Additional reinforcement for lateral tension

If a Threaded transport anchor is loaded by lateral tension with an inclination of $\gamma > 15^\circ$ an additional reinforcement is required (table 6).

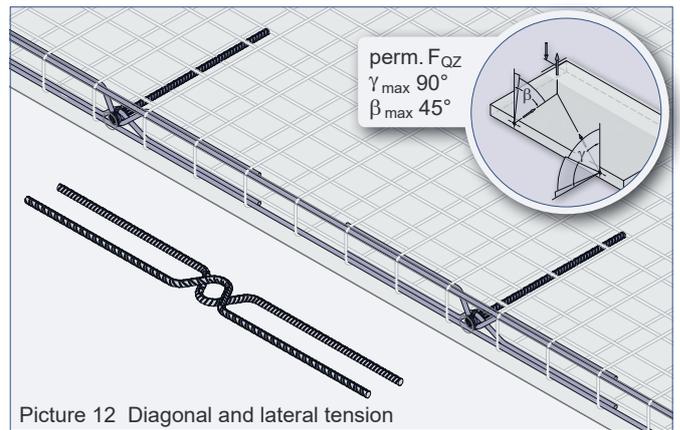
The reinforcement for lateral tension can be done as a single (picture 11) or double reinforcement bar (picture 12). There must be direct pressure contact between the insert of the transport anchor and the reinforcement in the peak of the bending. The reinforcement for lateral tension is installed in 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).



Picture 11 Lateral tension



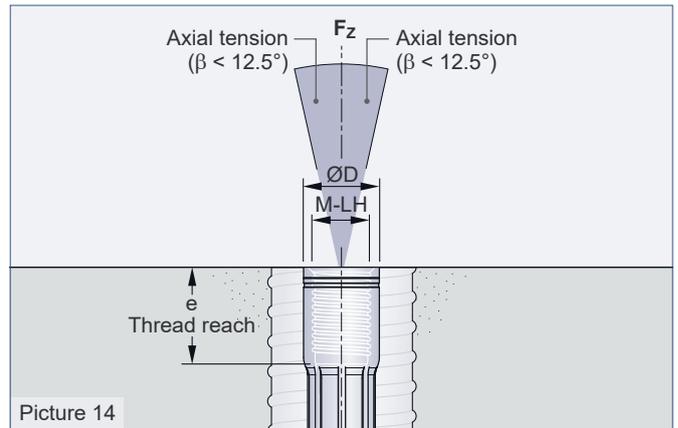
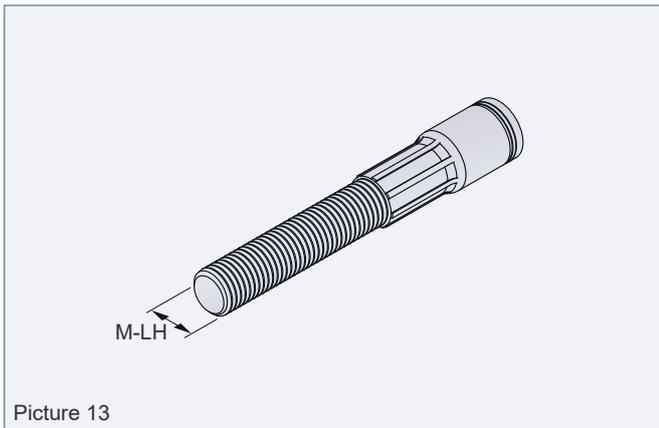
Picture 12 Diagonal and lateral tension

Table 6: Additional reinforcement for lateral tension (material B500B) (required if $\gamma > 15^\circ$)

Type	Element thicknesses [mm]	$\varnothing d_{br}$ [mm]	$\varnothing d_s$ [mm]	h [mm]	l [mm]	Longitudinal reinforcement [mm]
SL 16	80	32	10	40	800	-
	100			50		$2 \times \varnothing 10 / 930$
	120			60		
SL 24	100	48	12	57	1000	$2 \times \varnothing 12 / 1180$
	120			67		
	140			77		
	160			87		
SL 30	120	48	16	76	1200	$2 \times \varnothing 14 / 1520$
	140			86		
	160			96		
SL 42	180	64	20	106	1800	$2 \times \varnothing 14 / 2230$
	160			107		
	200			117		
	220			127		
SL 52 ①	240	140	20	147	1800	$2 \times \varnothing 14 / 2800$
	200			120		

© For type SL 52 B500A and B500B possible

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 7: Permissible bearing capacities and dimensions

Ref. no. galvanised ①	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

① The elongation length L_V (see page 13) has to be added to the reference number

Materials

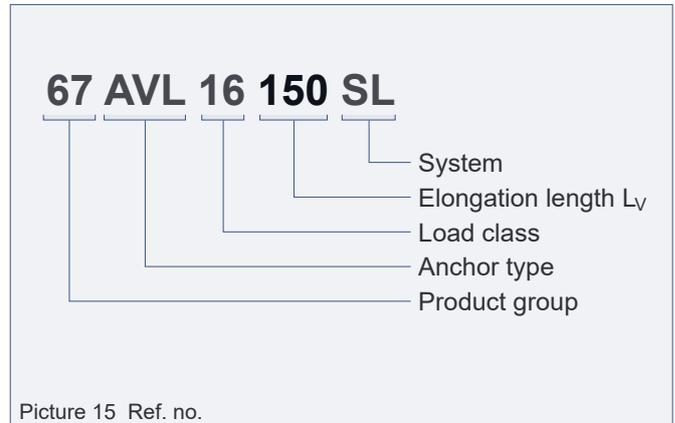
The Threaded transport anchor elongation SL consists of a threaded rod with a crimped-on insert. These threaded inserts are made of special high precision steel tubes and are galvanized according to common standards.

This galvanization protects the anchor temporarily, from the storage at the producer site to the final installation in the concrete element.

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 an Threaded transport anchor SL installation in recessed position (in the cubicle). The dimension $L_{V,min}$ (table 7) must not be less than this.

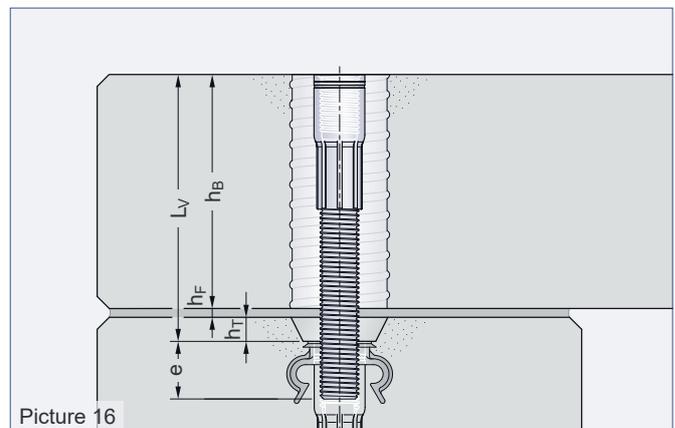


Calculation of the elongation length L_V

$$L_V = h_B + h_F + h_T$$

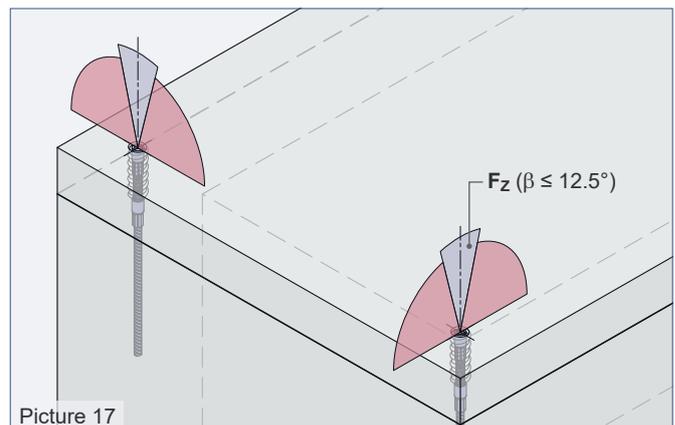
Check of the minimum length

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



Load directions

The Threaded transport anchor elongation SL is only suitable for axial load ($\beta \leq 12,5^\circ$). Diagonal or lateral tension is not permissible within the complete transport chain!



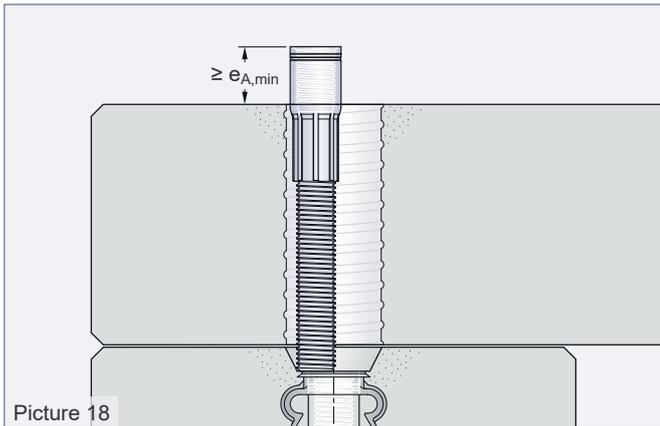
Elongation for Threaded transport anchor SL

Installation

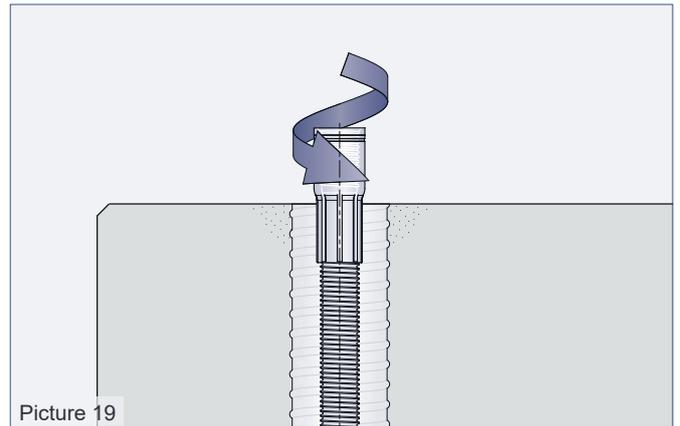
Before using the Threaded transport anchor elongation SL please check if the minimum thread reach of the elongation ($e_{A,min}$) can be reached (picture 18). If this is correct, the Threaded transport anchor elongation SL can be screwed in flush to the concrete surface.

If the minimum thread reach is not reached ($e_{A,min}$), the Threaded transport anchor elongation SL must be installed in deepened position.

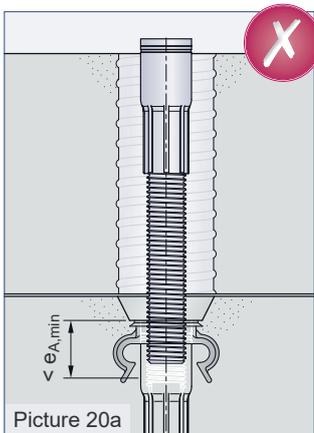
After screwing-in the area all around the Threaded transport anchor elongation SL must be completely grouted with mortar. In order to prevent dirt from penetrating the thread, it is recommended to close the insert (e.g. by using a PHILIPP 72KAS__).



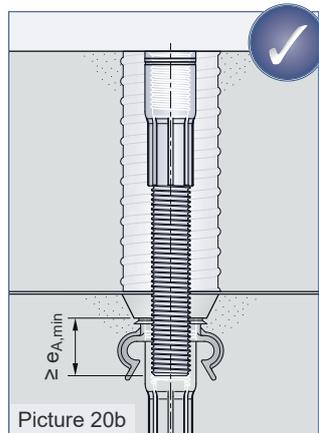
Picture 18



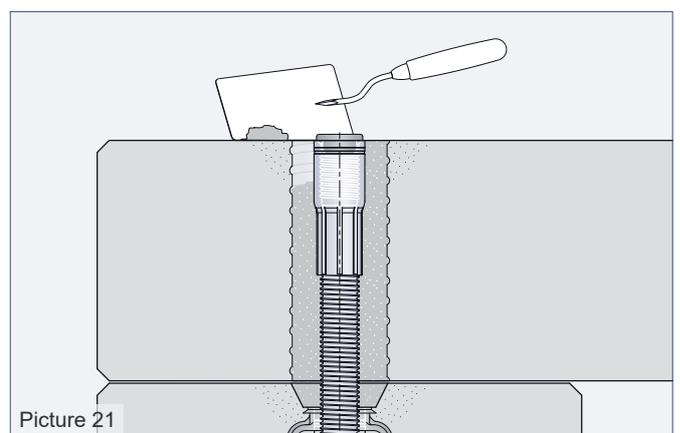
Picture 19



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 8: Permissible load bearing capacities and dimensions

Ref. no.	Type	perm. F		M-LH	Dimensions					Weight [kg/pc.]
		0°- 30° [kN]	0°- 90° [kN]		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

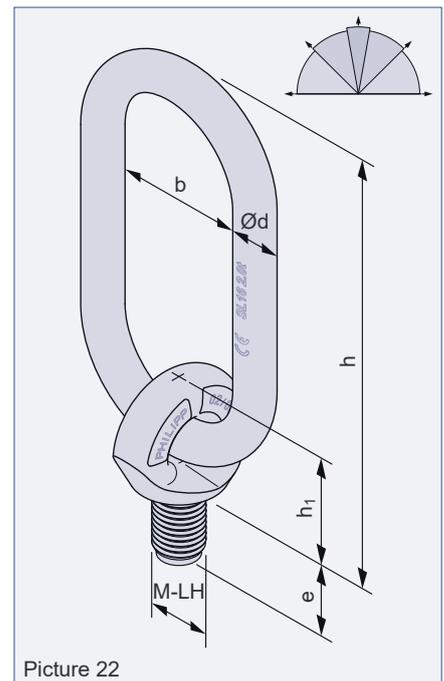
- The weight of 1.0 t corresponds to 10.0 kN.

Application

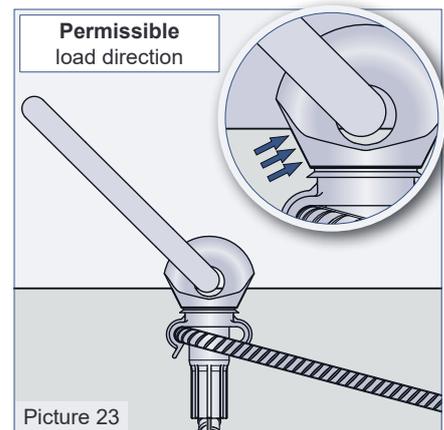
Lifty SL has a metric left-hand thread and is used as a lifting device within the Power System SL. It may only be used for recessed installation using the recess formers 72KHN16SL to 72KHN52SL.

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.



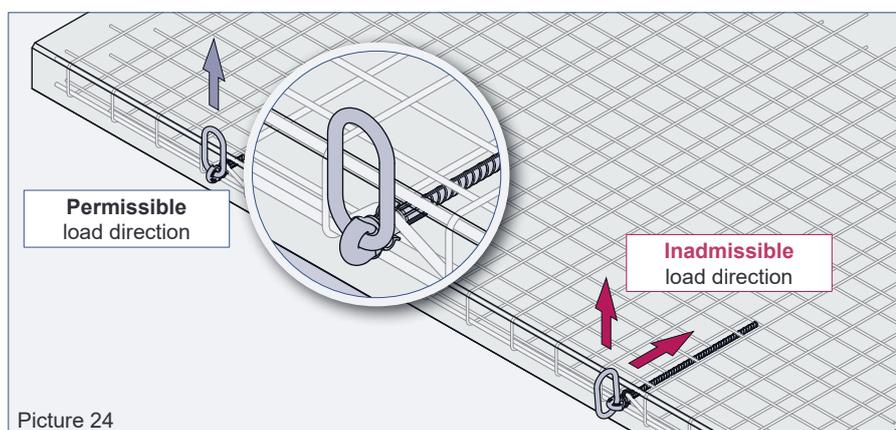
Picture 22



Picture 23



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

Lifty SL



Using only one Lifty SL in order to lift concrete elements attention must be paid that the Lifty is protected against unscrewing.

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 state and inspection service".



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



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

Lifty SL

Replacement criteria and inspection service

The replacement state of the Lifty SL follows the German DGUV regulation 109-017, para. 8.4.

Prior inspection the Lifty SL must be cleaned during inspection the following points have to be considered. If one of the following points is fulfilled the Lifty SL has reached its replacement state and must not be used any more.

- 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

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 lengthening of 5 % or the diameter of the link has a taper of 10 % (see wear measurements in table 9).

Table 9: Wear measurements of the chain link

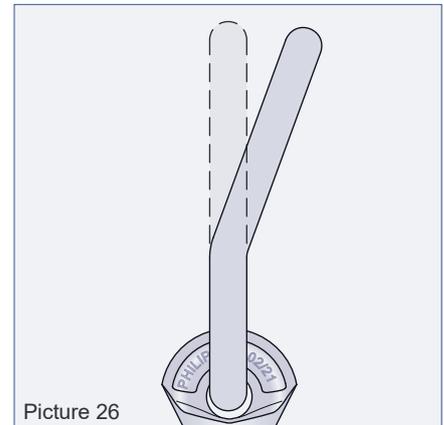
Type	T [mm]		T _{max} [mm]		Ød [mm]		d _{min} [mm]	
SL 16	115		121		13		11.7	
SL 24	115		121		16		14.4	
SL 30	115		121		22		19.8	
SL 42	139 ①	160	146 ①	168	26 ①	28	23,4 ①	25.2
SL 52	139 ①	180	146 ①	189	26 ①	35	23,4 ①	31.5

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

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 10). The outer diameter of the thread must also be checked acc. to picture 28 and table 10.

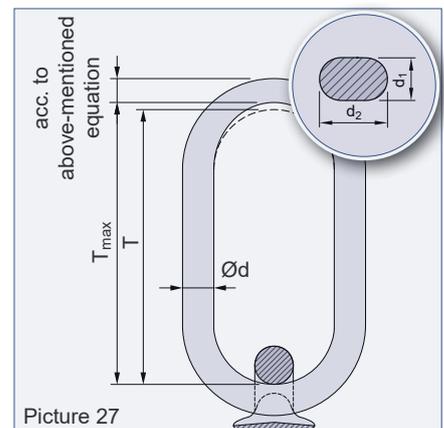
Table 10: Wear measurements of the ring bolt

Type	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

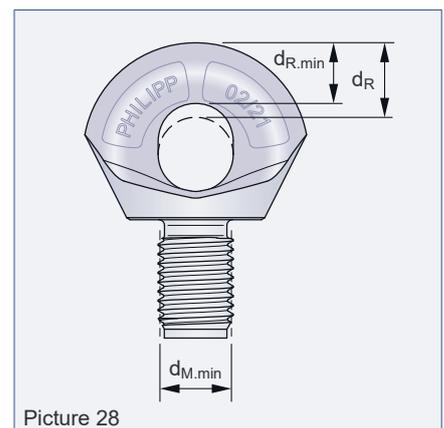


Picture 26

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



Picture 27



Picture 28

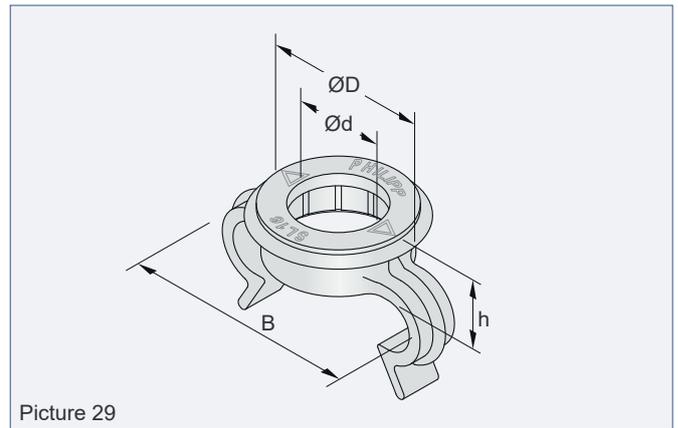
Accessories

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.

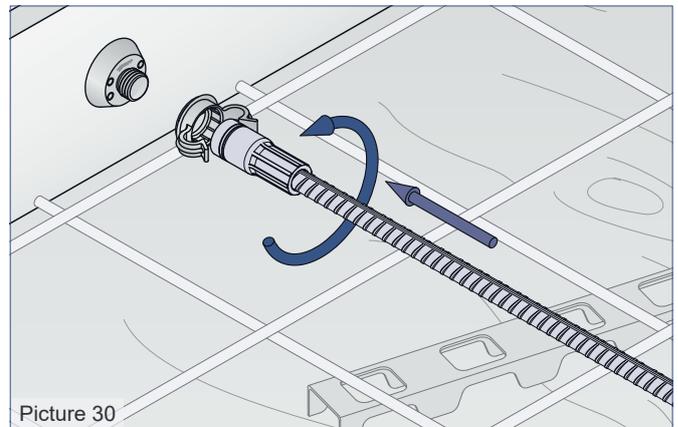
Due to the colour-coded marking a quick and correct classification of the corresponding lifting device is ensured.



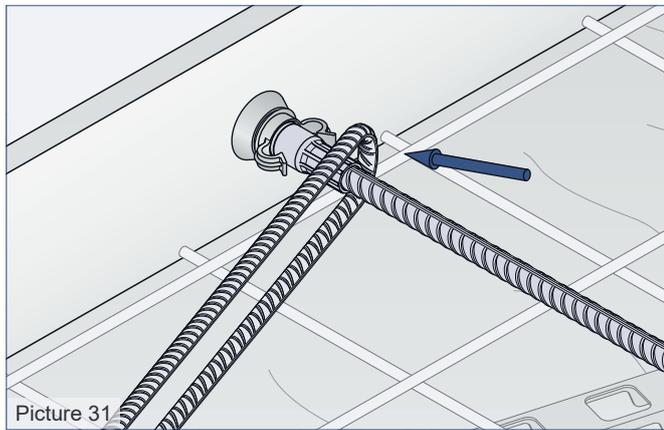
Picture 29

Table 11: Marking ring SL with clip

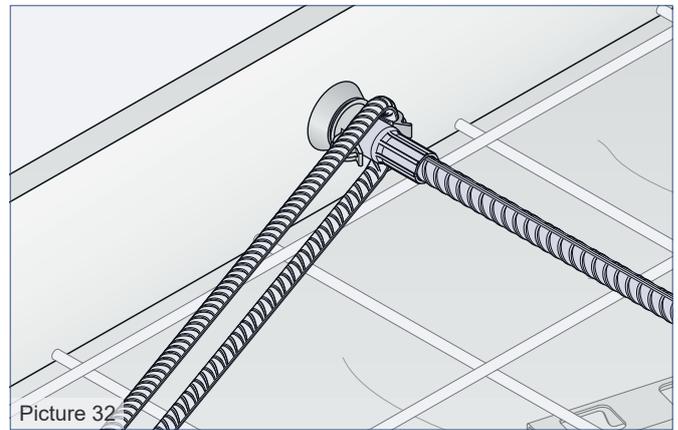
Ref. no.	Type	ØD [mm]	Ød [mm]	B [mm]	h [mm]	Colour code
74KR16SLCLIP	SL 16	31	17	49	10	Signal blue
74KR24SLCLIP	SL 24	41	25	63	10	Signal yellow
74KR30SLCLIP	SL 30	52	31	15	10	Clay brown
74KR42SLCLIP	SL 42	64	43	15	13	Salmon orange
74KR52SLCLIP	SL 52	80	53	15	13	Emerald green



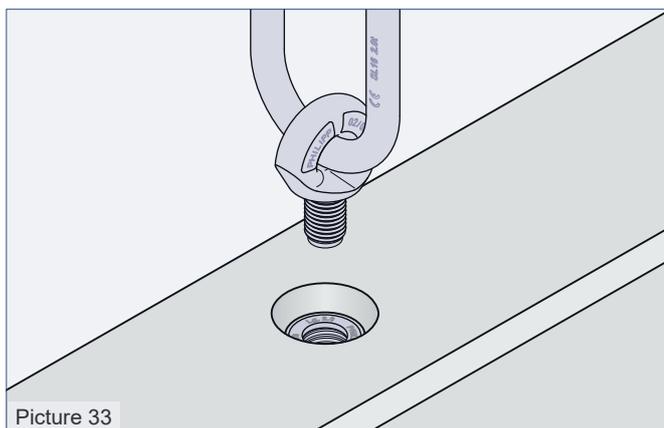
Picture 30



Picture 31



Picture 32

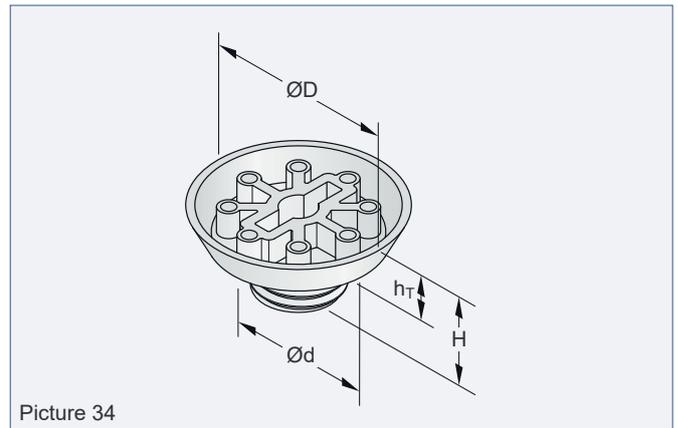


Picture 33

Accessories

Plastic recess former SL

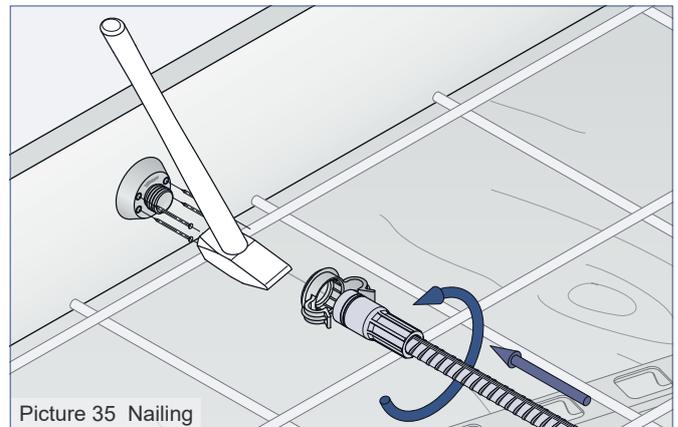
The Plastic recess former SL is used to fix the Threaded transport anchor SL to the formwork. They are nailed easily to the formwork through the indicated nail holes or by hot bonding (see pictures 35 and 36). Finally, the Threaded transport anchor SL can then be screwed on.



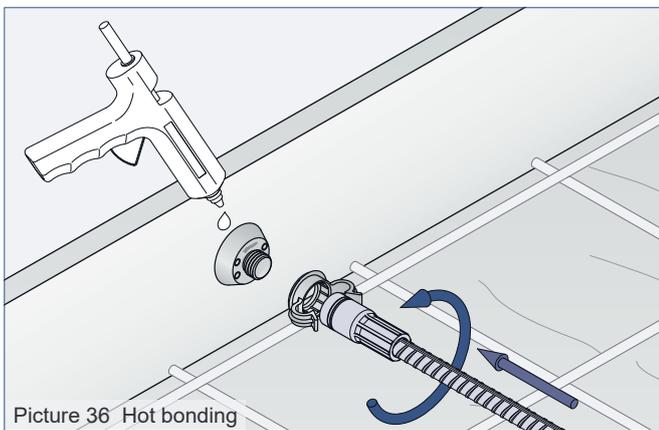
Picture 34

Table 12: 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

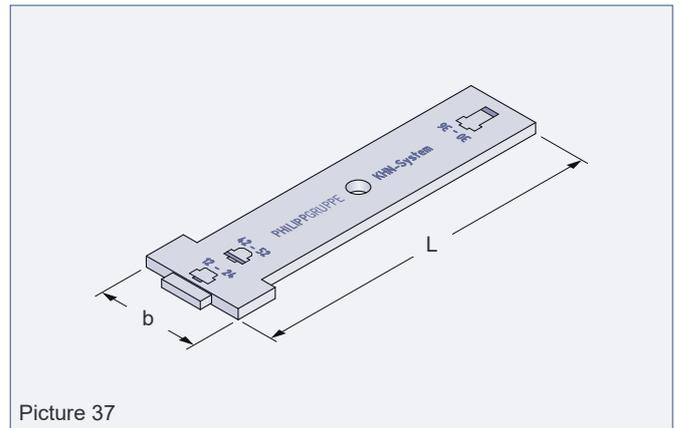


Picture 36 Hot bonding

Accessories

Key for Plastic recess former

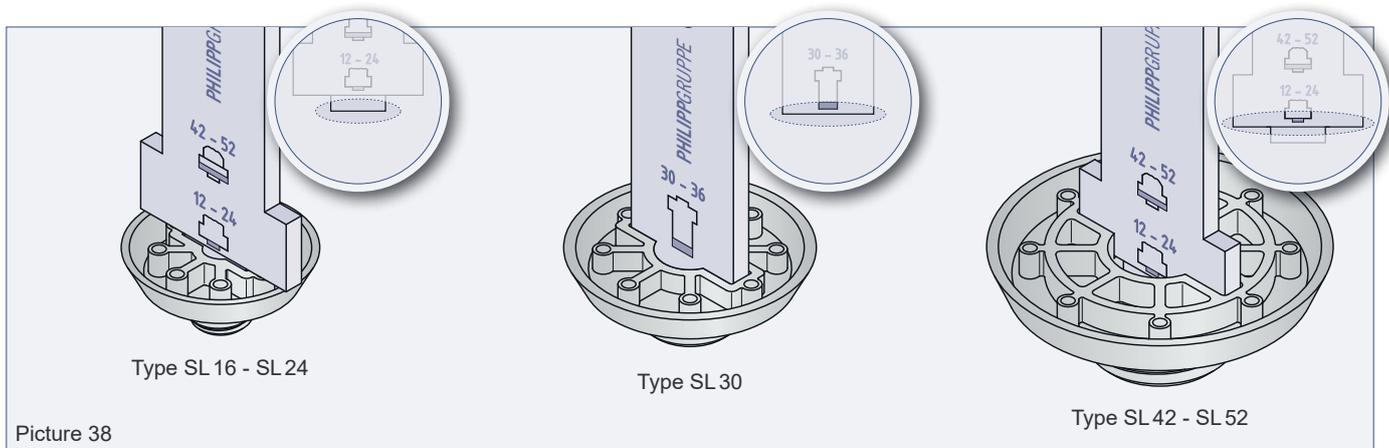
The tool/key is used for an easy unscrewing of the Plastic recess former SL (72KHN_SL) from the transport anchor set in concrete. Due to its special geometry, the tool/key can be used for all sizes (12-52) of the KHN system.



Picture 37

Table 13: Key for Plastic recess former

Ref. no.	Type	L [mm]	b [mm]
72KHNS	SL 16 - 52	200	57



Picture 38

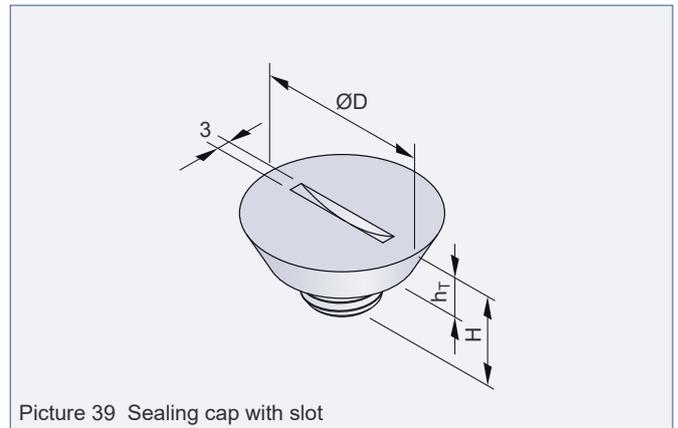
Accessories

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.



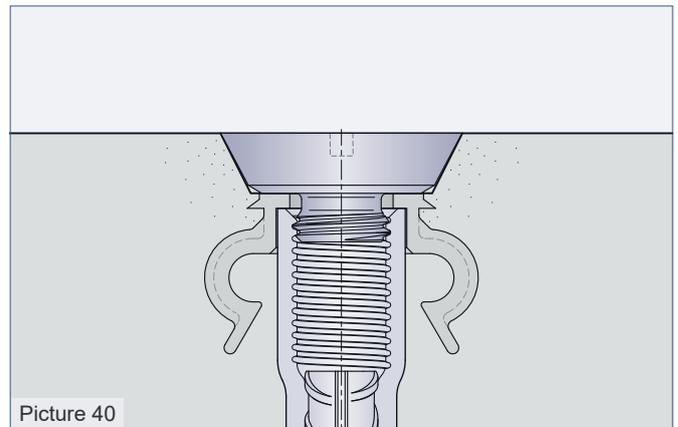
In order to avoid the penetration of moisture the Sealing cap SL in stainless steel should be pasted into the socket with a self-adhesive sealant.



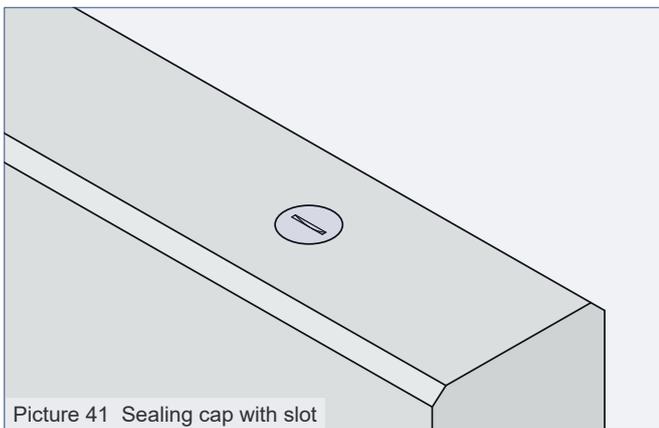
Picture 39 Sealing cap with slot

Table 14: 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 40

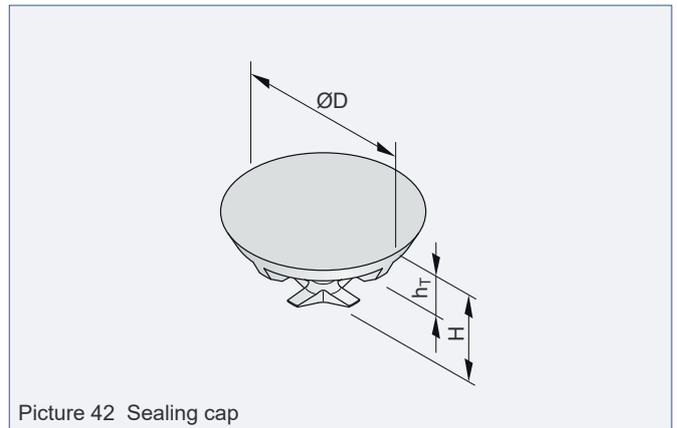


Picture 41 Sealing cap with slot

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.



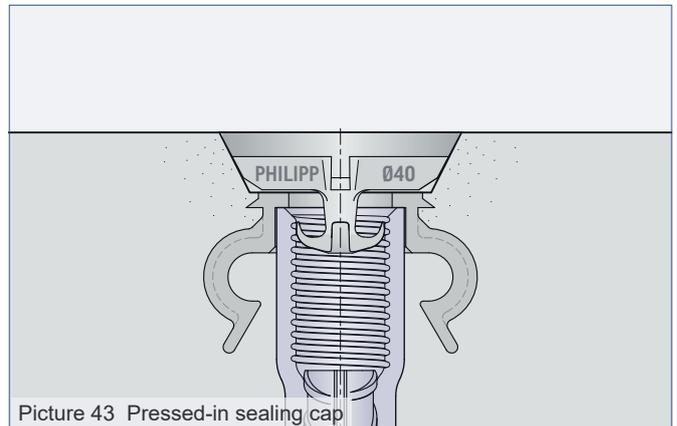
Picture 42 Sealing cap



The Sealing caps are only used for as an visual closure of the recesses and protection of the thread. In order to avoid damages at the concrete element (e.g. spalling caused by frost), the user shall ensure that the sealing caps are sealed against moisture penetration.

Table 15: Sealing cap KHN (plastic)

Ref. no.	for type	$\varnothing D$ [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				

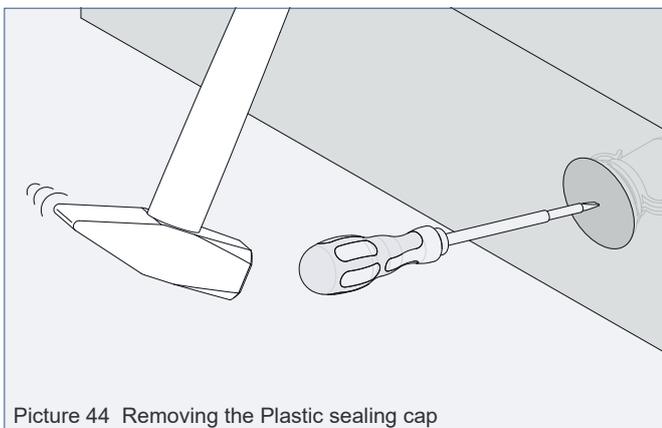


Picture 43 Pressed-in sealing cap

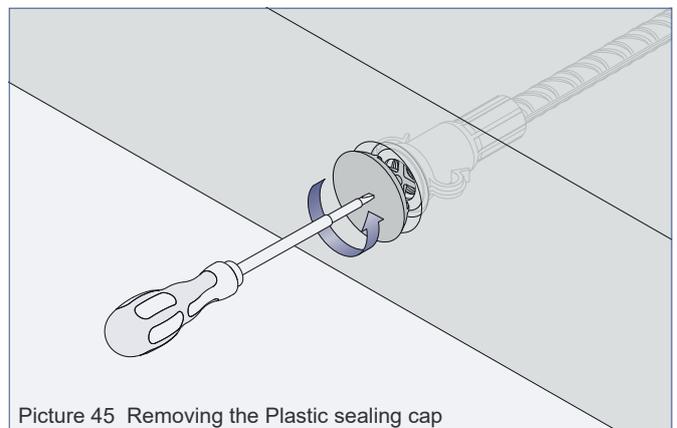
Removing the Plastic sealing cap

In order to remove the plastic sealing cap, punch a big screw driver centrally into it.

Then, the Plastic sealing cap can be unscrewed easily.



Picture 44 Removing the Plastic sealing cap



Picture 45 Removing the Plastic sealing cap

Accessories

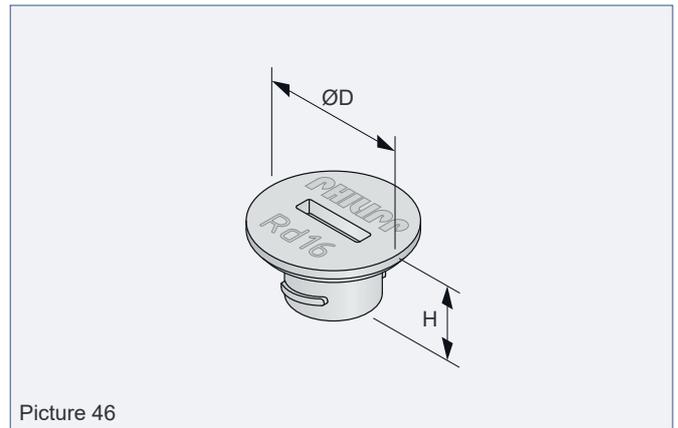
Outside retaining cap

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.

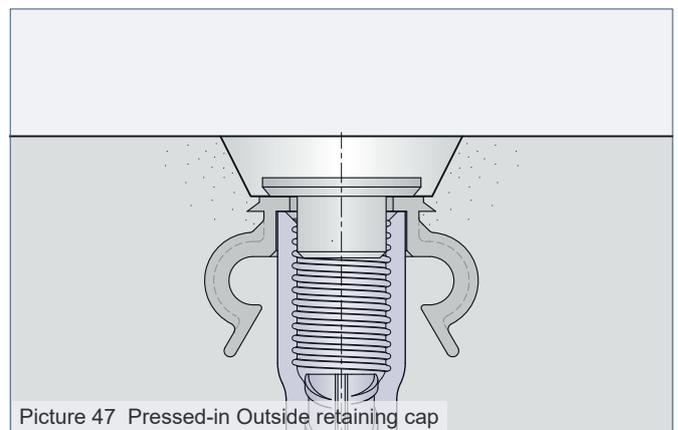
Table 16: Outside retaining cap

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

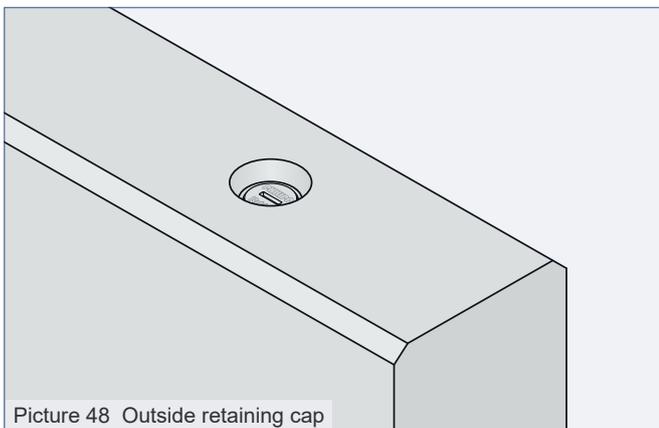
The Outside retaining cap does not close the entire recess but only the threaded insert. As a result, a soiling of the thread is prevented and the system can still be used without any problems. The Outside retaining caps are simply pressed into the threaded insert.



Picture 46



Picture 47 Pressed-in Outside retaining cap



Picture 48 Outside retaining cap

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