PHILIPPGROUP

PHILIPP Power System SL

VB3-T-028-en - 01/16

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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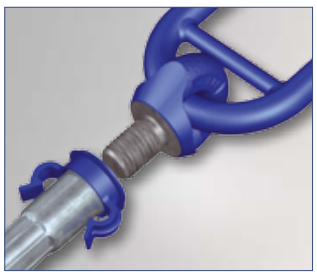
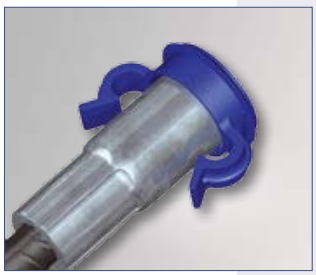
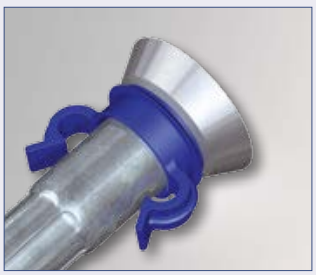
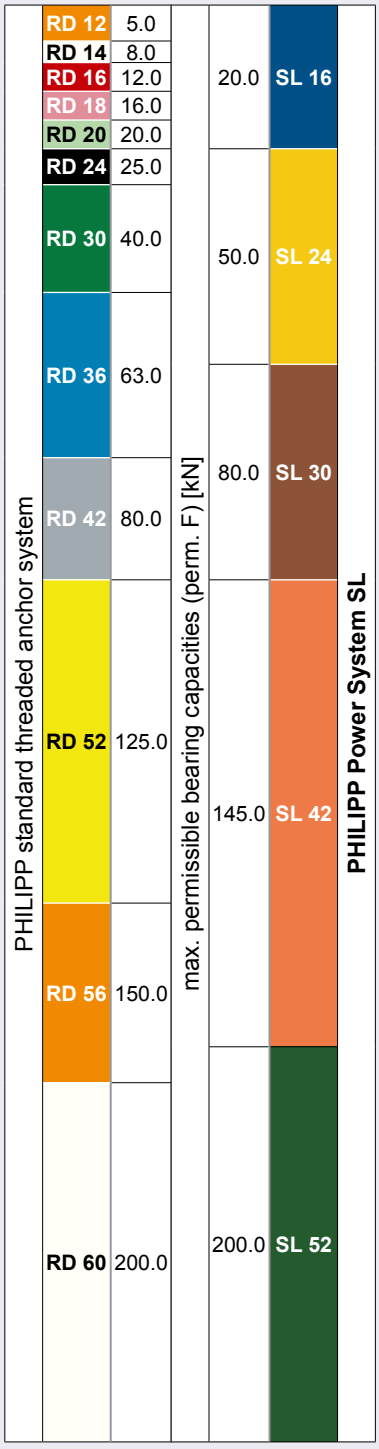
Content

PHILIPP Power System SL



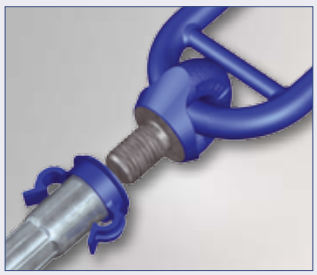
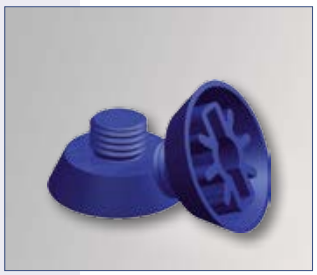
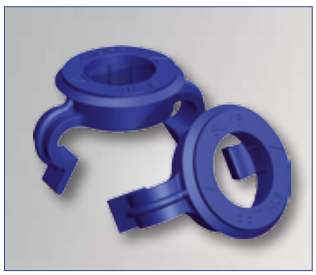
The Power System SL is the optimized threaded transport anchor system of PHILIPP.

In contrast to the standard threaded anchor system the Power System SL has only five different load classes. These five load classes of the Power Sytem SL 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
- **Optimized storage** because of smaller product range

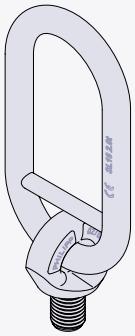

System overview

Threaded transport anchor SL – straight tail

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

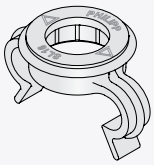
Lifty SL

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



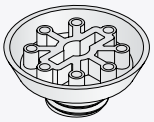
Marking ring SL with clip (plastic)

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



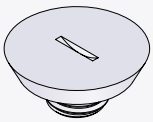
Nailing plate SL (plastic)

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



Sealing cap SL (stainless steel)

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



Outside caps (plastic)

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 insert systems for precast concrete elements" (VDI/BV-BS 6205).

The use of Power System SL requires the compliance with this Installation Instruction as well as the General Installation 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 anchor SL must be fixed either with the Nailing plates SL. The precast element is lifted and transported by the Lifty SL which is screwed into the cast-in anchor. To avoid a mix-up with the standard threaded transport anchor system the Power SL System has a left-hand thread. Both the geometry of the Lifty SL and the Threaded 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 in other load classes. 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. The threaded inserts are made of special high precision steel tubes and are galvanised according to common standards.
The Lifty SL consists of a forged ring bolt with thread and a welded chain link.

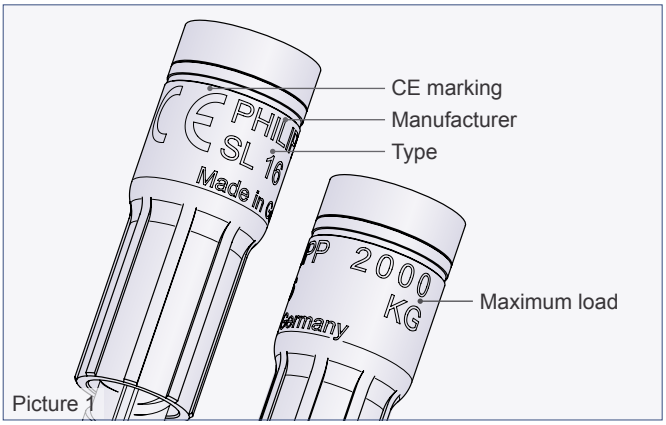
Concrete

Concrete strengths f_{cc} given in table 2 are tested of concrete cubes at the time of first lifting.

Marking of the Power System SL

Threaded transport anchor:

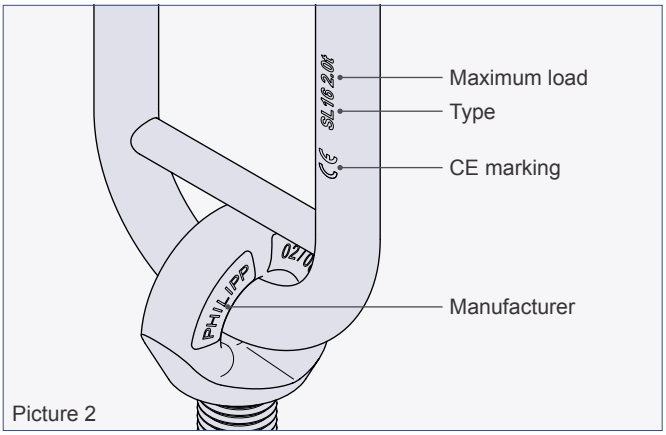
- Manufacturer (PHILIPP)
- Type (system / load class)
- Maximum load (e.g. 2000 KG)
- Colour code (colour painted)



Picture 1

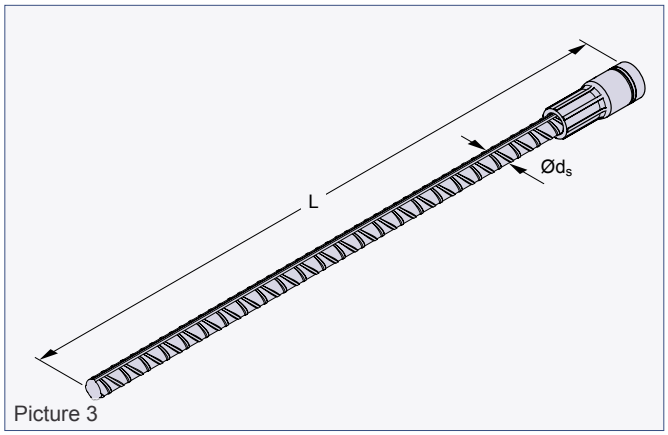
Lifting device:

- Manufacturer (PHILIPP)
- Type (system / load class)
- Maximum load (e.g. 2.0t)
- Colour code (colour painted)
- Year of manufacturing (backside)

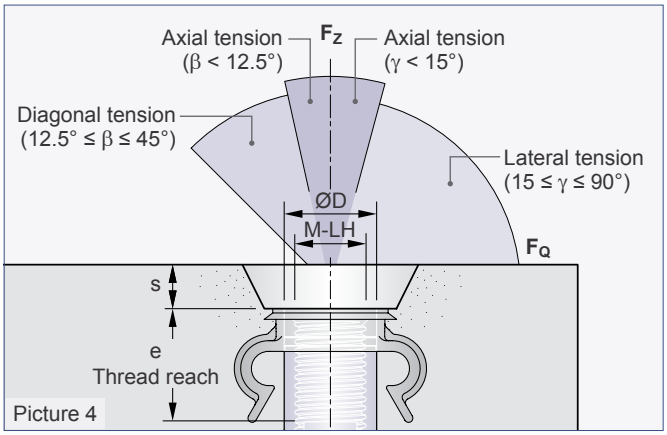


Picture 2

Threaded transport anchor SL – straight tail



Picture 3

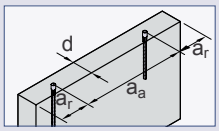


Picture 4

Table 1: Dimensions of Threaded transport anchors SL - straight tail

Ref.-No. **bright zinc plated**	Type	M-LH	L	ØD	Ød$_s$	e	s
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 2: Permissible bearing capacities of Threaded transport anchor SL - straight tail

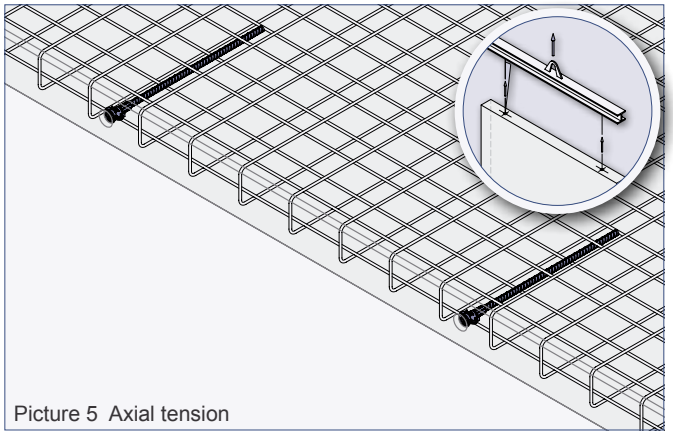
Ref.-No.	Load class	Element thicknesses and edge distances			perm. F if f_{cc} **15 N/mm²**				perm. F if f_{cc} **25 N/mm²**			
					**Axial tension**	**Diagonal tension**		**Lateral tension**	**Axial tension**	**Diagonal tension**		**Lateral tension**
					perm. F$_Z$ 0°- 12.5°	perm. F$_Z$ 12.5°- 30°	perm. F$_Z$ 12.5°- 45°	perm. F$_Q$	perm. F$_Z$ 0°- 12.5°	perm. F$_Z$ 12.5°- 30°	perm. F$_Z$ 12.5°- 45°	perm. F$_Q$
		d [mm]	a$_a$ [mm]	a$_r$ [mm]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]	[kN]
67M16SL	16	80	930	465	20.0	-	16.2	5.4	20.0	-	19.2	7.0
		100			20.0	-	16.3	7.7	20.0	-	19.2	10.0
		120			20.0	-	16.5	10.3	20.0	-	19.2	13.3
67M24SL	24	100	1180	590	50.0	-	42.5	10.6	50.0	-	42.5	13.7
		120			50.0	-	42.5	13.8	50.0	-	42.5	17.8
		140			50.0	-	42.5	17.5	50.0	-	42.5	22.6
		160			50.0	-	42.5	21.6	50.0	-	42.5	27.9
67M30SL	30	120	1520	760	76.1	-	61.5	15.9	80.0	-	66.4	20.5
		140			79.8	-	64.5	20.3	80.0	-	66.4	26.2
		160			80.0	-	66.4	25.1	80.0	-	66.4	32.4
		180			80.0	-	66.4	30.3	80.0	-	66.4	39.2
67M42SL	42	160	2230	1115	145.0	-	116.0	27.4	145.0	-	116.0	35.3
		180			145.0	-	116.0	33.1	145.0	-	116.0	42.7
		200			145.0	-	116.0	39.6	145.0	-	116.0	51.1
		220			145.0	-	116.0	46.3	145.0	-	116.0	59.8
		240			145.0	-	116.0	53.8	145.0	-	116.0	69.4
67M52SL	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

Main reinforcement

On use of Power System SL precast units must be reinforced with a minimum reinforcement (Table 3). This minimum reinforcement can be replaced by a comparable steel bar reinforcement. At the first time of lifting the concrete must have a minimum strength f_{cc} of **15 N/mm²**. The user is personally responsible for further transmission of load into the concrete unit.



Picture 5 Axial tension

Table 3: Minimum reinforcement

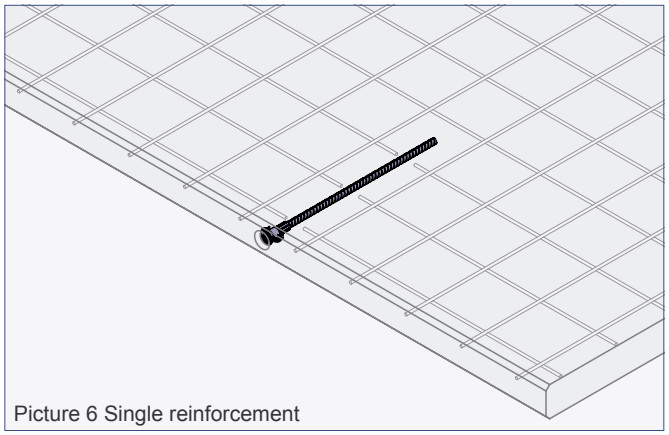
Load class	Mesh cap (square) [mm²/m]
16	188 ①
24	188
30	188
42	188
52	257

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

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

Information according reinforcement for thin elements

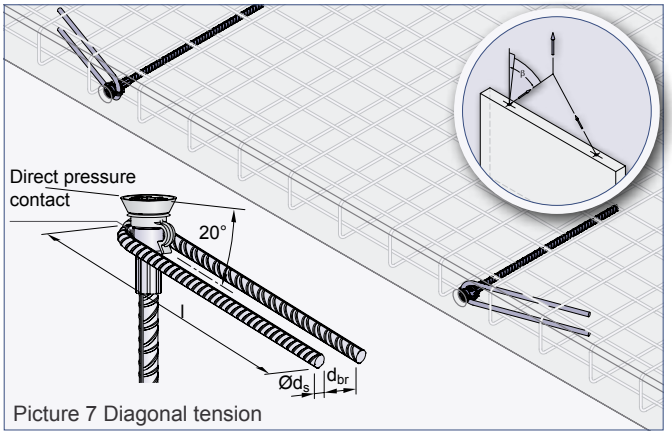
In order to ensure also a central position of the anchor in the element the mesh has to be cut out in this area.



Picture 6 Single reinforcement

Additional reinforcement for diagonal tension

If the Power System SL is used under diagonal tension $\beta \geq 12.5°$ an additional reinforcement according to Table 4 is required. Here the reinforcement for diagonal tension is placed contrarily to the tensile direction (Picture 7) and must have direct pressure contact to the anchor insert in the peak of its bending.



Picture 7 Diagonal tension

Table 4: Additional reinforcement for diagonal tension (B500B)

Load class	if 12.5° ≤ β ≤ 30°			if 12.5° ≤ β ≤ 45°		
	$Ød_s$ [mm]	l [mm]	$Ød_{br}$ [mm]	$Ød_s$ [mm]	l [mm]	$Ød_{br}$ [mm]
16	-	-	-	10	300	24
24	-	-	-	12	550	34
30	-	-	-	16	700	41
42	-	-	-	20	1000	64
52 ②	20	1000	140	20	1000	140

② for load class 52 B500A and B500B possible

Reinforcement

Additional reinforcement for lateral tension

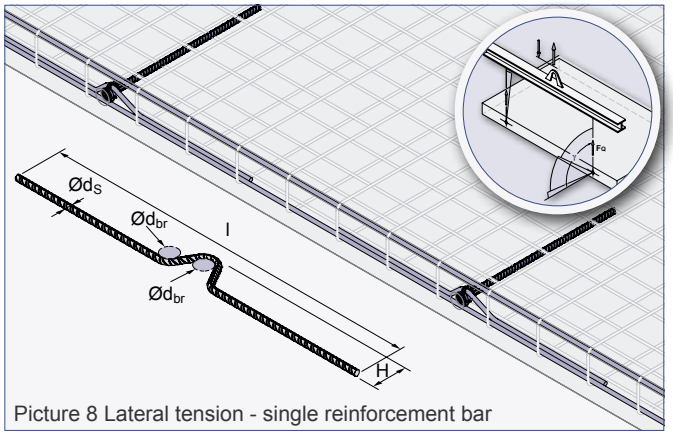
If the Power System SL is used under lateral tension $\gamma \geq 15°$ an additional reinforcement according to Table 5 is required. The reinforcement for lateral tension is installed in the front side of the wall contrarily to the load direction. Tilting of walls can cause diagonal and lateral tension at the same time, so called diagonal-lateral-tension, to the transport anchors (Picture 9). In this case only the reinforcement for lateral tension is required (double reinforcement bar). The diagonal tension is already covered by using this reinforcement.

During mounting the turn-over or tilt-up of the unit requires attention regarding the position of the reinforcement (single reinforcement bar, acc. to Picture 8). The double reinforcement bar (Picture 9) covers all load directions. In addition to the mesh cap (Table 3) longitudinal reinforcement must be installed as shown in Table 5.
The user has the choice to take the reinforcement for lateral tension either as a single reinforcement bar (Picture 8) or as double reinforcement bar (Picture 9). Nevertheless, there must be direct pressure contact between the insert of the transport anchor and the reinforcement in the peak of the bending.

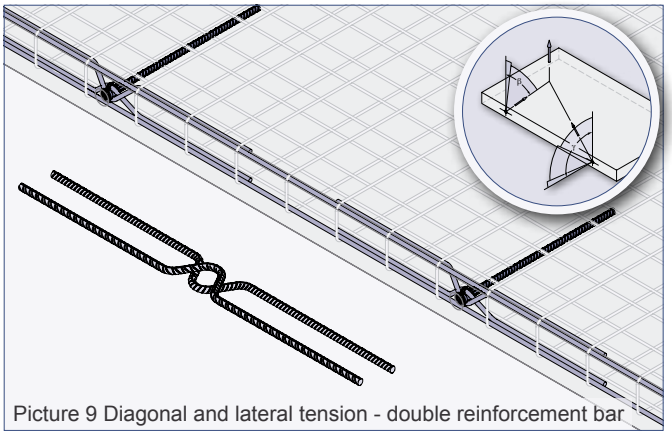
Table 5: Additional reinforcement for lateral tension (material B500B) (required if $\gamma \geq 15°$)

Load class	Thick-nesses [mm]	$Ød_{br}$ [mm]	$Ød_s$ [mm]	h [mm]	l [mm]	Longitudinal reinforcement [mm]
16	80	32	10	40	800	-
	100			50		2 × Ø10 Length 930
	120			60		
24	100	48	12	57	1000	2 × Ø12 Length 1180
	120			67		
	140			77		
	160			87		
30	120	48	16	76	1200	2 × Ø14 Length 1520
	140			86		
	160			96		
	180			106		
42	160	64	20	107	1800	2 × Ø14 Length 2230
	180			117		
	200			127		
	220			137		
	240			147		
52 ②	200	140	20	120	1800	2 × Ø14 Length 2800

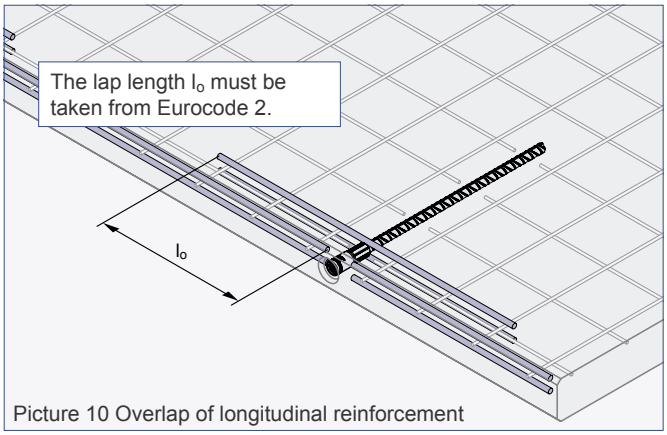
② for load class 52 B500A and B500B possible



Picture 8 Lateral tension - single reinforcement bar


Picture 9 Diagonal and lateral tension - double reinforcement bar

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.



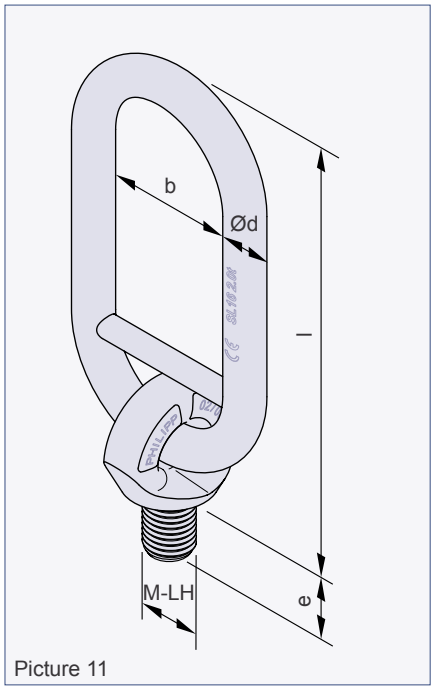
Picture 10 Overlap of longitudinal reinforcement

Position of the direct pressure contact between insert and additional reinforcement must be within the thread reach of the insert.

Lifty SL

Table 6: Dimensions Lifty SL

Ref.-No.	Type	Thread	Perm. load F		Dimensions			
		[M-LH]	0°- 30° [kN]	0°- 90° [kN]	Ød [mm]	e [mm]	b [mm]	l [mm]
62LISL16M	SL 16	16	-	20.0	13	23	50	150
62LISL24M	SL 24	24	-	50.0	16	35	50	162
62LISL30M	SL 30	30	-	80.0	22	39	50	177
62LISL42M	SL 42	42	-	145.0	28	55	65	220
62LISL52M	SL 52	52	200.0	150.0	28	68	65	220



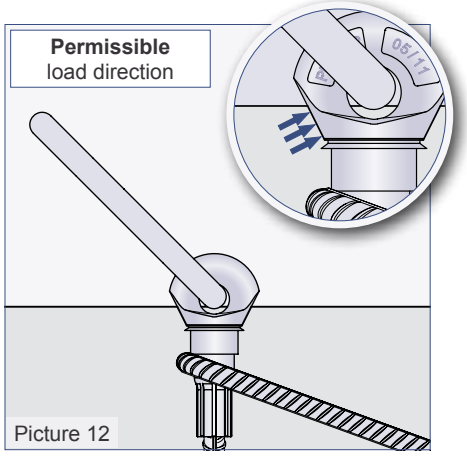
Picture 11

Application

Lifty SL is used as a lifting device within the Power System SL. It has a metric left-hand thread and is screwed in or removed from the Threaded transport anchor SL (also with left-hand thread). All load cases (axial, diagonal and lateral tension) can be handled by the Lifty SL.

If the Lifty SL is screwed in completely, a flush connection of the ring bolt in the prior made recess of the nailing plate is guaranteed (Picture 12). During rigging the forged ring bolt must point at the tensile direction all the time (Picture 13).

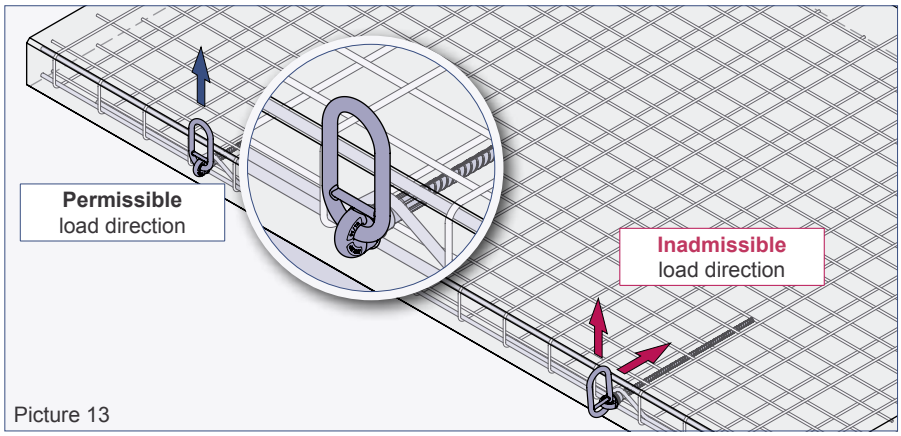
In order to align the Lifty SL into the correct position it is allowed to screw it back for a half turn at the most. As the ring bolt is supported by the concrete in the recess made by the Nailing plate SL, an optimum load transfer into the cast-in transport anchor is given.



Picture 12

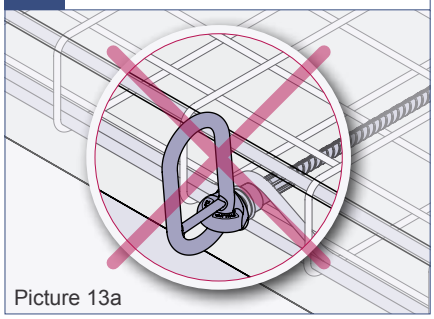
Using only one Lifty SL in order to lift concrete elements attention must be paid that the Lifty SL is protected against unscrewing.

Loading the Lifty SL is only admissible in the tension direction of the ring bolt axis according to picture 13.



Picture 13

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


Picture 13a

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 13).

Lifty SL

Safety notice

As each other lifting equipment and lifting device the Lifty SL is subject to an annual inspection according to DGUV 100-500 chapter 2.8. This inspection has to be done by an expert and lies within the responsibility of the owner.

In general, attention must be paid to the current accident prevention regulation. The correct hook size and form should be considered in order to extend the durability.
The replacement criteria of the Lifty SL are based on the German regulation DGUV 100-500 (chapter 2.8 section 3.15.4).

Replacement criteria and inspection service

During inspection the following points have to be considered:

- Before Inspection the Lifty SL must be cleaned
- Breakage of chain link
- Creaks or the capacity reducing corrosion pits (especially in the area of the thread)
- On plastic deformation the replacement state of the Lifty SL is reached. Those deformations can be e.g.:
  - Deformed chain link (Picture 14)
  - Deformation of the threaded bolt
  - Stretching caused by overload (Picture 15 and Table 7)
  - Wear of the ring bolt (Table 8, Picture 16)
- On exceeding permissible wear measurements the replacement state is also reached.

If you want a proper and documented inspection, don't hesitate to contact our PHILIPP Inspection Service under phone number +49 (0) 6021 4027-700.

Table 7: Check dimensions of the chain link

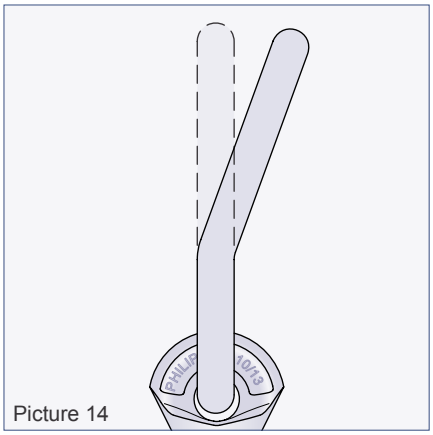
Load class	Pitch T [mm]	T_{max} = 1.05 × T [mm]	Ød [mm]	0,9 × d [mm]
16	115	121	13	11.7
24	115	121	16	14.4
30	115	121	22	19.8
42	139	146	26	23.4
52	139	146	26	23.4

Furthermore the radius of the chain link must be observed during inspection. The replacement state for this part is reached if the chain link has a diminution of 10% (Picture 16 and Table 8).

Table 8: Check dimensions of the ring bolt

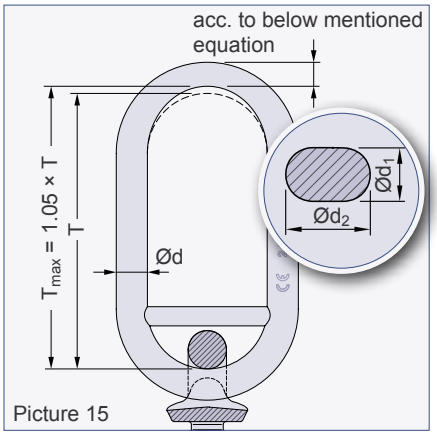
Load class	d_R [mm]	0.9 × d_R [mm]
16	15.5	14.0
24	21.5	20.5
30	31.3	28.5
42	38.2	34.5
52	38.2	34.5

Welding or other strong heat influences on the Lifty SL are not allowed.



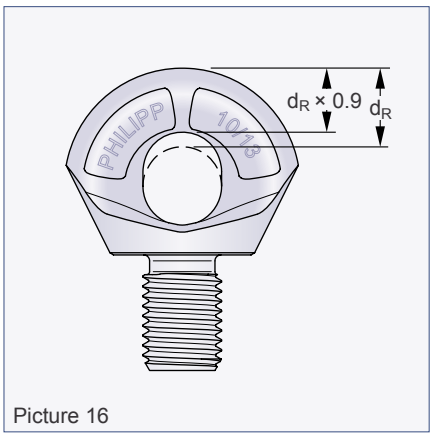
Picture 14

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



Picture 15

$$\frac{Ød_1 + Ød_2}{2} > 0.9 \times Ød$$

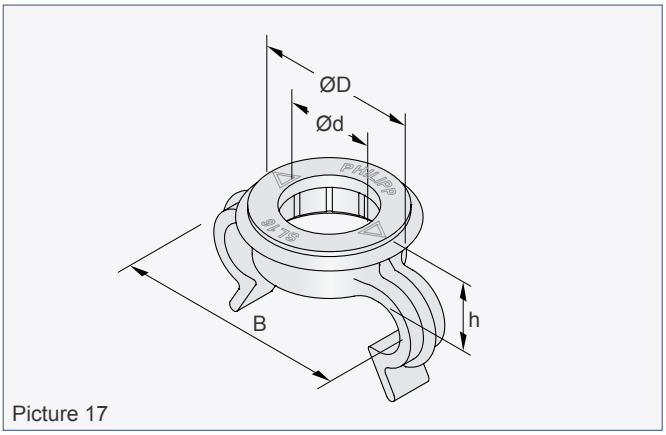


Picture 16

Accessories

Marking ring SL with clip (plastic)

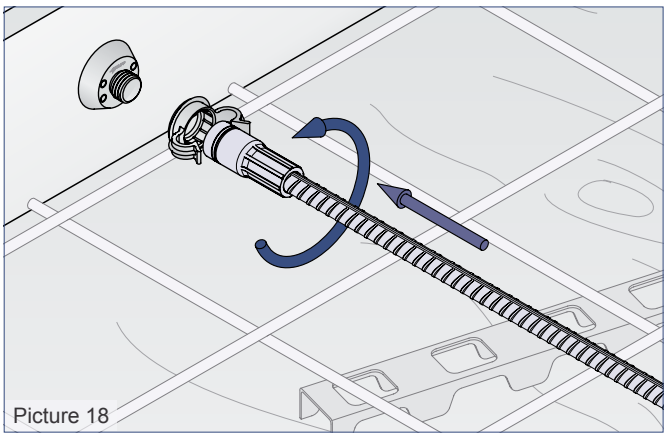
The Marking ring SL with clip is used for marking the installed anchor as well as to fix additional reinforcement to the right position of the threaded insert (reinforcement for lateral or diagonal tension, see Picture 19 and 20).
The Marking ring SL with clip is put over the threaded insert during the installation of the anchor. Afterwards the Threaded transport anchor SL is fixed to the mould by a Nailing plate SL.
Due to the colour-coded marking a quick and correct classification of the corresponding lifting device is ensured (Picture 21).

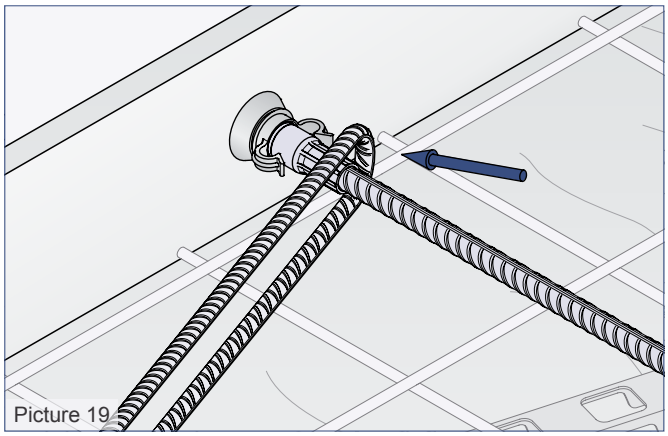


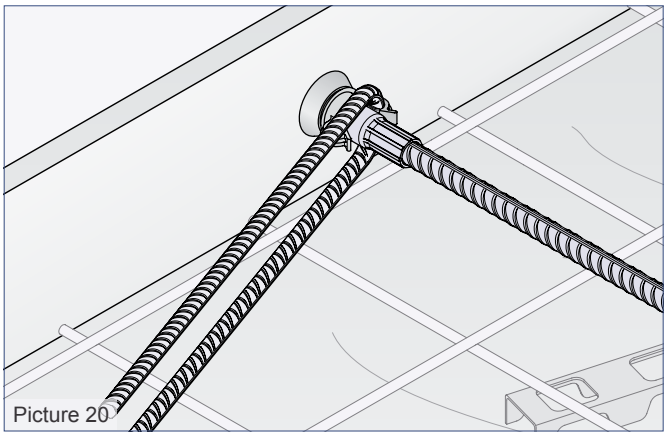
Picture 17

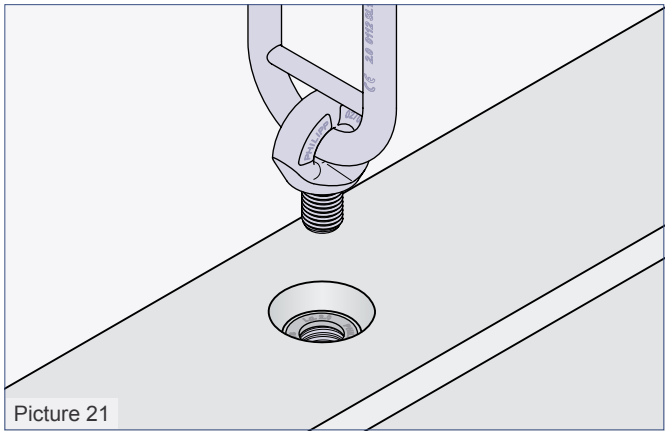
Table 9: Marking ring SL with clip (plastic)

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 18


Picture 19

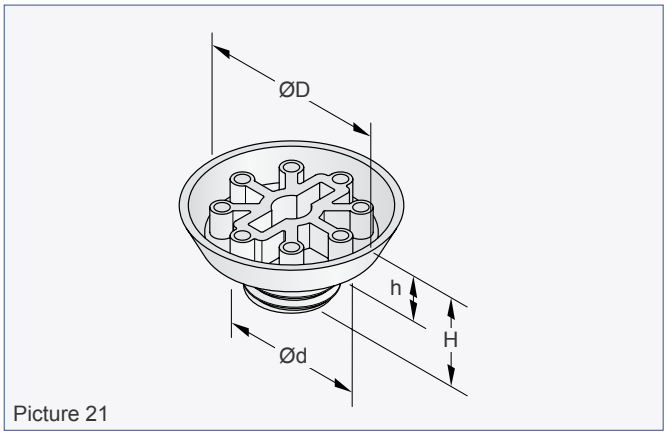

Picture 20


Picture 21

Accessories

Nailing plate SL (plastic)

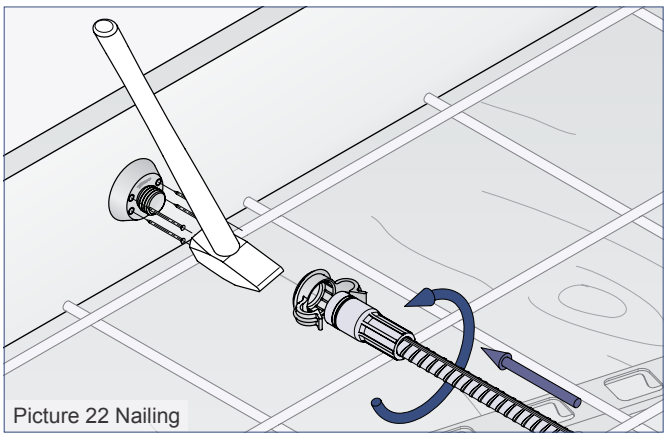
The Nailing plate SL is used to fix the Threaded transport anchor SL to the mould. They can be fixed either by nailing through the indicated nailing holes or by hot cluing (see Picture 22 and 23). Afterwards the Threaded transport anchor SL can be screwed on.

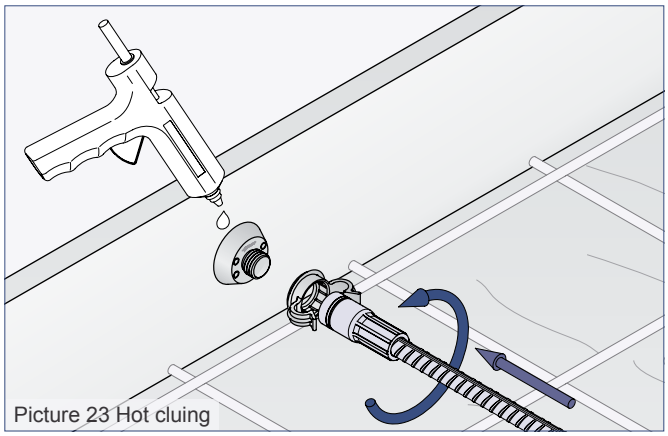


Picture 21

Table 10: Nailing plate SL (plastic)

Ref.-No.	Type	ØD [mm]	Ød [mm]	H [mm]	h [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 22 Nailing


Picture 23 Hot cluing

Accessories

Sealing caps SL

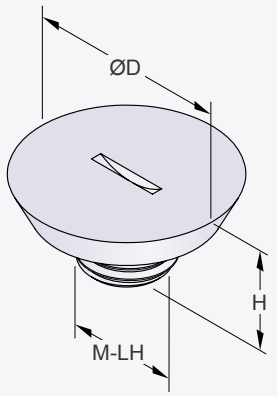
The Sealing caps SL are used for closing the recesses completely. Therefore, the penetration of dirt is not possible. A sealing of the threaded insert and the recess is also possible with mortar.

Sealing cap SL (stainless steel with slot)

The Sealing cap SL is used for closing the recess completely.

Table 11: Sealing cap SL (stainless steel with slot)

Ref.-No.	Type	ØD [mm]	H [mm]
72ASKHNSL16VA-S	SL 16	40	20
72ASKHNSL24VA-S	SL 24	55	25
72ASKHNSL30VA-S	SL 30	70	30
72ASKHNSL42VA-S	SL 42	96	35
72ASKHNSL52VA-S	SL 52	96	40



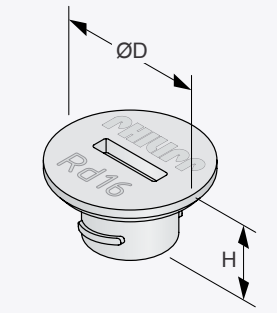
Picture 24

Outside cap (plastic)

The Sealing cap closes and protects the thread of the socket. Thus, it prevents the penetration of dirt into the socket.

Table 12: Outside cap (plastic)

Ref.-No.	Type	ØD [mm]	H [mm]	Colour
72ASS16	16	25	13	Concrete grey
72ASS24	24	35	17	Concrete grey
72ASS30	30	42	19	Concrete grey
72ASS42	42	60	20	Concrete grey
72ASS52	52	73	22	Concrete grey

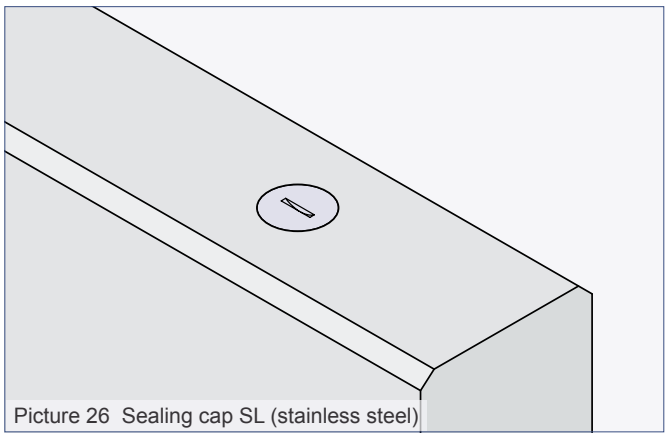


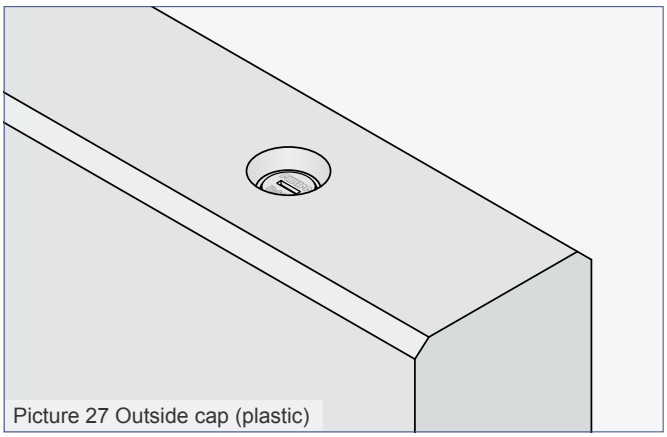
Picture 25

Sealing caps SL

The Sealing caps in stainless steel closes the recess created by the Nailing plate. On the top the Sealing cap SL has a small slot for screwing. Hence, the Sealing cap in stainless steel offers an optically attractive solution to close the recess flush to the concrete surface. In order to avoid the penetration of moisture the Sealing cap in stainless steel should be pasted into the socket with a self-adhesive sealant.

In contrast to the Sealing cap SL the Outside cap does not complete the recess totally but only the threaded socket. Therefore the penetration of dirt is not possible. A permanent corrosion protection is only partially given as a penetration of water into the sealed socket cannot be excluded. The Outside caps are simply plugged into the thread.


Picture 26 Sealing cap SL (stainless steel)


Picture 27 Outside cap (plastic)

Packing units and weights

Table 13: Packing units (PU) and weights (KG)

Type	Threaded transport anchor SL straight tail		Lifty SL		Marking ring SL with clip		Nailing plate SL (plastic)	
	Package unit [pcs.]	Weight [kg/100 pcs.]	Package unit [pcs.]	Weight [kg/100 pcs.]	Package unit [pcs.]	Weight [kg/100 pcs.]	Package unit [pcs.]	Weight [kg/100 pcs.]
SL 16	1	45.0	1	48.0	100	0.25	100	0.6
SL 24	1	154.0	1	130.0	100	0.37	100	1.3
SL 30	1	314.0	1	340.0	100	0.55	100	2.0
SL 42	1	768.0	1	620.0	100	0.71	100	4.4
SL 52	1	1321.0	1	740.0	100	1.07	100	6.5

Type	Sealing caps SL (stainless steel with slot)		Outside cap (plastic)	
	Package unit [pcs.]	Weight [kg/100 pcs.]	Package unit [pcs.]	Weight [kg/100 pcs.]
SL 16	1	8.7	100	0.14
SL 24	1	19.5	100	0.38
SL 30	1	35.0	100	0.53
SL 42	1	81.0	100	0.96
SL 52	1	81.0	100	1.33

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