PFEIFER

Set the right direction for safety and reliability

10/2014

PFEIFER thread system
The Original

PFEIFER
SEIL- UND HEBETECHNIK
GMBH

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PFEIFER – Safely in the right direction

“Made in Germany” for over 430 years.

PFEIFER Seil- und Hebetechnik GmbH in Memmingen is the headquarters of the PFEIFER Group and can look back on a family tradition of more than 430 years in the manufacture of ropes and cables. Today, Gerhard Pfeifer, of the 12th generation of the family, heads the international group of companies providing top-class performance in the areas of wire rope technology, lifting technology and connecting and lifting systems.

Quality is our business.

All our products have always been safety-related. In every case, human lives depend on our products working safely. That‘s why our performance is based on quality through competence. We want to gain, and retain, the trust of our customers through reliable and innovative products and a reliable service.
Which is exactly why both today and in the future we are backing “Made in Germany” where it matters.

We will be pleased to give you advice. Good advice.

With constant ongoing development, regular testing and inspection of our products, our engineers and technicians are a team of advisors with a comprehensive body of knowledge and innovative strength. Our technology experts can develop reliable, economical and safe suggestions for components and solutions – even for the most difficult applications, e.g. anchors even in limit situations that differ from the general installation manuals.

Unmistakable: The PFEIFER colour-coding system

The unique colour coding system was originally developed by PFEIFER for the correct allocation of lifting loop to the PFEIFER socket. This gives immediate recognition for allocating the pictured individual components, a guarantee of the correct application and avoiding any confusion – all without the need for much prior technical knowledge.

Pastel orange RAL 2003	Size Rd 12
Pure white RAL 9010	Size Rd 14
Flame red RAL 3000	Size Rd 16
Light pink RAL 3015	Size Rd 18
Pastel green RAL 6019	Size Rd 20
Anthracite grey RAL 7016	Size Rd 24
Emerald green RAL 6001	Size Rd 30
Light blue RAL 5012	Size Rd 36
Silver grey RAL 7001	Size Rd 42
Sulphur yellow RAL 1016	Size Rd 52
Pastel orange RAL 2003	Size Rd 56
Flame red RAL 3000	Size Rd 60

PFEIFER – Pole Position for quality and reliability

With PFEIFER you have many advantages

Product range

- PFEIFER thread system: Perfectly matched, comprehensive range of lifting anchors, swivel eyes, rope loops and special lifting loops and accessories
- Tried, prove and continually developed over decades
- The market-leading system, universally suitable for use in precasting moulds
- Economical, safety-tested, strong, high capacity for force transmission

Technologically right up to date

- With thorough reworking, now compliant with the VDI/BV-BS directive 6205 and therefore CE-compliant
- Regular customer information about current technical topics
- Continuous further development and optimization of products and conditions of use

Quality and safety

- Design and production of all thread system components, and installation instructions, compliant with the EC machinery directive
- Consistent colour coding for unambiguous assignment of the system components during the whole logistics chain
- Proven millions of times in use
- In-process Quality Assurance
- Made in Germany

Efficiency

- Reliable lifting devices – from the low-cost to the indestructible
- Longevity by means of selected quality materials, always chosen to fit the application

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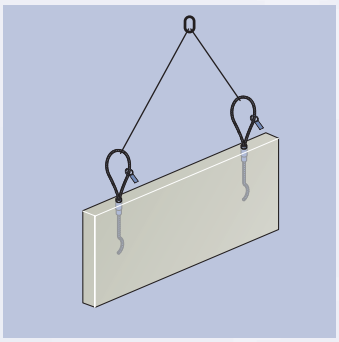
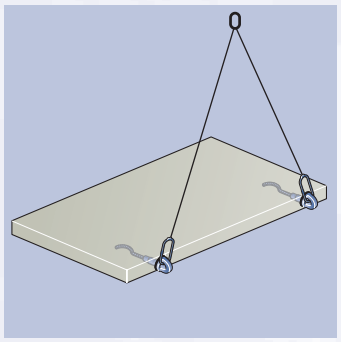
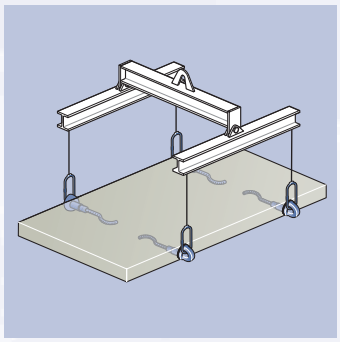
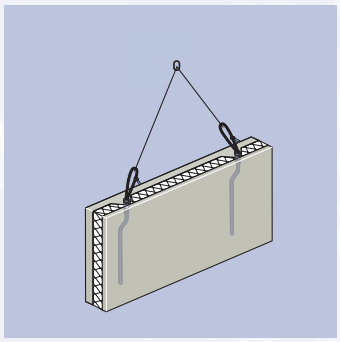
Contents

Qualifying: which lifting anchor will you enter in the race?

Installation in the edge of structural elements

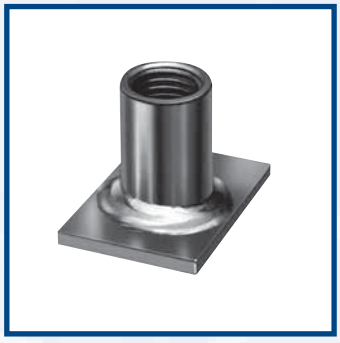
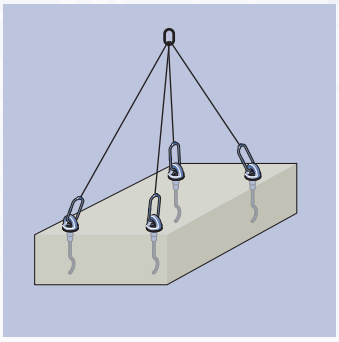
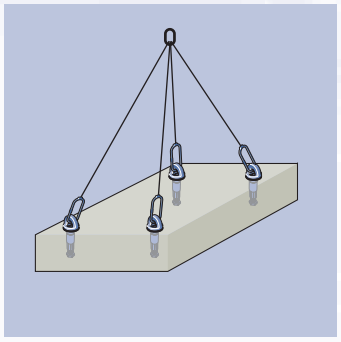
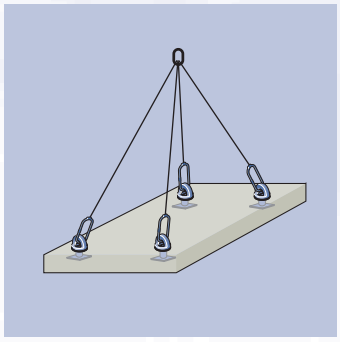




Installation in the face of structural elements



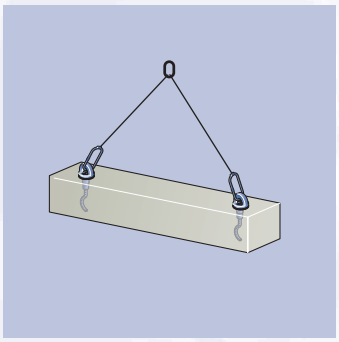
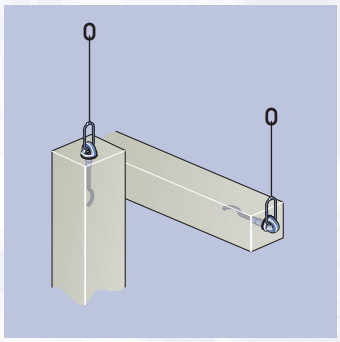





For rapid and simple planning of the lifting anchors you can go by the type of application or of the installation.

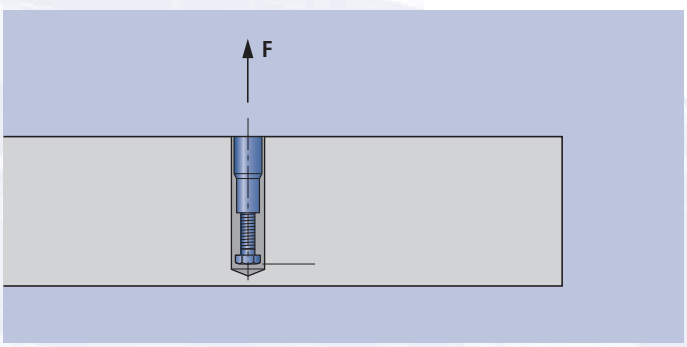
Installation in heavily reinforced structural column elements

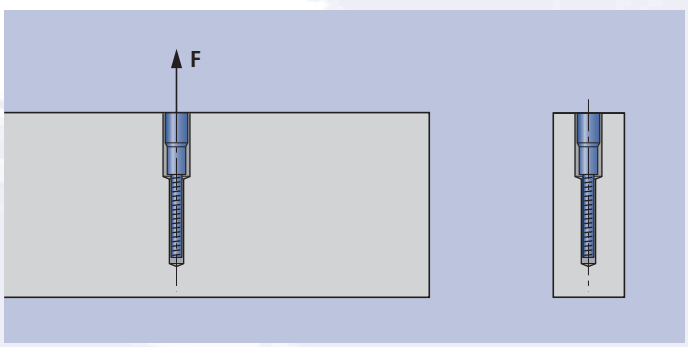




Specialised applications



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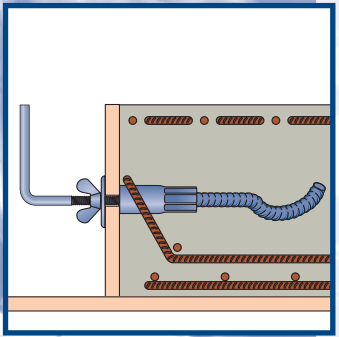
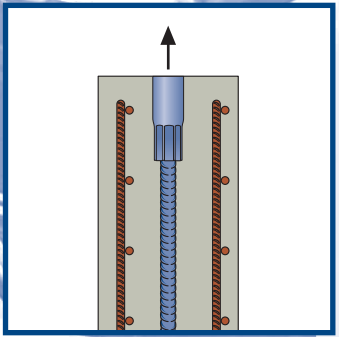




Strong on the bends and on the straight: PFEIFER lifting anchors for edge installation

PFEIFER lifting anchors are an important part of the reliable PFEIFER thread system and a significant factor for its great success. The different types of anchor offer PFEIFER customers a solution for every application case.

System

- The cleverly designed lifting anchors of the thread system, such as waved anchors (short, long), sockets, bar anchors, flat steel anchors, bolt anchors and custom anchors are carefully matched to the associated lifting devices and accessories. They are suitable for edge and face installation in slabs and for installation in columns and girders. This makes them a suitable and safe solution for every application.

PFEIFER waved anchor

- Highest safety levels from decades of experience in manufacturing and application consulting
- Safe load application, even in the thinnest structural elements
- Carrying capacity from 0.5 to 20 tons
- Optimised shape of wave for cautious load application in narrow slabs with minimal gap effect
- Individual manufacture of custom lengths and custom anchors

Safety

- In-process Quality Assurance, according to QA test plans using tensile tests, bolt-in tests, dimensional checks, zinc-coat thickness measurements

Made in Germany

- Qualified, trained and instructed personnel
- Safe manufacture under consistent conditions
- In-house quality assurance
- Raw materials with warranted and defined properties from proven suppliers

PFEIFER – waved anchors, long

Item-No. 05.017

Can be used for:
- Installation in the edge of structural elements
- Installation in column-shaped structural elements

For use by:
- trained and qualified personal

PFEIFER

Thread System

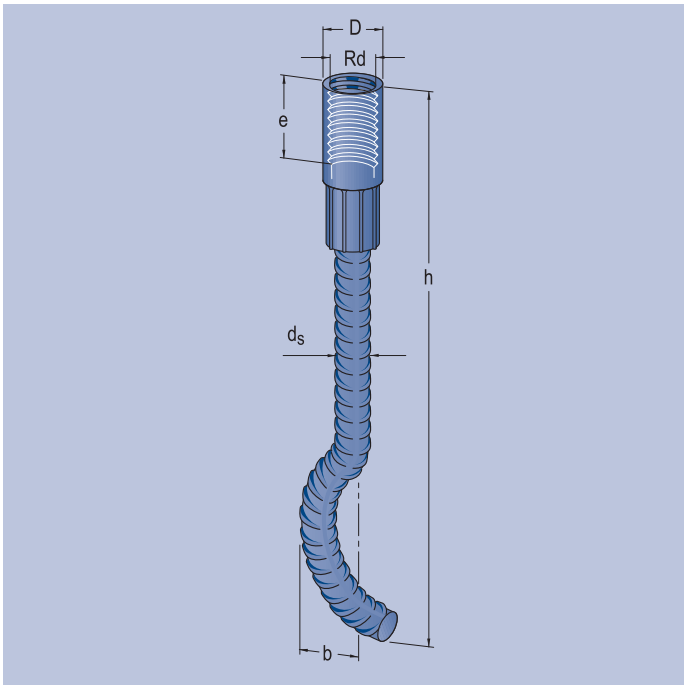
Lifting anchor

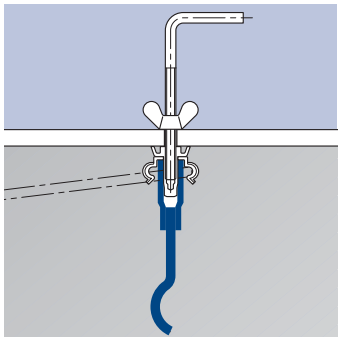
The PFEIFER waved anchor long, is one of the lifting anchors in the PFEIFER thread system. In combination with the associated PFEIFER lifting devices it is suitable for lifting precast concrete elements of all types, specifically for erecting thin slabs. The specially shaped wave gives, particularly for thin wall elements with a low level of reinforcement, a gentle load application.

Advantages: Safe and gentle load application in thin shear walls, unambiguous assignment through PFEIFER colour coding

Material:

Socket of high grade precision steel tube, galvanized or in stainless steel, swaged on with reinforcing bar B500 A/B, black





Ref.-No. galvanized	Ref.-No. stainless steel	Type/Size	$N_{R, adm}$ [kN]	$V_{R, adm}$ [kN]	Thread	Dimensions D	[mm] b	d_s	e	h	Weight approx. [kg/piece]
05.017.123	**05.017.124**	Rd 12	5	2,5	Rd 12 x 1,75	15,0	15	8	22	137	0,08
05.017.143	**05.017.144**	Rd 14	8	4,0	Rd 14 x 2,00	18,0	20	10	25	170	0,14
05.017.163	**05.017.164**	Rd 16	12	6,0	Rd 16 x 2,00	21,0	21	12	27	216	0,25
05.017.183	**05.017.184**	Rd 18	16	8,0	Rd 18 x 2,50	24,0	25	14	34	235	0,39
05.017.203	**05.017.204**	Rd 20	20	10,0	Rd 20 x 2,50	27,2	25	16	35	257	0,55
05.017.243	**05.017.244**	Rd 24	25	12,5	Rd 24 x 3,00	31,0	30	16	43	360	0,75
05.017.303	**05.017.304**	Rd 30	40	20,0	Rd 30 x 3,50	39,5	40	20	56	450	1,45
05.017.363	**05.017.364**	Rd 36	63	31,5	Rd 36 x 4,00	47,0	50	25	67	570	2,70
05.017.423	**05.017.424**	Rd 42	80	40,0	Rd 42 x 4,50	54,0	50	28	80	620	3,75
05.017.523	**05.017.524**	Rd 52	125	62,5	Rd 52 x 5,00	67,0	70	32	97	880	7,65
05.017.563		Rd 56	150	–	Rd 56 x 5,50	70,0	80	36	80	1200	11,00
05.017.603		Rd 60	200	–	Rd 60 x 5,50	76,0	80	40	85	1410	15,00

Notice: The waved anchors in sizes Rd 56 and Rd 60 are only intended for loads at angles of inclination up to max. 12.5°. Transversal shear pull, such as when erecting wall elements, is not intended for waved anchors Rd 56 and Rd 60.

Example order for PFEIFER waved anchors, long shape, galvanized, Rd 12:
500 PFEIFER waved anchors, Ref.-No. 05.017.123.195

Technical installation instructions on page 14

PFEIFER bar anchors

Item-No. 05.019

PFEIFER

Thread System

Lifting anchor

Can be used for:
- Installation in the edge of structural elements
- Installation in column-shaped structural elements

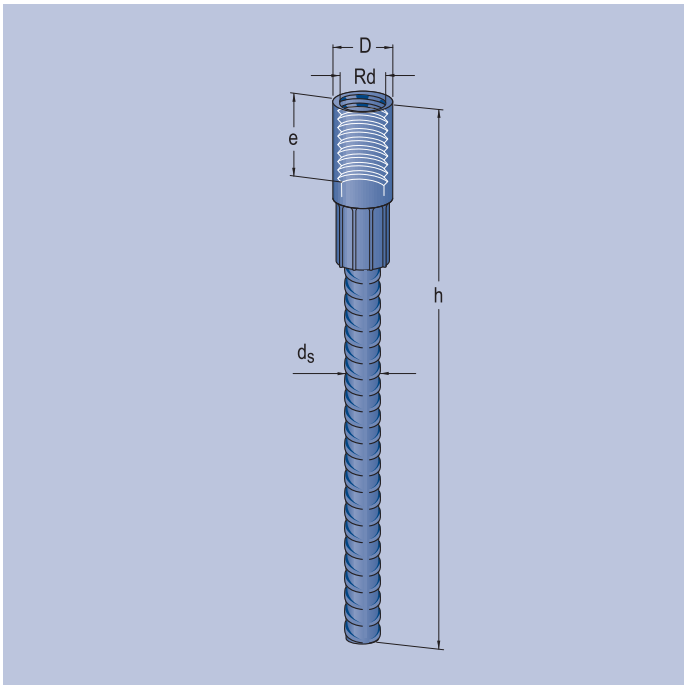
For use by:
- trained and qualified personal

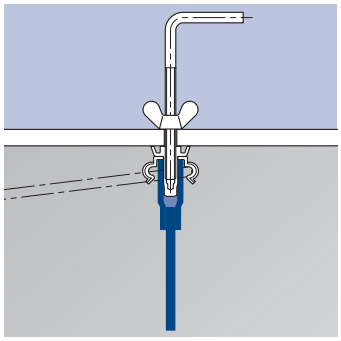
The PFEIFER bar anchor is one of the lifting anchors in the PFEIFER thread system. It is suitable as a lifting anchor for installation in edges of thin slabs and for large-volume building structural elements. With its straight shape it can be inserted easily into the existing reinforcement.

Advantages: Safe load application, easy installation in reinforcement, unambiguous assignment through PFEIFER colour coding

Material:

Socket of high grade precision steel tube, galvanized or in stainless steel, swaged on with reinforcing bar B500 A/B, black





Ref.-No. galvanized	Ref.-No. stainless steel	Type/Size	$N_{R, adm}$ [kN]	$V_{R, adm}$ [kN]	Thread	Dimensions [mm] D	d_s	e	h	Weight approx. [kg/piece]
05.019.123.195	**05.019.124.195**	Rd 12	5	2,5	Rd 12 x 1,75	15,0	8	22	195	0,10
05.019.143.235	**05.019.144.235**	Rd 14	8	4,0	Rd 14 x 2,00	18,0	10	25	235	0,18
05.019.163.280	**05.019.164.280**	Rd 16	12	6,0	Rd 16 x 2,00	21,0	12	27	280	0,30
05.019.183.305	**05.019.184.305**	Rd 18	16	8,0	Rd 18 x 2,50	24,0	14	34	305	0,43
05.019.203.350	**05.019.204.350**	Rd 20	20	10,0	Rd 20 x 2,50	27,2	16	35	350	0,66
05.019.243.400	**05.019.244.400**	Rd 24	25	12,5	Rd 24 x 3,00	31,0	16	43	400	0,78
05.019.303.510	**05.019.304.510**	Rd 30	40	20,0	Rd 30 x 3,50	39,5	20	56	510	1,59
05.019.363.690	**05.019.364.690**	Rd 36	63	31,5	Rd 36 x 4,00	47,0	25	67	690	3,19
05.019.423.840	**05.019.424.840**	Rd 42	80	40,0	Rd 42 x 4,50	54,0	28	80	840	4,87
05.019.523.915	**05.019.524.915**	Rd 52	125	62,5	Rd 52 x 5,00	67,2	32	97	915	7,66

Example order for 500 PFEIFER bar anchors, long shape, galvanized, Rd 12:
500 PFEIFER bar anchors, Ref.-No. 05.019.123.195

Technical installation instructions on page 14

PFEIFER sockets

Item-No. 05.000

Can be used for:
- Installation in the edge of structural elements
- Installation in column-shaped structural elements

For use by:
- trained and qualified personal

PFEIFER

Thread System

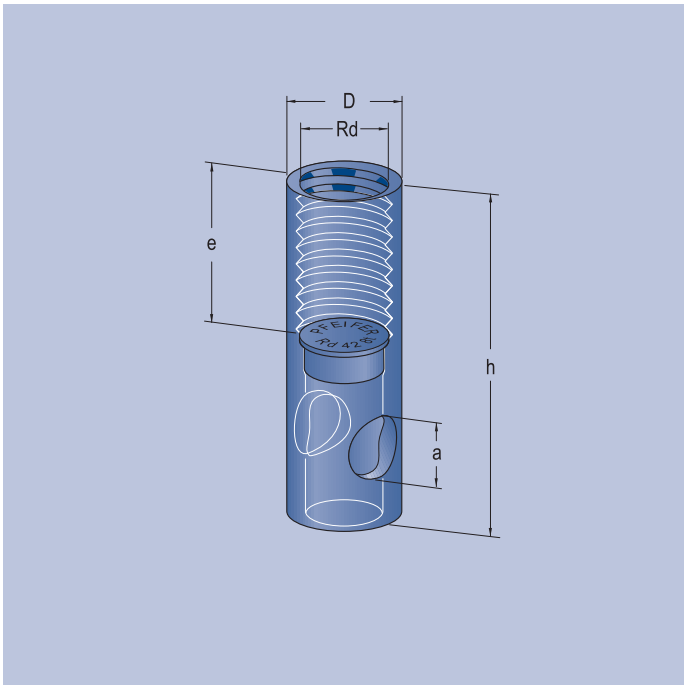
Lifting anchor

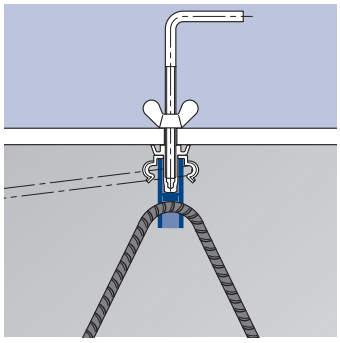
The PFEIFER socket is a lifting anchor in the PFEIFER thread system, with all-round use. It is suitable for moving columns, supporting beams, shear walls and much more. The customer inserts a retention reinforcement through the cross hole for anchoring and load application.

Advantages: Safe load application, versatile, geometric flexibility in anchoring the forces, unambiguous assignment through PFEIFER colour coding

Material:

Socket made of high grade precision steel tube, galvanized or stainless steel, plastic internal cap, colour-coded





Ref.-No. galvanized	Ref.-No. stainless steel	Type/Size	$N_{R, adm}$ [kN]	$V_{R, adm}$ [kN]	Thread	Dimensions [mm] D	a	e	h	Weight approx. [kg/piece]
05.000.123	**05.000.124**	Rd 12	5	2,5	Rd 12 x 1,75	15,0	8,0	22	40	0,02
05.000.143	**05.000.144**	Rd 14	8	4,0	Rd 14 x 2,00	18,0	10,5	25	47	0,04
05.000.163	**05.000.164**	Rd 16	12	6,0	Rd 16 x 2,00	21,0	13,0	27	54	0,07
05.000.183	**05.000.184**	Rd 18	16	8,0	Rd 18 x 2,50	24,0	13,0	34	65	0,11
05.000.203	**05.000.204**	Rd 20	20	10,0	Rd 20 x 2,50	27,2	15,5	35	69	0,15
05.000.243	**05.000.244**	Rd 24	25	12,5	Rd 24 x 3,00	31,0	18,0	43	78	0,19
05.000.303	**05.000.304**	Rd 30	40	20,0	Rd 30 x 3,50	39,5	22,5	56	103	0,42
05.000.363	**05.000.364**	Rd 36	63	31,5	Rd 36 x 4,00	47,0	27,5	67	125	0,71
05.000.423	**05.000.424**	Rd 42	80	40,0	Rd 42 x 4,50	54,0	32,0	80	145	1,04
05.000.523	**05.000.524**	Rd 52	125	62,5	Rd 52 x 5,00	67,2	40,0	97	195	2,35

Example order for PFEIFER sockets, galvanized, Rd 12:
500 PFEIFER sockets, Ref.-No. 05.000.123

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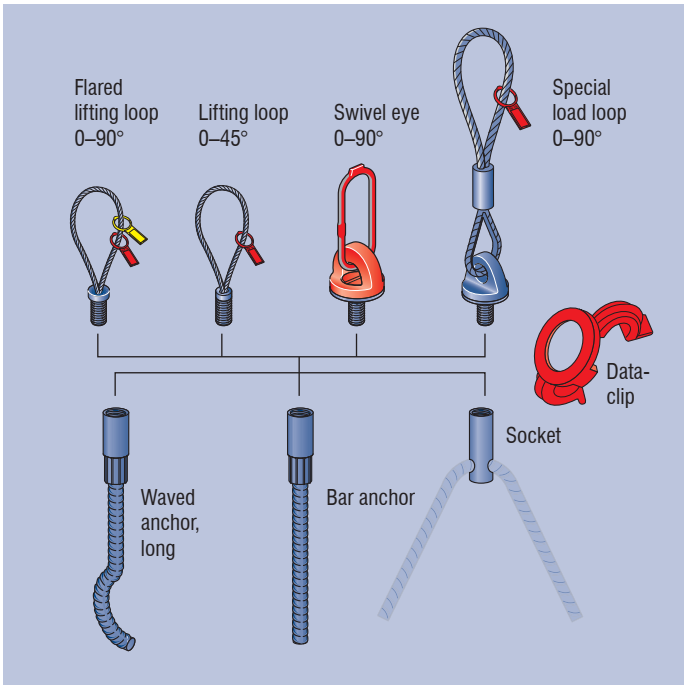
Instructions for installation and use for slab edge installation

System

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



The PFEIFER thread system consists of the corresponding lifting anchor, the selected lifting device and the colour-coded data clip.

Type/Size	Ref.-No.	Colour
Rd 12	05.220.120	Pastel orange
Rd 14	05.220.140	Pure white
Rd 16	05.220.160	Flame red
Rd 18	05.220.180	Light pink
Rd 20	05.220.200	Pastel green
Rd 24	05.220.240	Anthracite grey
Rd 30	05.220.300	Emerald green
Rd 36	05.220.360	Light blue
Rd 42	05.220.420	Silver grey
Rd 52	05.220.520	Sulphur yellow
Rd 56	*	Orange
Rd 60	*	Red

* For these sizes the marking of the anchor is inside the socket.
Here, the front face of the reinforcing steel is marked in the appropriate colour.

Safety

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

The following safety parameter values for the PFEIFER lifting anchor system are derived as follows in accordance with the VDI/BV-BS 6205 directive, with the prerequisite of the machinery directive 2006/42/EC. For this, a load-side dynamic working coefficient $\psi_{dyn} = 1.3$ was assumed.

– Steel failure wire rope: $\gamma_s = 4{,}0$

– Steel failure chains or full sections: $\gamma_s = 3{,}0$

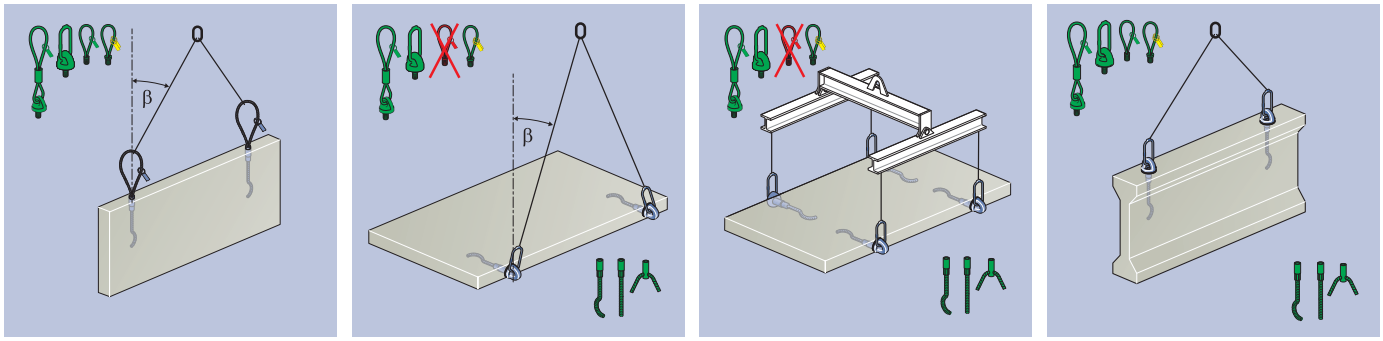
– Concrete failure (procedure B*): $\gamma_c = 2{,}5$

– Concrete failure (procedure A*): $\gamma_c = 2{,}1$

* for factory monitored fabrication of the prefab concrete elements

Use

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



Warning: The use of non-matched system components can cause reduced safety levels and hazards to life and limb. Always use PFEIFER components that are matched to each other!

Caution: The concreted-in anchors must be determined by the planning engineer. The instructions for installation and use of the selected anchor type must be complied with!

Dimensioning

Notice: The anchor must always be attached higher than the centre of gravity because otherwise the element can tip over during transport!

Notice: To achieve the stated carrying capacity, you need to comply with the minimum additional reinforcements as in Tables 1, 2, 3 or 4 (depending on the load) and the minimum dimensions as in Table 5 and a concrete cube compressive strength of at least 15 N/mm².

$$E \leq R_{adm}$$

Notice: Determination of stress according to VDI/BV-BS 6205.

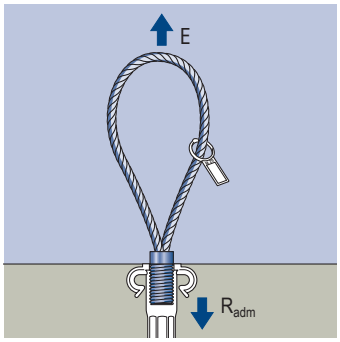
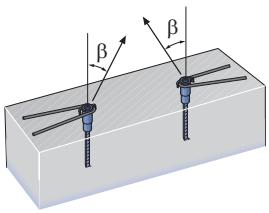
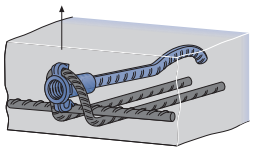


Table 1 – Resistance

Angle of inclination ß=0–45°



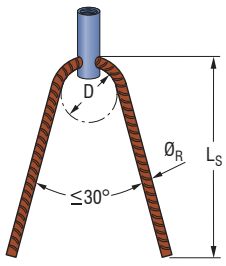
Transversal shear pull perpendicular to the panel plane



Load/application	Type/Size	Adm. resistance $N_{R,adm}$ [kN]	Adm. resistance $V_{R,adm}$ [kN]	Surface reinforcement [mm²/m]
	Rd 12	5	2,5	131
	Rd 14	8	4,0	131
	Rd 16	12	6,0	131
	Rd 18	16	8,0	188
	Rd 20	20	10,0	188
	Rd 24	25	12,5	188
	Rd 30	40	20,0	188
	Rd 36	63	31,5	188
	Rd 42	80	40,0	188
	Rd 52	125	62,5	188
Notice: Parallel shear pull possible only up to 12.5°	**Rd 56**	150	–	188
	Rd 60	200	–	188

Table 2 – Retention reinforcement, socket

Type/Size	Retention reinforcement			Retention reinforcement PFEIFER socket
	L_S [mm]	D [mm]	$Ø_R$ [mm]	
Rd 12	220	24	6	
Rd 14	260	32	8	
Rd 16	310	40	10	
Rd 18	420	40	10	
Rd 20	430	48	12	
Rd 24	470	56	14	
Rd 30	650	64	16	
Rd 36	820	140	20	
Rd 42	840	175	25	
Rd 52	1190	196	28	



Notice: Retention reinforcement applies only to PFEIFER sockets.

Caution: Missing or incorrectly installed retention reinforcement of PFEIFER sockets results in anchor failure and falling of the structural element – hazard to life. The retention reinforcement must always be installed in accordance with the Instructions for use.

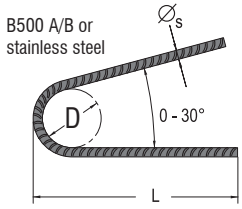
Notice: The use of PFEIFER sockets is admissible only with the retention reinforcement inserted by the customer in accordance with Table 2.

Notice: If PFEIFER sockets are fitted with socket screws, it is automatically ensured that the reinforcing steel for anchoring is in direct contact with the socket because the fixing bolt pushes the reinforcing bar firmly against the crimped part of the socket through the plastic cap.

Table 3 – parallel shear reinforcement

Type/Size	$Ø_s$ [mm] 12,5–30°	D [mm] 12,5–30°	$Ø_s$ [mm] 31–45°	D [mm] 31–45°	L [mm]
Rd 12	6	24	6	24	150
Rd 14	6	24	6	24	200
Rd 16	8	32	8	32	200
Rd 18	8	32	8	32	250
Rd 20	8	32	8	32	300
Rd 24	10	40	10	40	300
Rd 30	12	48	12	48	400
Rd 36	12	48	14	56	550
Rd 42	14	56	16	64	600
Rd 52	16	68	20	140	750
Rd 56	–	–	–	–	–
Rd 60	–	–	–	–	–

Additional reinforcement
Parallel shear reinforcement, all sizes as in Table 3

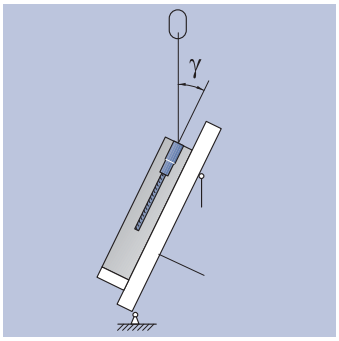


Warning: Waved anchors of sizes Rd 56 and 60 can be loaded up to a parallel shear pull of 12.5°. Loading at greater parallel shear pull results in reduced safety levels and therefore a hazard for life and limb!

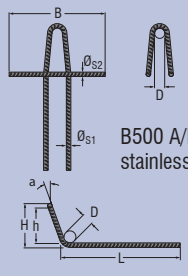
Dimensioning

Table 4 – transverse shear reinforcement

Size	$Ø_{S1}$ [mm]	L [mm]	h [mm]	H [mm]	D [mm]	α Grad	B [mm]	$Ø_{S2}$ [mm]
Rd 12	6	270	23	35	24	15	280	8
Rd 14	6	350	30	42	24	15	350	12
Rd 16	8	420	33	49	32	15	400	12
Rd 18	8	460	39	55	32	15	450	12
Rd 20	10	490	44	64	40	15	490	14
Rd 24	12	520	51	75	48	15	550	14
Rd 30	12	570	68	92	48	15	580	16
Rd 36	14	690	90	118	56	15	700	16
Rd 42	16	830	111	143	64	15	850	20
Rd 52	20	930	134	174	140	15	1000	20



Additional reinforcement: Transverse shear reinforcement, all sizes as in Table 3



B500 A/B or stainless steel

Notice: With an angle γ ≤ 15° inclusion of transverse shear reinforcement is not required. This is applicable, for example, in the use of tilting tables.

Notice: For simultaneous parallel and transversal shear pull only the transverse shear reinforcement as in Table 4 is required.

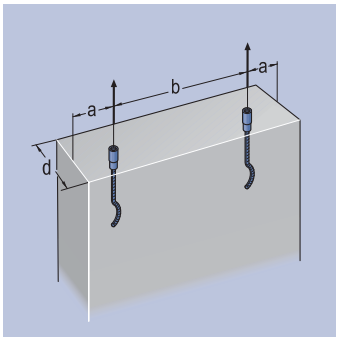


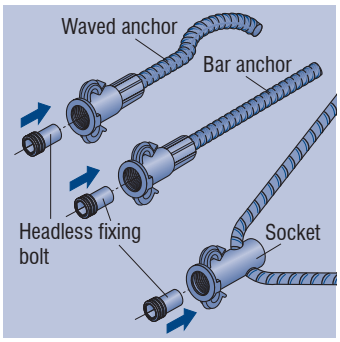
Table 5 – minimum rod dimensions and distances

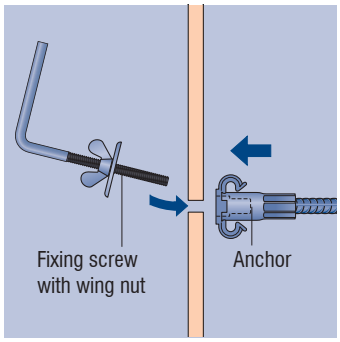
Type/Size	Minimum wall thickness d [mm]				Edge distance a [mm]	Distances between anchors b [mm]
	ß ≤ 12,5°	ß >12,5°≤ 30°	30° <ß ≤ 45°	Transversal shear pull		
Rd 12	55	55	60	60	150	300
Rd 14	60	60	70	70	200	400
Rd 16	65	65	80	80	200	400
Rd 18	80	80	95	95	250	500
Rd 20	90	90	110	110	275	550
Rd 24	100	100	125	125	300	600
Rd 30	120	120	140	140	350	700
Rd 36	130	130	150	210	500	1000
Rd 42	140	140	160	240	500	1000
Rd 52	150	150	170	280	600	1200
Rd 56	150	–	–	–	1250	2500
Rd 60	200	–	–	–	1600	3200

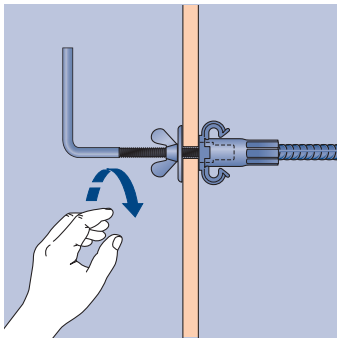
Notice: Maintenance of the required concrete cover should be independently checked. A concrete cover of 25 mm was assumed here.

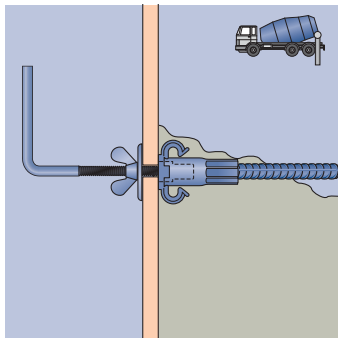
Notice: For each installation, the available concrete cover must be compared with that required. If the available cover is less than the concrete cover required, stainless steel parallel or transversal shear reinforcement must be employed as applicable.

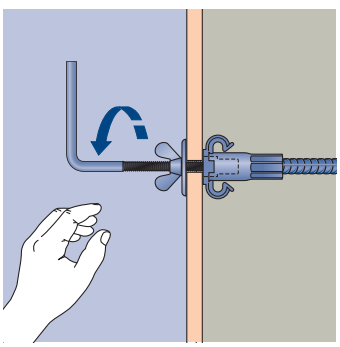
Installation

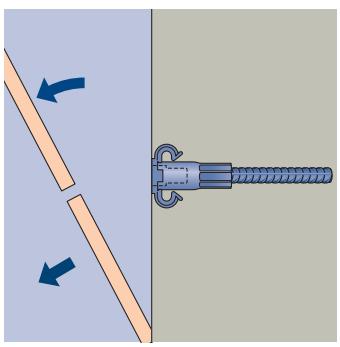








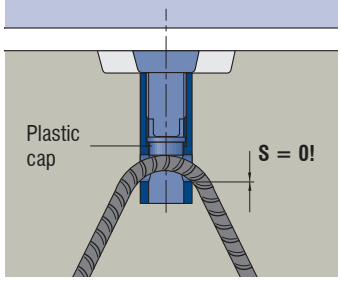




Notice: In the installation illustrations the slab face installation variant with the PFEIFER headless fixing bolt is shown.

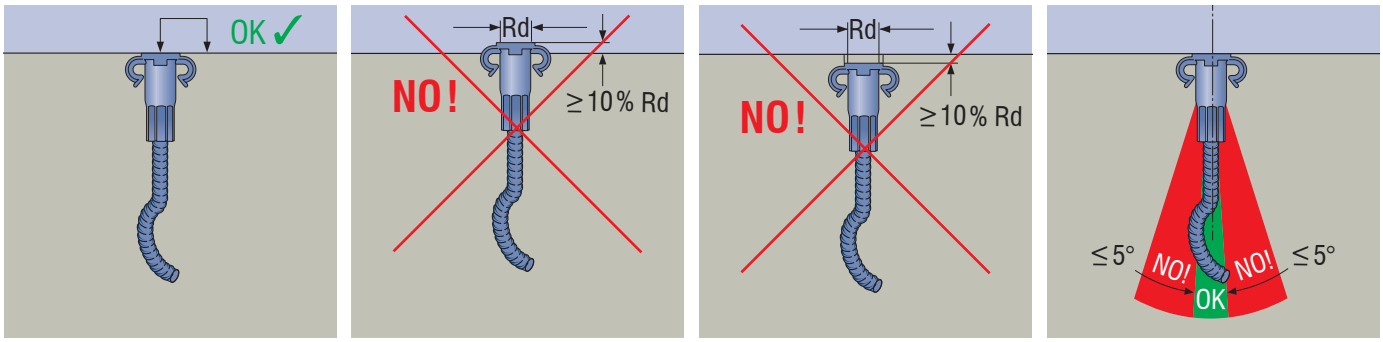
Different installation variants and product data (e.g. deeper installation) can be found in the accessories section from page 45.

Plastic caps sockets



Installation

Installation tolerances



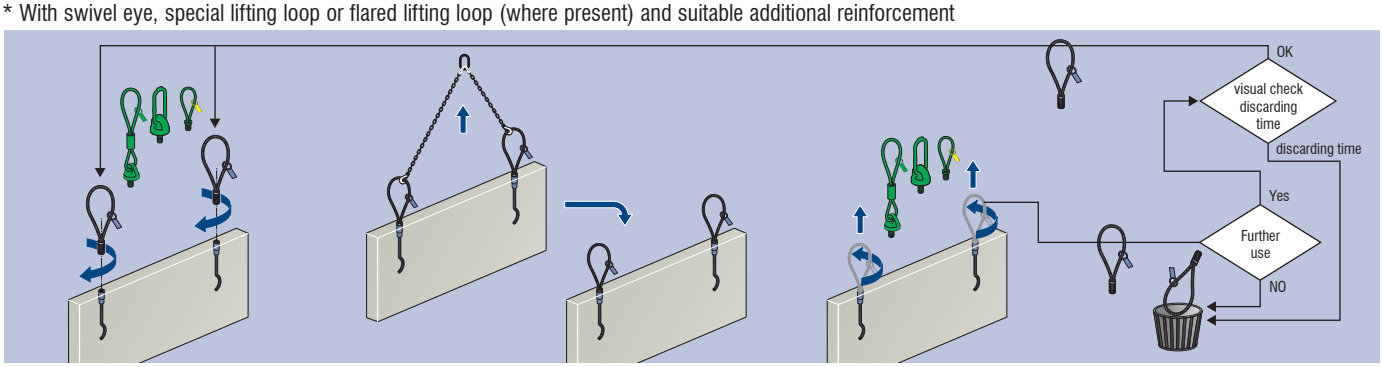
Notice: For a planned, recessed installation according to instructions for installation and use the same tolerance field is to be applied.

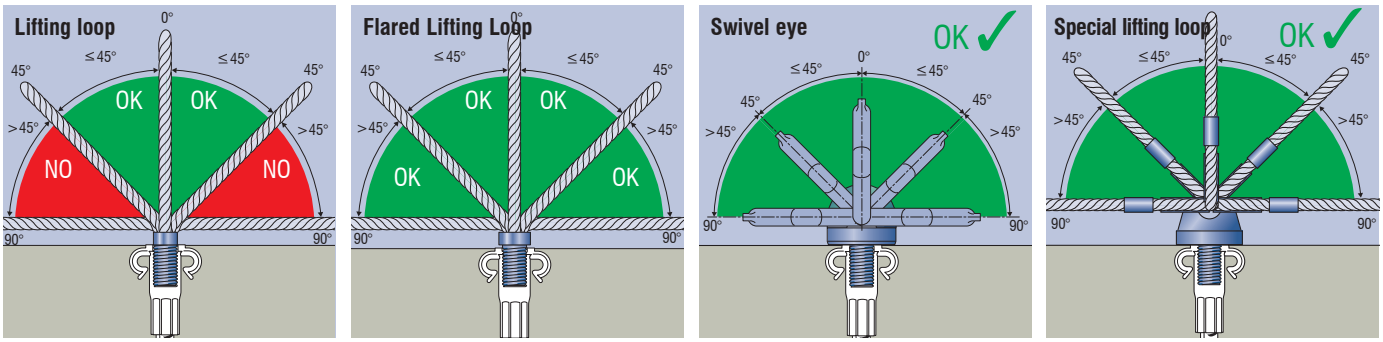
Caution: Incorrect positions and faulty installation of the anchor can lead to early failure and falling down – danger of death! As a rule, the anchor should be installed flush and at right-angles!

Use

			
Tensile load	0 – 45°	0 – 45°	0 – 45°
Transverse shear load*	OK ✓	OK ✓	OK ✓
Temperature	-20 to 80 °C	-20 to 80 °C	-20 to 80 °C

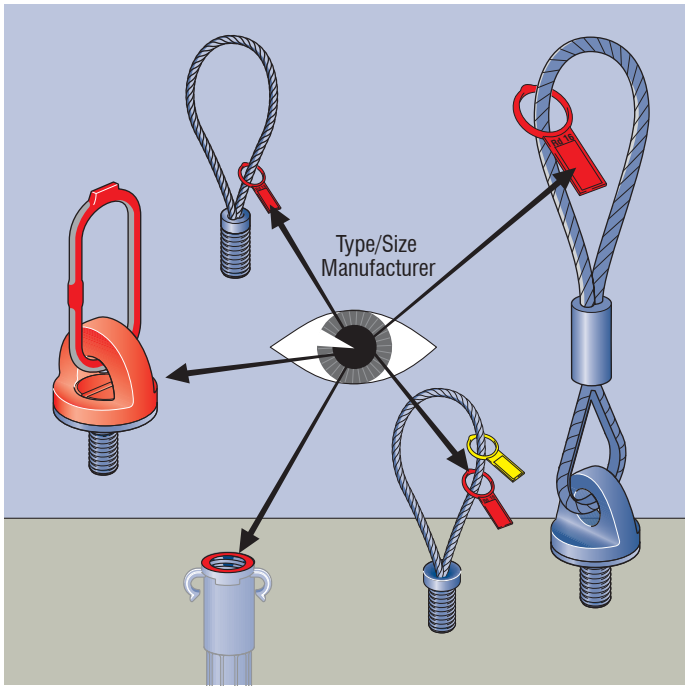
* With swivel eye, special lifting loop or flared lifting loop (where present) and suitable additional reinforcement





Warning: Loading the lifting loop beyond the approved angle will lead to reduced safety of the system. Risk of falling, danger to life! Loading of the lifting devices according to figure only!

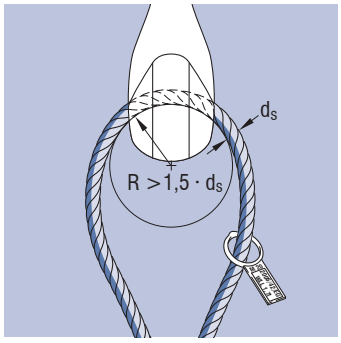
Use



Check the system consistency by, for example, inspecting the data clip of the lifting anchor and the load capacity identification tag of the lifting loop.

Information on the markings:
– Type/Size
– Year of manufacture
– EC marking
– Manufacturer

Caution: If the markings are missing or illegible the lifting devices cannot be correctly allocated to the anchor. This can result in items falling and causing a hazard to life and limb. Lifting devices and anchors with absent or illegible markings must be immediately taken out of service!



Warning: If the deflection radius of the hook is too small, the lifting device can fail even at the rated load. This is a hazard to life. Only attach hooks with a deflection radius of at least 1.5 x the cable diameter.

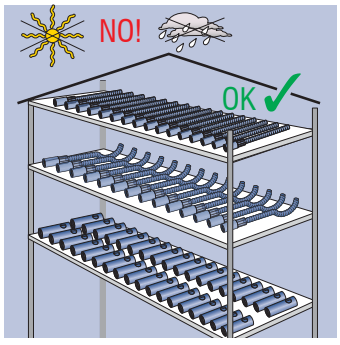
Misuse

Warning: Use of the anchor by untrained personnel results in the risk of incorrect use and the risk of items falling down, causing injury or death. Use only trained personnel.

Warning: Use of the anchor systems for lashing during transport of the building component is not admissible since this can lead to the load falling and so to injury and death of persons. These anchor systems must be used only for lifting and moving the stated precast concrete elements!

Caution: Incorrect use can result in safety hazards and reduced carrying capacity. This results in the risk of a fall and a hazard to life and limb. Lifting anchor systems must be used only in accordance with the instructions for installation and use and only by suitable trained personnel!

Storage



Notice: Store the thread system components dry and protected. There is a risk of corrosion if there are large changes of temperature, wetness (humidity) or any influence from acids, road salt or sea water!

Notices

PFEIFER

NEW

They ensure your advance: PFEIFER lifting anchors for transporting sandwich panels

PFEIFER cropped bar anchors are part of the reliable PFEIFER thread system. The anchor is designed specifically for lifting and moving sandwich panels and is inserted from the top into the front side of the load bearing layer. They offer PFEIFER customers a professional solution for this application too.

System

- The cleverly designed products of the whole range, i.e. waved anchors (short, long), sockets, bar anchors, flat steel anchors, bolt anchors and custom anchors as well as the associated lifting devices and accessories, are suitable for front-sided and top-sided installation and for installation in columns and girders, thereby offering a solution for every application.

PFEIFER bar anchors for sandwich panels

- Highest safety levels from over 40 years of experience in manufacturing and application consulting
- Its special cropped shape means that the load can be lifted precisely above the centre of gravity. This prevents the sandwich panels from tilting.
- 6 sizes from Rd20 to Rd52 available
- only one version for every position of the center of gravity

Safety

- In-process Quality Assurance using QA test plans: Tensile tests, bolt-in tests, dimensional checks, zinc-coat thickness measurements

Made in Germany

- Safe manufacture under consistent conditions
- In-house quality assurance
- Steel alloy and precision tube manufacture to the PFEIFER specification

PFEIFER Sandwich Lifting Anchor

Item-No. 05.009

Can be used for:
- front-sided installation into sandwich-panels

For use by:
- trained and qualified personal

PFEIFER

Thread System

Lifting anchor

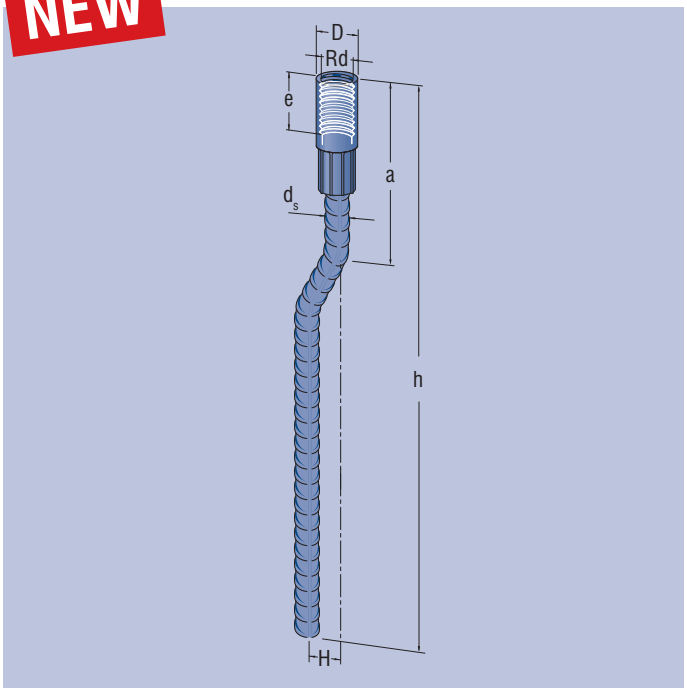
The PFEIFER Sandwich Lifting Anchor is a lifting anchor from the PFEIFER thread system.
It is designed for lifting and moving sandwich panels and is inserted from the top into the front side of the load bearing layer.

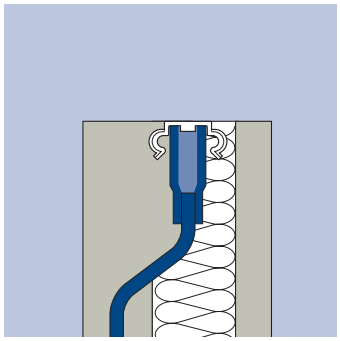
Advantages: Its special cropped shape means that the load can be lifted precisely above the centre of gravity. This prevents the sandwich panels from tilting.

Material:

Socket of high grade precision steel tube, galvanized or in stainless steel, swaged on with reinforcing steel bar B500 A/B, black

NEW





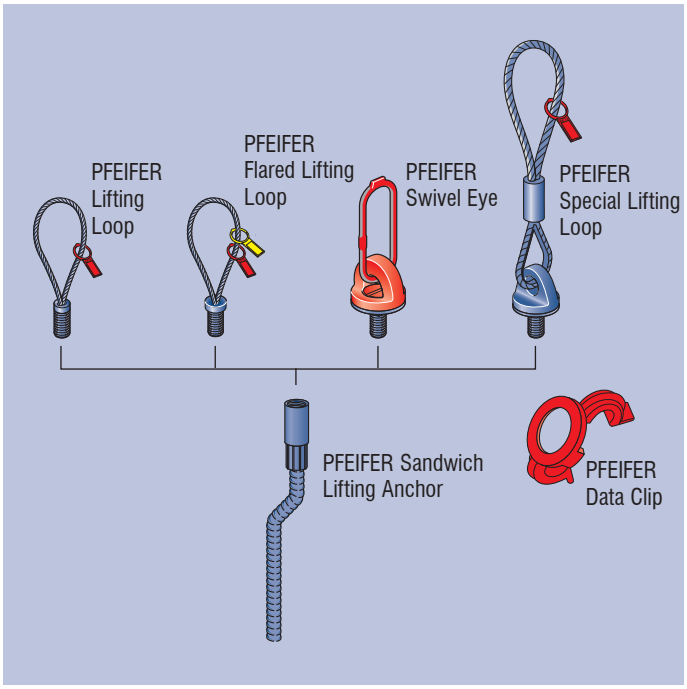
Ref. no. galvanized	Ref. no. stainless steel	Type/ Size	$N_{R, adm}$ [kN]	Thread	Dimensions [mm] D	d_s	a	e	H	h	Weight approx. [kg/piece]
05.009.203.065	**05.009.204.065**	Rd 20	20	Rd 20 x 2,50	27,2	16	100	35	100	650	1,15
05.009.243.070	**05.009.244.070**	Rd 24	25	Rd 24 x 3,00	31,0	16	110	43	120	700	1,26
05.009.303.087	**05.009.304.087**	Rd 30	40	Rd 30 x 3,50	39,5	20	155	56	120	870	2,47
05.009.363.110	**05.009.364.110**	Rd 36	63	Rd 36 x 4,00	47,0	25	155	67	120	1100	4,74
05.009.423.120	**05.009.424.120**	Rd 42	80	Rd 42 x 4,50	54,0	28	210	80	125	1200	6,62
05.009.523.140	**05.009.524.140**	Rd 52	125	Rd 52 x 5,00	67,2	32	260	97	140	1400	10,65

Sample order for 500 PFEIFER anchors, cropped shape, galvanized, Rd 36:
500 PFEIFER anchors, order no. 05.009.363.120

Instructions for installation and use for front-sided installation

System

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



The PFEIFER thread system comprises a PFEIFER lifting anchor, matching PFEIFER lifting device and colour-coded PFEIFER data clip.

Type/Size	Ref. no.	Colour
Rd 20	05.220.200	Pastel green
Rd 24	05.220.240	Anthracite grey
Rd 30	05.320.300	Emerald green
Rd 36	05.220.360	Light blue
Rd 42	05.220.420	Silver grey
Rd 52	05.220.520	Sulphur yellow

Safety

FOR PLANNERS, FOR PRECAST COMPANIES, FOR USERS

The following safety parameter values for the PFEIFER lifting anchor system are derived as follows in accordance with the VDI/BV-BS 6205 directive, with the prerequisite of the machinery directive 2006/42/EC. For this, a load-side dynamic working coefficient ψ_{dyn}=1.3 was assumed.

– Steel failure wire rope: $\gamma_s = 4{,}0$

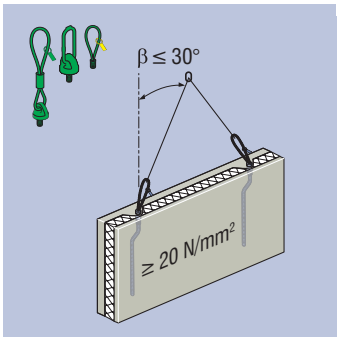
– Steel failure chains or full sections: $\gamma_s = 3{,}0$

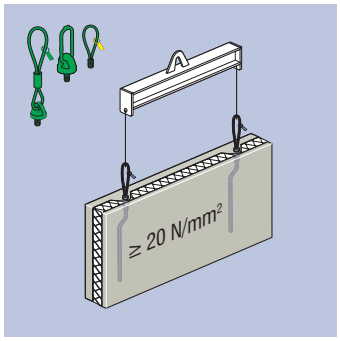
– Concrete failure (procedure A*): $\gamma_c = 2{,}1$

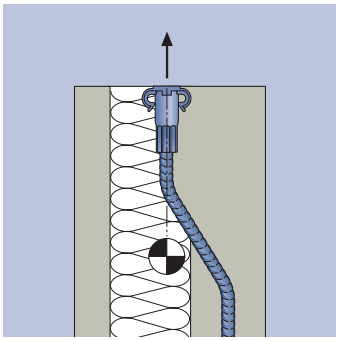
* for factory monitored fabrication of the precast concrete elements

Use

FOR PLANNERS, FOR PRECAST COMPANIES, FOR USERS







Caution: The concreted-in anchors must be determined by the planning engineer. The instructions for installation and use of the selected anchor type must be complied with!

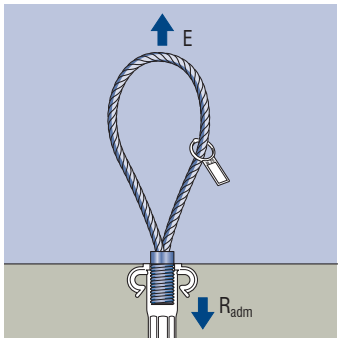
Notice: The cropped shape means that the socket axis is situated directly above the centre of gravity outside the central line of the load bearing layer, even in the insulation area.

Warning: The use of non-matched system components can cause reduced safety levels and hazards to life and limb. Use exclusively PFEIFER components that are matched to each other!

Dimensioning

Notice: The anchor must always be attached higher than the centre of gravity because otherwise the element can tip over during transport!

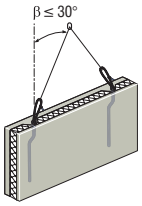
$$E \leq R_{adm}$$



Notice: The reinforcements in accordance with Tables 1 to 5 are essential to achieve the specified load bearing capacity depending on the load case as well as the minimum dimensions according to table 6 and a concrete cube compressive strength of at least **20 N/mm²**.

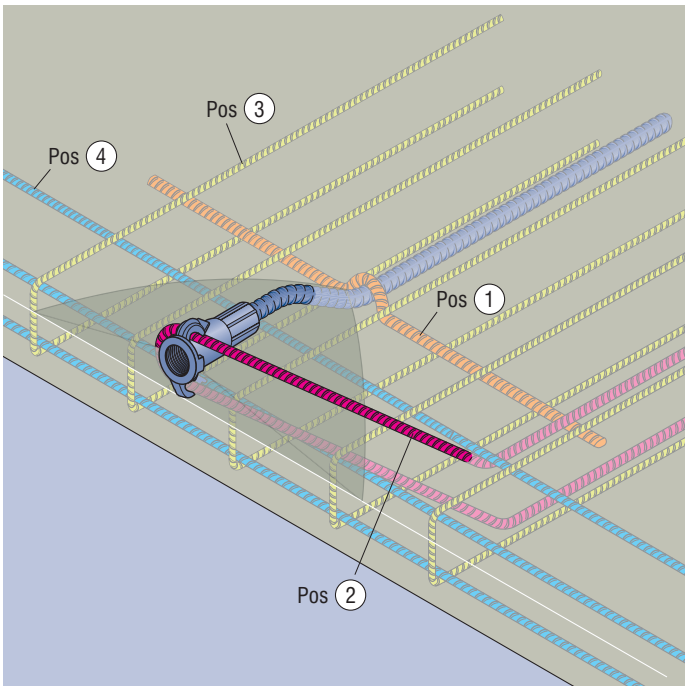
Notice: Determination of stress according to VDI/BV-BS 6205.

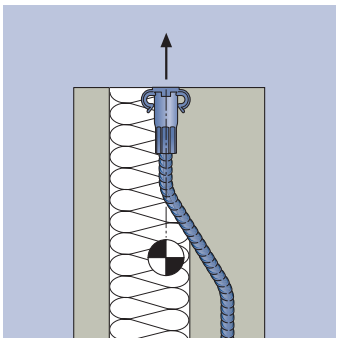
Table 1 – Resistance

Load case	Type/Size	Minimum concrete cube compressive strength	Adm. resistance $N_{R,adm}$ [kN]	Surface reinforcement [mm²/m]
	**Rd 20**	20 N/mm²	20	188
	Rd 24	20 N/mm²	25	188
	Rd 30	20 N/mm²	40	188
	Rd 36	20 N/mm²	63	188
	Rd 42	20 N/mm²	80	188
	Rd 52	20 N/mm²	125	188

Summary of all reinforcements

The reinforcement (pos. 1 to 4) shown in the figure below is a fixed component of the anchor system and must be installed in the correct manner.





Notice: Dimensioning is based therefore on the computational determination of the centre of gravity.

The anchors and the socket axis must lie exactly in the centre line.

If you do not know where this is, it will be impossible to fit the anchors correctly.

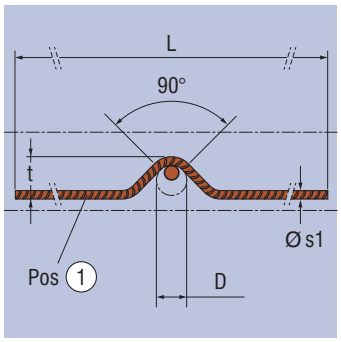
Notice: An additional concrete support wedge must be fitted in the socket and deflection region at the cost of the insulation.

Notice: The illustration of the reinforcement in the left-hand figure is designed as a qualitative visualisation of the reinforcement points. The details given in Tables 2 to 5 are used for the dimensioning.

Notice: Use of PFEIFER anchors (cropped shape) is only permitted in combination with the additional reinforcement provided by the customer in accordance with the Table 2 to 5.

Table 2 – retention reinforcement – no. 1

Type/Size	L [mm]	$Ø_{S,1}$ [mm]	t [mm]	D [mm]
Rd 20	700	10	42	40
Rd 24	700	10	42	40
Rd 30	700	12	50	48
Rd 36	1000	14	74	56
Rd 42	1200	16	90	64
Rd 52	1300	20	86	140



Caution: Missing or incorrectly installed retention reinforcement of PFEIFER Sandwich Lifting Anchor results in anchor failure and falling of the structural element – hazard to life. The retention reinforcement must always be installed in accordance with the Instructions for use.

Notice: Direct contact between pos. 1 and anchor!

Table 3 – stirrup reinforcement B500 A/B – pos. 3

Type/Size	$\varnothing_{s,3}$ [mm]	Quantity n	L_3 [mm]
Rd 20	8	6	700
Rd 24	8	6	750
Rd 30	10	6	950
Rd 36	10	6	1100
Rd 42	12	6	1200
Rd 52	14	6	1300

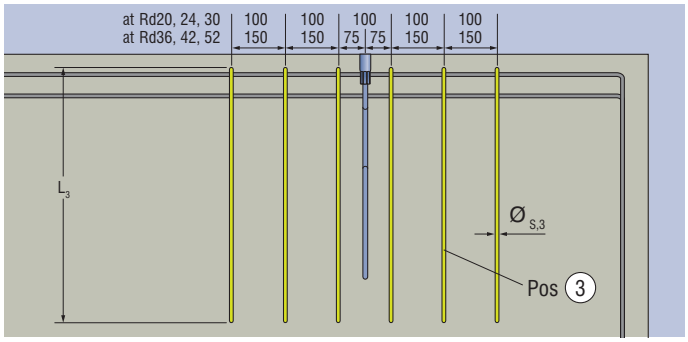
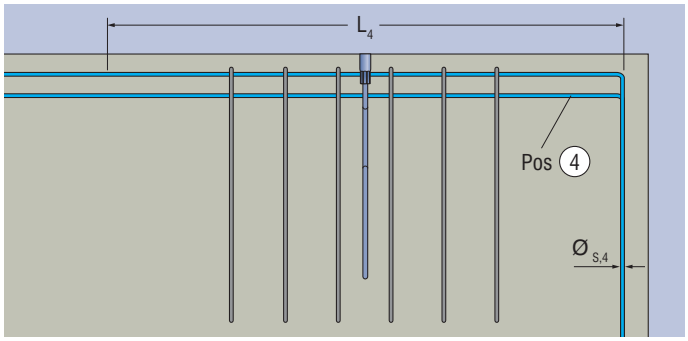
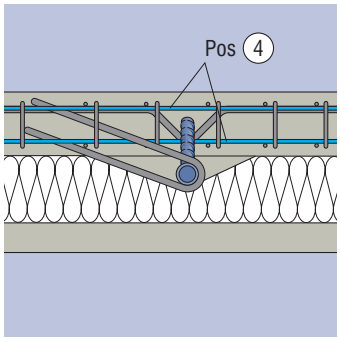


Table 4 – splitting tensile reinforcement B500 A/B – pos. 4

Type/Size	$\varnothing_{s,4}$ [mm]	Quantity n	L_4 [mm]
Rd 20	8	3	1500
Rd 24	8	3	1500
Rd 30	8	3	1500
Rd 36	10	3	1500
Rd 42	12	3	1500
Rd 52	12	3	1500



Notice: Reinforcement values in accordance with Tables 3 and 4 should be taken as minimum values. Existing reinforcement can therefore be taken into account if necessary.



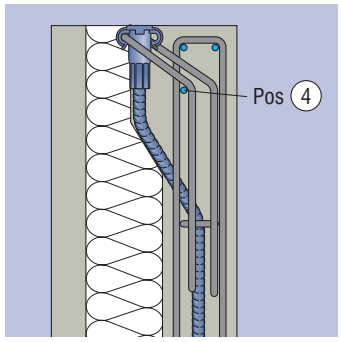
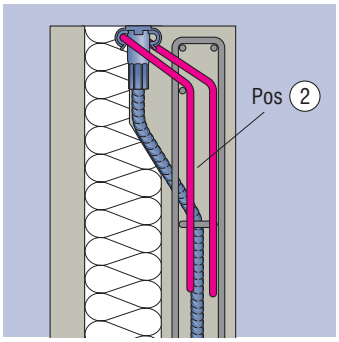
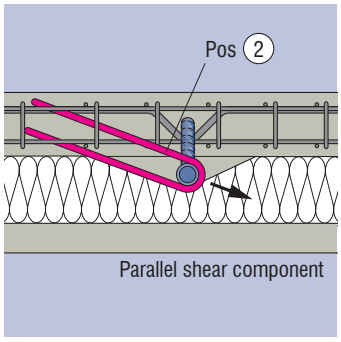


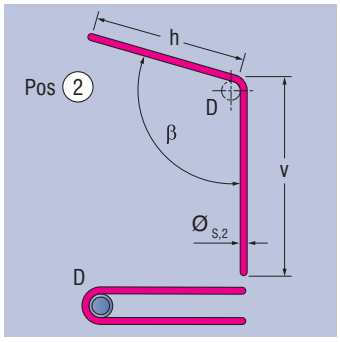
Table 5 – parallel shear reinforcement B500 A/B or made of stainless steel – pos. 2

Type/Size	$\varnothing_{s,2}$ [mm]	h [mm]	v [mm]	D [mm]	Angle β (°)
Rd 20	8	350	400	32	105
Rd 24	10	400	500	40	105
Rd 30	10	400	500	40	105
Rd 36	12	440	550	48	105
Rd 42	14	480	650	56	105
Rd 52	16	500	750	70	105

Notice: If corrosion-protection is also required, the parallel shear reinforcement must be made of stainless steel or the concrete wedge designed such that the reinforcement is evenly covered with a corresponding layer of concrete on all sides.





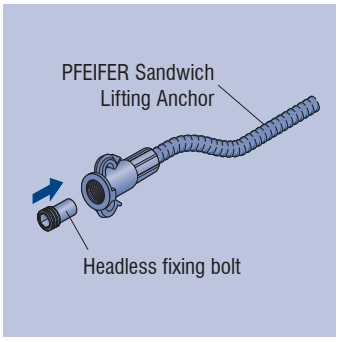


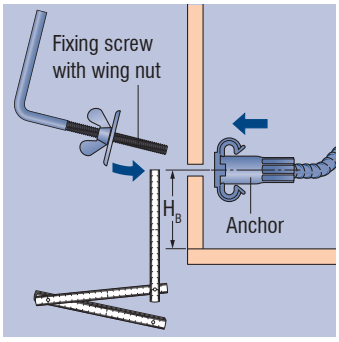
Caution: In the case of planned straight pull the parallel shear reinforcement must always be fitted to accommodate any parallel shear components.

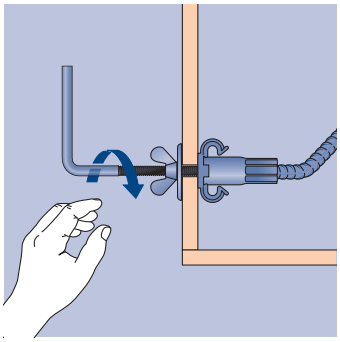
Warning: Missing or incorrectly fitted parallel shear reinforcement will lead to reduced payloads and pose a danger to life and limb. In accordance with Table 5 a parallel shear reinforcement should be arranged to act against the acting parallel shear component.

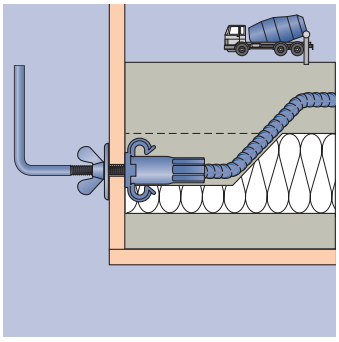
Notice: Direct contact Socket/reinforcement

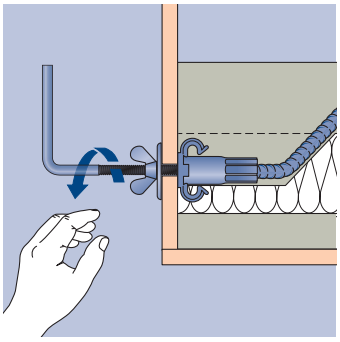
Installation

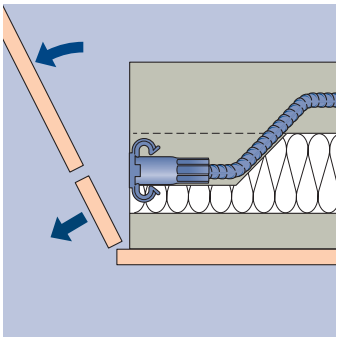


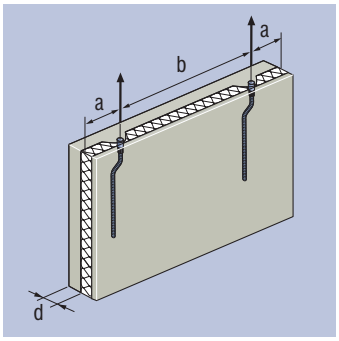


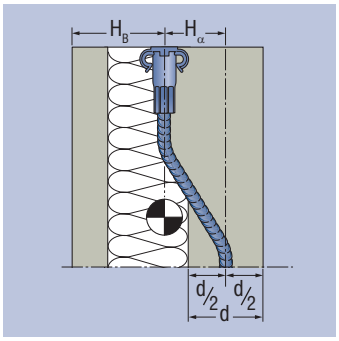












Notice: This illustration shows only the basic installation. The more detailed instructions under “Rotated anchor position” and “Underpinning” must be observed.

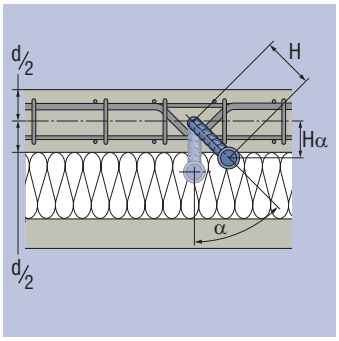
Table 6 – minimum dimensions and distances

Type/Size	d [mm]	a [mm]	b [mm]
Rd 20	100	400	800
Rd 24	100	400	800
Rd 30	110	500	1000
Rd 36	140	750	1500
Rd 42	160	750	1500
Rd 52	160	750	1500

Caution: The anchors must be installed in the load bearing layer such that cmin is not undershot. The socket must always be positioned in the centre line.

Warning: The straight part of the anchor must be positioned in each case in the centre of the load bearing layer. A eccentric arrangement of the straight rod in the load bearing layer reduces safety and poses a danger to life and limb.

Rotated anchor position



Different locations of the centre of gravity can be created by rotating the PFEIFER Sandwich Lifting Anchor around their own axis. The respective location of the centre of gravity must be defined first by the planner.
As the angle α can be varied between 0° and 45°, the most varied of locations of the centre of gravity can be resolved with a anchor type.

Warning: The straight part of the anchor must be positioned in each case in the centre of the load bearing layer. A eccentric arrangement of the straight rod in the load bearing layer reduces safety and poses a danger to life and limb.

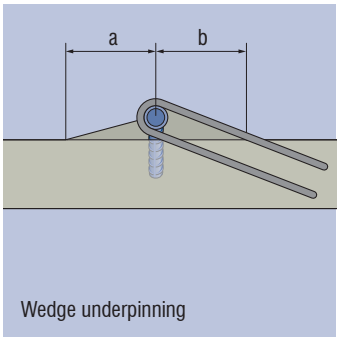
Warning: If the location of the centre of gravity is incorrectly determined and the anchor is incorrectly fitted, problems can range from the tilting of the sandwich panel to failure of the anchor system. Danger to life! The socket of the anchor is always positioned in the centre line.

Table 7 – Variable anchor socket positions H_α depending on the angle of rotation α

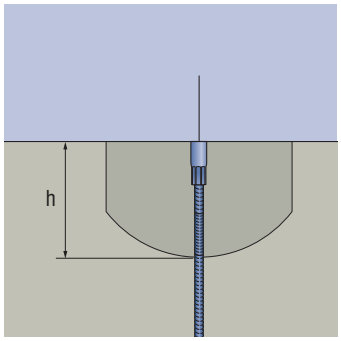
Type/Size	α = 0° [mm]	α = 20° [mm]	α = 30° [mm]	α = 40° [mm]	α = 45° [mm]	α = 50 [mm]	α = 60 [mm]	α = 70 [mm]
Rd 20	100	94	87	77	71	64	50	34
Rd 24	120	113	104	92	85	77	60	41
Rd 30	120	113	104	92	85	77	60	41
Rd 36	120	113	104	92	85	77	60	41
Rd 42	125	117	108	96	86	80	63	43
Rd 52	140	132	121	107	99	90	70	48

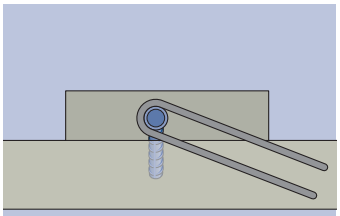
Underpinning with concrete support wedge

The straight section of the anchor must be positioned in the centre of the load bearing layer of the precast element (see minimum dimension). The concrete underpinning must be fitted between the anchor socket and the load bearing layer. It provides the socket with corresponding support against the deviation forces from the bending of the rod under stress. Sandwich panels are normally produced in the so-called “negative process” in which the facing layer is concreted first. In this case the underpinning can be created easily by removing the insulation beforehand. In the “positive process” the underpinning can be fitted manually after concreting the load bearing layer, before laying the insulation.



Wedge underpinning




alternatively
Prism underpinning

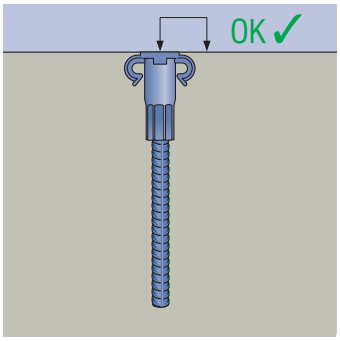
Notice: If corrosion-protection is also required, the parallel shear reinforcement must be made of stainless steel or the concrete wedge designed such that the reinforcement is evenly covered with a corresponding layer of concrete on all sides.

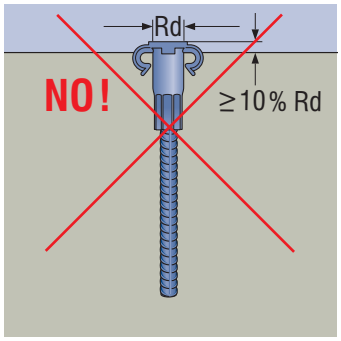
Table 8 – Concrete underpinning – minimum dimensions of the concrete wedge

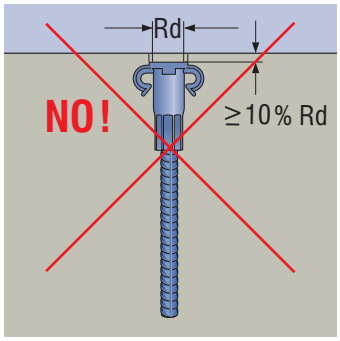
Type/Size	a	b [mm]	h [mm]
Rd 20	130	200	200
Rd 24	150	250	250
Rd 30	170	250	300
Rd 36	200	400	300
Rd 42	170	250	350
Rd 52	230	450	430

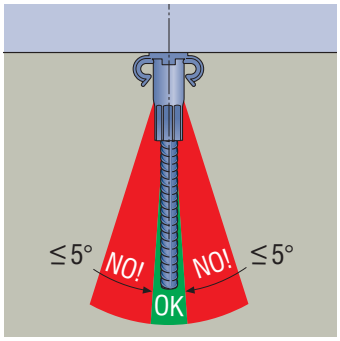
Caution: If the concrete wedge fails, the anchor will deform under stress and its support function will be unreliable. Reduced safety and danger to life. The concrete underpinning is easy to fit in each case.

Installation tolerances









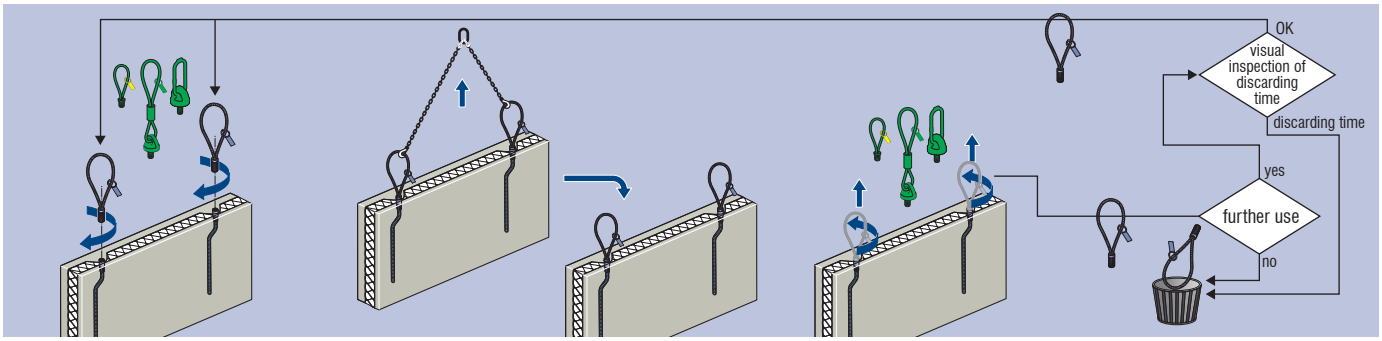
Notice: For a planned, recessed installation according to instructions for installation and use the same tolerance field is to be applied.

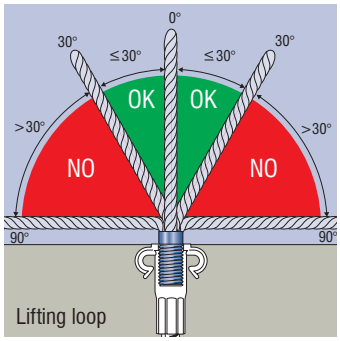
Caution: Incorrect positions and faulty installation of the anchor can lead to early failure and falling down – danger to life! As a rule, the anchor should be installed flush and at right-angles!

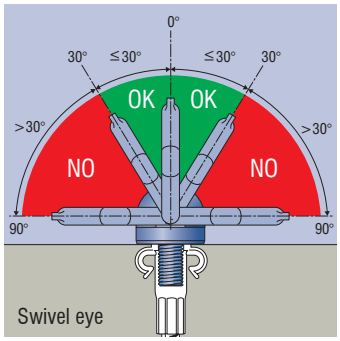
Use

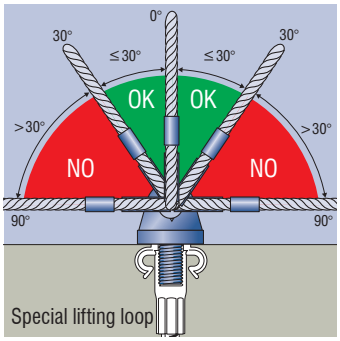
Tensile load	0 – 30°
Transversal shear load	**NO!**
Temperature	-20 bis 80 °C

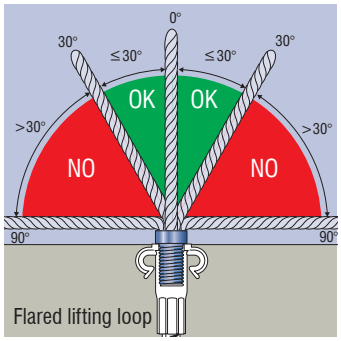
Caution: In the case of planned straight pull the parallel shear reinforcement must always be fitted to accommodate any parallel shear components.

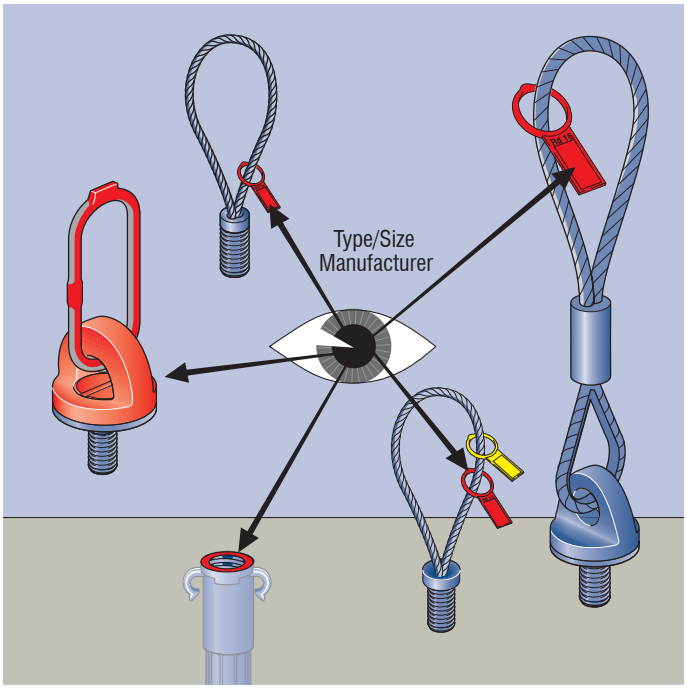








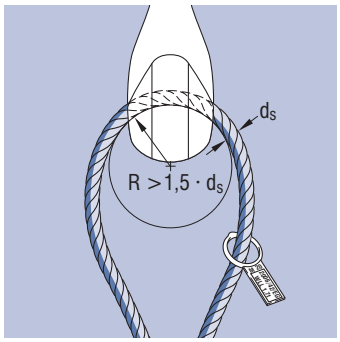




Check the system consistency by, for example, inspecting the data clip of the lifting anchor and the load capacity identification tag of the lifting loop.

Information on the markings:
- Type/Size
- Year of manufacture
- EC marking
- Manufacturer

Caution: If the markings are missing or illegible the lifting devices cannot be correctly allocated to the anchor. This can result in items falling and causing a hazard to life and limb. Lifting devices and anchors with absent or illegible markings must be immediately taken out of service!



Warning: If the deflection radius of the hook is too small, the lifting device can fail even at the rated load. This is a hazard to life. Only attach hooks with a deflection radius at least as large as the wire rope diameter.

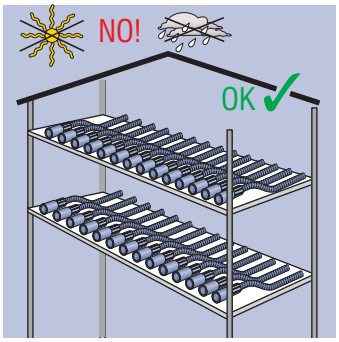
Misuses

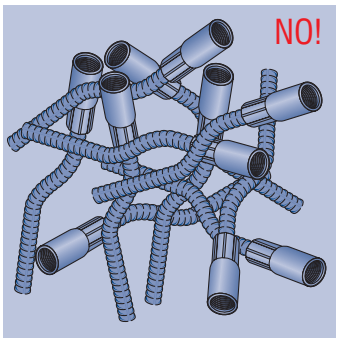
Warning: Use of the anchor by untrained personnel results in the risk of incorrect use and the risk of items falling down, causing injury or death to persons. Employ only trained and qualified personal!

Warning: Use of the anchor systems for lashing during transport of the structural element is not admissible since this can lead to the load falling and so to injury and death of persons. These anchor systems must be used only for lifting and moving the stated precast concrete elements!

Caution: Incorrect use can result in safety hazards and reduced carrying capacity. This results in the risk of a fall and a hazard to life and limb. Lifting anchor systems must be used only in accordance with the instructions for installation and use and only by suitable trained personnel!

Storage





Notice: Store the thread system components dry and protected. There is a risk of corrosion if there are large changes of temperature, wetness (humidity) or any influence from acids, road salt or sea water!

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Notices

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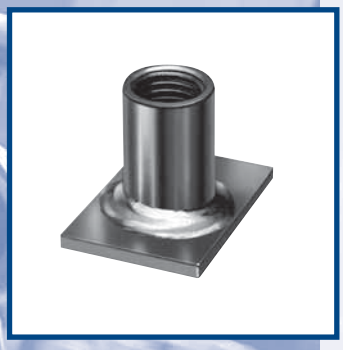
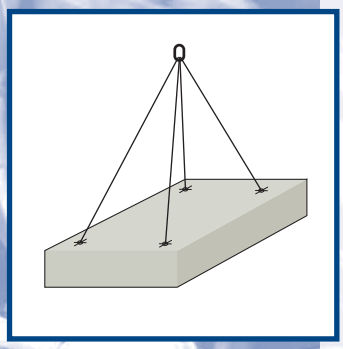
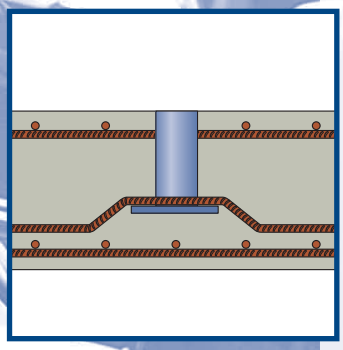






Always on the right track: PFEIFER lifting anchors for slab face installation

PFEIFER lifting anchors are part of the reliable PFEIFER thread system and a significant factor for its great success. The different types of anchor are suitable for slab face installation and here too they offer PFEIFER customers a solution for every application case.

System

- The cleverly designed products of the whole range, i.e. waved anchors (short, long), sockets, bar anchors, flat steel anchors, bolt anchors and custom anchors as well as the associated lifting devices and accessories, are suitable for slab edge and slab face installation and for installation in columns and girders, thereby offering a solution for every application.

PFEIFER waved anchor

- Highest safety levels from over 40 years of experience in manufacturing and application consulting
- Safe load application, even in the thinnest structural elements
- Carrying capacity from 0.5 to 20 tons
- Optimised waved shape for protective load application with minimal gap effect
- Individual manufacture of custom lengths and custom anchors

Safety

- In-process Quality Assurance using QA test plans: Tensile tests, bolt-in tests, dimensional checks, zinc-coat thickness measurements

Made in Germany

- Safe manufacture under consistent conditions
- In-house quality assurance

PFEIFER – waved anchor, short

Item No. 05.018

Can be used for:
- Installation in the face of structural elements
- Longitudinal installation in column-shaped elements

For use by:
- trained and qualified personal

PFEIFER

Thread System

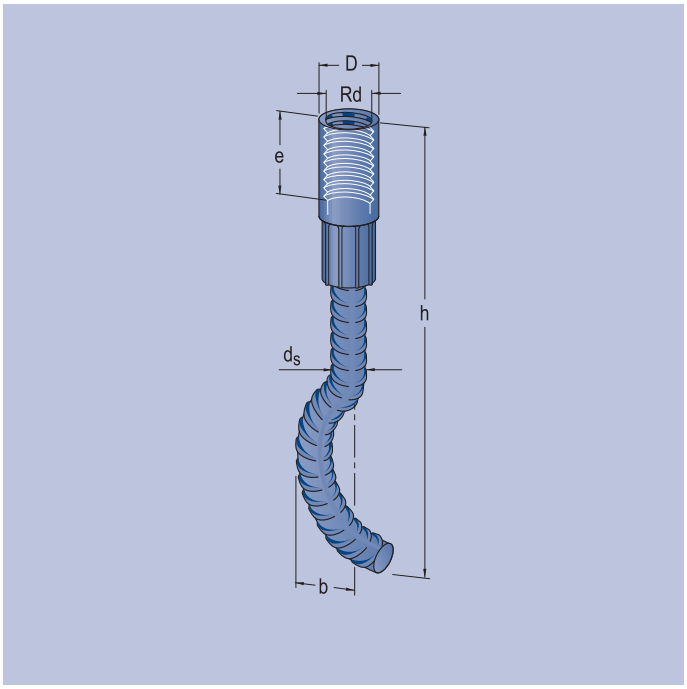
Lifting anchor

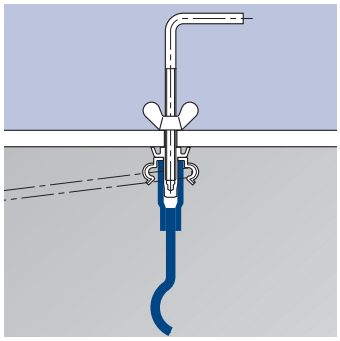
The PFEIFER waved anchor short, is one of the lifting anchors in the PFEIFER thread system. It is intended in particular for use in large-area prefabricated concrete elements with moderate thickness perpendicular to the plane of the slab. Longitudinal installation in the more strongly reinforced structural elements such as columns and girders is also possible. Through the waved shape, the forces are applied safely into the concrete.

Advantages: Safe load application, unambiguous assignment through PFEIFER colour coding

Material:

Socket of high grade precision steel tube, galvanized or in stainless steel, swaged on with reinforcing bar B500 A/B, black





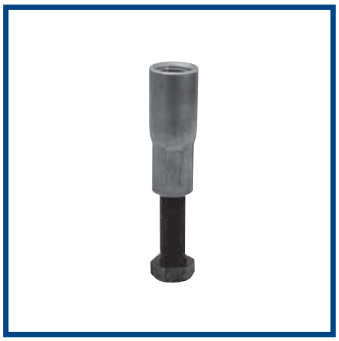
Ref.-No. galvanized	Ref.-No. stainless steel	Type/Size	$N_{R,adm}$ [kN]	Dimensions [mm] Rd	D	b	d_s	e	h	Weight approx. [kg/piece]
05.018.123	**05.018.124**	Rd 12	5	Rd 12 x 1,75	15,0	15	8	22	108	0,07
05.018.143	**05.018.144**	Rd 14	8	Rd 14 x 2,00	18,0	20	10	25	130	0,12
05.018.163	**05.018.164**	Rd 16	12	Rd 16 x 2,00	21,0	21	12	27	172	0,21
05.018.183	**05.018.184**	Rd 18	16	Rd 18 x 2,50	24,0	25	14	34	175	0,29
05.018.203	**05.018.204**	Rd 20	20	Rd 20 x 2,50	27,2	25	16	35	192	0,40
05.018.243	**05.018.244**	Rd 24	25	Rd 24 x 3,00	31,0	30	16	43	250	0,60
05.018.303	**05.018.304**	Rd 30	40	Rd 30 x 3,50	39,5	40	20	56	300	1,10
05.018.363	**05.018.364**	Rd 36	63	Rd 36 x 4,00	47,0	50	25	67	382	2,04
05.018.423	**05.018.424**	Rd 42	80	Rd 42 x 4,50	54,0	50	28	80	450	3,00

Example order for PFEIFER waved anchors, short form, galvanized, Rd 12:
500 PFEIFER waved anchors, Ref.-No. 05.018.123

Technical installation instructions on page 34

PFEIFER bolt anchor

Item-No. 05.016



PFEIFER

Thread System

Lifting device

Can be used for:
- Installation in the face of structural elements

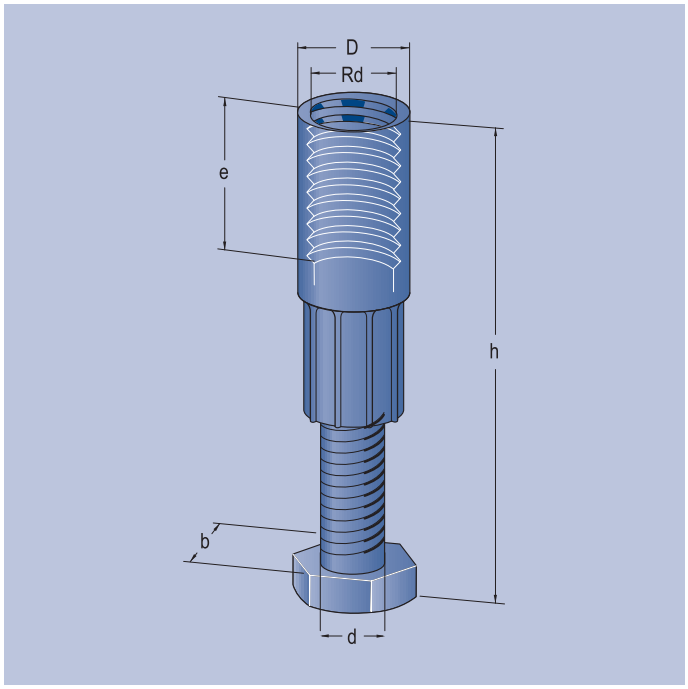
For use by:
- trained and qualified personal

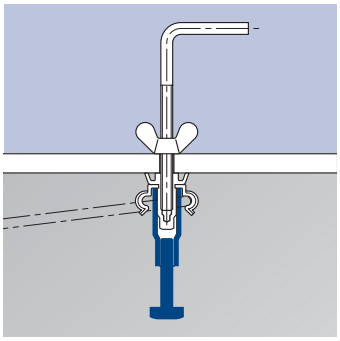
The PFEIFER bolt anchor is a lifting anchor in the PFEIFER thread system. It is intended for use in large-area prefabricated concrete elements such as floor slabs with small thickness perpendicular to the plane of the slab. With the bolt head, the forces are concentrated and applied deep into the concrete.

Advantages: Safe load application, unambiguous assignment through PFEIFER colour coding

Material:

Socket of high grade precision steel tube, galvanized or stainless steel, swaged on with bolt





Ref.-No. galvanized	Ref.-No. stainless steel	Type/Size	$N_{R, adm}$ [kN]	Thread	Dimensions [mm] D	b	d	e	h	Weight approx. [kg/piece]
05.016.123	**05.016.124**	Rd 12	5	Rd 12 x 1,75	15,0	13	8	22	70	0,04
05.016.143	**05.016.144**	Rd 14	8	Rd 14 x 2,00	18,0	17	10	25	70	0,06
05.016.163	**05.016.164**	Rd 16	12	Rd 16 x 2,00	21,0	19	12	27	80	0,12
05.016.183	**05.016.184**	Rd 18	16	Rd 18 x 2,50	24,0	22	14	34	100	0,17
05.016.203	**05.016.204**	Rd 20	20	Rd 20 x 2,50	27,2	24	16	35	127	0,30
05.016.243	**05.016.244**	Rd 24	25	Rd 24 x 3,00	31,0	30	20	43	140	0,44
05.016.303	**05.016.304**	Rd 30	40	Rd 30 x 3,50	39,5	30	20	56	170	0,72

Example order for PFEIFER bolt anchors, short form, galvanized, Rd 12:
500 PFEIFER bolt anchors, Ref.-No. 05.016.123

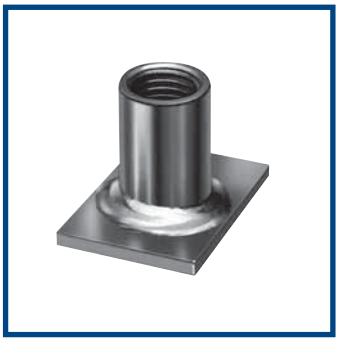
Technical installation instructions on page 34

PFEIFER flat steel anchor

Item-No. 05.002

Can be used for:
- Installation in the face of structural elements

For use by:
- trained and qualified personal



PFEIFER

Thread System

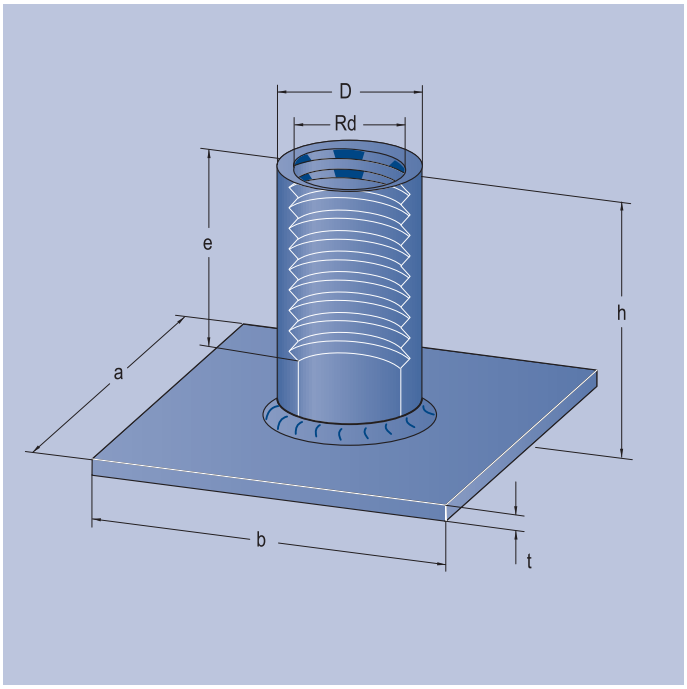
Lifting device

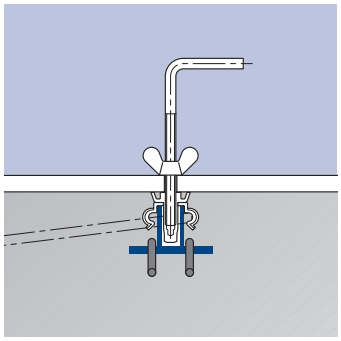
The PFEIFER flat steel anchor is one of the lifting anchors in the PFEIFER thread system. It is particularly suitable for thin plates. With the welded-on flat steel and an appropriate tensile reinforcement on top, safe load application into the structural element is assured.

Advantages: Safe load application, unambiguous assignment through PFEIFER colour coding

Material:

socket of high grade precision steel tube, welded with flat steel, black/plain or galvanized, socket and flat steel welded of stainless steel.





Ref.-No. black/plain	Ref.-No. galvanized	Ref.-No. stainless steel	Type/Size	$N_{R, adm}$ [kN]	Thread	Dimensions [mm] D	a	b	t	e	h	Weight approx. [kg/piece]
05.002.122	**05.002.123**	**05.002.124**	Rd 12	5	Rd 12 x 1,75	15,0	35	25	3	22	30	0,04
05.002.142	**05.002.143**	**05.002.144**	Rd 14	8	Rd 14 x 2,00	18,0	35	35	3	25	33	0,07
05.002.162	**05.002.163**	**05.002.164**	Rd 16	12	Rd 16 x 2,00	21,0	50	35	3	27	35	0,09
05.002.182	**05.002.183**	**05.002.184**	Rd 18	16	Rd 18 x 2,50	24,0	60	45	5	34	44	0,19
05.002.202	**05.002.203**	**05.002.204**	Rd 20	20	Rd 20 x 2,50	27,2	60	60	5	35	47	0,26
05.002.242	**05.002.243**	**05.002.244**	Rd 24	25	Rd 24 x 3,00	31,0	80	60	5	43	54	0,34
05.002.302	**05.002.303**	**05.002.304**	Rd 30	40	Rd 30 x 3,50	39,5	100	80	6	56	72	0,69
05.002.362	**05.002.363**	**05.002.364**	Rd 36	63	Rd 36 x 4,00	47,0	130	100	6	67	84	1,13
05.002.422	**05.002.423**	**05.002.424**	Rd 42	80	Rd 42 x 4,50	54,0	130	130	8	80	98	1,76
05.002.522	**05.002.523**	**05.002.524**	Rd 52	125	Rd 52 x 5,00	67,2	150	130	8	97	117	2,66

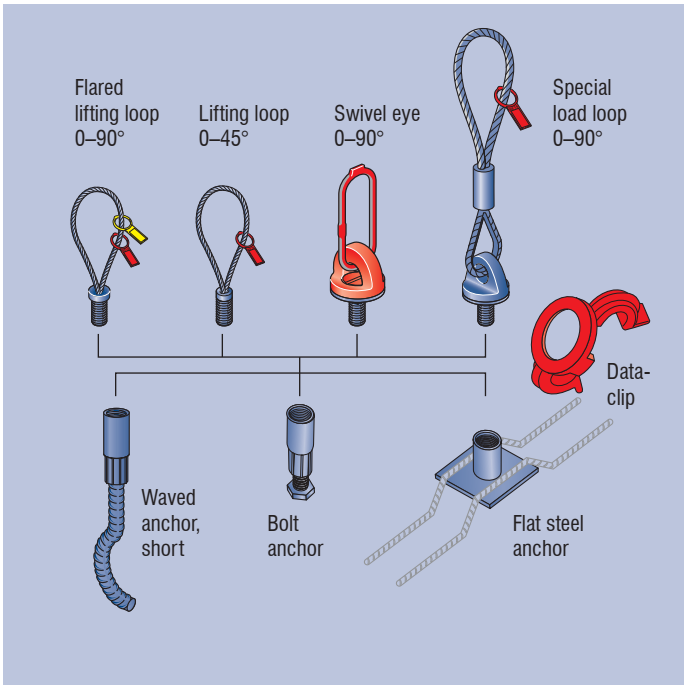
Example order for 500 PFEIFER flat steel anchors, galvanized, Rd 36:
500 PFEIFER flat steel anchors, Ref.-No. 05.002.363

Technical installation instructions on page 34

Instructions for installation and use for slab face installation

System

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



The PFEIFER thread system consists of the corresponding lifting anchor, the selected lifting device and the colour-coded data clip.

Type/Size	Ref.-No.	Colour
Rd 12	05.220.120	Pastel orange
Rd 14	05.220.140	Pure white
Rd 16	05.220.160	Flame red
Rd 18	05.220.180	Light pink
Rd 20	05.220.200	Pastel green
Rd 24	05.220.240	Anthracite grey
Rd 30	05.220.300	Emerald green
Rd 36	05.220.360	Light blue
Rd 42	05.220.420	Silver grey
Rd 52	05.220.520	Sulphur yellow
Rd 56	*	Orange
Rd 60	*	Red

* For these sizes the marking of the anchor is inside the socket.
Here, the front face of the reinforcing steel is marked in the appropriate colour.

Safety

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

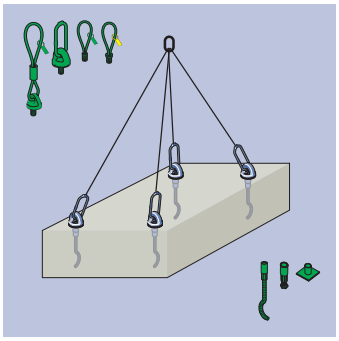
The following safety parameter values for the PFEIFER lifting anchor system are derived as follows in accordance with the VDI/BV-BS 6205 directive, with the prerequisite of the machinery directive 2006/42/EC. For this, a load-side dynamic working coefficient $\psi_{dyn}=1.3$ was assumed.

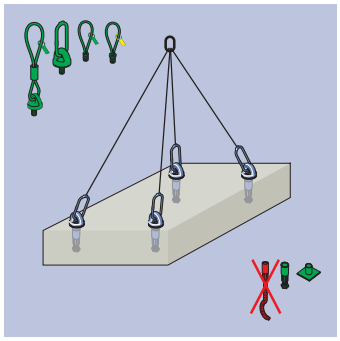
– Steel failure wire rope: $\gamma_s = 4{,}0$
– Steel failure chains or full sections: $\gamma_s = 3{,}0$
– Concrete failure (procedure B*): $\gamma_c = 2{,}5$
– Concrete failure (procedure A*): $\gamma_c = 2{,}1$

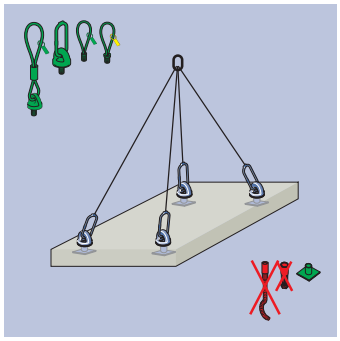
* for factory monitored fabrication of the prefab concrete elements

Use

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS







Warning: The use of non-matched system components can cause reduced safety levels and hazards to life and limb. Always use PFEIFER components that are matched to each other!

Caution: The concreted-in anchors must be determined by the planning engineer. The instructions for installation and use of the selected anchor type must be complied with!

Dimensioning

Notice: The anchor must always be attached higher than the centre of gravity of the concrete structural element because otherwise the element can tip over during transport!

Notice: To achieve the stated carrying capacity, you need to comply with the additional reinforcements as in Tables 2-4 (depending on the load) and the minimum dimensions as in Table 2 and a concrete cube compressive strength of at least 15 N/mm².

$$E \leq R_{adm}$$

Notice: Determination of stress according to VDI/BV-BS 6205.

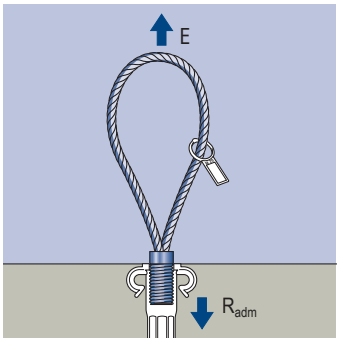
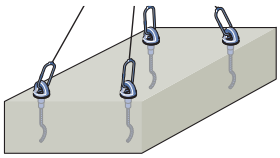
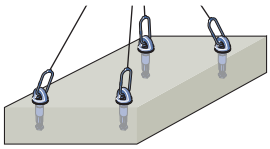
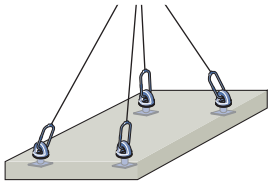


Table 2 – resistance and reinforcement

Load/application	Type/Size	Admissible resistance $N_{R,adm}$ [kN]	Surface reinforcement [mm²/m]
Waved anchor, short 	**Rd 12**	5	188
	Rd 14	8	188
	Rd 16	12	188
	Rd 18	16	188
	Rd 20	20	188
	Rd 24	25	188
	Rd 30	40	188
	Rd 36	63	188
	Rd 42	80	188

Load/application	Type/Size	Admissible resistance $N_{R,adm}$ [kN]	Surface reinforcement [mm²/m]
Bolt anchor 	**Rd 12**	5	188
	Rd 14	8	188
	Rd 16	12	188
	Rd 18	16	188
	Rd 20	20	188
	Rd 24	25	188
	Rd 30	40	188

Load/application	Type/Size	Admissible resistance $N_{R,adm}$ [kN]	Surface reinforcement [mm²/m]
Flat steel anchor 	**Rd 12**	5	188
	Rd 14	8	188
	Rd 16	12	188
	Rd 18	16	188
	Rd 20	20	188
	Rd 24	25	188
	Rd 30	40	257
	Rd 36	63	257
	Rd 42	80	424
	Rd 52	125	424

Notice: The dimensions for the additional reinforcement can be found in Tables 3 and 4.

Table 3 – parallel shear reinforcement for ß = 12.5° – 45°

Type/Size	Admissible resistance $N_{R,adm}$ [kN]	$ø_s$ [mm]	L [mm]	D [mm]
Rd 12	5	6	150	24
Rd 14	8	6	200	24
Rd 16	12	8	200	32
Rd 18	16	8	250	32
Rd 20	20	8	300	32
Rd 24	25	10	300	40
Rd 30	40	12	400	48
Rd 36	63	14	550	56
Rd 42	80	16	600	64
Rd 52	125	20	750	146

Additional reinforcement

Parallel shear reinforcement

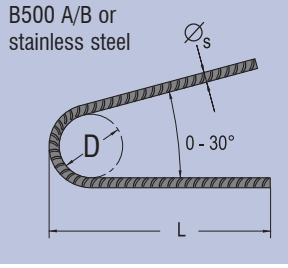


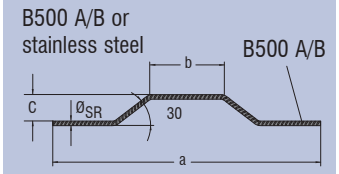
Table 4 – retention reinforcement for flat steel anchors

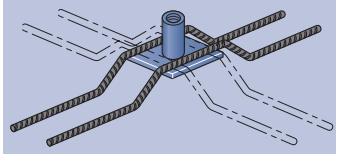
Typ/Size	Admissible resistance $N_{R,adm}$ [kN]	Number of retention stirrups	$Ø_{SR}$ [mm]	a [mm]	b [mm]	c [mm]
Rd 12	5	2	6	250	35	30
Rd 14	8	2	6	360	45	35
Rd 16	12	2	8	420	45	35
Rd 18	16	2	8	530	55	40
Rd 20	20	2	10	640	70	40
Rd 24	25	4	10	640	70	50
Rd 30	40	4	12	830	90	55
Rd 36	63	4	14	1140	110	60
Rd 42	80	4	16	1250	140	60
Rd 52	125	4	20	1530	140	75

From size Rd 24 the reinforcements are installed crosswise – see illustration.

Additional reinforcement

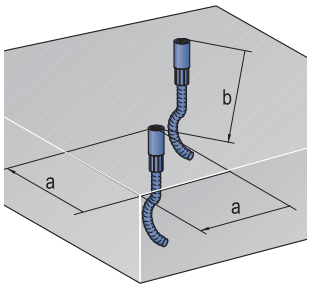
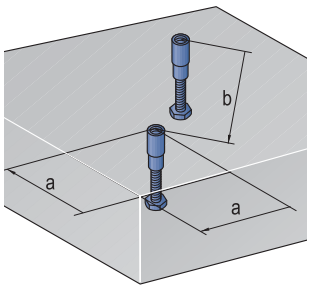
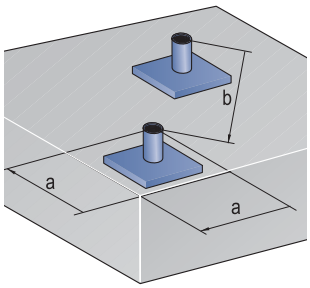
Retention reinforcement



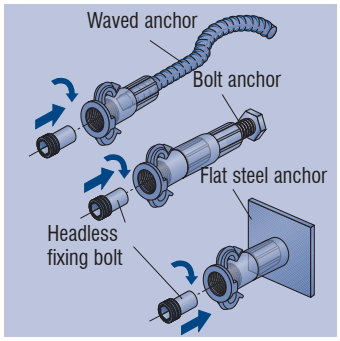


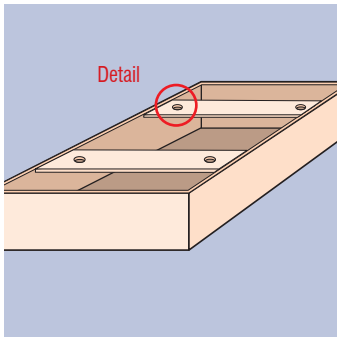
Notice: In the case of the waved anchor, short, and bolt anchor, no additional retention reinforcement should be installed.

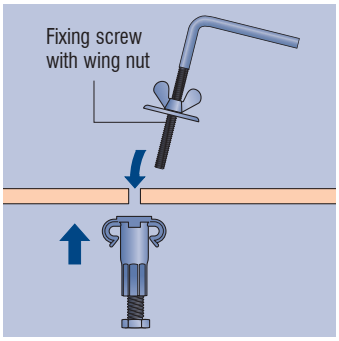
Table 5 – minimum rod dimensions and distances

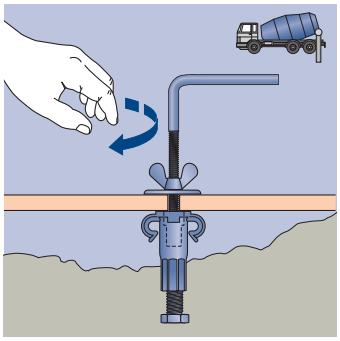
	Size	Minimum edge distance a [mm]	Minimum distance between anchors b [mm]	Minimum slab thickness d [mm]
Waved anchor, short				
	**Rd 12**	95	200	130
	Rd 14	115	220	150
	Rd 16	135	260	195
	Rd 18	155	300	195
	Rd 20	170	350	215
	Rd 24	220	440	270
	Rd 30	275	550	320
	Rd 36	300	600	405
	Rd 42	400	800	470
Bolt anchor				
	**Rd 12**	130	260	95
	Rd 14	130	260	95
	Rd 16	155	290	100
	Rd 18	210	365	120
	Rd 20	300	470	150
	Rd 24	345	510	160
	Rd 30	475	630	190
Flat steel anchor				
	**Rd 12**	150	300	75
	Rd 14	200	400	85
	Rd 16	280	460	85
	Rd 18	290	580	100
	Rd 20	340	680	100
	Rd 24	340	680	120
	Rd 30	440	880	140
	Rd 36	590	1180	160
	Rd 42	650	1300	170
	Rd 52	790	1580	200

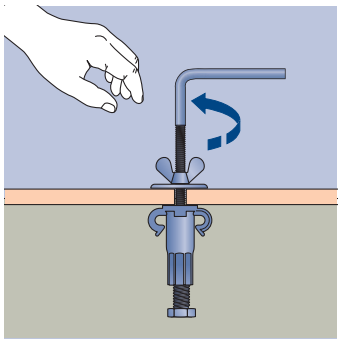
Installation

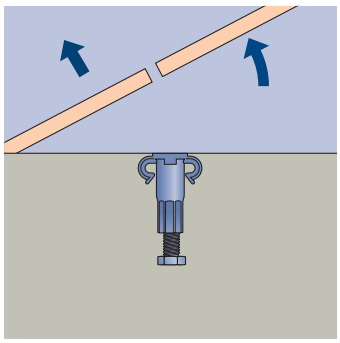










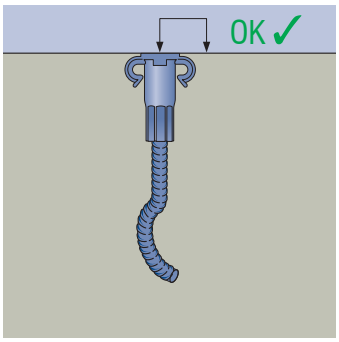


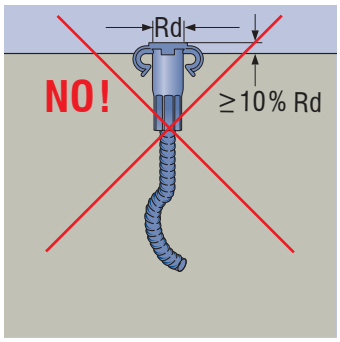
Notice: Example drawing, using the bolt anchor.
Similar principles apply for the other anchor variants.

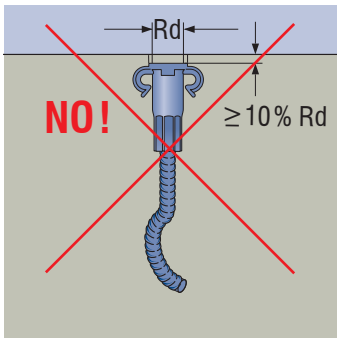
Caution: The anchor must always be attached higher than the centre of gravity of the subsequent concrete structural element because otherwise the element can tip over during transport.

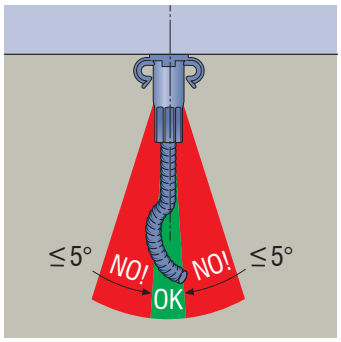
Notice: To achieve the stated carrying capacity, comply with the minimum dimensions according to Table 2 and a concrete cube strength compression of at least 15 N/mm².

Installation tolerances









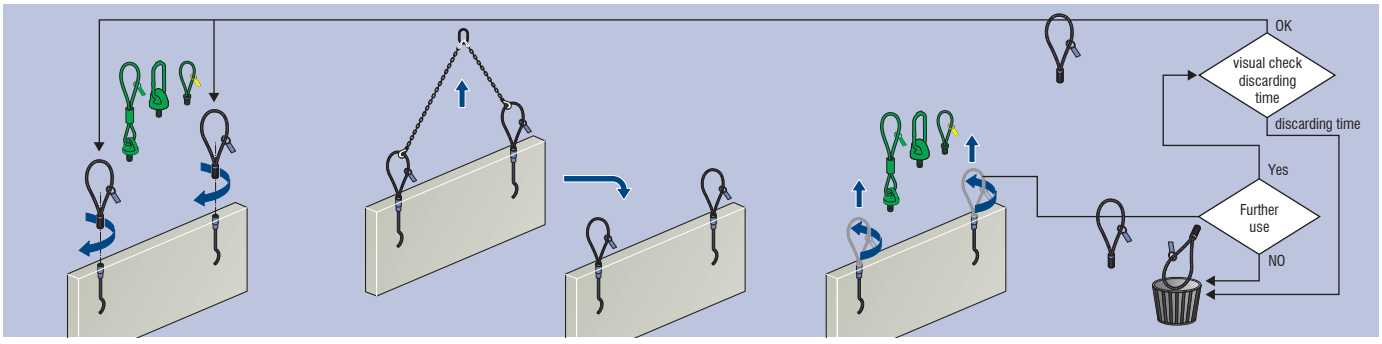
Notice: For a planned, recessed installation according to instructions for installation and use the same tolerance field is to be applied.

Caution: Incorrect positions and faulty installation of the anchor can lead to early failure and falling down – danger of death! As a rule, the anchor should be installed flush and at right-angles!

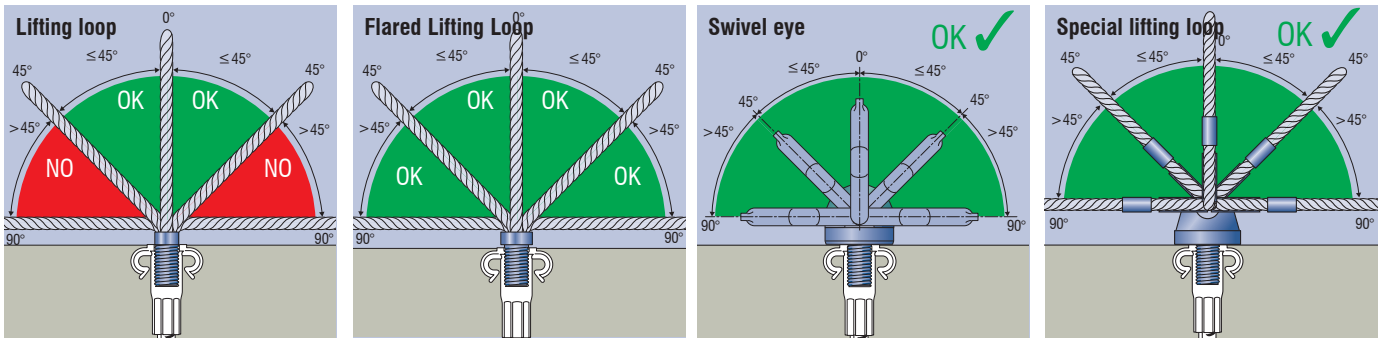
Use

			
Tensile load	0 – 45°	0 – 45°	0 – 45°
Transverse shear load*	NO!	NO!	NO!
Temperature	-20 to 80 °C	-20 to 80 °C	-20 to 80 °C

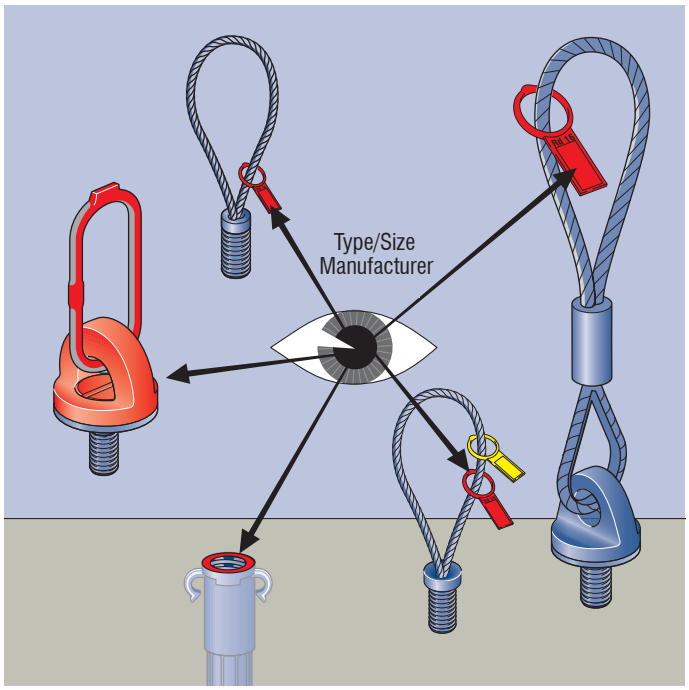
* Transversal shear pull is possible with a flared lifting loop, swivel eye or special lifting loop.



Use



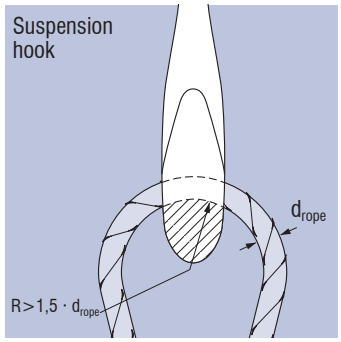
Warning: Loading the lifting loop beyond the approved angle will lead to reduced safety of the system. Risk of falling, danger to life. Loading of the lifting devices according to figure only.



Check the system consistency by, for example, inspecting the data clip of the lifting anchor and the load capacity identification tag of the lifting loop.

Information on the markings:
– Type/Size
– Year of manufacture
– EC marking
– Manufacturer

Caution: If the markings are missing or illegible the lifting devices cannot be correctly allocated to the anchor.
This can result in items falling and causing a hazard to life and limb. Lifting devices and anchors with absent or illegible markings must be immediately taken out of service.



Warning: If the deflection radius of the hook is too small, the lifting device can fail even at the rated load. This is a hazard to life. Only attach hooks with a deflection radius of at least 1.5 x the cable diameter.

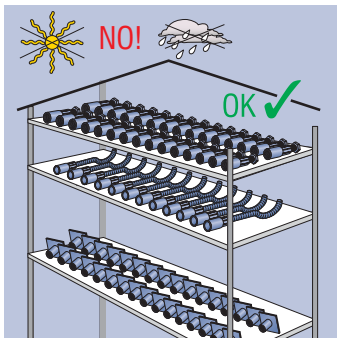
Misuses

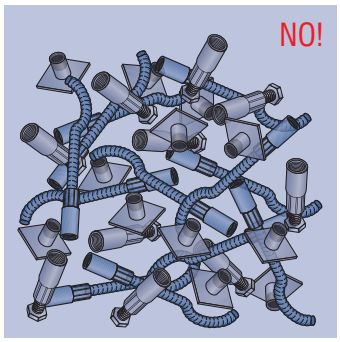
Warning: Use of the anchor by untrained personnel results in the risk of incorrect use and the risk of items falling down, causing injury or death to persons. Use only trained personnel.

Warning: Use of the anchor systems for lashing during transport of the building component is not admissible since this can lead to the load falling and so to injury and death of persons. These anchor systems must be used only for lifting and moving the stated precast concrete elements!

Caution: Incorrect use can result in safety hazards and reduced carrying capacity. This results in the risk of a fall and a hazard to life and limb. Lifting anchor systems must be used only in accordance with the instructions for installation and use and only by suitable trained personnel!

Storage





Notice: Store the thread system components dry and protected. There is a risk of corrosion if there are large changes of temperature, wetness (humidity) or any influence from acids, road salt or sea water!

Notices

PFEIFER

They ensure your advance: PFEIFER lifting anchors for installation in column-shaped structural elements

PFEIFER lifting anchors are part of the reliable PFEIFER thread system and a significant factor for its great success. The different types of anchor are suitable for installation in columns and girders and here too they offer PFEIFER customers a solution for every application case.

System

- The cleverly designed products of the whole range, i.e. waved anchors (short, long), sockets, bar anchors, flat steel anchors, bolt anchors and custom anchors as well as the associated lifting devices and accessories, are suitable for slab edge and slab face installation and for installation in columns and girders, thereby offering a solution for every application.

PFEIFER waved anchor

- Highest safety levels from over 40 years of experience in manufacturing and application consulting
- Safe load application, even in the thinnest structural elements
- Carrying capacity from 0.5 to 20 tons
- Optimised waved shape for protective load application with minimal gap effect
- Individual manufacture of custom lengths and custom anchors

Safety

- In-process Quality Assurance using QA test plans: Tensile tests, bolt-in tests, dimensional checks, zinc-coat thickness measurements

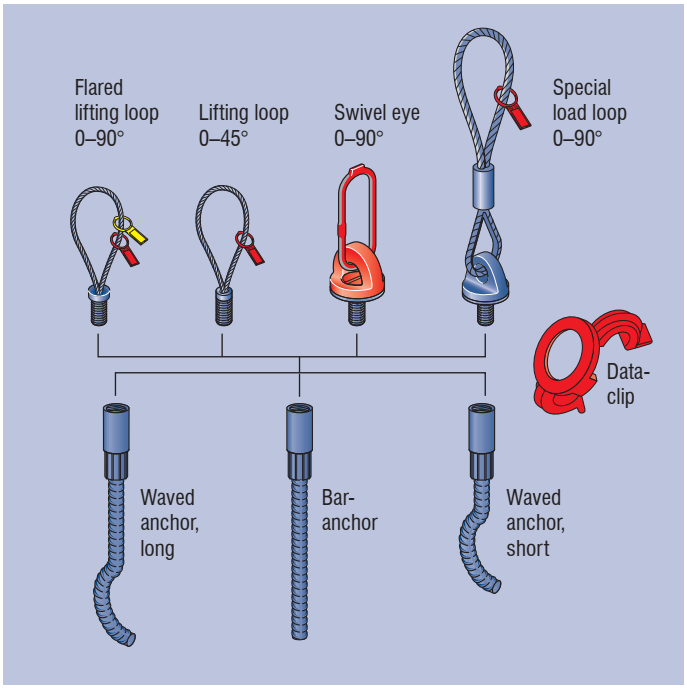
Made in Germany

- Safe manufacture under consistent conditions
- In-house quality assurance
- Steel alloy and precision tube manufacture to the PFEIFER specification

Instructions for installation and use for column-shaped structural elements

System

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



The PFEIFER thread system consists of the corresponding lifting anchor, the selected lifting device and the colour-coded data clip.

Type/Size	Ref.-No.	Colour
Rd 12	05.220.120	Pastel orange
Rd 14	05.220.140	Pure white
Rd 16	05.220.160	Flame red
Rd 18	05.220.180	Light pink
Rd 20	05.220.200	Pastel green
Rd 24	05.220.240	Anthracite grey
Rd 30	05.220.300	Emerald green
Rd 36	05.220.360	Light blue
Rd 42	05.220.420	Silver grey
Rd 52	05.220.520	Sulphur yellow
Rd 56	*	Orange
Rd 60	*	Red

* For these sizes the marking of the anchor is inside the socket.
Here, the front face of the reinforcing steel is marked in the appropriate colour.

Safety

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

The following safety parameter values for the PFEIFER lifting anchor system are derived as follows in accordance with the VDI/BV-BS 6205 directive, with the prerequisite of the machinery directive 2006/42/EC. For this, a load-side dynamic working coefficient $\psi_{dyn}=1.3$ was assumed.

– Steel failure wire rope: $\gamma_s = 4{,}0$

– Steel failure chains or full sections: $\gamma_s = 3{,}0$

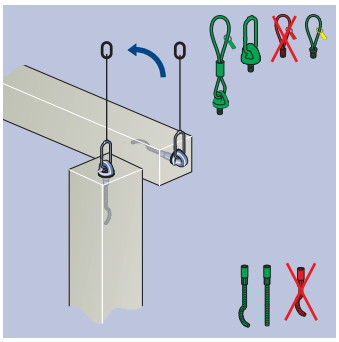
– Concrete failure (procedure B*): $\gamma_c = 2{,}5$

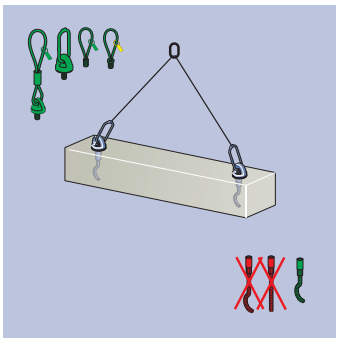
– Concrete failure (procedure A*): $\gamma_c = 2{,}1$

* for factory monitored fabrication of the prefab concrete elements

Use

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS





Warning: The use of non-matched system components can cause reduced safety levels.

This can cause a hazard to life and limb. Always use PFEIFER components that are matched to each other!

Caution: The anchors to be concreted-in must be determined by the planning engineer. The instructions for installation and use of the selected anchor type must be complied with!

Notice: The anchor must always be attached higher than the centre of gravity of the concrete structural element because otherwise the element can tip over during transport.

Notice: To achieve the stated carrying capacity, you need to comply with the additional reinforcements as in Tables 3, 4 (depending on the load) and the minimum dimensions as in Tables 3, 4 and a concrete cube compressive strength of at least 15 N/mm².

$$E \leq R_{adm}$$

Notice: determination of stress according to VDI/BV-BS 6205

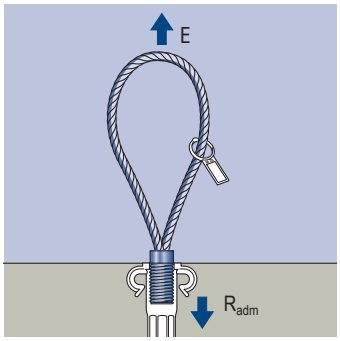
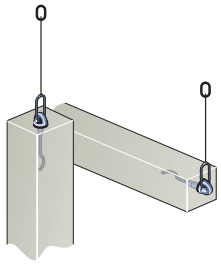
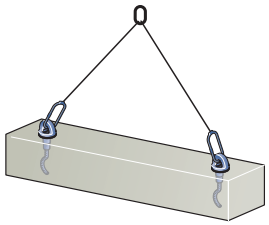


Table 1 – Resistance

Load/application		Type/Size	Admissible resistance $N_{R,adm}$ [kN]	Admissible resistance $V_{R,adm}$ [kN]	Rein-forcement
Face installation in column – Waved anchor, long – Bar anchor		**Rd 20**	20	10,0	**acc. Table 3**
		Rd 24	25	12,5	
		Rd 30	40	20,0	
		Rd 36	63	31,5	
		Rd 42	80	40,0	
		Rd 52	125	62,5	
Installation in long side of column/girder – Waved anchor, short		**Rd 20**	20	**Notice:** Transversal shear pull in this case not admissible.	**acc. Table 4**
		Rd 24	25		
		Rd 30	40		
		Rd 36	63		
		Rd 42	80		

Reinforcement, face installation in columns

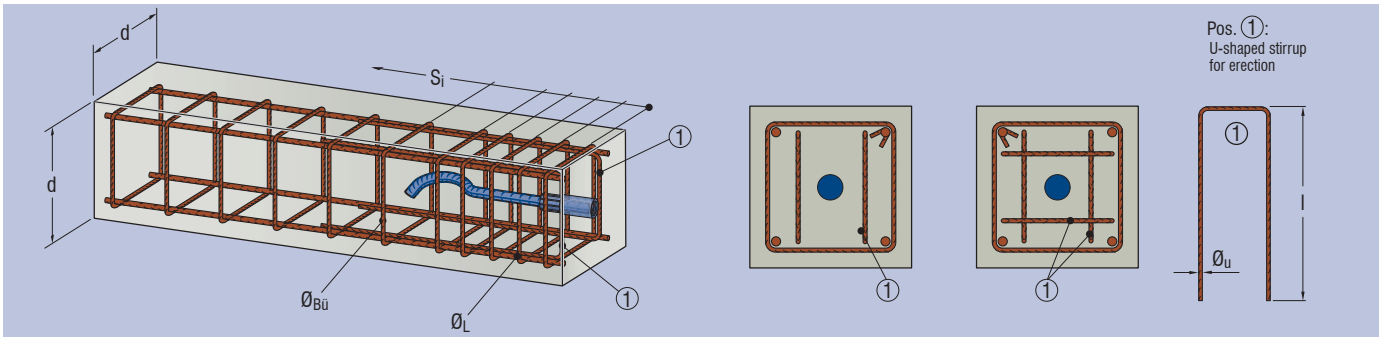


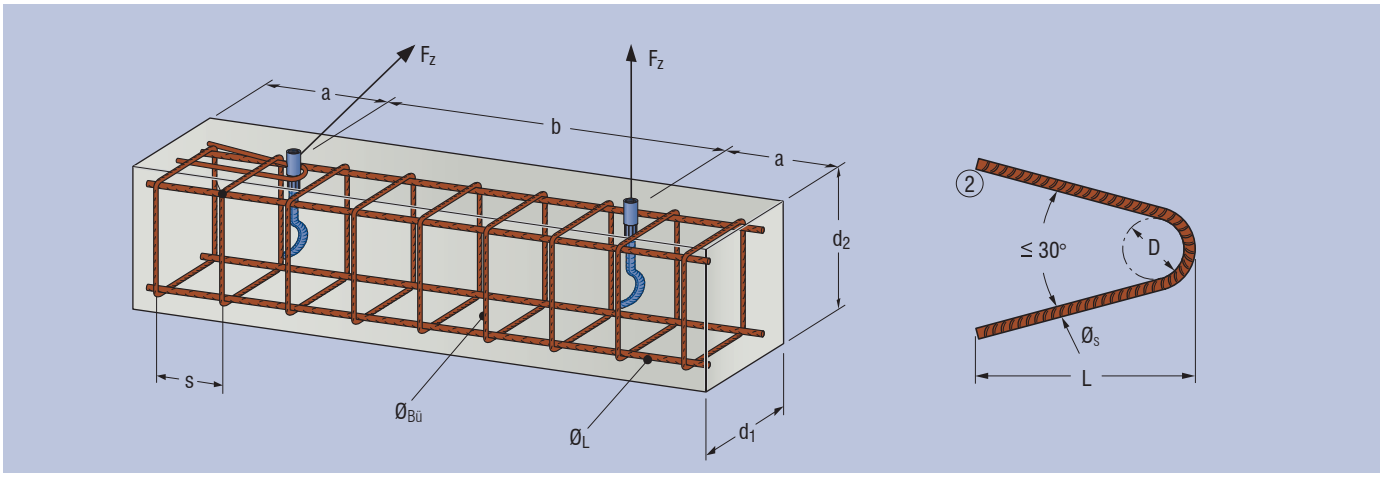
Table 3 – additional reinforcement for erection and vertical lifting of column head

Type/Size	$N_{R,adm}$ kN	$V_{R,adm}$ kN	d [mm]	$ø_{BÜ}$ [mm]	S_i [mm]	$ø_L$ [mm]	No. of U-stirrups	$ø_u$ [mm]	l [mm]
Rd 20	20	10	170	8	30, 30, 50, 50, 125	12	2	6	500
Rd 24	25	12,5	190	8	30, 30, 50, 50, 125	14	2	8	500
Rd 30	40	20	260	10	30, 50, 50, 50, 50, 150	16	2	10	600
Rd 36	63	31,5	300	12	30, 30, 50, 50, 50, 150	20	4	8	700
Rd 42	80	40	360	12	30, 30, 50, 50, 50, 50, 250	25	4	10	750
Rd 52	125	62,5	400	16	30, 30, 50, 50, 50, 50, 250	25	4	12	950

Reinforcement for anchor installation in column long side/girder

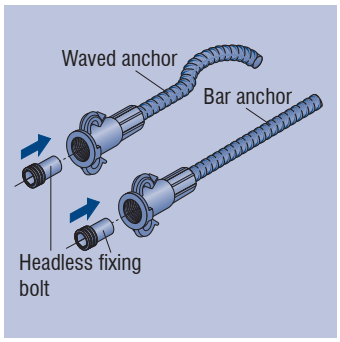
Table 4 – dimensions for basic reinforcement for straight pull, parallel shear pull and transversal shear pull

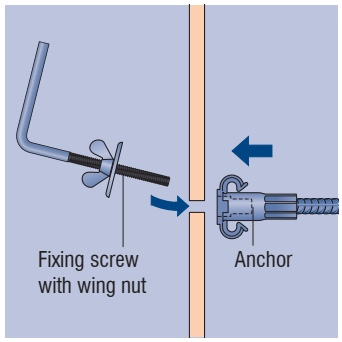
Type/Size	a [mm]	b [mm]	d_1 [mm]	d_2 [mm]	$ø_{Bü}$ [mm]	s [mm]	$ø_L$ [mm]	$ø_s$ [mm]	D [mm]	L [mm]
Rd 20	350	700	170	220	6	150	12	8	32	300
Rd 24	450	900	205	270	6	150	14	10	40	300
Rd 30	600	1200	260	320	8	200	16	12	48	400
Rd 36	700	1400	300	430	10	200	20	12	48	550
Rd 42	750	1500	360	470	10	200	25	14	56	600

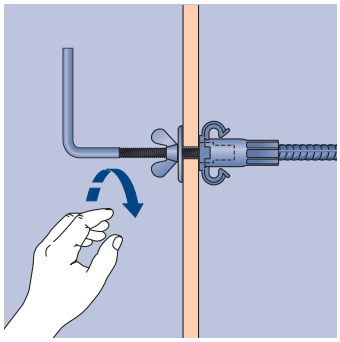


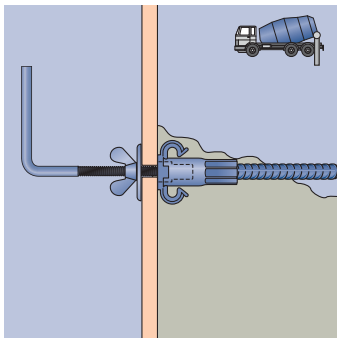
Installation

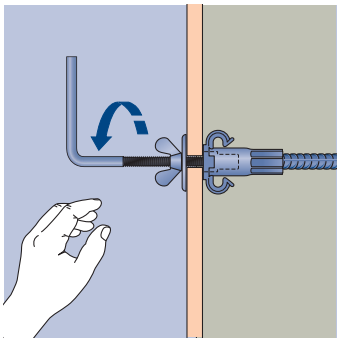
FOR PLANNERS, **FOR PRECAST PLANTS,** FOR USERS

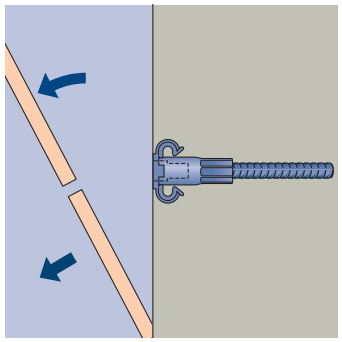








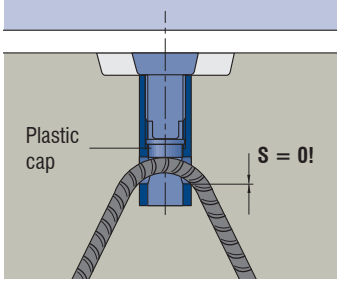




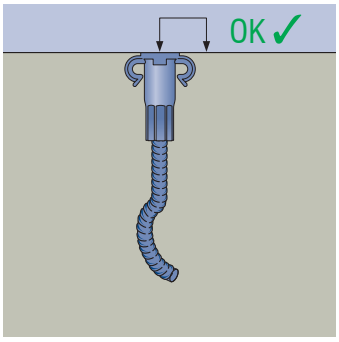
Notice: In the installation illustrations the top-sided installation variant with the PFEIFER headless fixing bolt is shown.

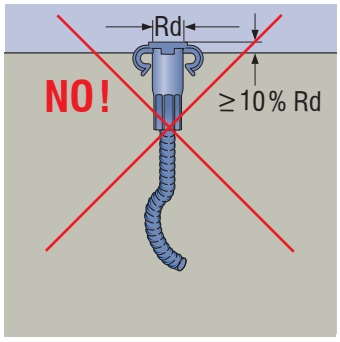
Different installation variants (e.g. recessed) can be found in the section “Accessories” from page 44.

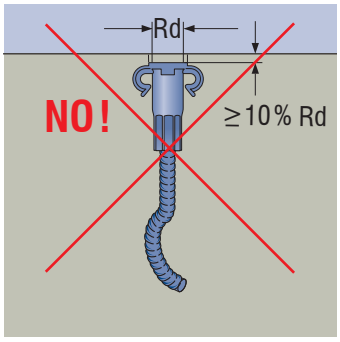
Plastic caps sockets

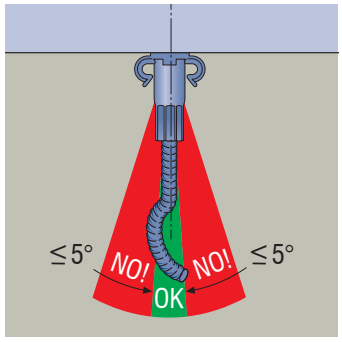


Installation tolerances









Notice: For the sake of simplified assignment, the minimum dimensions and distances were included in the section “Dimensioning”, Tables 2 and 3.

Caution: Incorrect positions and faulty installation of the anchor can lead to early failure and falling down – danger of death! As a rule, the anchor should be installed flush and at right-angles!

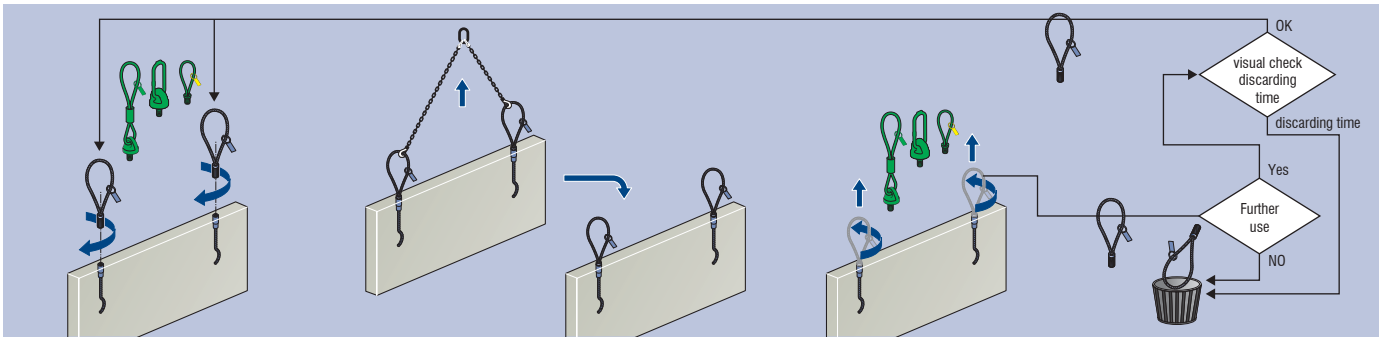
Notice: For a planned, recessed installation according to instructions for installation and use the same tolerance field is to be applied.

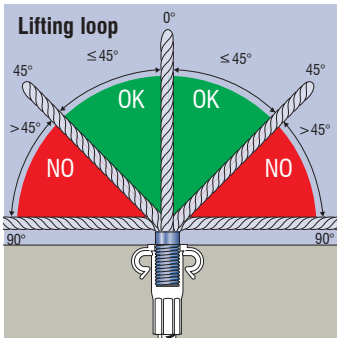
Use

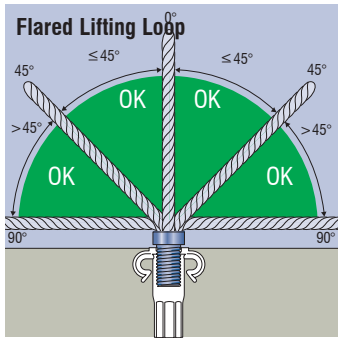
FOR PLANNERS, **FOR PRECAST PLANTS, FOR USERS**

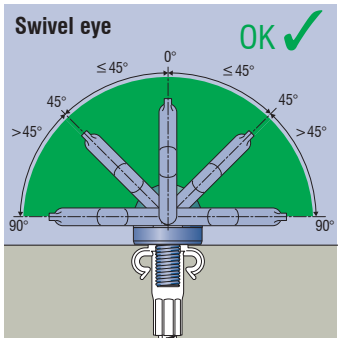
		
Tensile load	0 – 45°	0 – 45°
Transverse shear load*	**OK ✓**	**NO!**
Temperature	-20 to 80 °C	-20 to 80 °C

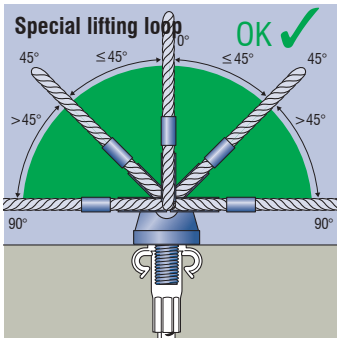
* Transversal shear pull is possible with a flared lifting loop, swivel eye or special lifting loop.



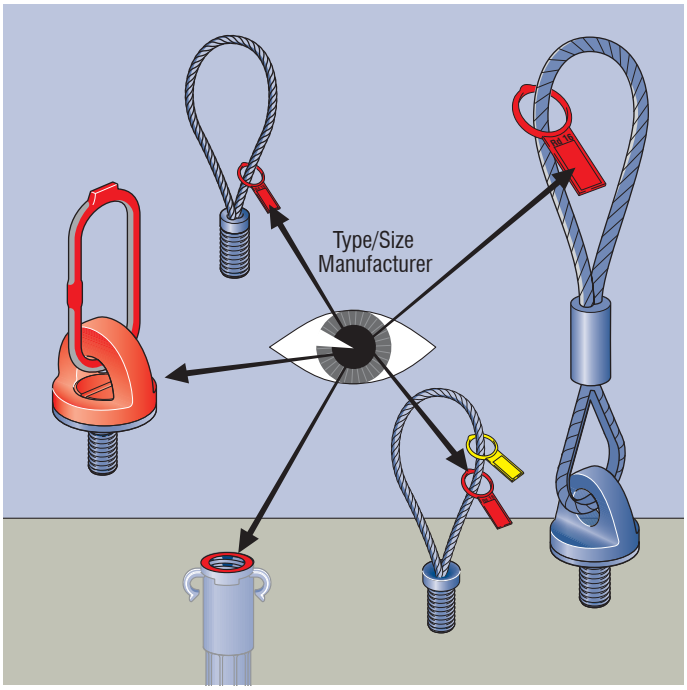








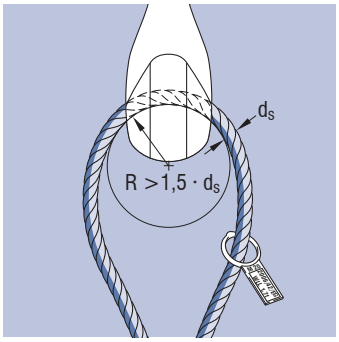
Warning: Loading the lifting loop beyond the approved angle will lead to reduced safety of the system. Risk of falling, danger to life. Loading of the lifting devices according to figure only.



Check the system consistency by, for example, inspecting the data clip of the lifting anchor and the load capacity identification tag of the lifting loop.

Information on the markings:
– Type/Size
– Year of manufacture
– EC marking
– Manufacturer

Caution: If the markings are missing or illegible the lifting devices cannot be correctly allocated to the anchor. This can result in items falling and causing a hazard to life and limb. Lifting devices and anchors with absent or illegible markings must be immediately taken out of service!



Warning: If the deflection radius of the hook is too small, the lifting device can fail even at the rated load. This is a hazard to life. Only attach hooks with a deflection radius of at least 1.5 x the cable diameter.

Misuses

FOR PLANNERS, **FOR PRECAST PLANTS, FOR USERS**

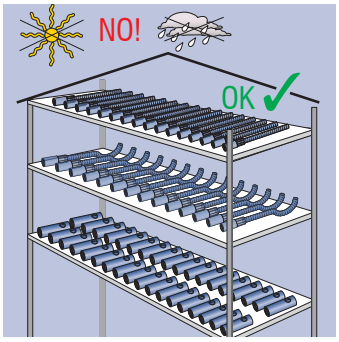
Warning: Use of the anchor by untrained personnel results in the risk of incorrect use and the risk of items falling down, causing injury or death. Use only trained personnel.

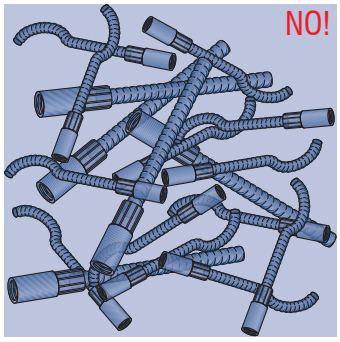
Warning: Use of the anchor systems for lashing during transport of the building component is not admissible since this can lead to the load falling and so to injury and death of persons. These anchor systems must be used only for lifting and moving the stated precast concrete elements.

Caution: Incorrect use can result in safety hazards and reduced carrying capacity. This results in the risk of a fall and a hazard to life and limb. Lifting anchor systems must be used only in accordance with the instructions for installation and use and only by suitable trained personnel.

Storage

FOR PLANNERS, **FOR PRECAST PLANTS, FOR USERS**





Notice: Store the thread system components dry and protected. There is a risk of corrosion if there are large changes of temperature, wetness (humidity) or any influence from acids, road salt or sea water!

PFEIFER

They ensure your advance: PFEIFER lifting anchors for installation in specialised structural elements

PFEIFER cropped bar anchors are part of the reliable PFEIFER thread system. The anchor is designed specifically for lifting and moving sandwich panels and is inserted from the top into the front side of the load bearing layer. They offer PFEIFER customers a professional solution for this application too.

System

- The cleverly designed products of the whole range, i.e. waved anchors (short, long), sockets, bar anchors, flat steel anchors, bolt anchors and custom anchors as well as the associated lifting devices and accessories, are suitable for front-sided and top-sided installation and for installation in columns and girders, thereby offering a solution for every application.

PFEIFER-Repair Kit

- In the event that lifting anchors have been forgotten or cannot be used, this system, which provides a method of retroactive installation, offers the optimal solution.
- The element can be safely transported once the hardening time for the injection mortar has elapsed.

Safety

- In-process Quality Assurance using QA test plans: Tensile tests, bolt-in tests, dimensional checks, zinc-coat thickness measurements

Made in Germany

- Safe manufacture under consistent conditions
- In-house quality assurance
- Steel alloy and precision tube manufacture to the PFEIFER specification

PFEIFER repair kit

Item-No. 05.011.016
Item-No. 05.011.019
Item-No. 05.600
Item-No. 05.601
Item-No. 05.602
Item-No. 05.604
Item-No. 05.605

Can be used for:
- slab edge installation – backfitting
- slab face installation – backfitting

For use by:
- trained and qualified personal

The PFEIFER repair kit system consists of the PFEIFER injection grout KM 5 and the PFEIFER bolt anchors and/or bar anchors in the sizes Rd16, Rd20, and Rd30. This system can be used for installing forgotten or damaged transport anchors later. The anchor is simply glued into a drilled hole. The element can safely be transported after the injection grout has hardened.

PFEIFER

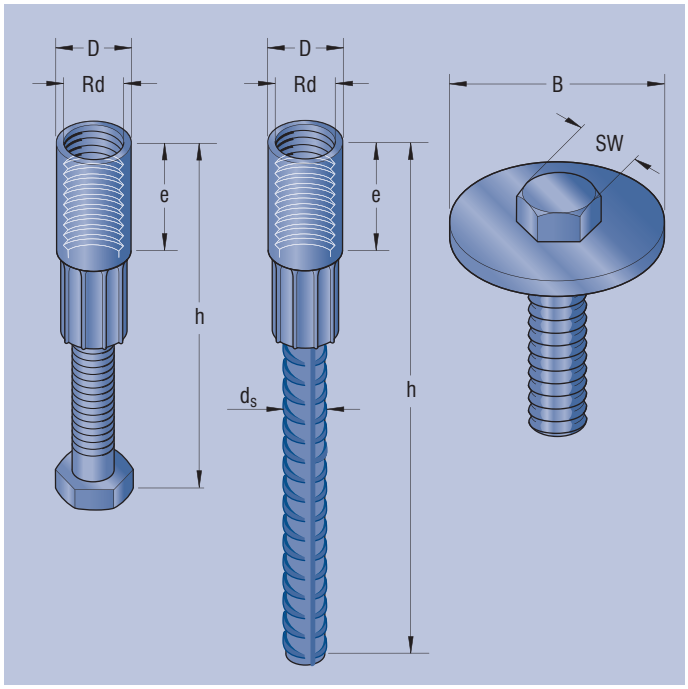
repair kit

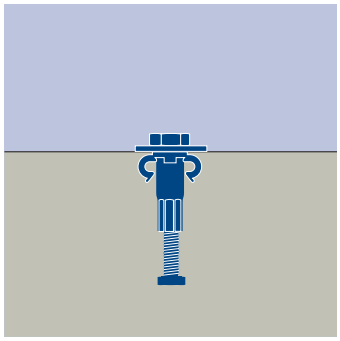
Lifting Anchors

We recommend the PFEIFER repair kit only for applications that do not require a general approval from the building inspection authority.

Material:

Bushing made from precision steel pipe in special quality, galvanized, or from stainless steel 1.4571
Crimped with bolt or rebar steel, black
Steel washer and bolt, galvanized
Bonding grout





Ref. No. galvanized	Ref. No. stainless steel	Type/ Size	$N_{R,\,adm}$ [kN]	Rd	e	h	B	SW	Packing Unit Pieces	Weight approx. kg/Packing Unit
Bolt anchor for installation in ceilings										
05.011.163.016	05.011.164.016	Rd 16	12	Rd 16 x 21,0	26	80	28	24	2 bolt anchors/2 bolts with washers*	0,80
05.011.203.016	05.011.204.016	Rd 20	20	Rd 20 x 27,2	35	127	37	30	2 bolt anchors/2 bolts with washers*	1,13
05.011.303.016	05.011.304.016	Rd 30	40	Rd 30 x 39,5	56	170	56	46	1 bolt anchor/1 bolt with washer*	2,32
Bar anchor for installation in walls										
05.011.163.019	05.011.164.019	Rd 16	12	Rd 16 x 21,0	26	120	28	24	2 bar anchors/2 bolts with washers*	0,90
05.011.203.019	05.011.204.019	Rd 20	20	Rd 20 x 27,2	35	180	37	30	2 bar anchors/2 bolts with washers*	1,25
05.011.303.019	05.011.304.019	Rd 30	40	Rd 30 x 39,5	56	250	56	46	1 bar anchor/1 bolt with washer*	2,45
									* incl. sufficient quantity of bonding grout	
05.600.000	Bonding grout KM 5, 150-ml cartridge, incl. 2 mixing nozzles									0,44
05.602.001	Additional mixing nozzle									0,01

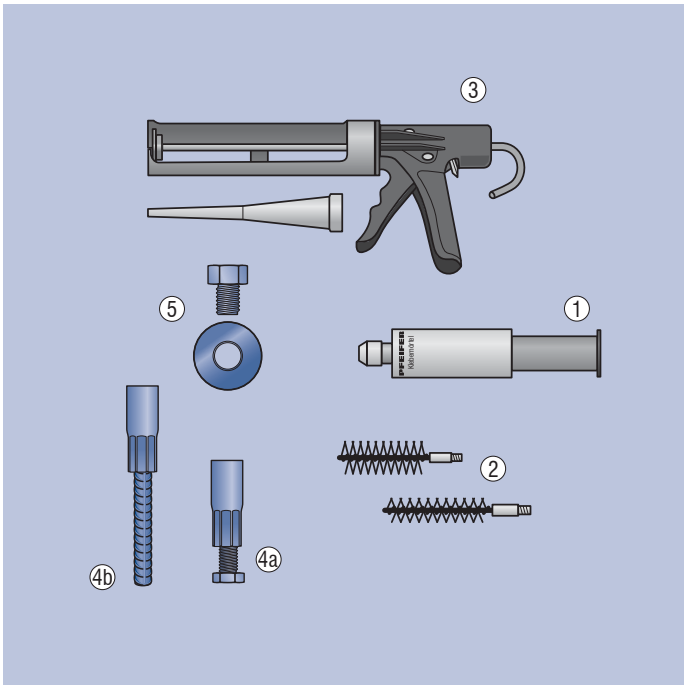
05.604.017	Cleaning brush, diameter 17 mm
05.604.021	Cleaning brush, diameter 21 mm
05.604.026	Cleaning brush, diameter 26 mm
05.604.031	Cleaning brush, diameter 31 mm
05.604.046	Cleaning brush, diameter 46 mm
05.605.001	Brush retainer L = 185 mm (essential)

Notice: Cleaning brush diameter Commercially available guns for silicone cartridges can be used. Due to the grout consistency, a rugged version makes squeezing easier.
PFEIFER gun
for one-time use: Ref. No. 05.601.002
in workman quality: Ref. No. 05.601.001

Instructions for installation and use for the repair kit

System

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



1. Mortar fixative KM 5, 150 ml cartridge including 2 mixing tins
2. Cleaning brush Ø 17, 21, 26, 31 or 46
3. PFEIFER injection gun

4a) Bolt anchor

4b) PFEIFER bar anchors

5. 2 bolts with washers

Installation characteristics of the PFEIFER repair kit

Storage of the injection grout:	+ 5° C up to + 25° C
Application temperature range:	– 40° C up to + 60° C
Short-term thermal stress:	+ 60° C
Long-term thermal stress:	+ 40° C
Usable life:	6 weeks

Safety

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

The following safety parameter values for the PFEIFER lifting anchor system are derived as follows in accordance with the VDI/BV-BS 6205 directive, with the prerequisite of the machinery directive 2006/42/EC. For this, a load-side dynamic working coefficient $\psi_{dyn} = 1.3$ was assumed.

– Steel failure wire rope: $\gamma_s = 4{,}0$

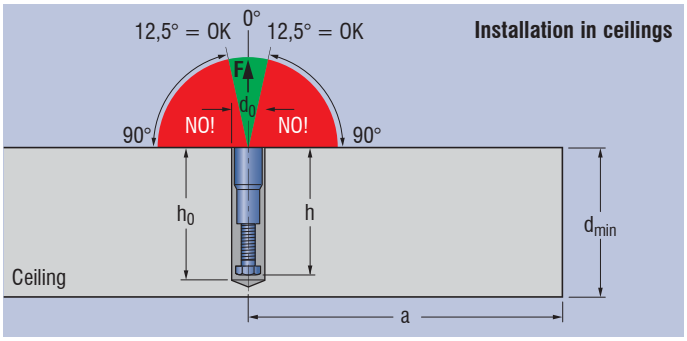
– Steel failure chains or full sections: $\gamma_s = 3{,}0$

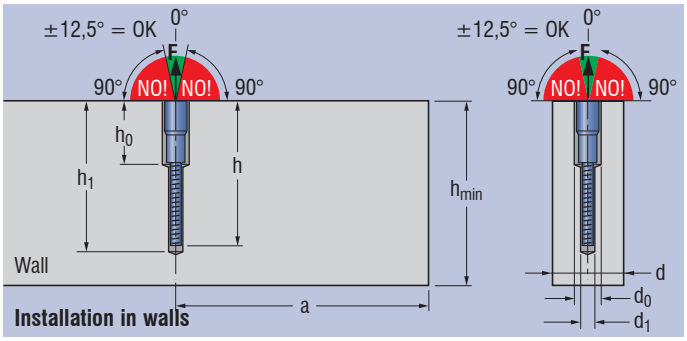
– Concrete failure (procedure B*): $\gamma_c = 2{,}5$

* for factory monitored fabrication of the prefab concrete elements

Use

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS





Dimensioning

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

1. Reinforcement

The PFEIFER repair kit requires a minimum pressure resistance of the concrete of 25 N/mm². The surface reinforcement specified in Table 1 is required when the repair kit is installed in a ceiling element. Installing the anchors in wall elements requires the minimum reinforcement specified in Table 2.

Table 1 – Surface reinforcement for ceiling transport

Size	Surface reinforcement
RD16	Q 188 A (bottom)
RD20	Q 188 A (bottom)
RD30	Q 188 A (bottom/ top)

Table 2 – Surface reinforcement for wall transport

Size	Surface reinforcement
RD16	2 x Q 188 A (both sides)
RD20	2 x Q 188 A (both sides)
RD30	2 x Q 188 A (both sides)

Caution: The local load transfer into the concrete can only be ensured when the application conditions specified in Table 3, 4 are satisfied. Proving the load transfer in the component and/or the dimensioning of the concrete component for the installation state is within the responsibility of the planning engineer.

2. Edge distance, minimum distance, minimum component thickness

When you drill a hole in a ceiling element, you must store the concrete plate at ground level to prevent rear chipping caused by the drilling. Also, take edge distance, minimum distance and minimum component thickness in Table 3 into account.

Table 3 – Minimum distances for installation in ceiling elements

Anchor type Bolt anchor	Anchor length h [mm]	Minimum plate thickness d_{min} [mm]	Minimum edge distance a [mm]	Minimum axis distance b [mm]
RD16	80	120	200	240
RD20	127	160	320	380
RD30	170	220	425	510

Table 4 – Minimum distances for installation in walls

Anchor type Bar anchor	Anchor length h [mm]	Wall thickness d [mm]	Minimum component height h_{min} [mm]	Minimum edge distance a [mm]	Minimum axis distance b [mm]
RD16	120	100	500	180	360
RD20	180	130	800	270	540
RD30	250	160	1000	375	750

The following tables contain all installation characteristics that are necessary for the application of the PFEIFER repair kit. The specifications in this Table must always be observed.

Table 5 – Installation characteristics of ceiling elements (bolt anchors)

Parameter			RD16	RD20	RD30
Nominal drill diameter	d_0	[mm]	25	30	45
Drill bit diameter	$d_{cut,0}$	[mm]	≤ 25,55	≤ 30,55	≤ 45,8
Drilled hole depth	h_o	[mm]	≥ 90	≥ 140	≥ 180
Steel brush diameter	d_b	[mm]	≥ 26	≥ 31	≥ 46

Caution: Install the anchors of the repair kit ALWAYS WITH bolt and washer.

Table 6 – Installation characteristics of wall elements (bar anchors)

Parameter			RD16	RD20	RD30
Nominal drill diameter	d_0	[mm]	25	30	45
Drill bit diameter	$d_{cut,0}$	[mm]	≤ 25,55	≤ 30,55	≤ 45,8
Steel brush diameter	$d_{b,0}$	[mm]	≥ 26	≥ 31	≥ 46
Nominal drill diameter	d_1	[mm]	16	20	25
Drill bit diameter	$d_{cut,1}$	[mm]	≤ 16,5	≤ 20,55	≤ 25,55
Steel brush diameter	$d_{b,1}$	[mm]	≥ 17	≥ 21	≥ 26
Drilled hole depth – 1. Drilled hole	h_o	[mm]	60 ≤ ho ≤ 65	75 ≤ ho ≤ 80	110 ≤ ho ≤ 120
Drilled hole depth – 2. Drilled hole	h_1	[mm]	≥ 130	≥ 190	≥ 260

Table 7 – Curing time of the injection grout

Cartridge temperature (min. + 5° C)	Open time/ pot life	Temperature in the anchorage ground	Curing time[1)]
		– 5° C	360 Min
		+/–0° C	180 Min
+ 5° C	15 Min	+ 5° C	90 Min
+20° C	6 Min	+20° C	35 Min
+30° C	4 Min	+30° C	20 Min
+40° C	2 Min	+40° C	12 Min

Caution: At higher outside temperatures, you should store the bonding grout cartridges at a protected place where they are not exposed to direct sunlight.
The material cures prematurely when you use a hot cartridge. Likewise, this applies to low temperatures. Here, the cold material takes longer to cure, and the bonding grout can even be damaged!

Table 8 – Lifting volume in scale divisions

Parameter	Ceiling installation			Wall installation		
	Drilled hole depth h_o [mm]	Nominal drill diameter d_o [mm]	Lifting volume in scale divisions [–]	Drilled hole depth h_o/h_1 [mm]	Nominal drill diameter d_o/d_1 [mm]	Lifting volume in scale divisions [–]
RD16	90	25	2	60/130	25/16	3
RD20	140	30	4	75/190	30/20	4
RD30	180	45	10	110/260	45/25	8

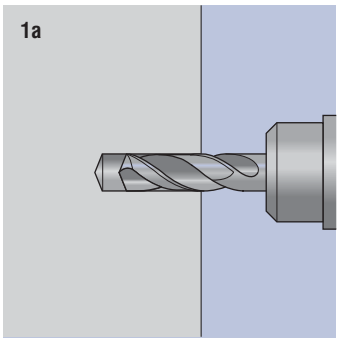
Caution: The curing times only apply for a dry anchorage ground. The times must be doubled in a humid anchorage ground.

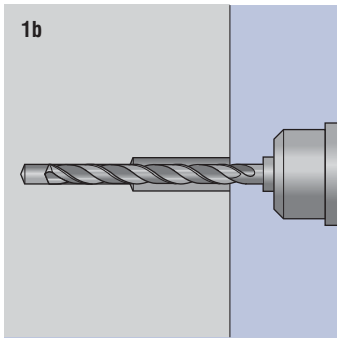
Use with ceilings:

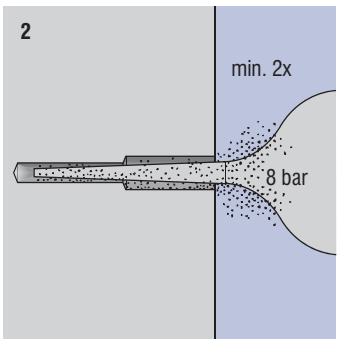
Rd 16 bolt anchor 1 cartridge for 2-3 anchors
Rd 20 bolt anchor 1 cartridge for 1.5 anchors
Rd 30 bolt anchor 2 cartridges for 1 anchor

Use with walls:

Rd 16 bar anchor 1 cartridge for 2 anchors
Rd 20 bar anchor 1 cartridge for 1.5 anchors
Rd 30 bolt anchor 2 cartridges for 1 anchor







Installation

Installation instructions

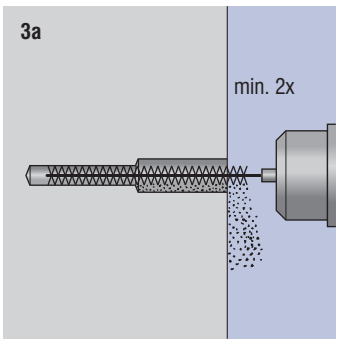
Preparing the anchorage ground

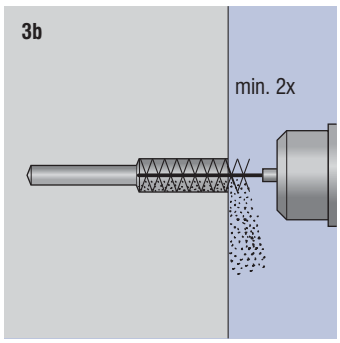
1a. Single-stage drilling for ceiling installation with hammer drills, keeping to the diameter and depth values of the drilled holes that are specified in Table 5.

1b. Two-stage drilling for wall installation with hammer drills, keeping to the diameter and depth values of the drilled holes that are specified in Table 6. Drill the larger hole in the first step. Next, centred in the first hole, drill the second hole with a reduced nominal drill diameter. Arrange the drilled holes such that the reinforcement is not damaged.Never use the injection system in water-filled drilled holes. Fill incorrectly drilled holes with grout.

2. Blow out the drilled hole with compressed air ≥ 8 bars.

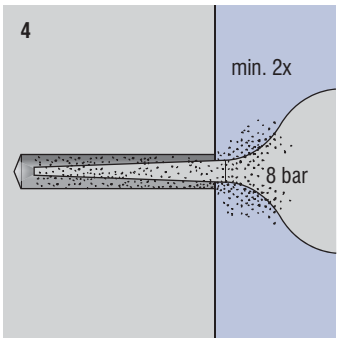
Caution: Never use the injection system in water-filled drilled holes.

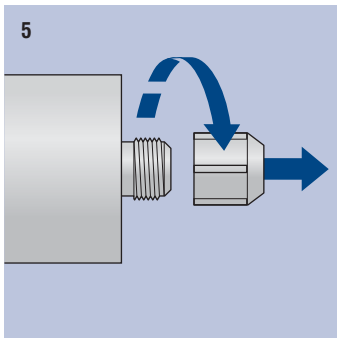




3a. Clean the drilled hole with a steel brush as specified in Table 5 or 6. Here, you must screw the brushes to the brush retainer. Safe clamping is not possible otherwise.

3b. With two-stage drilling, you must ensure that both drilling diameters are sufficiently cleaned after each brushing.



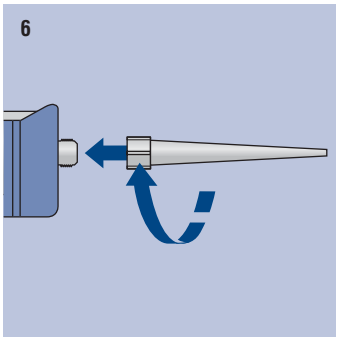


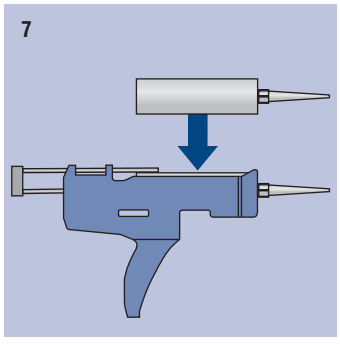
4. Blow out the drilled hole with compressed air ≥ 8 bars.

Preparing the injection cartridge

5. Remove the cap of the injection grout.

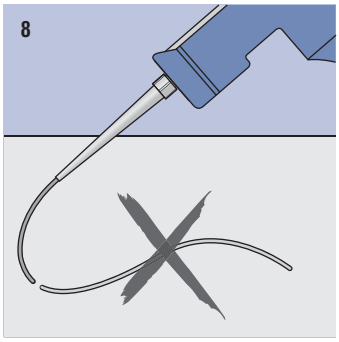
Caution: The mixing coil in the static mixer must be visible. Never use the static mixer without mixing coil!





6. Screw the mixing nozzle onto the cartridge.

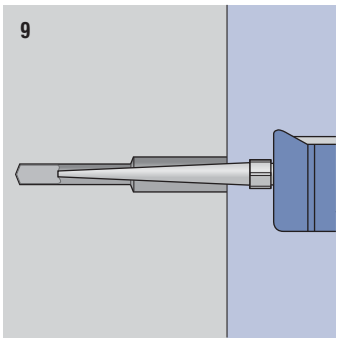
7. Insert the cartridge into the gun.

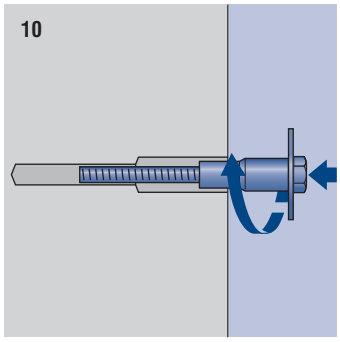


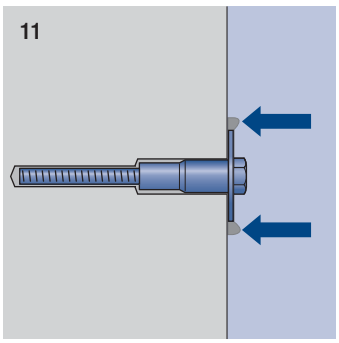
8. Discard the first strokes. Press out the grout until homogeneously coloured grey grout emerges (approximately 2 gun strokes).

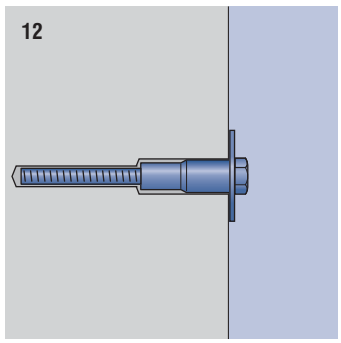
Caution: Grout in a colour different to grey does not set, and must be discarded.

Notice: Once the static mixer has been changed, you may continue using an opened cartridge.









Grout injection

9. Starting at the bottom of the drilled hole, fill the drilled hole stroke by stroke upwards with the injection grout KM5
   The filling volumes correspond to the specifications in Table 8.

10. Immediately afterwards, manually press in the bolt anchor/bar anchor with a rotating movement until the washers are in contact with the concrete surface.

11. Visual inspection:
    Excess grout must emerge at the concrete surface.
    If grout does not emerge, you must pull out the bolt anchor immediately and inject more grout.

12. After the curing time specified in Table 7 has been elapsed, you can put the bolt anchor under load.

Notice: The figures above only show the installation of the bar anchor. The installation of the bolt anchor is analogous.

Our formula “clever”

PFEIFER accessories are part of the proven PFEIFER thread system and a significant factor in its great success. They are the right items for the user and the usage, give added value and are perfectly matched to the rest of the range.

System

- Comprehensive product range with data clips, fixing bolts (with/without head), fixing screws, recess discs, fastening bolts, cover caps, magnetic discs, external caps (large/small) and thread cleaners.

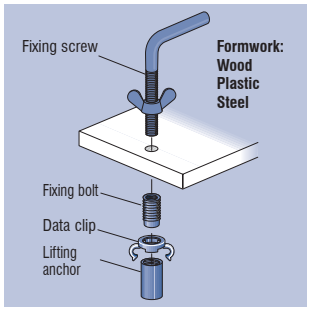
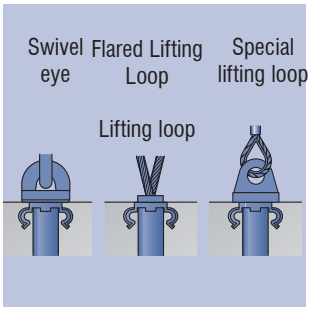
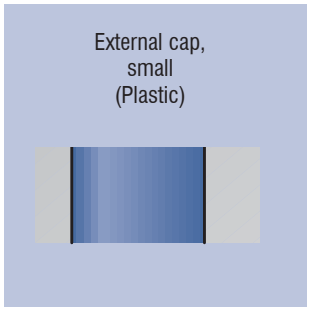
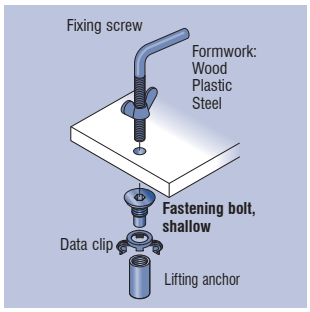
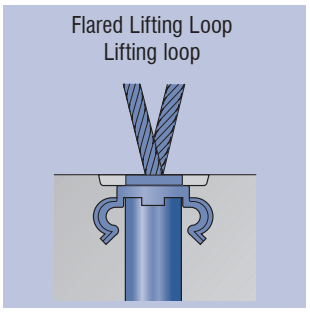
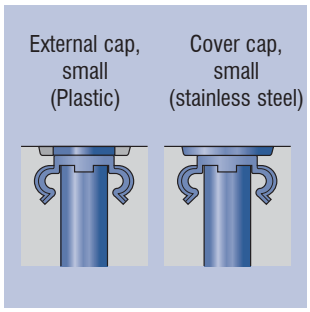
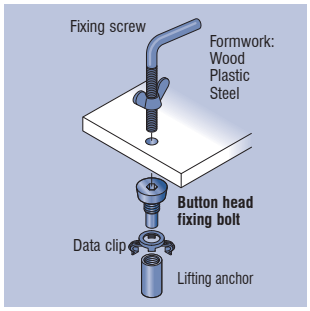
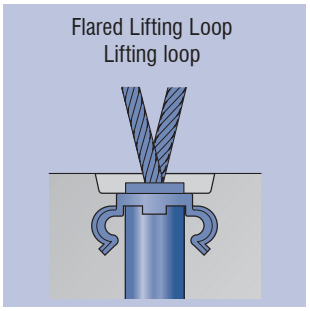
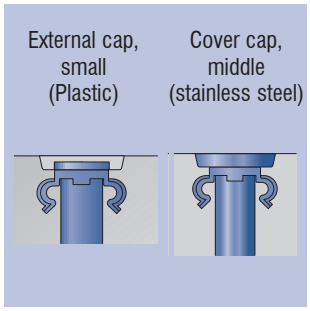
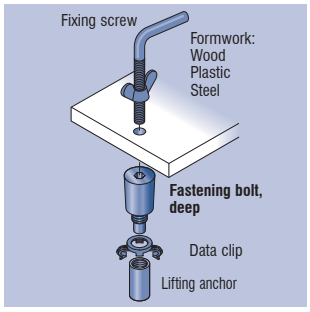
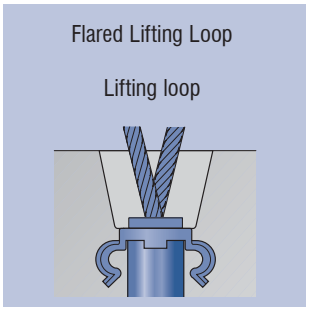
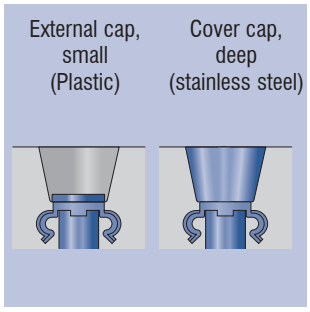
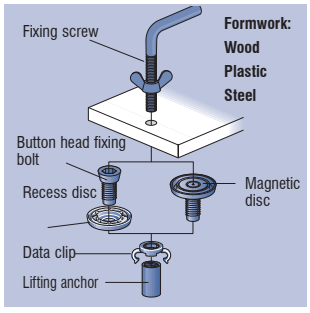
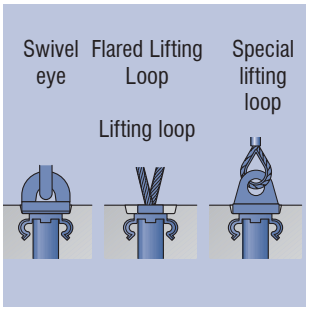
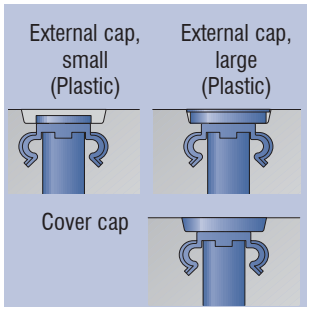
PFEIFER data clips

- Coloured marking of size, carrying capacity, manufacturer
- For perfect marking of lifting anchors
- Support the assignment and unambiguous recognition of carrying capacity along the whole logistic chain

Made in Germany

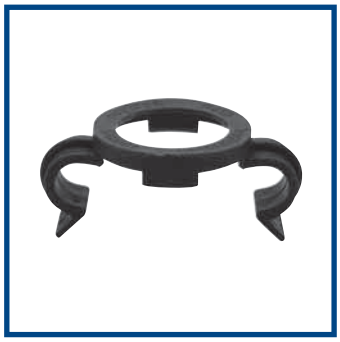
- Safe manufacture under consistent conditions
- In-house quality assurance

Overview of formwork fixings and anchor plug types

Fixing to Formwork	Usable lifting devices	Possible closing/cap	
			Flush mounted, with headless fixing bolt or hex bolt.
			Installed recessed 3-5 mm with fastening bolt shallow.
			With button head fixing bolt, recessed 10-15 mm.
			Installed recessed 30 mm with fastening bolt, deep
			Installed recessed with magnetic disc or recess disc and button head fixing bolt

PFEIFER data clip

Item-No. 05.220



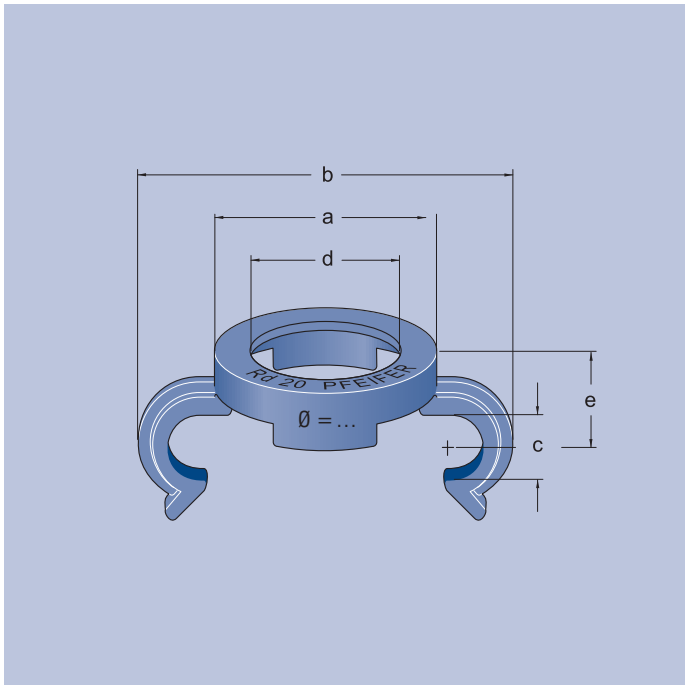
PFEIFER

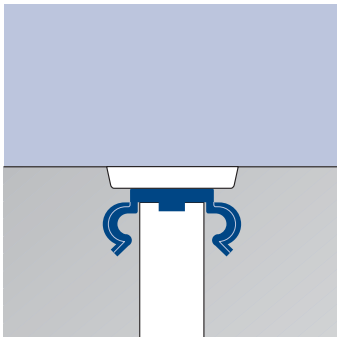
Thread System

Accessories

PFEIFER data clips are components of the PFEIFER thread system.
They have a special identifying colour depending on the size of the lifting anchor. The ring round the socket bears the necessary information such as manufacturer / type / size, making the clear identification and the correct assignment of lifting anchors, lifting devices and formwork accessories easy to see from the colour coding, even when cast in concrete.
A further use is to fix the lateral additional reinforcement on the lifting anchor.

Material:
Plastic





Ref.-No.	Colour coding	for lifting anchor size	Dimensions [mm] a	b	c	d	e	Packing unit Piece	Weight approx. kg/ pkg. unit
05.220.120	Pastel orange	Rd 12	18,5	35	6,5	12,5	10,0	200	0,24
05.220.140	Pure white	Rd 14	21,5	38	6,5	14,5	11,0	200	0,30
05.220.160	Flame red	Rd 16	25,5	46	8,5	17,0	12,0	200	0,36
05.220.180	Light pink	Rd 18	28,5	49	8,5	19,0	14,5	200	0,62
05.220.200	Pastel green	Rd 20	31,5	52	8,5	21,0	14,5	200	0,66
05.220.240	Anthracite grey	Rd 24	35,0	60	11,0	25,5	15,5	200	0,72
05.220.300	Emerald green	Rd 30	44,0	73	13,0	31,5	16,5	200	1,74
05.220.360	Light blue	Rd 36	52,5	86	15,0	37,5	22,5	100	1,20
05.220.420	Silver grey	Rd 42	59,5	97	17,0	44,0	23,5	100	1,35
05.220.520	Sulphur yellow	Rd 52	73,0	119	22,0	54,0	31,0	100	2,25
05.220.560	Pastel orange	Rd 56	81,0	–	–	59,0	–	–	–*
05.220.600	Flame red	Rd 60	86,0	–	–	64,0	–	–	–*

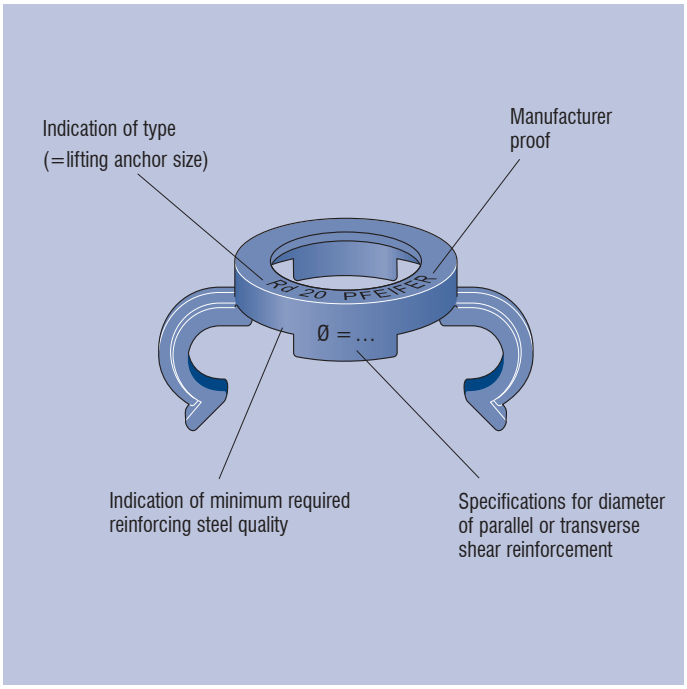
Example order for 100 PFEIFER data clips Rd 16:
100 PFEIFER data clips, Ref.-No. 05.220.160

* Dataclips in Sizes Rd 56 and Rd 60 are not planned for fitting the supplementary reinforcement.
They are only functionally for marking.

Instructions for installation and use

System

FOR PLANNERS, **FOR PRECAST PLANTS,** FOR USERS



The data clip is identified as follows:

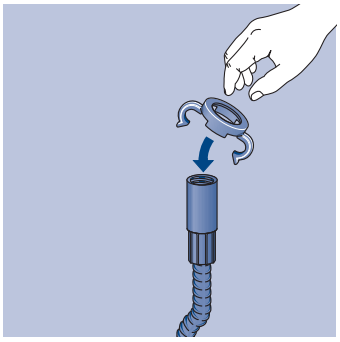
- **Name of manufacturer**
- **Declaration of type**
- **Specification of necessary quality of reinforcement steel**
- **Specification of the diameter of lateral additional reinforcement**

Notice: The data clips must be ordered in addition to the desired anchor.

Notice: It is absolutely imperative to have an identification tag for a lifting anchor system which can also be easily read in the cast in concrete state. Therefore the PFEIFER data clip must be installed with every PFEIFER threaded anchor.

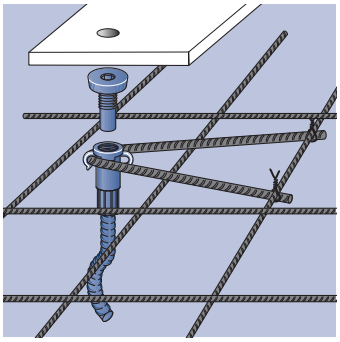
Use

FOR PLANNERS, **FOR PRECAST PLANTS,** FOR USERS



Notice: The PFEIFER data clip is pushed by hand onto the anchor socket and stays there automatically. After the concreting and formwork removal the front-side is plainly visible for use and unambiguous assignment of the lifting device can be done.

Fixing the additional reinforcement



Notice: The additional parallel shear reinforcement required for parallel shear pull must have direct metallic contact with the socket. They ensure the lateral fixings on the data clip.

Notice: It is recommended first to fix the data clip to the lifting anchor socket with a headless fixing bolt. This enables the reinforcement to be easily inserted without the data clip jumping off the socket.

Notice: Lifting anchors fitted with data clips can be covered with the concrete grey PFEIFER external caps, which makes them visually inconspicuous on the structural element after assembly.

PFEIFER fixing screws for fixing bolts

Item-No. 05.206

PFEIFER

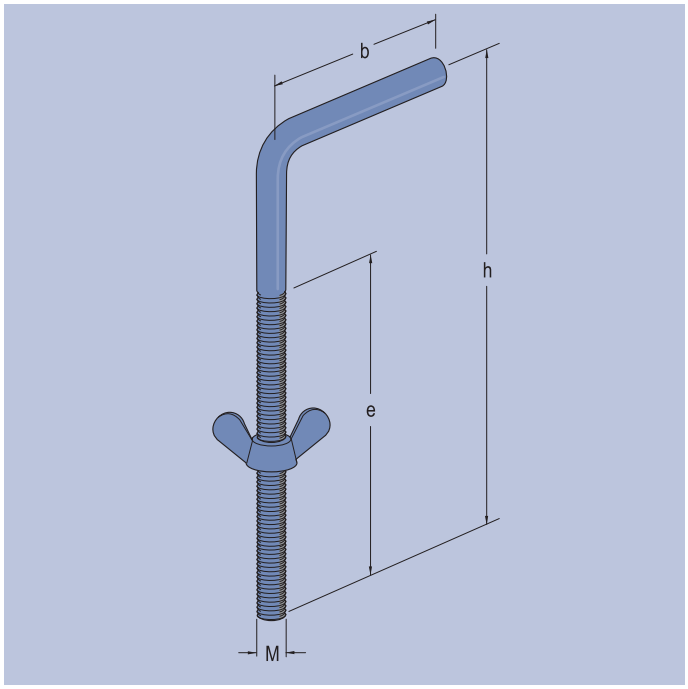
Thread System

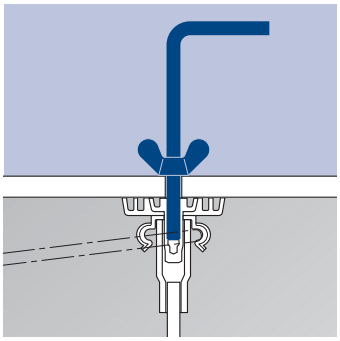
Accessories

PFEIFER fixing screws are part of the PFEIFER thread system range of accessories. They are used in combination with fixing bolts.

With their use, fixing bolts can be safely and quickly attached to all formwork of various thicknesses, maintaining correct dimensions and angles.

Material:
Steel, galvanized





Ref.-No.	Type/Size	to fit fixing bolts	Dimensions [mm] b	e	h	Weight approx. kg/100 pieces
05.206.063	M 6	M 12	60	80	120	6,0
05.206.083	M 8	M 14/16/18/20	60	80	120	11,0
05.206.103	M 10	M 24/30/36	60	110	150	26,0
05.206.163	M 16	M 42/52/56/60	60	130	180	46,0

Example order for 50 PFEIFER fixing screws, to fit fixing bolts for lifting anchor size Rd 30:
50 PFEIFER fixing bolts, Ref.-No. 05.206.103

PFEIFER fixing bolt headless

Item-No. 05.211

PFEIFER

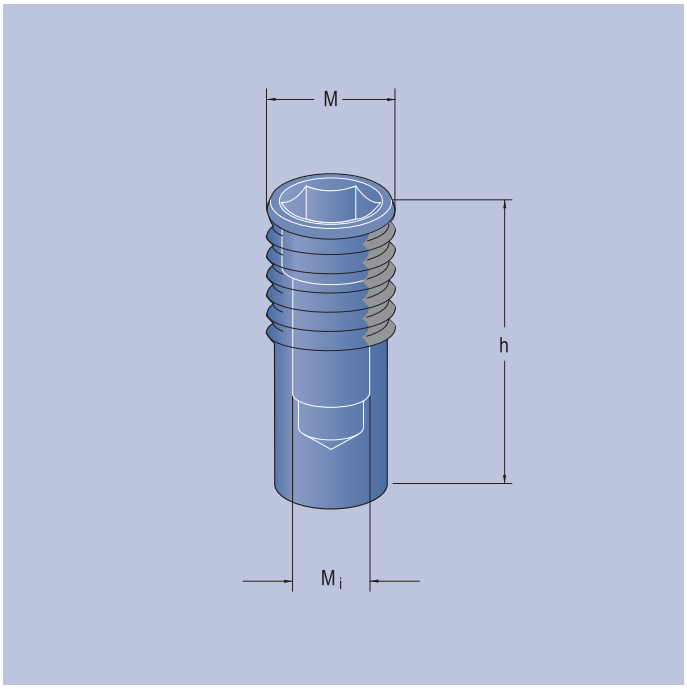
Thread System

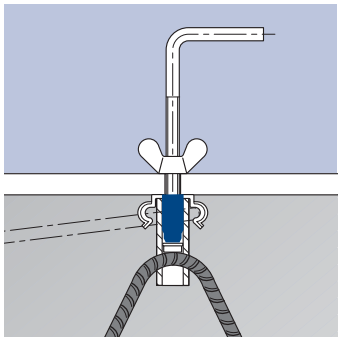
Accessories

PFEIFER headless fixing bolts are components of the PFEIFER thread system range of accessories. They are used for flush installation of lifting anchors of the PFEIFER thread system. The metric external thread fits all PFEIFER threaded anchors and ensures secure retention on the formwork.

The short thread provides for rapid screwing out and in. Fixing to the formwork is done with the PFEIFER fixing screw that requires only a small hole in the formwork.

Material:
Steel, galvanized

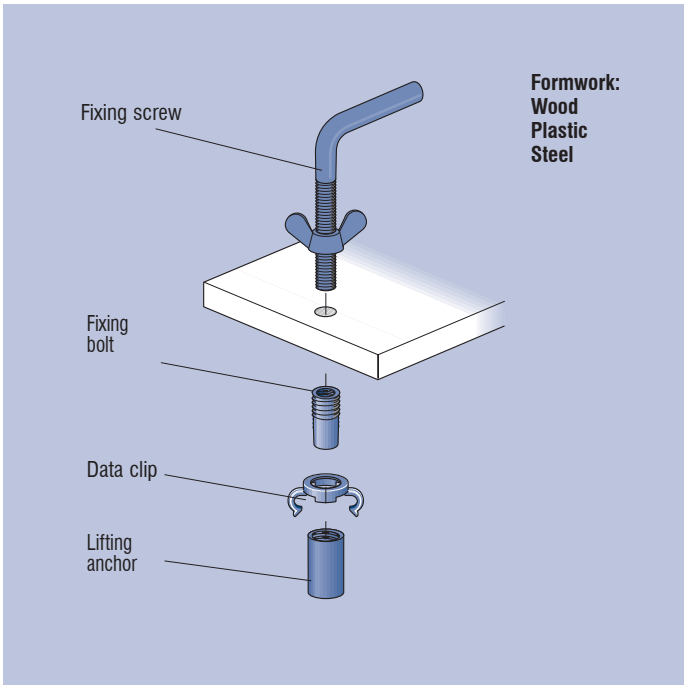




Ref.-No. zinc-plated	Type/Size	for lifting anchor size	Dimensions [mm] h	M_i	SW	Weight approx. kg/100 pieces
05.211.123	M 12 x 1,75	Rd 12	20,0	M 6	6	0,8
05.211.143	M 14 x 2,0	Rd 14	23,5	M 8	8	1,0
05.211.163	M 16 x 2,0	Rd 16	26,0	M 8	10	2,0
05.211.183	M 18 x 2,5	Rd 18	32,0	M 8	10	3,0
05.211.203	M 20 x 2,5	Rd 20	32,5	M 8	10	4,0
05.211.243	M 24 x 3,0	Rd 24	40,5	M 10	14	7,0
05.211.303	M 30 x 3,5	Rd 30	56,0	M 10	14	15,0
05.211.363	M 36 x 4,0	Rd 36	67,0	M 10	14	32,0
05.211.423	M 42 x 4,5	Rd 42	80,0	M 16	17	47,0
05.211.523	M 52 x 5,0	Rd 52	103,0	M 16	17	115,0
05.211.563	M 56 x 5,5	Rd 56	80,0	M 16	17	105,0
05.211.603	M 60 x 5,5	Rd 60	85,0	M 16	17	125,0

Example order for 50 PFEIFER headless fixing bolts, size M 16 x 2.0:
50 PFEIFER headless fixing bolts, Ref.-No. 05.211.163

System

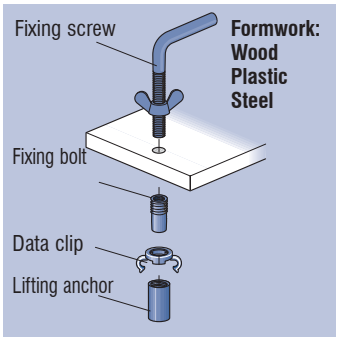


This PFEIFER accessory system consists of:

- **PFEIFER fixing screw**
- **PFEIFER headless fixing bolt**
- **PFEIFER data clip for the selected PFEIFER lifting anchor**

Use

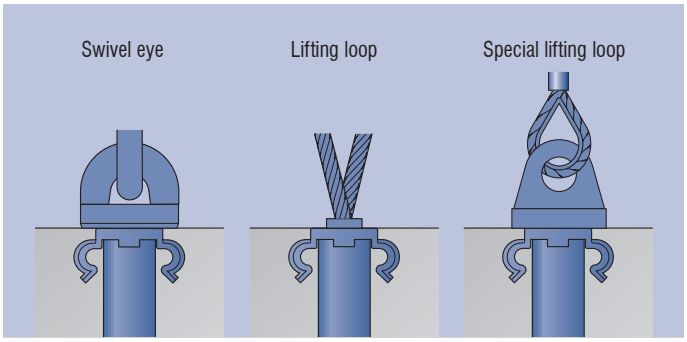
Formwork: wood, plastic, steel



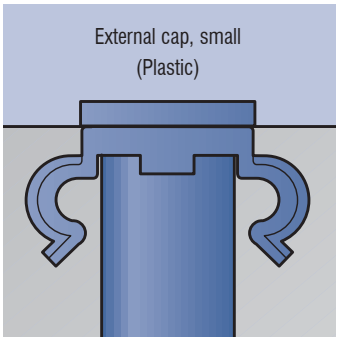
The PFEIFER fixing bolt is the means of firmly fixing the lifting anchors of the PFEIFER thread system to the formwork.

Notice: Installing the PFEIFER sockets with the fixing bolt achieves the so important form-fitting connection to the reinforcement bolt since the bolt firmly presses the plastic cap on to the reinforcement bar.

Caution: If the fixing bolt is tightened too much onto soft formwork wood, it is pressed into the wood and will later protrude from the structural element by this indentation depth, and will not be flush.



Caution: If swivel eyes are provided for lifting the precast element, all the lifting anchors of the thread system should be provided with recess discs and fixing bolts. This is the only way to ensure that the pressure plate has a flat support surface perpendicular to the lifting anchor longitudinal axis (see p. 51-52).



Notice: The anchor can be usefully closed with a PFEIFER small external cap.

PFEIFER fixing bolt
PFEIFER recess disc

Item-No. 05.209
Item-No. 05.201

PFEIFER

Thread System

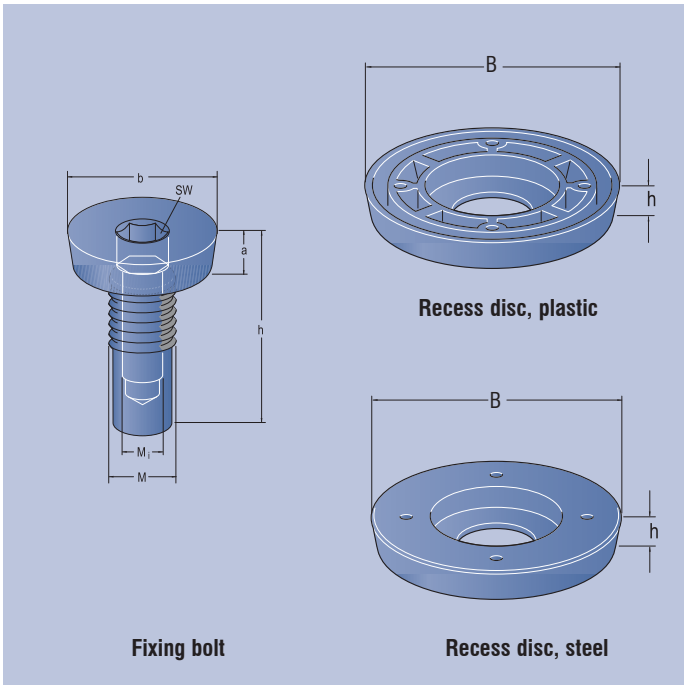
Accessories

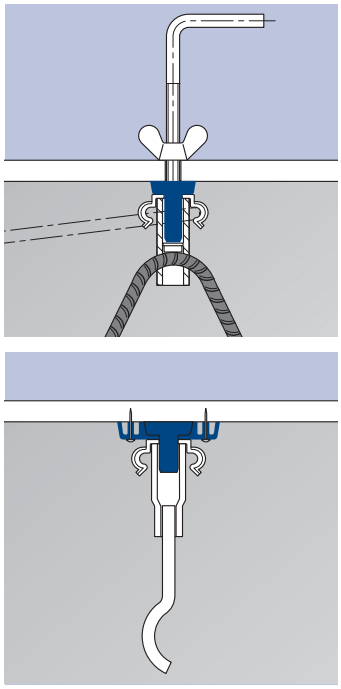
The recess discs are a constituent of the PFEIFER thread system. They are provided for recessed installation of anchors and for lifting the precast element with swivel eyes.

The recess disc is also available made of galvanized steel, which is very strong and durable in use. After assembly, the recess can be closed with the cover cap or the large external cap flush with the surface.

PFEIFER fixing bolt; material:
Steel, galvanized

PFEIFER recess disc:
Plastic with the PFEIFER colour coding or steel, galvanized





Example order for 100 PFEIFER recess discs, size Rd 36:
100 PFEIFER recess discs Ref.-No. 05.201.360

Recess disc, Plastic

Ref.-No.	Colour coding	Packing unit, pieces	Weight approx g/pkg. unit
05.201.120	Pastel orange	50	0,46
05.201.140	Pure white	50	0,58
05.201.160	Flame red	50	0,63
05.201.180	Light pink	25	0,34
05.201.200	Pastel green	25	0,43
05.201.240	Anthracite grey	25	0,63
05.201.300	Emerald green	25	0,80
05.201.360	Light blue	25	1,03
05.201.420	Silver grey	25	1,55
05.201.520	Sulphur yellow	25	1,68

Recess disc, steel

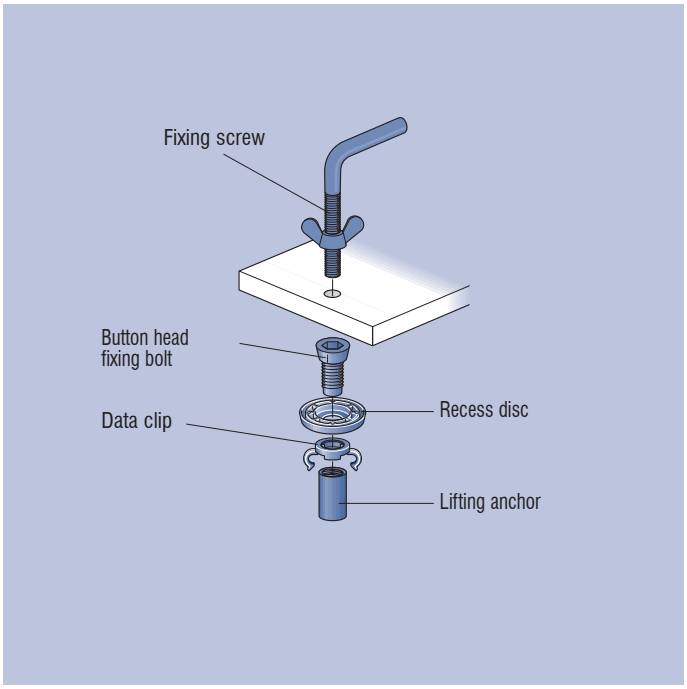
Ref.-No.	Weight approx. kg/100 pieces	Dims., [mm] B	h
05.201.123	11,50	50,5	10
05.201.143	13,50	55,5	10
05.201.163	16,00	59,5	10
05.201.183	16,50	62,5	10
05.201.203	25,00	73,5	10
05.201.243	32,00	78,5	12
05.201.303	47,00	94,5	12
05.201.363	56,00	105,5	12
05.201.423	110,00	115,5	15
05.201.523	1,68	135,5	15

Example order for 50 PFEIFER fixing bolts, size M 24: 50 PFEIFER fixing bolts Ref.-No. 05.209.243

Fixing bolt

Ref.-No.	Type/Size	M_i	b	a	Dims., [mm] h	SW	Weight approx. kg/100 pieces
05.209.123	M 12	M 6	23,5	8,5	30,0	8	3,0
05.209.143	M 14	M 8	26,5	8,5	33,5	8	5,0
05.209.163	M 16	M 8	30,5	8,5	36,0	10	6,0
05.209.183	M 18	M 8	33,5	8,5	42,0	10	9,0
05.209.203	M 20	M 8	37,0	8,5	42,5	10	11,0
05.209.243	M 24	M 10	40,5	10,0	52,5	14	17,0
05.209.303	M 30	M 10	49,0	10,0	66,0	14	31,0
05.209.363	M 36	M 10	59,0	10,0	77,0	14	55,0
05.209.423	M 42	M 16	67,5	13,0	93,0	17	84,0
05.209.523	M 52	M 16	80,0	13,0	118	17	172,0

System

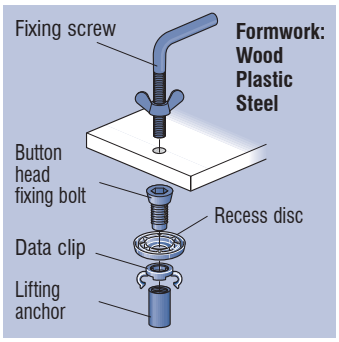


This PFEIFER accessory system consists of:

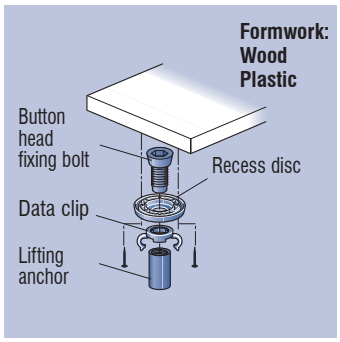
- **PFEIFER fixing screw**
- **PFEIFER button head fixing bolt**
- **PFEIFER recess disc**
- **PFEIFER data clip for the selected Pfeifer lifting anchor**

Use

Formwork: wood, plastic, steel

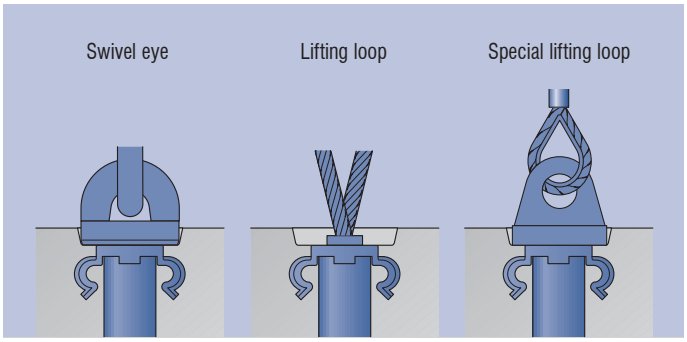


Formwork: wood, plastic

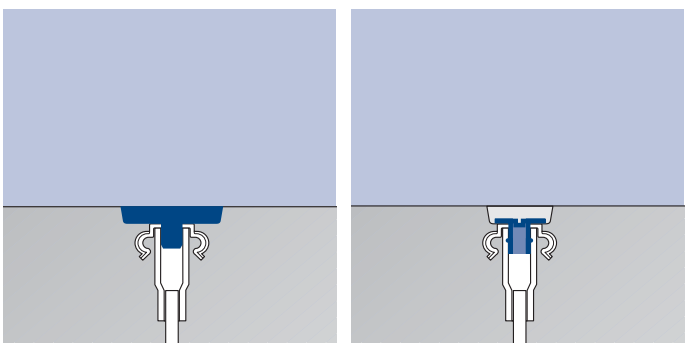


The PFEIFER fixing bolt is the means of firmly fixing the lifting anchors of the PFEIFER thread system to the formwork.

Notice: Installing the PFEIFER sockets with the fixing bolt achieves the so important form-fitting connection to the reinforcement bolt since the bolt firmly presses the plastic cap on to the reinforcement bar.



Caution: If swivel eyes are provided for lifting the precast element, all the lifting anchors of the thread system should be provided with recess discs and fixing bolts. This is the only way to ensure that the pressure plate has a flat support surface perpendicular to the lifting anchor longitudinal axis.



Notice: The recesses can be closed with PFEIFER external caps and PFEIFER cover caps in an architecturally attractive way.

PFEIFER magnetic disc

Item-No. 05.208

PFEIFER

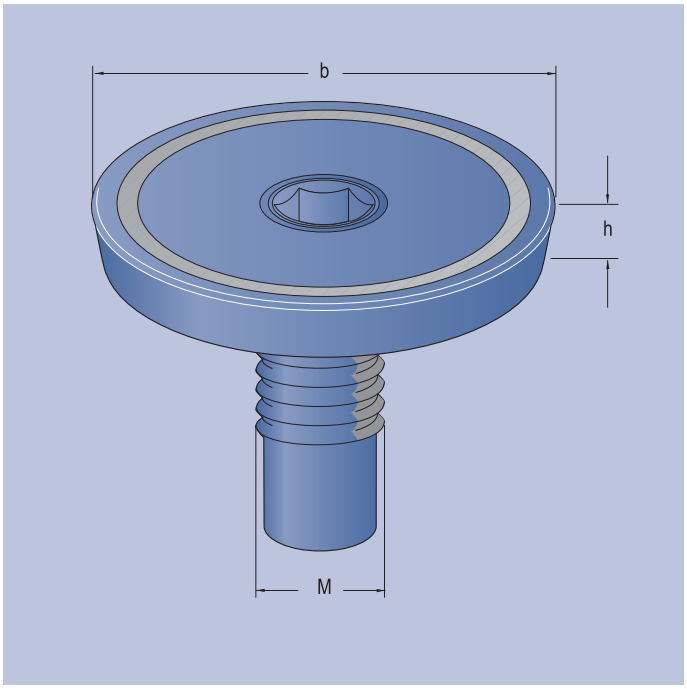
Thread System

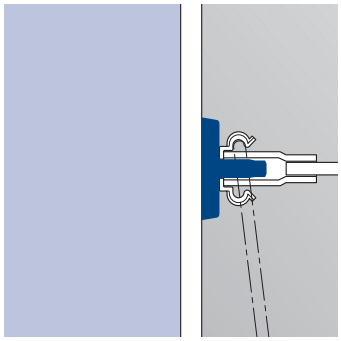
Accessories

The magnetic disc is used for fixing lifting anchors of the PFEIFER thread system and PFEIFER socket dowels to steel formwork.

It ensures rapid and safe fixing of the components to the steel surface and makes it unnecessary to spend time drilling and then welding the steel form.

Material:
Steel housing, zinc-plated
Permanent magnet

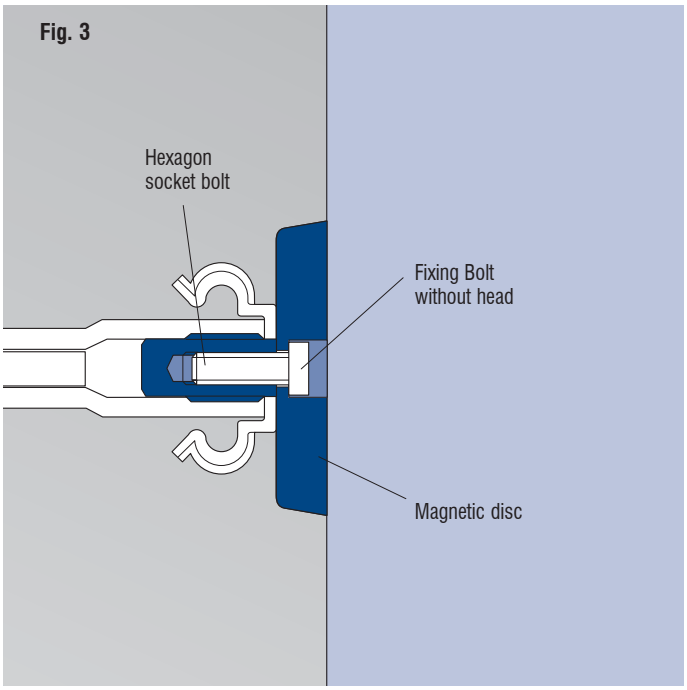




Ref.-No.	Type/Size	for lifting anchor size	min. adhesion N	Dimensions [mm] b	h	Weight approx. kg/piece
05.208.123	12	Rd 12	450	50,5	10,5	0,14
05.208.143	14	Rd 14	450	55,5	10,5	0,15
05.208.163	16	Rd 16	630	59,2	10,5	0,19
05.208.183	18	Rd 18	630	62,5	10,5	0,21
05.208.203	20	Rd 20	1000	73,5	10,5	0,32
05.208.243	24	Rd 24	1000	78,2	12,5	0,46
05.208.303	30	Rd 30	1000	94,2	12,5	0,61
05.208.363	36	Rd 36	1000	105,2	12,5	0,80

Example order for 50 PFEIFER magnetic discs for lifting anchor Rd 14:
50 PFEIFER magnetic discs, Ref.-No. 05.208.143

System

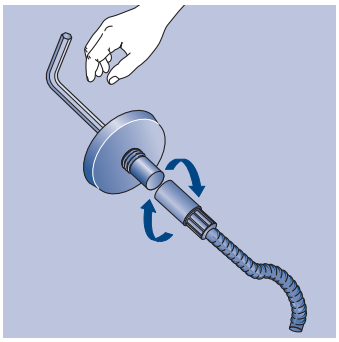


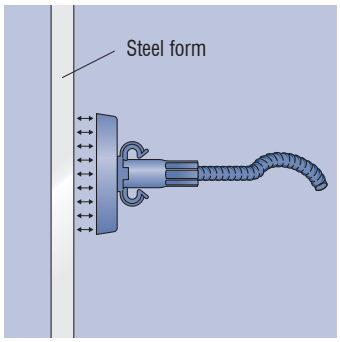
The fully integrated system components of the PFEIFER magnetic disc are:

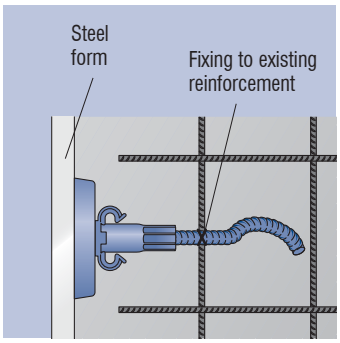
- **PFEIFER magnetic disc**
- **PFEIFER fixing bolt without head**
- **PFEIFER hexagon socket bolt**

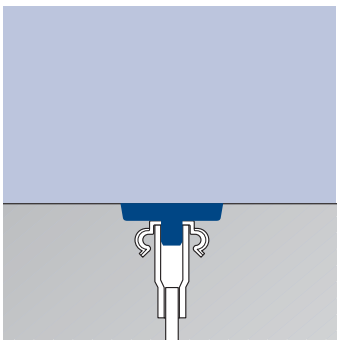
Notice: The PFEIFER magnetic disc is supplied with these three components integrated and non-removable.

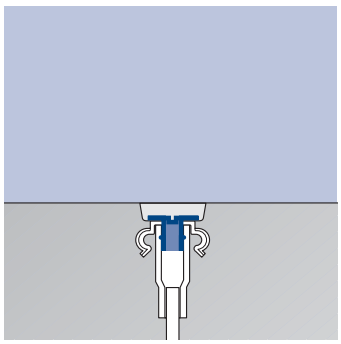
Use











Caution: The adhesion forces can be sudden and very strong. This gives a risk of crushing when the magnetic disc is brought close to metal parts or other magnetic discs. Do not allow your fingers to come between the formwork and the magnetic disc.

Caution: The magnetic disc has a strong magnetic field. It should therefore be kept away from magnetically sensitive objects such as electronic devices, heart pacemakers and the like. Heavy vibration and heat will weaken the magnet.

Notice: Hammer blows on the magnetic disc will cause the magnet to fracture and are not permissible. Clean the magnetic disc after insertion to prevent unevenness and roughness from forming.

Notice: The projecting end of the anchor must be firmly tied to the structural element reinforcement to prevent the anchor from moving on the steel surface when shaking occurs.

Size selection for hexagon socket bolt

fits size	Size of wrench
Rd 12	SW 5
Rd 14	SW 6
Rd 16	SW 6
Rd 18	SW 6
Rd 20	SW 6
Rd 24	SW 8
Rd 30	SW 8
Rd 36	SW 8

Notice: The recesses can be closed with PFEIFER external caps and PFEIFER cover caps in an architecturally attractive way.

PFEIFER external cap, small

Item-No. 05.216

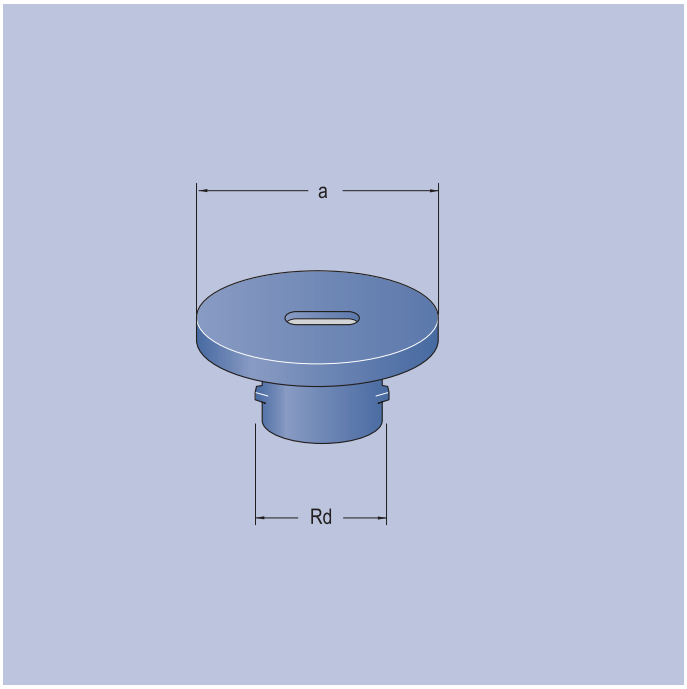
PFEIFER

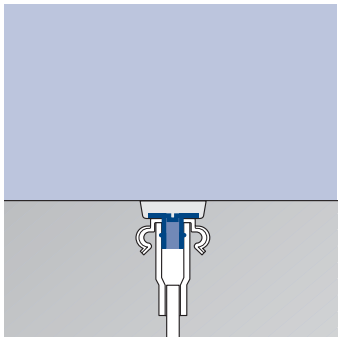
Thread System

Accessories

The concrete grey PFEIFER external cap enables all the lifting anchors of the thread system to be closed in a simple way. All external caps are suitable for capping the flush or recessed anchors.

Material:
plastic, concrete grey





Ref.-No.	Type/Size	Dimensions [mm] a	Dimensions [mm] Rd	Packing unit, pieces	Weight approx. kg/pkg. unit
05.216.120	12	18,5	12	200	0,14
05.216.140	14	21,5	14	200	0,26
05.216.160	16	25,5	16	200	0,36
05.216.180	18	28,5	18	200	0,40
05.216.200	20	31,5	20	200	0,58
05.216.240	24	35,0	24	200	0,76
05.216.300	30	44,0	30	200	1,18
05.216.360	36	52,5	36	100	0,67
05.216.420	42	59,5	42	100	0,99
05.216.520	52	73,0	52	100	1,40
05.216.560	56	75,0	56	50	1,10
05.216.600	60	80,0	60	50	1,20

Sample order for 100 PFEIFER external caps, small, size Rd 42:
100 PFEIFER external caps, Ref.-No. 05.216.420

PFEIFER external cap, large
PFEIFER cover plate

Item-No. 05.218
Item-No. 05.219

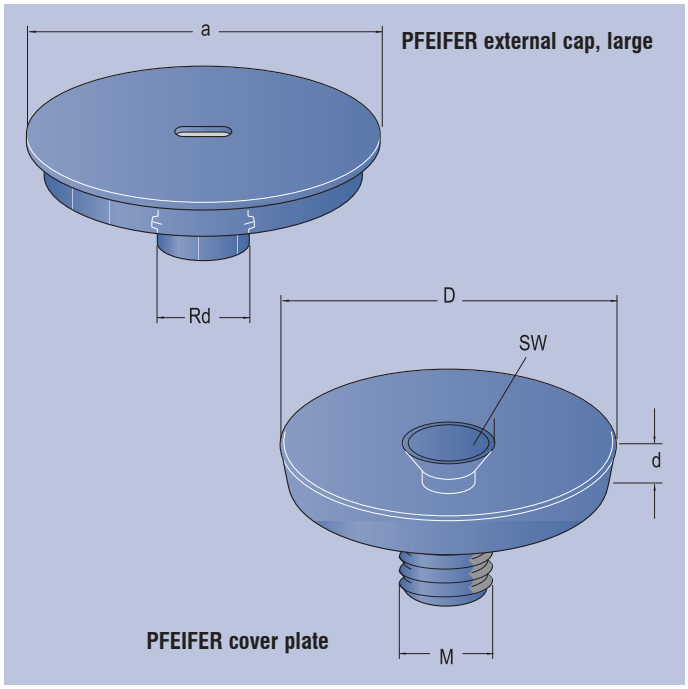
The concrete grey external cap, large, plastic, can be used for capping all lifting anchors of the thread system if they were installed recessed with a recess disc or magnetic disc.

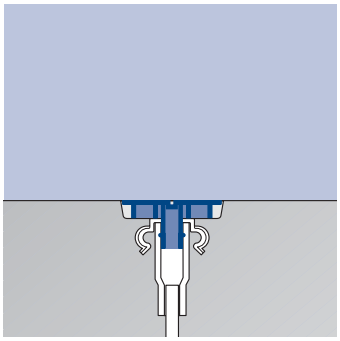
The cover plate of galvanized steel for dry environments, or optionally stainless steel for outdoor and humid areas, provides a lasting closure of the thread opening and recess.

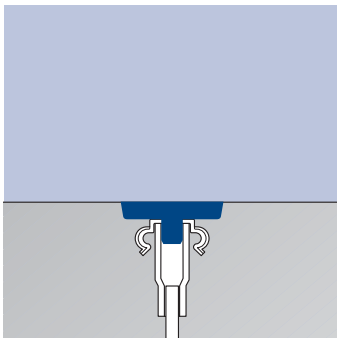
In both cases the socket thread should be greased to avoid deterioration of the anchor socket.

Material: PFEIFER external cap, large
plastic, concrete grey

Material: PFEIFER cover plate
Steel, galvanized or stainless 1.4571







Cover cap							External cap, large			
Ref.-No. galvanized	Ref.-No. stainless steel	Type/Size	Lifting anchor Size	SW	Dims., [mm] D	d	Ref.-No.	Dims., [mm] a	Rd	Weight approx. kg/100 pieces
05.219.123	**05.219.124**	12	Rd 12	5	50	10	**05.218.120**	50	12	0,43
05.219.143	**05.219.144**	14	Rd 14	5	55	10	**05.218.140**	55	14	0,56
05.219.163	**05.219.164**	16	Rd 16	5	59	10	**05.218.160**	59	16	0,75
05.219.183	**05.219.184**	18	Rd 18	5	62	10	**05.218.180**	62	18	0,88
05.219.203	**05.219.204**	20	Rd 20	5	73	10	**05.218.200**	73	20	1,08
05.219.243	**05.219.244**	24	Rd 24	6	77,5	12	**05.218.240**	78	24	1,40
05.219.303	**05.219.304**	30	Rd 30	6	93,5	12	**05.218.300**	94	30	2,36
05.219.363	**05.219.364**	36	Rd 36	6	104,5	12	**05.218.360**	105	36	2,88
05.219.423	**05.219.424**	42	Rd 42	10	114,5	15				
05.219.523	**05.219.524**	52	Rd 52	10	134,5	15				

Sample order for 100 PFEIFER external caps, large, size Rd 16:
100 PFEIFER external caps, Ref.-No. 05.218.160

Example order for 50 PFEIFER cover caps, stainless steel, for size Rd 12:
50 PFEIFER cover caps, Ref.-No. 05.219.124

PFEIFER fastening bolt
PFEIFER cover cap

Item-No. 05.224
Item-No. 05.225
Item-No. 05.226
Item-No. 05.227
Item-No. 05.228

PFEIFER

Thread System

Accessories

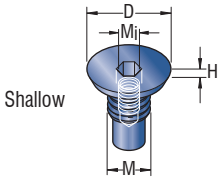
PFEIFER fastening bolts, shallow and deep, are for locking PFEIFER threaded anchors. In contrast to the fixing bolts with head that provide a recess for the PFEIFER swivel eye or special lifting loop when combined with the recess discs, **only the PFEIFER lifting loop** can be used with these fastening bolts.

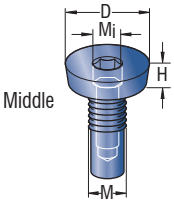
The main advantage of these two versions is in the flexibility of installation of the anchors with a large or small concrete covering and a comparatively small diameter of the recess that can be capped quickly and cheaply.

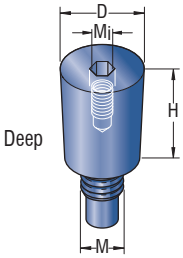
The cover caps, of grade V2A stainless steel, close the entire recess and give a clear and appealing appearance.

Get your own logo on the PFEIFER cover cap – Just ask us for an offer

PFEIFER fastening bolt; material: Steel, zinc-plated



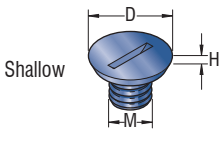


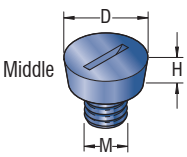


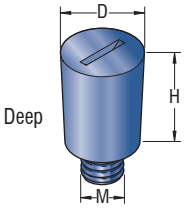
Fastening bolts

Ref.-No. shallow	Type/ Size	D [mm]	H [mm]	SW [mm]	Mi [mm]	Weight [kg]	Ref.-No. middle	D [mm]	H [mm]	Weight [kg]	Ref.-No. deep	D [mm]	H [mm]	Weight [kg]
05.224.123	12	23,0	3,0	6	M6	0,02	**05.209.123**	23,5	8,5	0,03	**05.225.123**	23,5	30,0	0,10
05.224.143	14	26,0	3,0	8	M8	0,03	**05.209.143**	26,5	8,5	0,05	**05.225.143**	26,5	30,0	0,13
05.224.163	16	30,0	3,5	10	M8	0,04	**05.209.163**	30,5	8,5	0,06	**05.225.163**	30,5	30,0	0,18
05.224.183	18	33,0	3,5	10	M8	0,06	**05.209.183**	33,0	8,5	0,09	**05.225.183**	33,5	30,0	0,23
05.224.203	20	37,0	4,0	10	M8	0,09	**05.209.203**	37,0	8,0	0,11	**05.225.203**	37,5	30,0	0,29
05.224.243	24	40,0	4,0	14	M10	0,13	**05.209.243**	40,5	10,0	0,17	**05.225.243**	41,0	30,0	0,38
05.224.303	30	48,5	4,5	14	M10	0,27	**05.209.303**	49,0	10,0	0,31	**05.225.303**	49,5	30,0	0,62
05.224.363	36	58,0	4,5	14	M10	0,48	**05.209.363**	59,0	10,0	0,55	**05.225.363**	59,0	30,0	0,99
05.224.423	42	66,5	5,0	17	M16	0,74	**05.209.423**	67,0	13,0	0,84	**05.225.423**	67,5	30,0	1,40
05.224.523	52	79,5	5,0	17	M16	1,41	**05.209.523**	80,0	13,0	1,72	**05.225.523**	80,5	30,0	2,33

PFEIFER locking screw; material: stainless steel







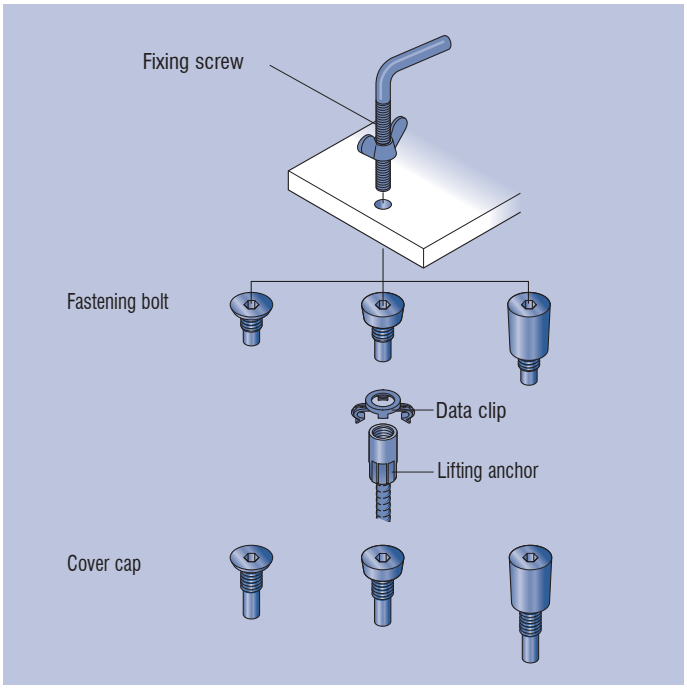
Cover caps

Ref.-No. shallow	Type/ Size	D [mm]	H [mm]	Weight [kg]	Ref.-No. middle	D [mm]	H [mm]	Weight [kg]	Ref.-No. deep	D [mm]	H [mm]	Weight [kg]
05.226.124	12	22,5	3,0	0,02	**05.227.124**	23,0	8,5	0,04	**05.228.124**	23,0	30,0	0,10
05.226.144	14	25,5	3,0	0,03	**05.227.144**	26,0	8,5	0,05	**05.228.144**	26,0	30,0	0,13
05.226.164	16	29,5	3,5	0,04	**05.227.164**	30,0	8,5	0,07	**05.228.164**	30,0	30,0	0,18
05.226.184	18	32,5	3,5	0,05	**05.227.184**	33,0	8,5	0,09	**05.228.184**	33,0	30,0	0,22
05.226.204	20	36,5	4,0	0,08	**05.227.204**	36,5	8,0	0,11	**05.228.204**	37,0	30,0	0,28
05.226.244	24	39,5	4,0	0,10	**05.227.244**	40,0	10,0	0,16	**05.228.244**	40,5	30,0	0,35
05.226.304	30	48,0	4,5	0,18	**05.227.304**	48,0	10,0	0,25	**05.228.304**	49,0	30,0	0,53
05.226.364	36	57,5	4,5	0,30	**05.227.364**	58,0	10,0	0,40	**05.228.364**	58,5	30,0	0,81
05.226.424	42	66,0	5,0	0,43	**05.227.424**	66,5	13,0	0,63	**05.228.424**	67,0	30,0	1,09
05.226.524	52	79,0	5,0	0,73	**05.227.524**	79,0	13,0	1,01	**05.228.524**	80,0	30,0	1,65

Instructions for installation and use

System

FOR PLANNERS, **FOR PRECAST PLANTS,** FOR USERS

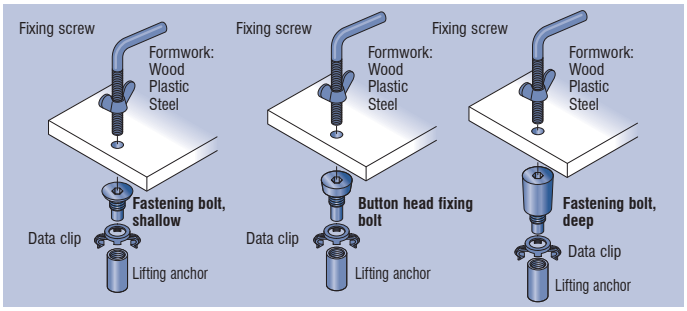


This PFEIFER accessory system consists of:

- **PFEIFER fixing screw**
- **PFEIFER fastening bolt**
- **PFEIFER data clip for the selected PFEIFER lifting anchor**
- **PFEIFER cover caps for closing**

Use

FOR PLANNERS, **FOR PRECAST PLANTS,** FOR USERS

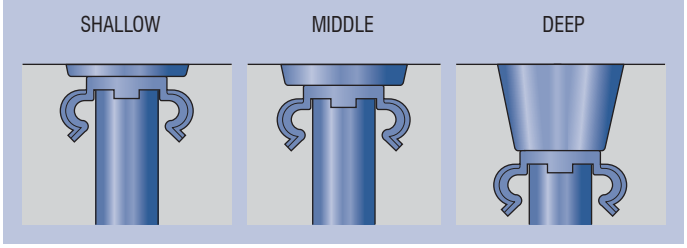


Warning: The use of swivel eyes or special lifting loops leads to reduced screw-in depths and therefore to a hazard to life and limb. Swivel eyes and special lifting loops must not be used with this installation variant. Only lifting loop are permissible here.

Caution: If the “deep” variant is used, the angles of inclination are restricted.
Rd 12 – Rd 16: 0 – 20 °
Rd 18 – Rd 24: 0 – 30 °
Rd 30 – Rd 52: 0 – 45 °

Closing with stainless steel cover caps

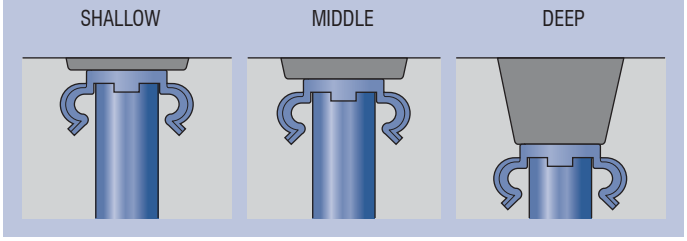
Closing with stainless steel cover caps



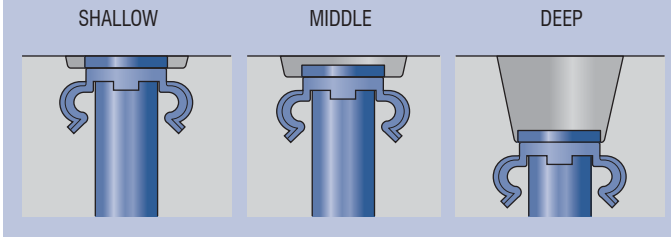
Notice: The cover cap can also be screwed in with the aid of a 1 Euro coin.

Notice: Closing with a low-shrinkage mortar is recommended only for non-visible areas for visual reasons.

Closing with mortar



Closing with external cap, small (plastic)



PFEIFER thread cleaners

Item-No. 05.212

PFEIFER thread cleaners enable penetrating concrete residues to be removed from the lifting anchor.

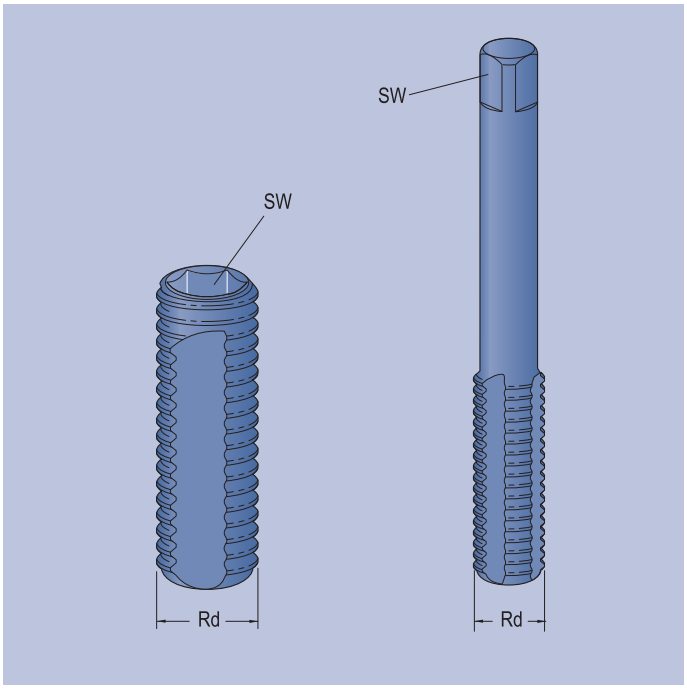
PFEIFER

Thread System

Accessories

Material:

Tool steel, hardened, with clearance gaps



Ref.-No.	Type/Size	Size of wrench	Weight approx. kg/piece
05.212.120	12	SW 7	0,04
05.212.140	14	SW 9	0,05
05.212.160	16	SW 9	0,05
05.212.180	18	SW 8	0,05
05.212.200	20	SW 10	0,08
05.212.240	24	SW 12	0,13
05.212.300	30	SW 14	0,25
05.212.360	36	SW 17	0,43
05.212.420	42	SW 19	0,66
05.212.520	52	SW 22	1,10

Example order for 3 PFEIFER thread cleaners, to fit fixing bolts
for lifting anchor size Rd 12: 3 PFEIFER thread cleaners, Ref.-No. 05.212.120

PFEIFER adapters

Item-No. 05.046

For use as anchor extension
in the PFEIFER thread system

PFEIFER

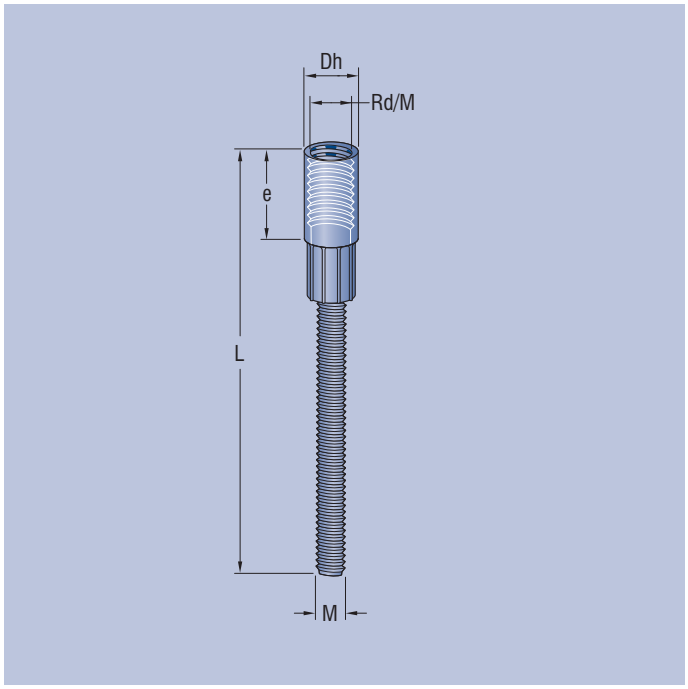
Thread System

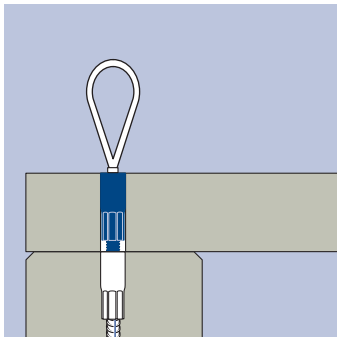
Accessories

The purpose of the PFEIFER adapter is to extend the PFEIFER threaded anchor, e.g. the PFEIFER socket or waved anchor, which is installed recessed relative to the accessible surface, e.g. when a subsequent concrete floor is laid on a wall.

Material:

- Socket made of special grade high grade precision steel tube,
- threaded bolt, high-strength





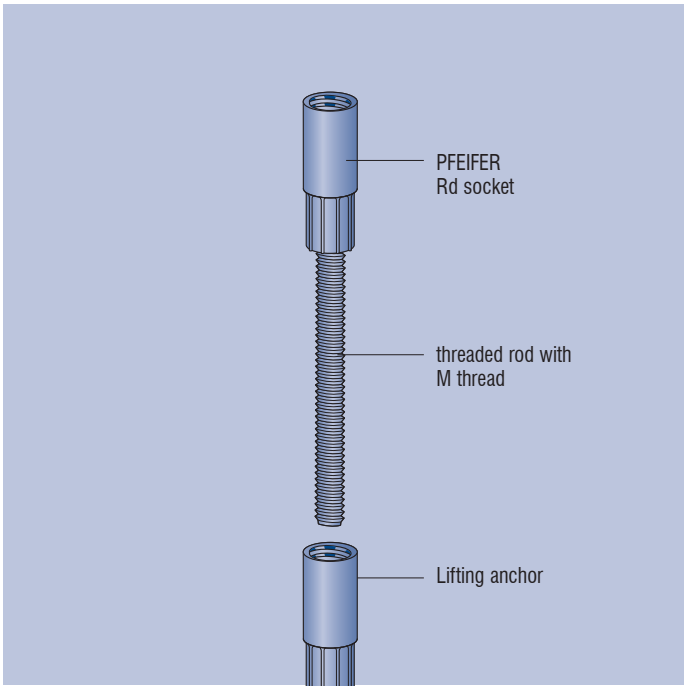
Item No. galvanized	Type/ Size	$N_{R, adm}$ kN	D	* Dims., [mm] L	e	M	Weight [kg/piece]
05.046.123.272	Rd 12	5	15,0	272	22	12	0,21
05.046.143.275	Rd 14	8	18,0	275	25	14	0,29
05.046.163.277	Rd 16	12	21,0	277	27	16	0,41
05.046.183.364	Rd 18	16	24,0	364	34	18	0,66
05.046.203.365	Rd 20	20	27,2	365	35	20	0,85
05.046.243.373	Rd 24	25	31,0	373	43	24	1,21
05.046.303.386	Rd 30	40	40,0	386	56	30	2,10
05.046.363.567	Rd 36	63	47,0	567	67	36	4,22
05.046.423.580	Rd 42	80	54,0	580	80	42	5,98
05.046.523.597	Rd 52	125	67,2	597	97	52	9,89
05.046.563.580	Rd 56	150	70,0	580	80	56	10,56
05.046.603.585	Rd 60	200	76,0	585	85	60	12,40

Example order for 10 PFEIFER adapters Rd 36:
10 PFEIFER adapters, Rd 36, Ref.-No. 05.046.363.567

Instructions for installation and use

System

FOR PLANNERS, **FOR PRECAST PLANTS,** FOR USERS



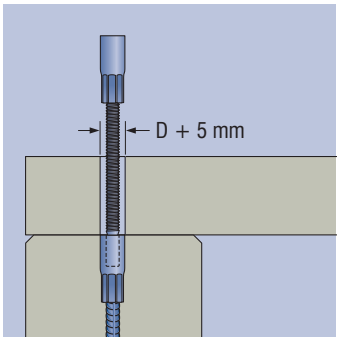
This PFEIFER accessory system consists of:

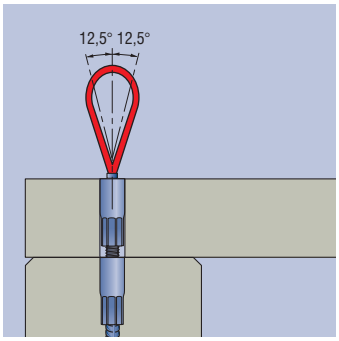
– **PFEIFER adapter for the selected PFEIFER lifting anchor**

Caution: Only a PFEIFER lifting device such as the lifting loop, the special lifting loop or a swivel eye must be screwed into the adapter.

Use

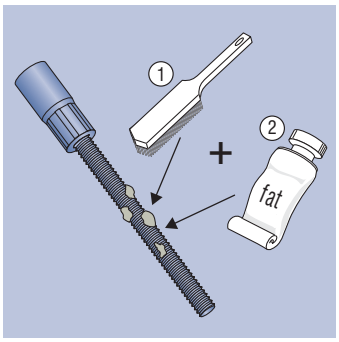
FOR PLANNERS, **FOR PRECAST PLANTS,** FOR USERS





Caution: With a parallel shear pull at greater than 12.5°, the absence of parallel shear reinforcement can result in bending the threaded bolt. This can result in failure of the adapter and hence to the structural element falling and to the death of persons. Without lateral supporting mortar, the anchor may only be loaded along the centre axis or up to not more than 12.5° parallel shear pull.

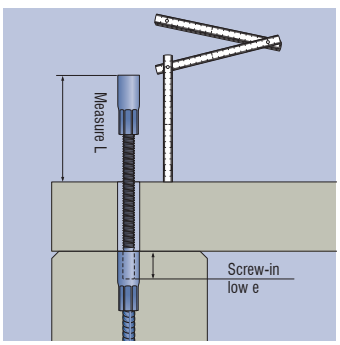
Notice: If subject to repeated multiple use as a lifting device, the PFEIFER adapter must be inspected by a technical expert before each use. If there is any doubt about the usability of the adapter, it must be discarded.

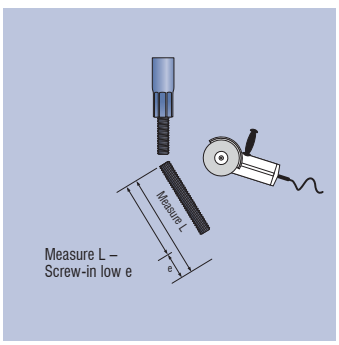


Caution: Screwing the adapter in and out with any type of tool damages the ferrule connection between the socket and the threaded bolt, that could lead to premature failure. The adapter must be screwed by hand only. If this is not possible, the threaded sockets and threaded rod should be cleaned and lightly greased.

Notice: The adapters do not need specific dimensioning. The thread size makes the selection unambiguous.

Notice: Ensure the correct screw-in depth by making suitable measurements before and after screwing in.





Caution: Adapters with bent threaded rod have reached their discarding time and must be disposed of immediately.

Caution: PFEIFER adapters can weigh over 4 kg depending on their size.

Injury can result if they fall.

All extremities must be kept away from the hazardous area.

PFEIFER

A Winner in all directions: PFEIFER lifting devices

PFEIFER lifting devices are part of the recognised PFEIFER thread system and a significant factor for its great success. In addition to the wire-lifting loops, prove millions of times, swivel eyes and special lifting loops complement our wide product range that offers a safe solution for every application.

System

- Perfectly matching range of products with swivel eyes, lifting loops and special lifting loops
- Wide choice of associated anchors and accessories

Made in Germany

- Safe manufacture under defined conditions
- Continuous product development
- Standardised and regulated welding materials
- Trained welders, welding monitoring and specialist welding engineers

Force transmission

- Flared lifting loop for parallel and transversal shear pull – unique
- Lifting loop tested for off-centre angles up to 45 degrees in all directions
- Special swivel eyes for forces at angles of inclination up to 90 degrees – ideal for erecting slabs
- For practically any structural element and all types of load, the appropriate combination of lifting device and anchor for safe and smooth application of the load

Safety

- Alternating bending and tensile tests by accredited testing body for durability
- Certification in accordance with DIN EN 9001
- In-house production control, a permanent feature of our production for decades

Round thread

- Very strong round thread – resistant to impacts
- Safe in use – even with dirty threaded sockets
- High level of force transmission, up to 20 t
- Tested for over half a century
- Originally new developed PFEIFER round thread with metric pitch for easier application by the customer

PFEIFER lifting loop

Item-No. 05.050

PFEIFER

Thread System

Lifting device

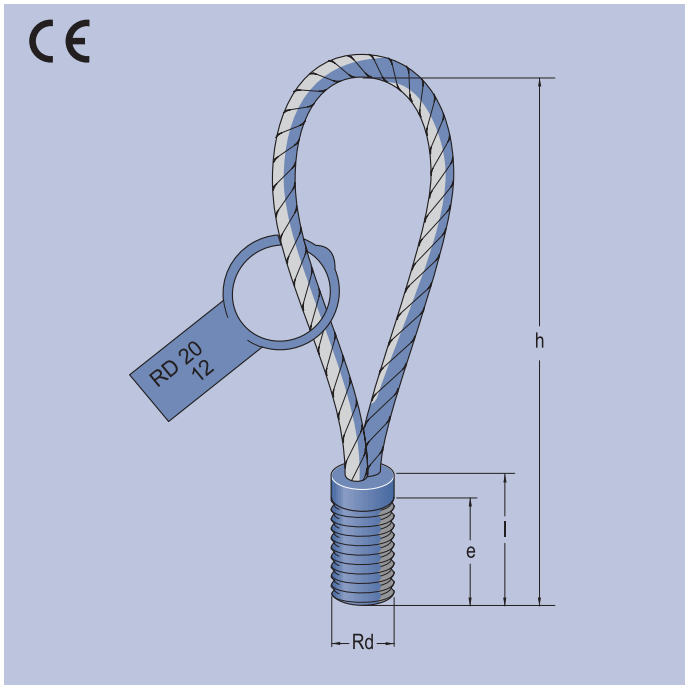
For use by:
- trained and qualified personal

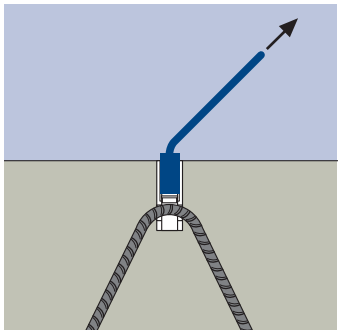
The PFEIFER lifting loop is an economical and flexible lifting device. It is part of the PFEIFER thread system and serves for the lifting of precast concrete elements under straight or parallel shear pull.

Advantages: Low-cost, great flexibility in all directions, long service life, safe attachment, unambiguous allocation of use through PFEIFER colour coding

Material:

Highly flexible, galvanized all-steel wire rope, threaded part in special steel





PFEIFER lifting loop

Item No.	Type/Size	$N_{R, adm}$ [kN]	Dimensions Rd	[mm] e	h	l	Weight approx. [kg/piece]
05.050.123	Rd 12	5	Rd 12 x 1,75	20	155	28	0,05
05.050.143	Rd 14	8	Rd 14 x 2,00	22	155	32	0,08
05.050.163	Rd 16	12	Rd 16 x 2,00	25	155	36	0,12
05.050.183	Rd 18	16	Rd 18 x 2,50	29	190	40	0,17
05.050.203	Rd 20	20	Rd 20 x 2,50	33	215	45	0,24
05.050.243	Rd 24	25	Rd 24 x 3,00	40	255	54	0,39
05.050.303	Rd 30	40	Rd 30 x 3,50	56	300	68	0,73
05.050.363	Rd 36	63	Rd 36 x 4,00	67	340	81	1,28
05.050.423	Rd 42	80	Rd 42 x 4,50	80	425	95	2,14
05.050.523	Rd 52	125	Rd 52 x 5,00	97	480	117	3,62

Example order for 50 PFEIFER lifting loop Rd 30:
50 PFEIFER lifting loop, Ref.-No. 05.050.303

Technical installation instructions on page 75

PFEIFER Flared Lifting Loop

Item-No. 05.070

PFEIFER

Thread System

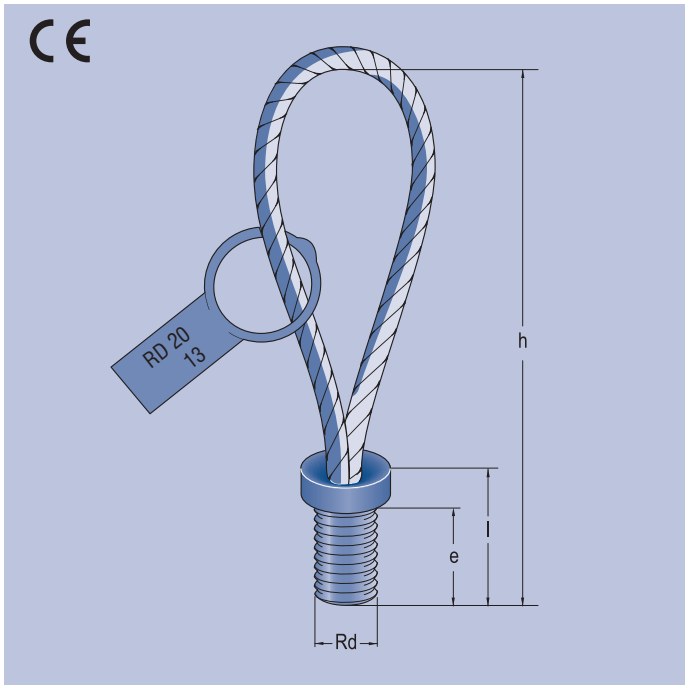
Lifting device

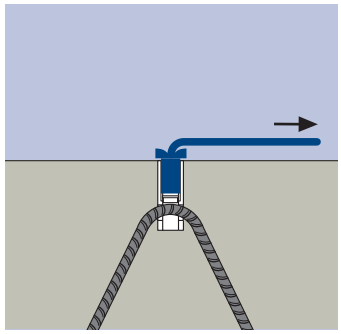
The PFEIFER Flared Lifting Loop is an economical and flexible lifting device. It is part of the PFEIFER thread system and serves to lift precast concrete elements under straight pull, parallel shear pull and transverse shear pull.

Advantages: low-cost, great flexibility in all directions, long service life, safe attachment, unambiguous allocation of use through PFEIFER colour coding.

Material:

Highly flexible, galvanized all-steel wire rope, threaded part in special steel, plain





PFEIFER Flared Lifting Loop

Ref.-No.	Type/Size	$N_{R, adm}$ [kN]	$V_{R, adm}$ [kN]	Dimensions [mm] Rd	e	h	l	Weight approx. [kg/piece]
05.070.123	Rd 12	5	2,5	Rd 12 x 1,75	21	155	31,5	0,08
05.070.163	Rd 16	12	6	Rd 16 x 2,00	24	158	38	0,12
05.070.203	Rd 20	20	10	Rd 20 x 2,50	33	219	49	0,24
05.070.243	Rd 24	25	12,5	Rd 24 x 3,00	39	255	57	0,44
05.070.303	Rd 30	40	20	Rd 30 x 3,50	53	305	73	0,73
05.070.363	Rd 36	63	31,5	Rd 36 x 4,00	63	340	91	1,42

Ordering example for 50 PFEIFER Flared Lifting Loops Rd 30:
50 PFEIFER Flared Lifting Loops, order no. 05.070.303

Technical installation instructions on page 75

PFEIFER swivel eyes

Item-No. 05.051
Item-No. 05.052

PFEIFER

Thread System

Lifting device

For use by:
• trained and qualified personal

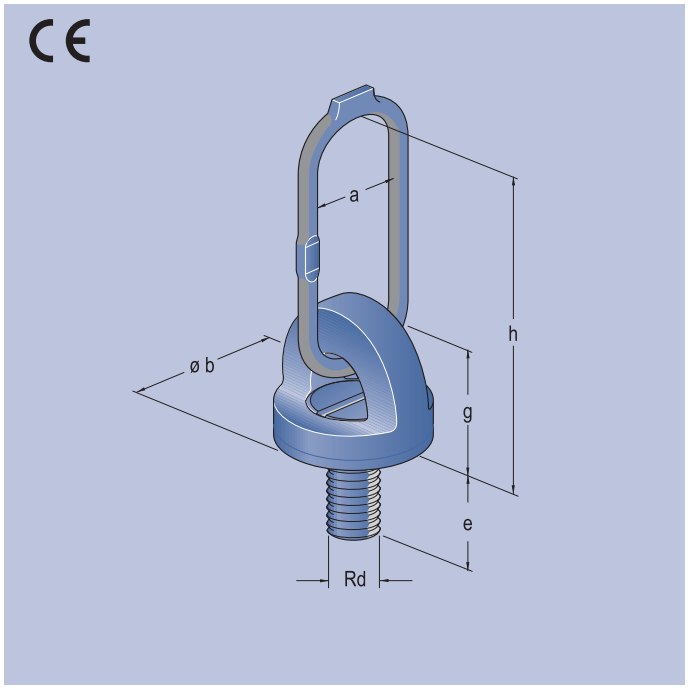
The PFEIFER swivel eye is the most universal lifting device for the PFEIFER thread system. The pivot plate can turn to any load direction without becoming unscrewed.

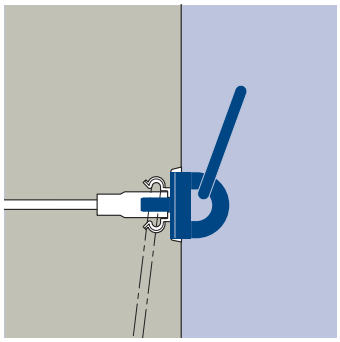
Straight pull, parallel and transversal shear pull are thereby possible.

Advantages: Reliable lifting device, long service life, safe attachment for all load directions, unambiguous assignment of use through PFEIFER colour coding

Material:

Steel, threaded bolt in special quality, lacquer as in the colour coding





PFEIFER swivel eyes

Item No.	Type/Size	$N_{R, adm}$ [kN]	$V_{R, adn}$ [kN]	Dimensions [mm] Rd	a	b	e	g	h	Weight approx. [kg/piece]
05.051.121	Rd 12	5	2,5	Rd 12 x 1,75	50	47	16	48	115	0,45
05.051.141	Rd 14	8	4,0	Rd 14 x 2,00	50	52	18	50	114	0,50
05.051.161	Rd 16	12	6,0	Rd 16 x 2,00	60	56	21	60	152	0,85
05.051.181	Rd 18	16	8,0	Rd 18 x 2,50	60	59	23	62	150	0,90
05.051.201	Rd 20	20	10,0	Rd 20 x 2,50	60	69	26	74	160	1,55
05.051.241	Rd 24	25	12,5	Rd 24 x 3,00	75	74	31	78	185	2,00
05.051.301	Rd 30	40	20,0	Rd 30 x 3,50	90	89	39	90	220	3,60
05.051.361	Rd 36	63	31,5	Rd 36 x 4,00	100	101	47	107	255	5,50
05.051.421	Rd 42	80	40,0	Rd 42 x 4,50	100	109	55	112	255	6,20
05.051.521	Rd 52	125	62,5	Rd 52 x 5,00	140	129	68	131	345	13,20
05.052.561	Rd 56	150	–	Rd 56 x 5,50	140	200	70	165	370	21,50
05.052.601	Rd 60	200	–	Rd 60 x 5,50	180	250	75	190	470	39,00

Notice: Swivel eyes in sizes Rd 56 and Rd 60 are intended for loads at angles of inclination up to max. 12.5°. Transversal shear pull, such as when erecting wall elements, is not intended for swivel eyes Rd 56 and Rd 60.

Technical installation instructions on page 75

Example order for 50 PFEIFER swivel eyes Rd 30: 50 PFEIFER swivel eyes, Ref.-No. 05.051.301

PFEIFER special lifting loop with pressure plate

Item-No. 05.053

PFEIFER

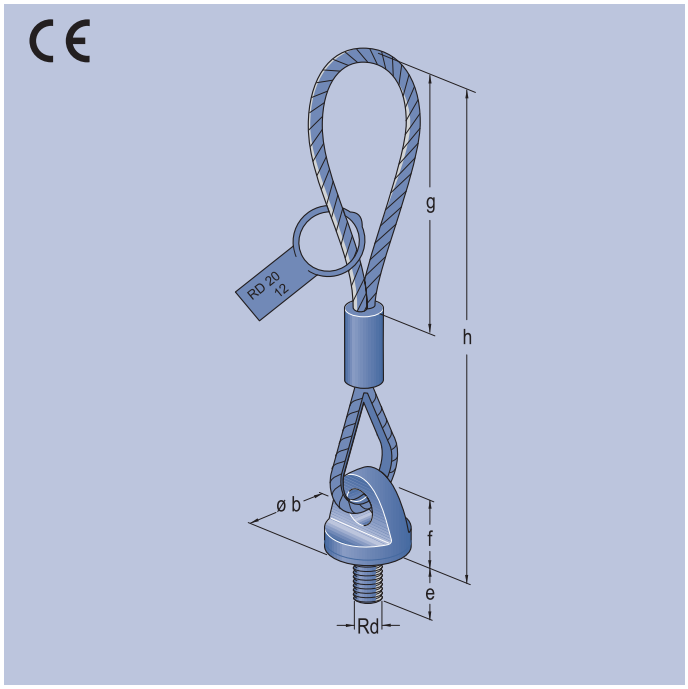
Thread System

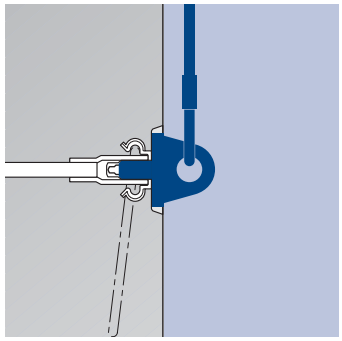
Lifting device

The PFEIFER special lifting loop is a lifting device in the PFEIFER thread system. The associated pressure plate, with its large contact area, provides for an even distribution of pressure on the precast concrete element.
This makes straight pull, parallel shear pull and transversal shear pull possible.

Advantages: safe, economical lifting device for all load directions, strong and flexible, unambiguous allocation of use through PFEIFER colour coding

Material:
Steel, steel wire cable, galvanized





Item No. galvanized	Type/Size	$N_{R, adm}$ [kN]	$V_{R, adm}$ [kN]	Rd	Dimensions [mm] b	e	g	h	f	Weight approx. [kg/piece]
05.053.123	Rd 12	5	2,5	Rd 12 x 1,75	45	16	160	310	40	0,34
05.053.143	Rd 14	8	4,0	Rd 14 x 2,00	51	18	180	340	42	0,63
05.053.163	Rd 16	12	6,0	Rd 16 x 2,00	55	21	180	345	48	0,63
05.053.183	Rd 18	16	8,0	Rd 18 x 2,50	58	23	200	385	50	1,03
05.053.203	Rd 20	20	10,0	Rd 20 x 2,50	67	26	220	410	60	1,22
05.053.243	Rd 24	25	12,5	Rd 24 x 3,00	73	31	240	435	62	1,75
05.053.303	Rd 30	40	20,0	Rd 30 x 3,50	88	39	240	490	75	3,25
05.053.363	Rd 36	63	31,5	Rd 36 x 4,00	100	47	260	570	92	5,68
05.053.423	Rd 42	80	40,0	Rd 42 x 4,50	100	55	350	650	97	8,67
05.053.523	Rd 52	125	62,5	Rd 52 x 5,00	120	68	380	760	113	16,80
05.053.563	Rd 56	150	–	Rd 56 x 5,50	140	70	520	1150	145	17,00
05.053.603	Rd 60	200	–	Rd 60 x 5,50	140	75	700	1250	145	27,00

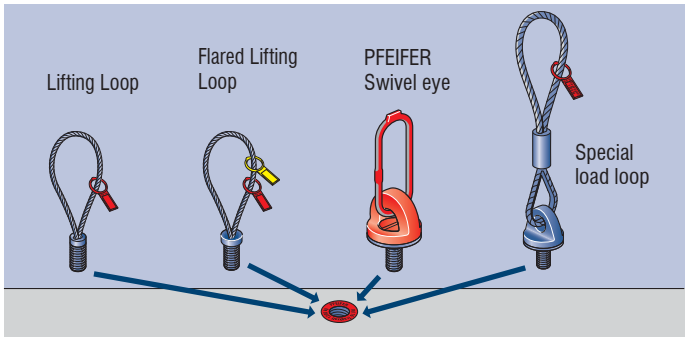
Notice: Special lifting loops in sizes Rd 56 and Rd 60 are only intended for loads at angles of inclination up to max. 12.5°. Transversal shear pull, such as when erecting wall elements, is not intended for special lifting loops Rd 56 and Rd 60.

Example order for 50 PFEIFER special lifting loop with pressure plate, galvanized, Rd 16:
50 PFEIFER special lifting loops, Ref.-No. 05.053.163

Instructions for installation and use

System

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



The PFEIFER lifting devices lifting loop, swivel eye and special lifting loops are the only admissible lifting devices that are part of the PFEIFER thread system.
In combination with concreted-in PFEIFER lifting anchors they form the matching lifting anchor system. This provides an unambiguous allocation of the lifting devices according to thread type and size.

Caution: The instructions for installation and use of the selected anchor type must be complied with!

Warning: The use of non-matched system components can cause reduced safety levels and is not permitted. This can cause a hazard to life and limb. Always use the PFEIFER components that are matched to each other!

Safety

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

The following safety parameter values for the PFEIFER lifting anchor system are derived as follows in accordance with the VDI/BV-BS 6205 directive, with the prerequisite of the machinery directive 2006/42/EC. For this, a load-side dynamic working coefficient $\psi_{dyn} = 1.3$ was assumed.

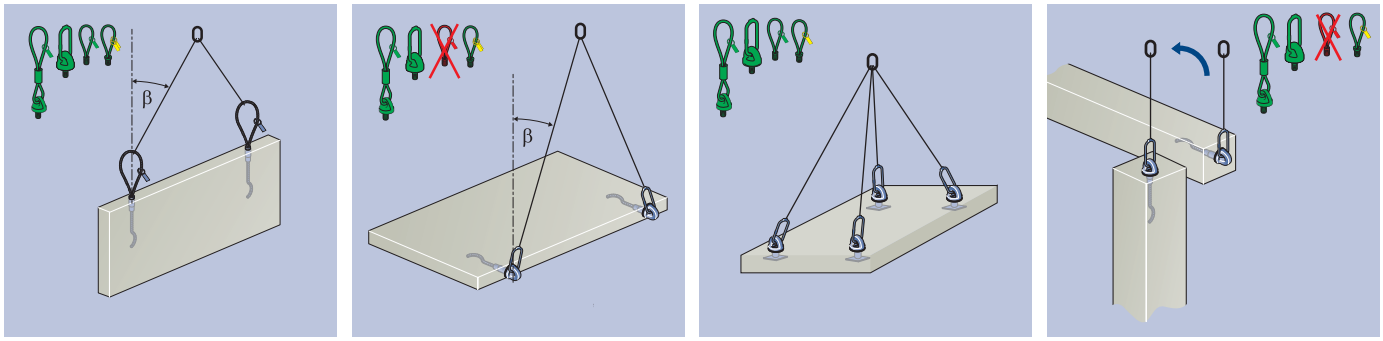
– Steel failure wire rope: $\gamma_s = 4{,}0$
– Steel failure chains or full sections: $\gamma_s = 3{,}0$
– Concrete failure (procedure B*): $\gamma_c = 2{,}5$
– Concrete failure (procedure A*): $\gamma_c = 2{,}1$

* for factory monitored fabrication of the prefab concrete elements

Use

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

PFEIFER lifting loops, swivel eyes and special lifting loops are intended to be lifting devices for the lifting anchors of the PFEIFER thread system. Other lifting devices – recognisable from differing manufacturer/type designation – are not permitted. The PFEIFER lifting loops, swivel eyes and special lifting loops must be fully screwed into the lifting anchor threaded sockets as far as the stop.



Dimensioning

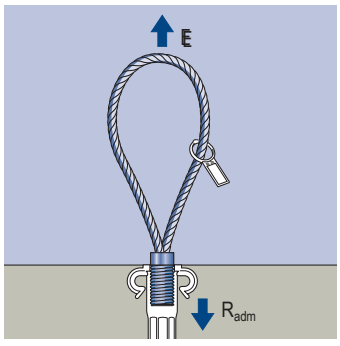
FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

Table 1

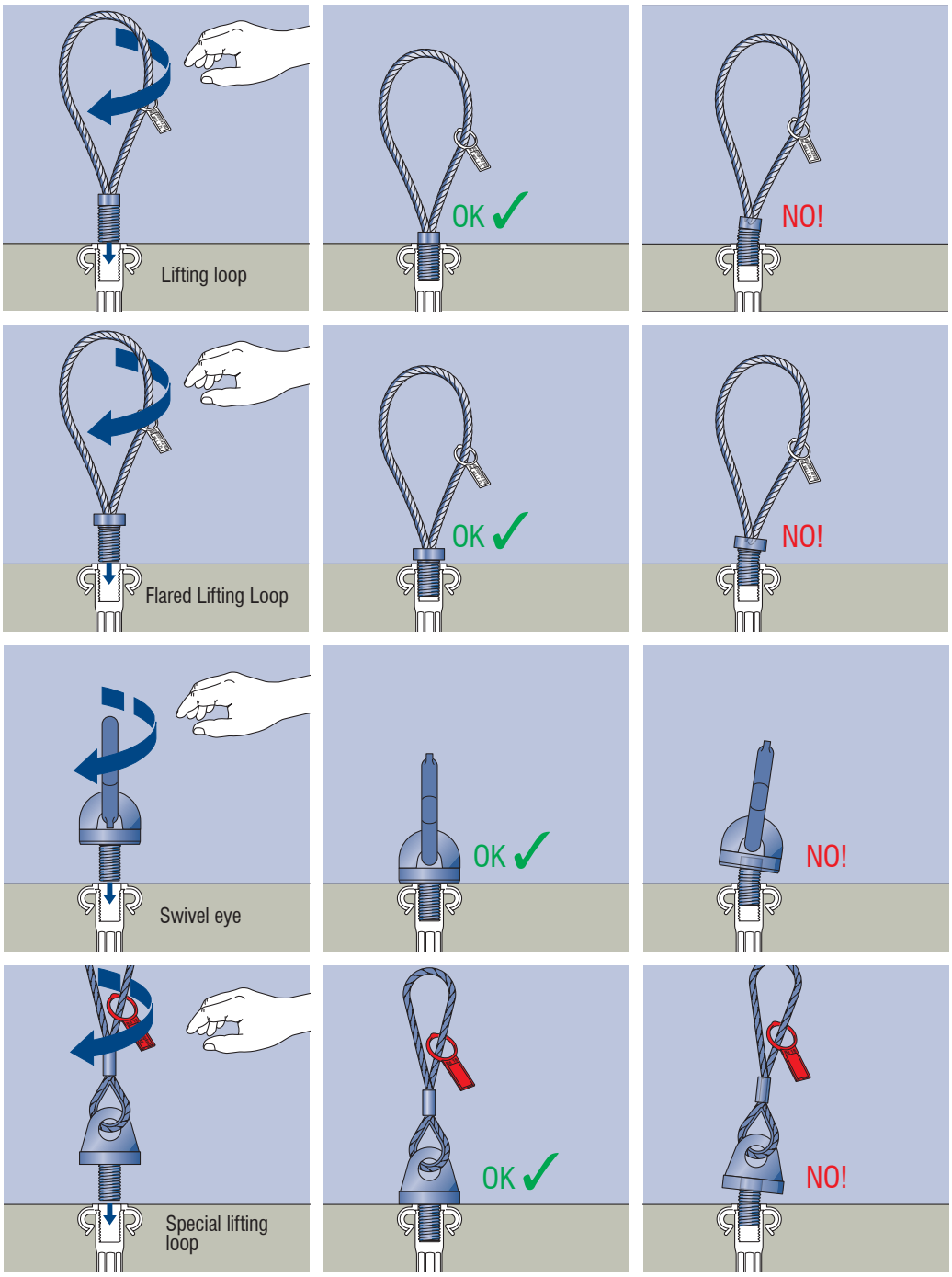
Type/thread Rd	Maximum load capacity $N_{R,adm}$ / (0°–45°) [kN]	Maximum load capacity $V_{R,adm}$ / (>45°) [kN] valid only for	Colour coding	Minimum screw-in depth t [mm]				Minimum curvature radius for special lifting loops and lifting loop (see p. 13) R [mm]
12 x 1,75	5,0	2,5	Pastel orange	20	16	16	20	9,0
14 x 2,00	8,0	4,0	Pure white	22	18	18	–	9,0
16 x 2,00	12,0	6,0	Flame red	25	21	21	24	10,5
18 x 2,50	16,0	8,0	Light pink	29	23	23	–	12,0
20 x 2,50	20,0	10,0	Pastel green	33	26	26	33	14,5
24 x 3,00	25,0	12,5	Anthracite grey	40	31	31	39	16,5
30 x 3,50	40,0	20,0	Emerald green	56	39	39	51	21,0
36 x 4,00	63,0	31,5	Light blue	67	47	47	63	24,0
42 x 4,50	80,0	40,0	Silver grey	80	55	55	–	30,0
52 x 5,00	125,0	62,5	Sulphur yellow	97	68	68	–	36,0
56 x 5,50	150,0	–	Pastel orange	–	70	70	–	42,0
60 x 5,50	200,0	–	Flame red	–	75	75	–	46,0

$E \leq R_{adm}$

Notice: determination of stress according to VDI/BV-BS 6205



Installation



Warning: An inadequate screw-in depth reduces the safety level or can even result in failure. This can result in injury or death.
Screw the thread in fully to the last turn (see Table 1)! No more than one thread pitch may protrude from the lifting anchor.

Notice: The flared lifting loop is completely screwed in the socket by hand. In doing so, the flare has finally no contact with the concrete surface! There´s always a small gap between the the flared lifting loop and the concrete element (see page 77).

Warning: A rotation mechanism that is faulty because of dirt or damage results in unscheduled loads that can result in reduced carrying capacities and hence falling down. Check that the rotary mechanism rotates freely before putting it into use.

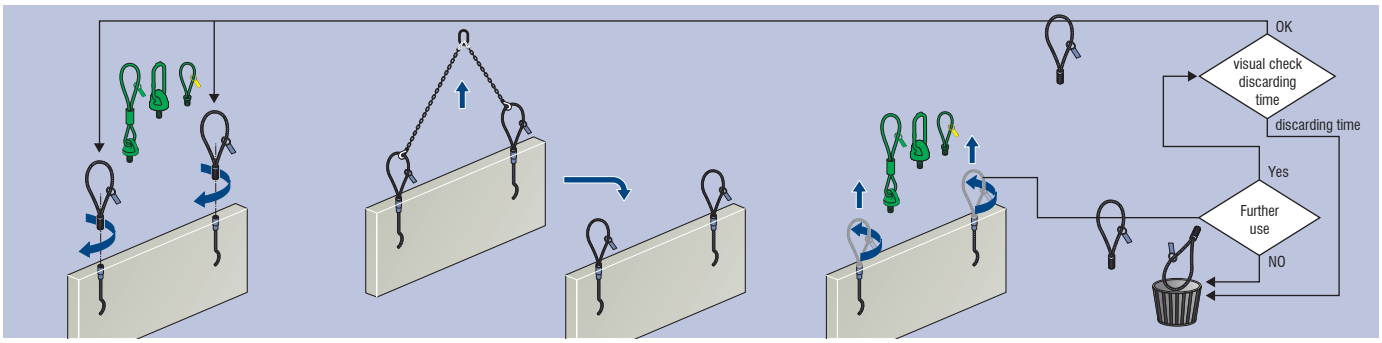
Caution: It is not permitted to use grippers, iron bars or similar tools for screwing in and out. This can damage the lifting devices. Always screw the lifting devices in and out manually!

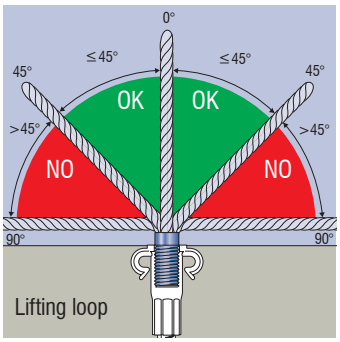
Warning: Using force to screw in the lifting devices can cause damage. This reduces the carrying capacity and falls can result. This causes a hazard to life and limb. Lifting devices must always be screwed in gently by hand.

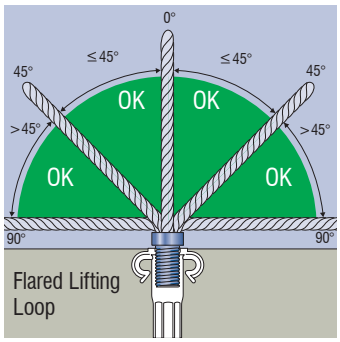
Warning: Dirty threads of lifting devices and anchors can reduce the screw-in depth. This reduces the carrying capacity and structural elements can fall down as a result. This causes a hazard to life and limb. The thread must always be clean and lubricated! If appropriate, dirty thread in the lifting anchor should be cleaned using the reworking screw (p. 67), so that the full screw-in depth is available!

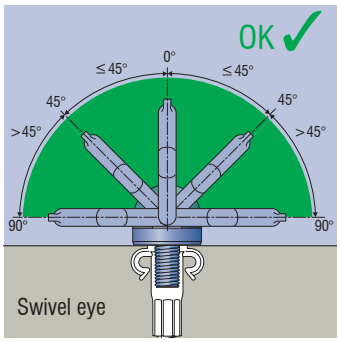
Use

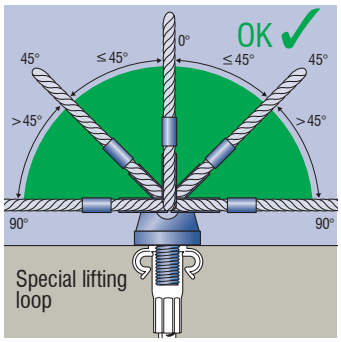
Tensile load	0 – 45°	0 – 45°	0 – 45°	0 – 45°
Transverse shear load	**NO!**	**OK ✓**	**OK ✓**	Rd 12-52 ✓ Rd 56-60 **NO!**
Temperature	-20 to 80 °C	-20 to 80 °C	-20 to 80 °C	-20 to 80 °C











Caution: PFEIFER lifting devices can be over 4 kg in weight depending on their size. Injury can result if they fall. All extremities must be kept away from the hazardous area.

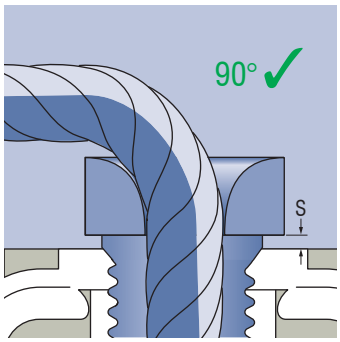
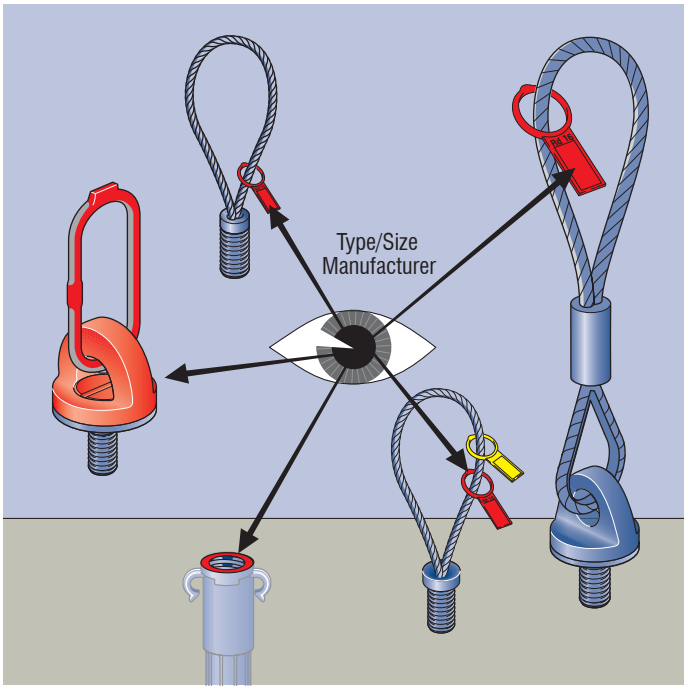


Table 2 – Scheduled gaps in Flared Lifting Loop

Type	Gap size S
Rd 12	1,75 mm
Rd 16	2,00 mm
Rd 20	3,00 mm
Rd 24	4,00 mm
Rd 30	4,00 mm
Rd 36	6,00 mm

Use

FOR PLANNERS, **FOR PRECAST PLANTS, FOR USERS**

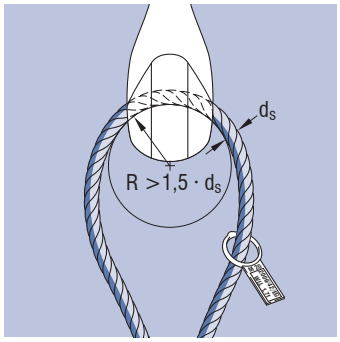


Check the system consistency by inspecting the data clip of the lifting anchor and the load capacity identification tag of the lifting loop.

Information on the markings:

– Type/Size
– Year of manufacture
– EC marking
– Manufacturer

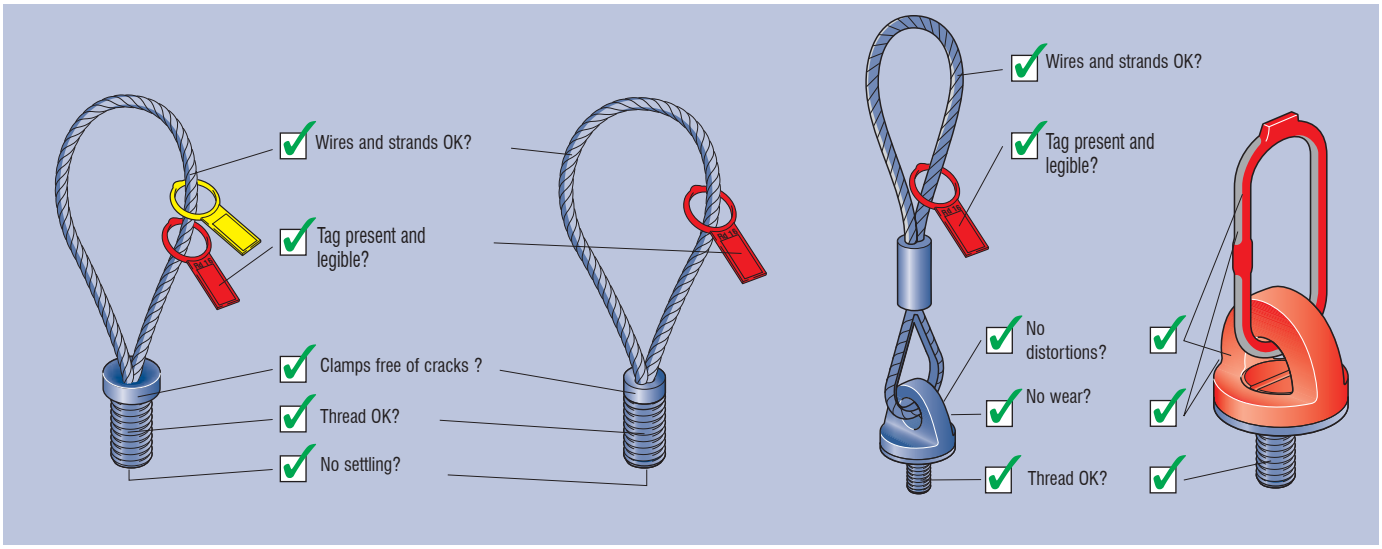
Caution: Missing or illegible markings can make it impossible to match lifting devices and anchors correctly. This can result in items falling and causing a hazard to life and limb. Lifting devices and anchors with absent or illegible markings must be immediately taken out of service!



Warning: If the deflection radius of the hook is too small, the lifting device can fail even at the rated load. This is a hazard to life.

Only attach hooks with a deflection radius of at least 1.5 x the cable diameter.

Original inspection and service life



Notice: Before using for the first time, at least once a year and after special events, the lifting devices must be examined by the authorised specialist according to the specified criteria. Therefore, the parts must be metallically pure.

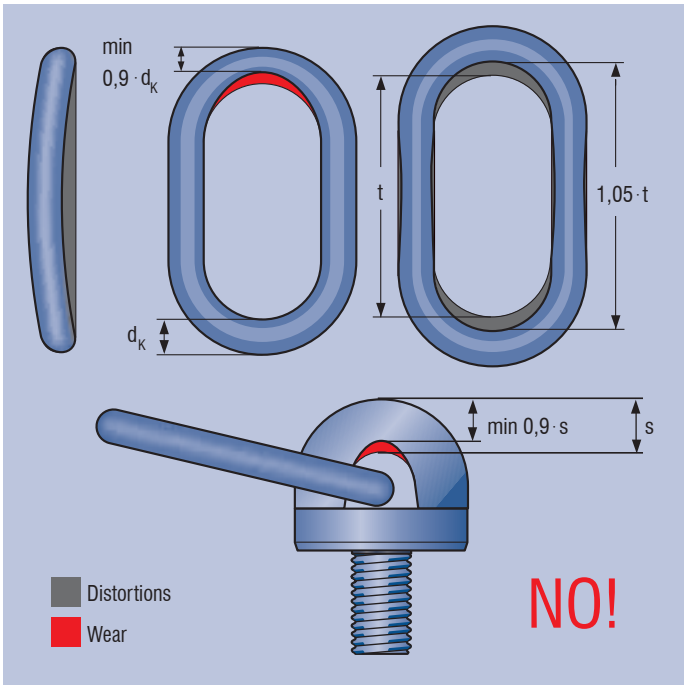
Warning: Any modification to the wire rope, oval link, thread, clamp or metal structural elements causes a weakening of the lifting device with the risk of failure and consequent falling of the structural element. Do not perform any repair work – dispose of the lifting devices instead.

Caution: Do not use a lifting device which has an illegible or missing identification label. They must be discarded.

PFEIFER lifting devices may no longer be used if the following types of damage occur:

- Breakage of 4 single wires over a wire rope length of 3 x the wire rope diameter or an entire strand
- Crushing of the wire rope
- Deformation or damage to the wire rope or the tapped socket
- Heavy wear
- Corrosion pits
- Connection between wire rope and ferrule loosened or detached
- Settling in swaged on areas
- Distortion of oval link
- Pivot plate becoming loose
- Thread damage
- Thimble has considerable distortion or protrudes
- evident distortions, signs of wear

Original inspection and discarding time



Warning: Damage, distortions, cracks and extensive corrosion pits can reduce the carrying capacity and lead to failure. This causes a hazard to life and limb. Any affected parts must be assessed by a suitably qualified person and, if necessary, taken out of service immediately.

Warning: The use of lifting devices that have reached the end of their serviceable life can result in failure. They must be clearly marked by the qualified person or made unusable.

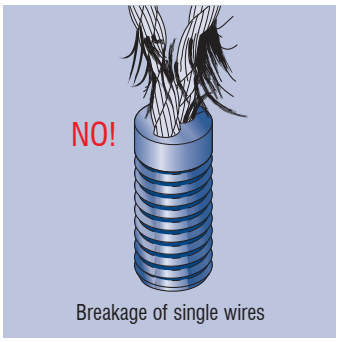
Original inspection and discarding time

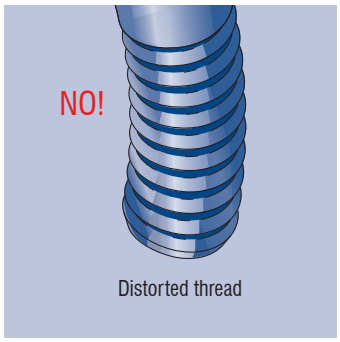
Table 2 – dimensions of oval link / swivel eye

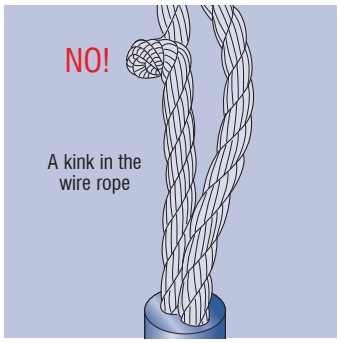
Swivel eye	Inner width t [mm]	Limit value 1,05·t [mm]	Nominal diameter d_k [mm]	Limit value 0,9·d_k [mm]
Rd 12	80	84,00	10,2	9,18
Rd 14	80	84,00	10,2	9,18
Rd 16	110	115,50	13,3	11,97
Rd 18	110	115,50	13,3	11,97
Rd 20	110	115,50	16,5	14,85
Rd 24	135	141,75	19,0	17,10
Rd 30	160	168,00	23,0	20,70
Rd 36	180	189,00	27,0	24,30
Rd 42	180	189,00	27,0	24,30
Rd 52	260	273,00	36,0	32,40
Rd 56	260	273,00	36,0	32,40
Rd 60	340	357,00	45,0	40,50

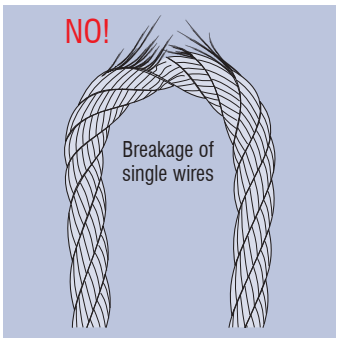
Table 3 – dimensions of oval suspension ring / swivel eye & special lifting loop

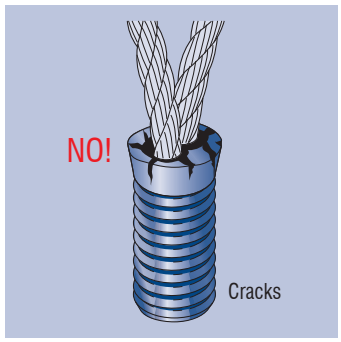
Swivel eye	Stirrup thickness S [mm]	Limit value 0,9·S [mm]
Rd 12	13,5	12,1
Rd 14	16,0	14,4
Rd 16	18,0	16,2
Rd 18	21,0	18,9
Rd 20	22,5	20,2
Rd 24	28,0	25,2
Rd 30	30,0	27,0
Rd 36	35,0	31,5
Rd 42	40,0	36,0
Rd 52	45,0	40,5
Rd 56	52,5	47,2
Rd 60	60,0	54,0

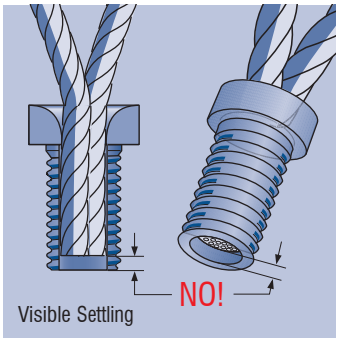


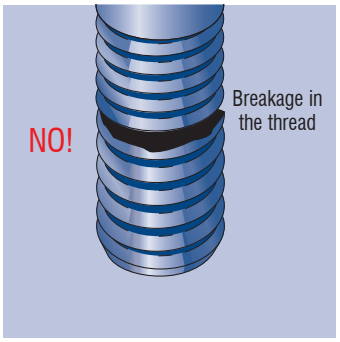




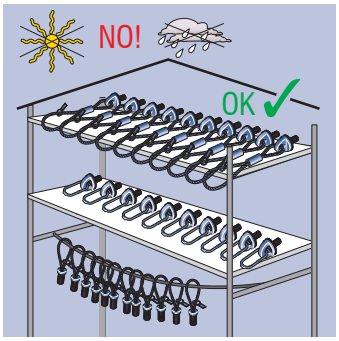


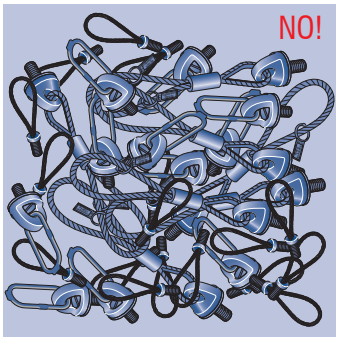


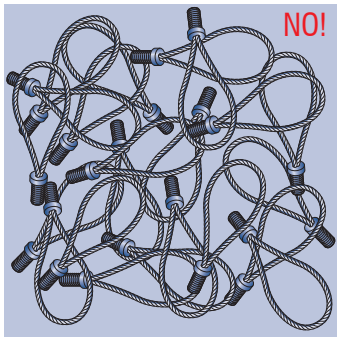




Storage







Misuse

Warning: Use of the anchor by untrained personnel results in the risk of incorrect use and the risk of items falling down, causing injury or death. Use only trained personnel.

Warning: It is not admissible to use the lifting devices for lashing during the transport of precast concrete elements. This can result in the load falling and thus to injury or the death of persons. These lifting devices must be used only for lifting and moving precast concrete elements.

Caution: Incorrect use can result in safety hazards and reduced carrying capacity. This results in the risk of a fall and a hazard to life and limb. Lifting anchor systems must be used only as shown in the instructions for installation and use and only by suitable trained personnel.

Test service

The PFEIFER test service, with specially trained test technicians (EN 473) and the most modern equipment, is available to take over from you the responsibility for carrying out the legally prescribed inspection of your hoists, lifting and attachment devices. We can test at your site with one of our mobile vehicles with examination equipment, at our headquarters or in our branch locations.

OHSAS 18001 TÜV SÜD ISO 9001

The quality of our products and services is what underlies our success.

Notices

The way to apply the PS to the concrete. In the best time

The following pages contain summarised technical information for easier understanding and for simple and correct rapid application of our products.

This information does not replace VDI/BV-BS 6205, but is only a short overview. The VDI/BV-BS directive is always the only binding document and must be strictly complied with.

Definition of lifting anchor systems

Lifting anchor systems are normally used for lifting precast elements. These systems usually consist of a re-usable lifting device and a lifting anchor cast into the concrete element.
They must operate reliably and safely. To achieve this, they must safely absorb all stresses that occur during transport, the lifting operations and assembly and introduce them into the structural element.

A failure of lifting anchors and lifting anchor systems can endanger human lives as well as lead to significant damage. Therefore lifting anchors and lifting anchor systems must be manufactured with high quality, carefully selected and dimensioned for each application and installed and used in accordance with regulations by suitable personnel.

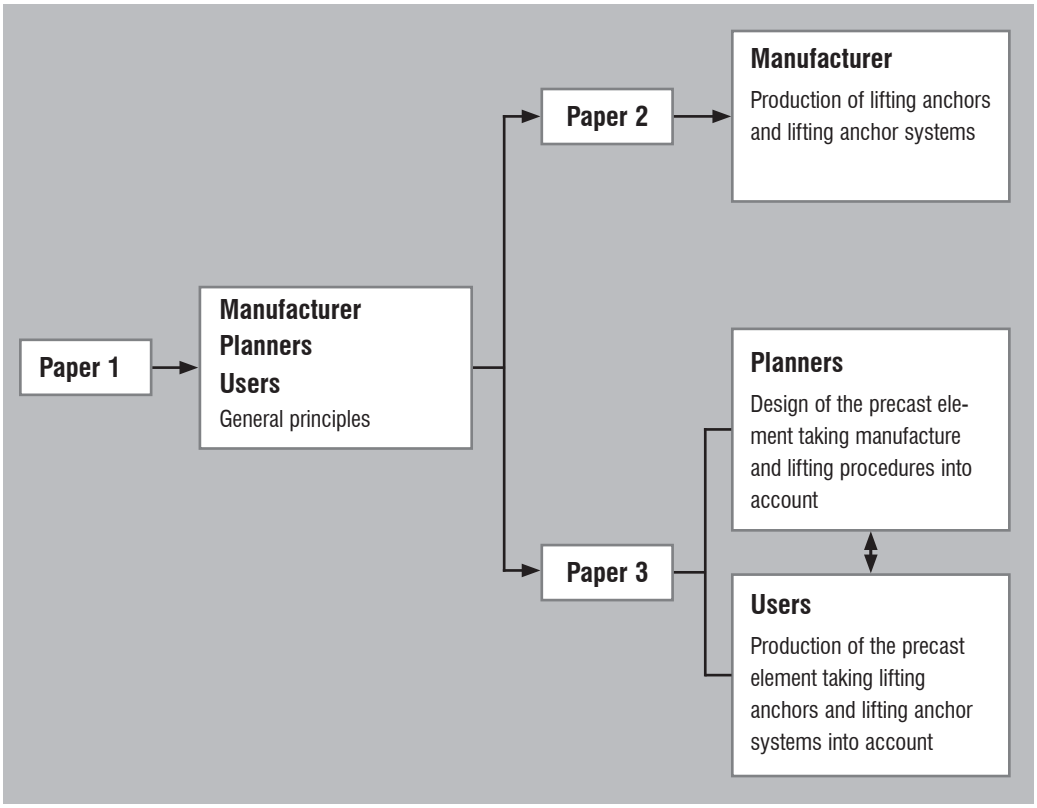
The use of transport anchors and transport anchor systems is intended to be for a single attachment of a precast concrete element. Multiple attachment within the transport chain from manufacturing of a precast element to the fitting comes within the definition of “single use”.

Legal basis

The PFEIFER thread system complies with all requirements of the VDI/BV-BS 6205 directive, paper 2. This directive was produced for the safe development, manufacture, testing, monitoring and use of lifting anchor systems for construction with precast concrete elements. It is divided into three parts:

Paper 1: General principles
Paper 2: Manufacture and placing on the market
Paper 3: Design and application

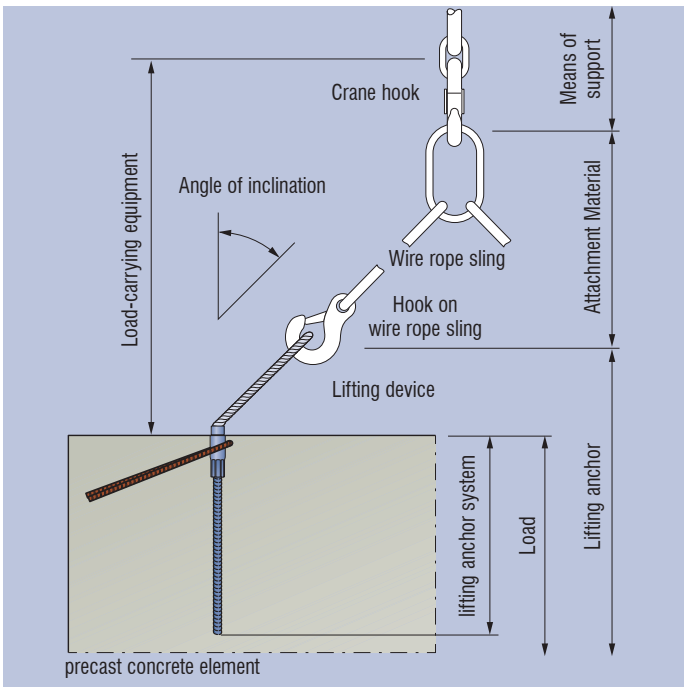
As shown in the following diagram, the three parts are relevant for different target groups



For the manufacturer of lifting anchors, paper 2 of this directive represents the first opportunity to meet the requirements of directive 2006/42/EC of the European Parliament and of the Council concerning machines, and thereby CE marking the products. Lifting anchor systems must comply with this directive to be able to be brought into the market. In particular the verification of safety in regard to concrete failure can now be defined and provided in a uniform way for each manufacturer. This enables the user and planner to have a consistent basis for dimensioning.

Term definitions

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



Means of support

Means of support are equipment permanently connected to the hoist for attaching lifting devices, attachment materials or loads.

Attachment Material

Equipment, not part of the hoist, that creates a link between the means of support and the load or between the means of support and the lifting device.

Lifting device

Equipment, not part of the hoist, that can be connected to the means of support of the hoist for taking up the load.

Lifting anchor

Steel item that is placed in the formwork before concreting and is concreted in, remains in the precast concrete element and is intended solely as an attachment point for attaching the precast concrete element directly to the means of support of the hoist or to the hoist through an intermediary lifting device or attachment material and does not have a function in the installed state of the structural element.

Lifting Anchor Systems

Construction units that consist of the part (lifting anchor) that remains long-term in the precast concrete element and the associated lifting device temporarily attached to it.

Safety concept

The stresses and resistances indicated in this VDI/BV-BS directive 6205 are to be understood as recommendations for creating an adequate level of safety, taking account of the European machinery directive. They are based on defect-free manufacture, fitting and dimensioning and on compliance with the rules of a quality management system.
Predictable incorrect use should be accounted for, partly also on the part of the manufacturer of the concrete element (text 3). Determination of the resistance of the lifting anchor incorporated into the concrete and of the necessary additional reinforcement must be done for all predicted directions of loading and possible types of failure in addition to the European machinery directive which considers steel failure only ostensibly and seemingly. In determining the permissible resistance of the anchorage of lifting anchors and lifting anchor systems, the concept of permissible loads (resistances) with global safety factors is to be applied. The safety concept requires the stress E not to exceed the admissible value of resistance R. The following evidence is to be provided:

$$E \leq R_{adm}$$

In this, the symbols are

E applied stress
R_{adm} admissible load (resistance)

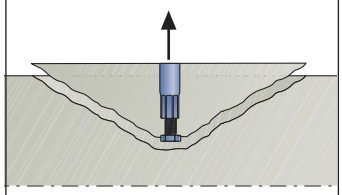
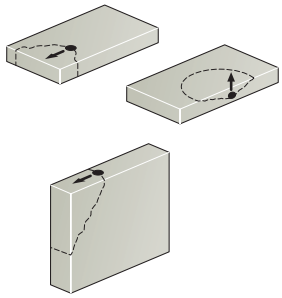
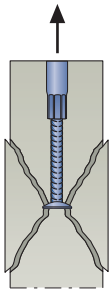
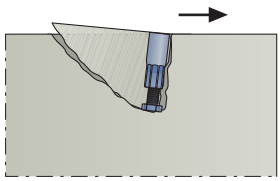
The admissible load (resistance) of the anchorage of lifting anchors and lifting anchor systems is determined, according to this directive, as follows:

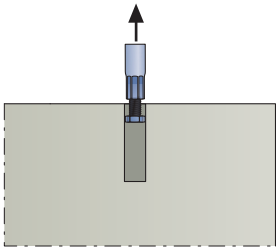
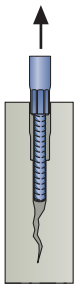
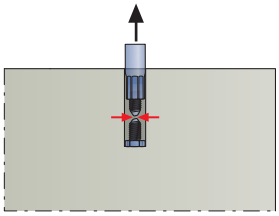
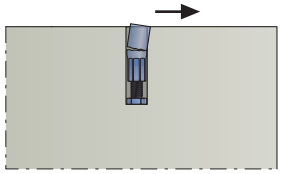
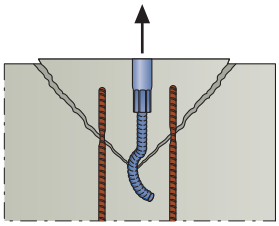
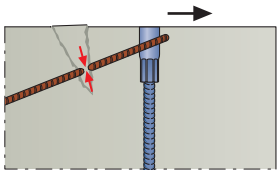
$$R_{adm} = R_{k/\gamma}$$

In this, the symbols are

R_k characteristic resistance of an anchorage
γ global safety factor, factor for covering uncertainties in stress and resistance

Possible types of failure of a lifting anchor

Failure type	Fracture pattern: tensile force	Fracture pattern: transversal shear force
concrete outbreak Type of failure characterised by a concrete breakout of wedge or cone shape, torn out of the anchor surroundings and starting at a lifting anchor.		
localised concrete outbreak (blow-out)) Concrete spalling at the side of the component that contains the anchor, at the level of the form-fitting load application by the lifting anchor into the concrete without a large concrete break-out at the concrete surface.		
rear breakout of concrete Failure type characterised by the concrete breaking out opposite the direction of stress, on lifting anchors with a shear load.		

Failure type	Fracture pattern: tensile force	Fracture pattern: transversal shear force
Failure type: pull-out Failure type identified by large shifts and a small concrete break-out near the surface, that can occur when the lifting anchor is pulled out of the concrete.		
Failure type: splitting Type of concrete failure in which the concrete splits along a plane that runs through the axis of the lifting anchor(s).		
Failure type: fracture of the lifting anchor steel Type of failure characterised by the fracture of steel parts of the lifting anchor.		
Failure type: failure of additional reinforcement Failure of steel of a reinforcement directly or indirectly loaded by the lifting anchor.		

Accounting for predictable incorrect uses

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

According to the Product Safety Act (Germany: ProdSG), not only hazards arising in correct use but also those in predictable incorrect use must be accounted for. Manufacturers and distributors of lifting anchor systems must reduce possible hazards by means of appropriate designs, markings and clear information in the instructions for installation and use.

Manufacturers of precast concrete elements can largely exclude hazards from predictable incorrect use by complying with the following conditions as in VDI//BV-BS 6205 Part 3:

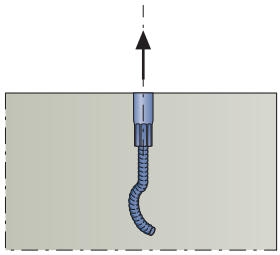
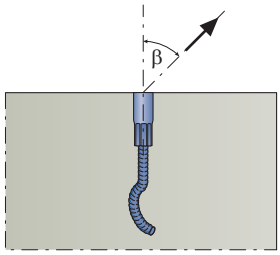
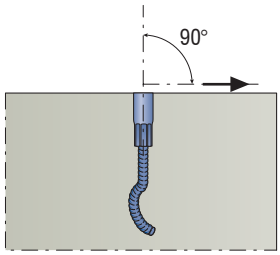
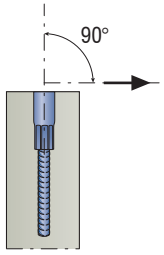
1. Installation of the anchors in accordance with the manufacturer's valid instructions for installation and use, with appropriate personnel as indicated by the planner.
2. The appropriate lifting devices are used.
3. All the required information is supplied to the transport and assembly operator in the form of written assembly instructions.
4. In the factory, suitable transporting and suitable storage are provided.

Planners of precast elements must include, in their assembly instructions, all the relevant loading cases from production through storage to transport and assembly into the building. These instructions must also include predictable incorrect usage. The built up documentation must be made available to the operators.

Dimensioning of lifting anchor systems

For the safe dimensioning of lifting anchor systems for precast concrete elements, the following points must be made clear at the start:
- The type of the structural element and the geometry
- Weight and location of centre of gravity of the structural element
- Directions of the loads on the anchor during the whole transport process, with all loading cases that occur.
- The static system of taking the loads

To determine the correct size of lifting anchor, the stresses in the direction of the wire rope sling must be determined for all load cases. These stresses must then be compared with the applicable resistance values for the type of loading case. Here, **stress ≤ resistance** always applies.

Directions of stress	
Straight pull Load or load components that act in the direction of the longitudinal axis of the lifting anchor.	
Parallel shear pull Simultaneous loading by an axial load and a transversal shear pull, acting at an angle β to the longitudinal axis of the lifting anchor in the plane of the component.	
Transversal shear pull parallel to the structural element plane Load or load component parallel to the surface of the building component and to the component plane, acting at an angle β perpendicular to the longitudinal axis of the lifting anchor.	
Transversal shear pull perpendicular to the structural element plane Load or load component parallel to the building component surface and perpendicular to the surface of the component.	

1. Force due to weight of precast element F_G

$$F_G = V \cdot \rho_G$$

with
V = volume of precast element in m^3
ρ_G = specific weight of concrete in kN/m^3

2. Formwork adhesion F_{adh}

$$F_{adh} = q_{adh} \cdot A_f$$

with
q_{adh} = base value of formwork adhesion as in Table 1
A_f = contact area between concrete and formwork in m^2

Table 1 – minimum values of formwork adhesion q_{adh}

Formwork type and surface texture	q_{adh} in kN/m^2
Lubricated steel formwork, lubricated plastic-coated shutter panel	≥ 1,0
Painted timber formwork	≥ 2,0
Bare timber formwork	≥ 3,0

3. Dynamics factor Ψ_{dyn}

During lifting, and also during transport, the lifting anchor systems are exposed to dynamic stresses that depend mainly on the type of hoist and the nature of the terrain. The following table gives approximate values for general dimensioning.

Table 2 – minimum values of dynamic factor Ψ_{dyn}

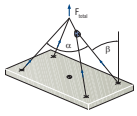
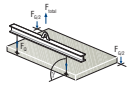
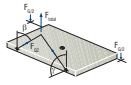
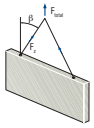
Boundary conditions	Dynamic factor Ψ_{dyn}
Tower crane, gantry, mobile crane	1,3
Lifting and transporting on even terrain	2,5
Lifting and transporting on uneven terrain	≥ 4

4. Shear pull factor z

Determination of increased load due to angle of inclination β to the vertical.

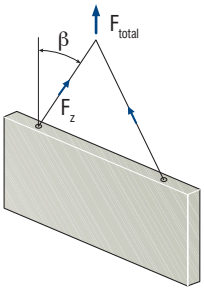
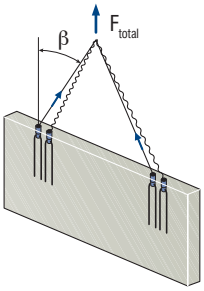
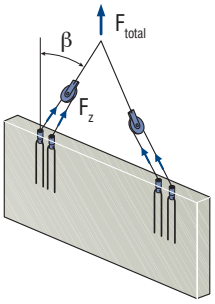
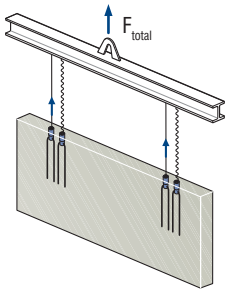
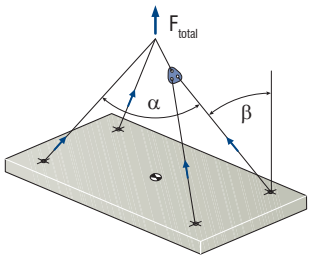
$$z = \frac{1}{\cos\beta}$$

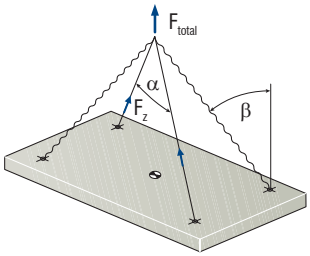
5. Providing verification

Load type	Calculation	Verification	
Lifting with formwork adhesion	$F_Z = \frac{(F_G + F_{adh}) \cdot z}{n}$	$F_Z \leq N_{R,\,adm}$	
Erecting	$F_Q = \frac{(F_G / 2) \cdot \Psi_{dyn}}{n}$	$F_Q \leq V_{R,\,adm}$	
	$F_{QZ} = \frac{(F_G / 2) \cdot \Psi_{dyn} \cdot z}{n}$	$F_{QZ} \leq V_{R,\,adm}$	
Transport	$F_Z = \frac{F_G \cdot \Psi_{dyn} \cdot z}{n}$	$F_Z \leq N_{R,\,adm}$	

n = number of lifting anchors sharing the load

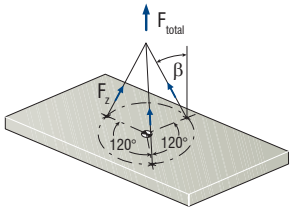
Example elements

Use	
	**Load type: Transport** - n = 2 - Shear pull factor z ≥ 1 (depends on angle β) - No formwork adhesion - Dynamic factor as per Table 2
	**Load type: Transport** - n = 2 (no compensation within the pairs of anchors) - Shear pull factor z ≥ 1 (depends on angle β) - No formwork adhesion - Dynamic factor as per Table 2
	**Load type: Transport** - n = 4 (compensation within the pairs of anchors) - Shear pull factor z ≥ 1 (depends on angle β) - No formwork adhesion - Dynamic factor as per Table 2
	**Load type: Transport** - n = 2 (no compensation within the pairs of anchors) - Shear pull factor z = 1 - No formwork adhesion - Dynamic factor as per Table 2
	**Load type: Lifting of formwork** - n = 4 - Shear pull factor z ≥ 1 (depends on angle β) - Formwork adhesion!! - no lifting load factor **Load type: Transport** - n = 4 - Shear pull factor z ≥ 1 (depends on angle β) - No formwork adhesion - Dynamic factor as per Table 2



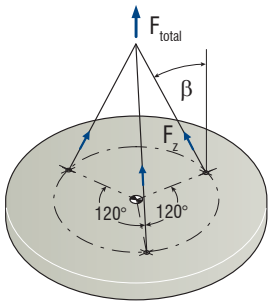
Load type: Lifting of formwork
- n = 2
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!!
- no lifting load factor

Load type: Transport
- n = 2
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Dynamic factor as per Table 2



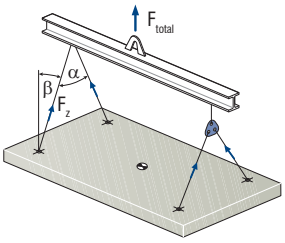
Load type: Lifting of formwork
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!!
- no lifting load factor

Load type: Transport
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Dynamic factor as per Table 2



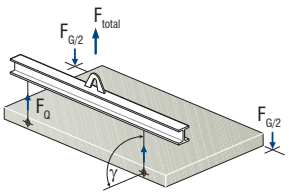
Load type: Lifting of formwork
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- no lifting load factor

Load type: Transport
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Dynamic factor as per Table 2



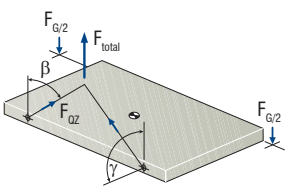
Load type: Lifting of formwork
- n = 4
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- no lifting load factor

Load type: Transport
- n = 4
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- Dynamic factor as per Table 2



Load type: Lifting of formwork
- n = 2
- Shear pull factor z = 1
- Formwork adhesion!
- no lifting load factor

Load type: Deposit/Erecting
- n = 2
- Shear pull factor z = 1
- No formwork adhesion
- Dynamic factor as per Table 2



Load type: Lifting of formwork
- n = 2
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- no lifting load factor

Load type: Deposit/Erecting
- n = 2
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Dynamic factor as per Table 2

Installation

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

To ensure adequate bonding, install only clean, oil-free lifting anchors with no deposit build-up and non-greased steel wire cables. If there is any doubt they must be carefully cleaned.
Installation of the lifting anchors must be as indicated by the manufacturer's installation instructions and by the planner and be done by qualified personnel.

Subsequent insertion of lifting anchors into the fresh concrete must be done competently and should be the exception. In particular it is only permissible if:
- no additional reinforcement is necessary to ensure the carrying capacity and
- the concrete is still sufficiently fluid that it can be properly compacted to ensure bonding

Suitable/qualified personnel

Personnel who, through professional training, professional experience and recent professional activity, have the required specialist knowledge, have been instructed about the required work and are mentally and physically suited and who can be expected to perform the required actions reliably.

The marking of the lifting anchor must also be clearly recognisable after installation in the precast element. This can easily be done by attaching the data clips. In each case the durable and clearly recognisable identification of the lifting anchor must ensure an unambiguous assignment of the compatible lifting device.

Use

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

Before lifting the precast elements, care must be taken to ensure that compatible lifting devices are used, taking account of the PFEIFER instructions for installation and use of the thread system.
Incorrectly installed or dirty lifting anchors or any with damage such as worn threads, corrosion or visible distortion must not be used for attachment.
The load capacity of lifting anchors can also be affected by damage to the concrete element (cracks, chips). In these cases an assessment by qualified personnel is required.
Transporting and assembling the precast elements must be done by qualified personnel and with regard to the indications of the planner.
The specifications in the transport and assembly instructions as in VDI/BV-BS 6205 section 6.8 must be followed.

Closing the anchors or recesses

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS

After they have been used, anchors should be closed by appropriate means.
There are many options available for this, with plastic or metal caps and seals.

CE

EC Declaration of Conformity

according to the EC machinery directive 2006/42/EC, appendix II 1AII 1A

The manufacturer

PFEIFER Seil- und Hebetechnik GmbH
Dr.-Karl-Lenz-Strasse 66
D-87700 Memmingen

declares that the lifting devices ‚PFEIFER thread system' according to article 2d), consisting of the following system components:

PFEIFER lifting loop, Rd 12, 14, 16, 18, 20, 24, 30, 36, 42, 52
PFEIFER-flared lifting loop, Rd 16, 20, 24, 30, 36
PFEIFER swivel eye, Rd 12, 14, 16, 18, 20, 24, 30, 36, 42, 52, 56, 60
PFEIFER special lifting loop, Rd 12, 14, 16, 18, 20, 24, 30, 36, 42, 52, 56, 60
PFEIFER waved anchor long, Rd 12, 14, 16, 18, 20, 24, 30, 36, 42, 52, 56, 60
PFEIFER bar anchor, Rd 12, 14, 16, 18, 20, 24, 30, 36, 42, 52
PFEIFER socket, Rd 12, 14, 16, 18, 20, 24, 30, 36, 42, 52
PFEIFER waved anchor short, Rd 12, 14, 16, 18, 20, 24, 30, 36, 42
PFEIFER bolt anchor, Rd 12, 14, 16, 18, 20, 24, 30
PFEIFER flat steel anchor, Rd12, 14, 16, 18, 20, 24, 30, 36, 42, 52
PFEIFER sandwich lifting anchor Rd 20, 24, 30, 36, 42, 52
PFEIFER repair kit, Rd 16, 20, 30

on the basis of their design and construction are compliant with the requirements of the **directive 2006/42/EC of the European Parliament and the Council of 17th May 2006 concerning machines and with the amendment to the directive 95/16/EC** (in short: EC machinery directive 2006/42/EC).

Applied harmonised standards
– EN ISO 12100:2011-03
Safety of machinery – general design principles – risk assessment and risk reduction

Other applied standards or specifications
– Directive VDI/BV-BS 6205:2012-04
Lifting anchors and lifting anchor systems for precast concrete elements
principles, design, applications

The person responsible for the creation and maintenance of the technical documentation is
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PFEIFER Seil- und Hebetechnik GmbH
Memmingen, 30.01.2014

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Manager, Development Connecting and Lifting Systems

PFEIFER

THESE ARE OUR PRODUCT LINES


Lifting Anchor Systems
Thread System


Lifting Anchor Systems
BS Anchor System


Lifting Anchor Systems
WK Anchor System


Fixing Systems
DB Anchor 682
for Permanent Fixing


Fixing Systems
Socket Dowels
Polyamide Sockets


Fixing Systems
HK Assembly Anchor System


Connection Systems
Column Shoe System
Wall Shoe System


Connection Systems
Stell Bearing
Staircase Bearing VarioSonic


Connection Systems
Sandwich Anchor System
Delta Anchor System


Connection Systems
Concrete Earthing System BEB


Reinforcement Systems
VS®-Wire Rope Loop System


Reinforcement Systems
PH Reinforcement Continuity System


Cable Tension Members
Tension Rod System


Attachment Materials
(Wire Ropes, Chains, Textiles)


Lashing Systems


Grabs for Reinforcing Steel
Balancing Spreader Beams

This document is superseded when a new edition appears at www.pfeifer.de.

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