PFEIFER

If you want to get hold of your concrete structural elements reliably and fast ...

02/2017

PFEIFER WK System

PFEIFER
SEIL- UND HEBETECHNIK
GMBH

DR.-KARL-LENZ-STRASSE 66
D-87700 MEMMINGEN
PHONE Technical support 0 83 31-937-345
Sales 0 83 31-937-231
FAX 0 83 31-937-342
E-MAIL export-bt@pfeifer.de
INTERNET www.pfeifer.de

PFEIFER – Quality that lifts off

“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. All our activities can be traced back to lifting, attaching and securing with 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.

Our performance is based on quality through competence. We have always gained, and retained, 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, we have a comprehensive body of knowledge and innovative strength. To be able to pass on this application knowledge to customers, we have trained a network of consulting engineers with this expert knowledge. Our technical experts can advise you about the products, develop economical and safe suggestions and solutions for installations – even for the trickiest applications.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Contents

With a sure grasp, fast and efficient

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

With PFEIFER you have many advantages

Comprehensive product range

- Practically all application cases are covered with suitable products
- Shorter-length anchors when the existing reinforcement can be used
- Fast, safe attachment with the PFEIFER WK Quicklift
- Load classes from 1.3 up to 20.0 tonnes

Technologically right up to date

- Continuous further developments and optimizations of products and conditions of use
- Design of all components compliant with the VDI/BV-BS directive 6205 and therefore CE-compliant
- Regular training seminars on the use of lifting anchors
- User-friendly documentation without huge amounts of text

Quality and safety

- Design and production of all WK system components, and installation instructions, compliant with the EC machinery directive
- DIN ISO 9001 certification
- Only raw materials specified by PFEIFER and specifically suitable for compressing are used
- Made in Germany
- Continuous production monitoring
- Monitoring of suitability testing by accredited bodies

Efficiency

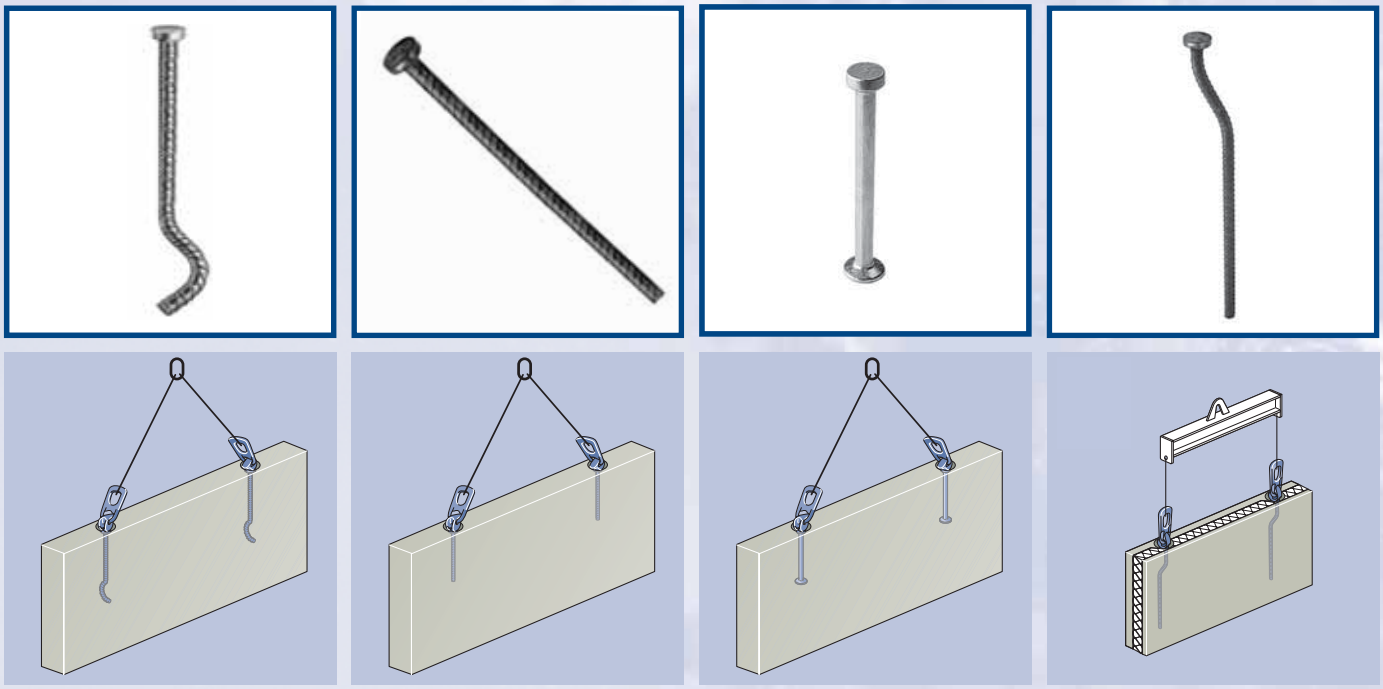
- Reliable lifting devices for quickest attachment
- High durability from selected quality materials

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

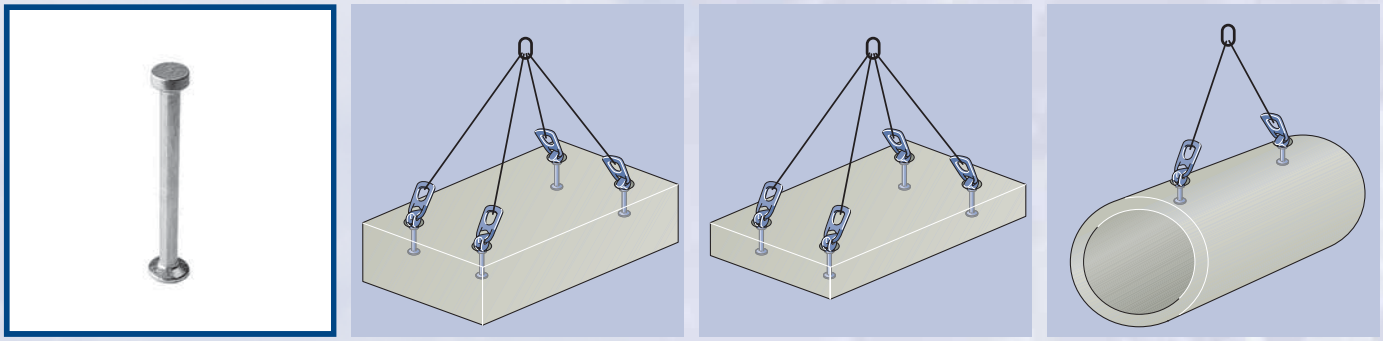
Qualifying:
which lifting anchor will you enter in the race?

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

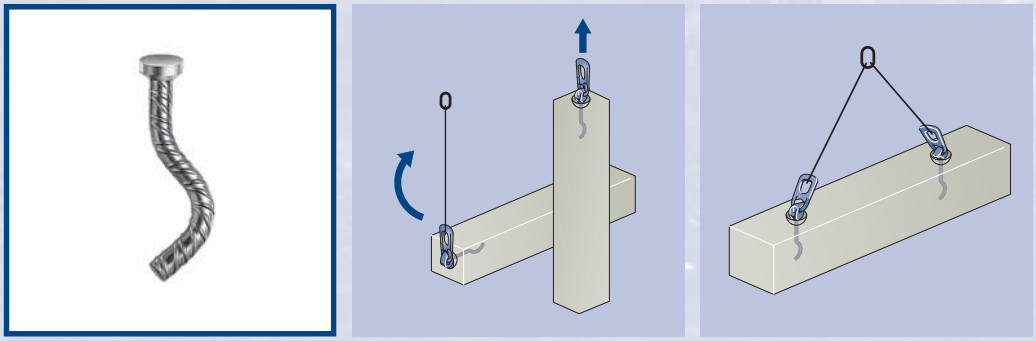
Installation in the edge of structural elements, for sandwich elements



Installation in the face of structural elements and for pipes

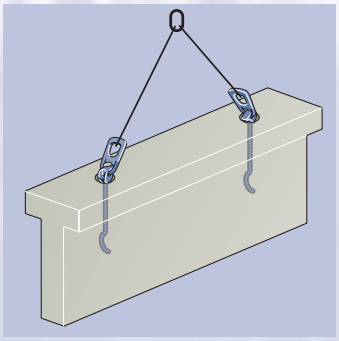


Installation in heavily reinforced structural column elements

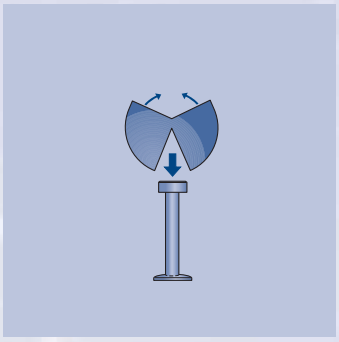


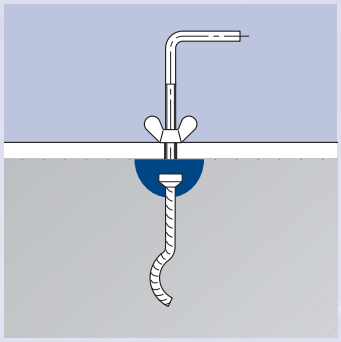
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Installation in girder

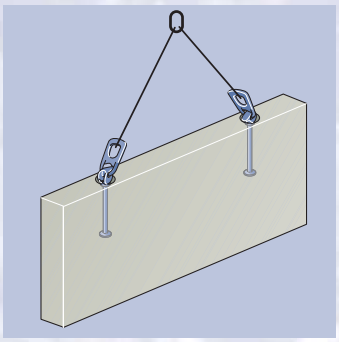


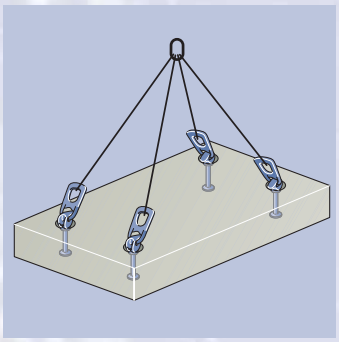
Accessories

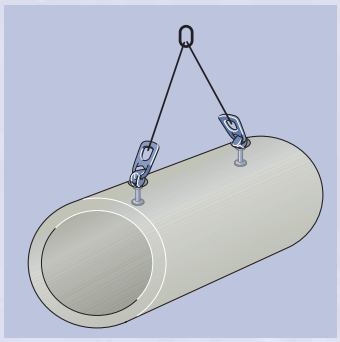




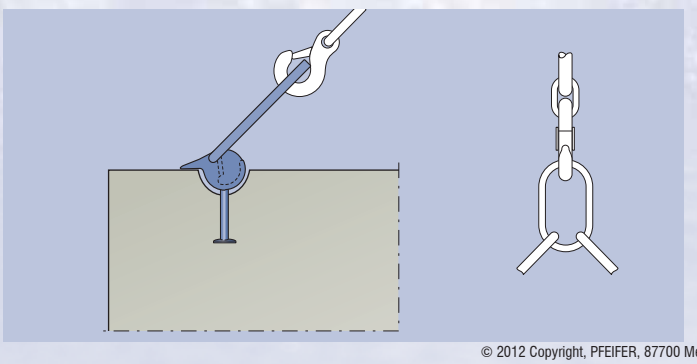
Lifting device







General Technical Info



© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER WK Anchor, long

Item-No. 05.185

Can be used for:
- on the face installation in flat elements

Usable by:
- trained and qualified personal

PFEIFER-WK anchors in long shape are provided in combination with the WK Quicklift as lifting anchors of reinforced wall components. The geometrical shape of the anchors enables installation in thin elements combined with low reinforcement effort.

PFEIFER

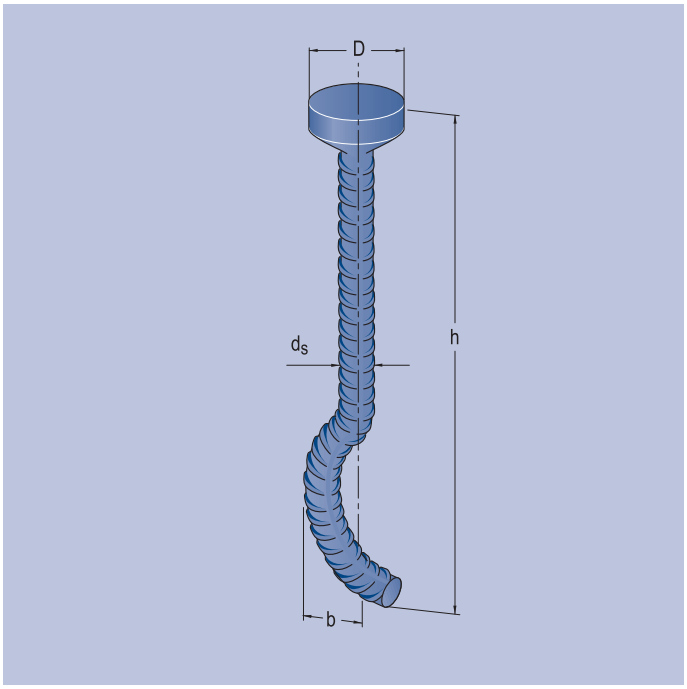
WK System

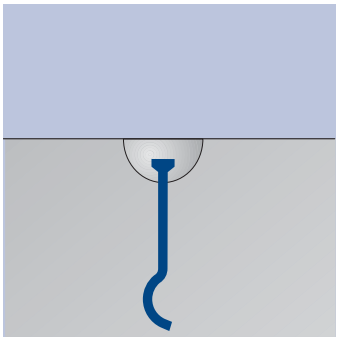
WK Anchor

Advantages: Safe load application, unambiguous assignment through the letter code marking

Material:
Forged steel, black

Made in Germany





Ref. No., plain	Type/Size	$N_{R,adm}$ [kN]	Dimensions [mm]				weight [kg/piece]
			d_S	D	h	b	
05.185.020.350.2	WK 2.0	20	14	26	350	32	0.47
05.185.025.400.2	WK 2.5	25	14	26	400	32	0.52
05.185.040.450.2	WK 4.0	40	20	36	450	45	1.24
05.185.063.570.2	WK 6.3	63	25	47	570	42	2.44
05.185.080.620.2	WK 8.0	80	28	47	620	52	3.23
05.185.100.900.2	WK 10.0	100	28	47	900	52	4.56
05.185.150.1200.2	WK 15.0	150	36	70	1200	73	10.26
05.185.200.1400.2	WK 20.0	200	40	70	1400	82	14.70

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER WK Bar Anchor

Artikel Nr. 05.182

Can be used for:
- on the face installation in flat elements

Usable by:
- trained and qualified personal

PFEIFER

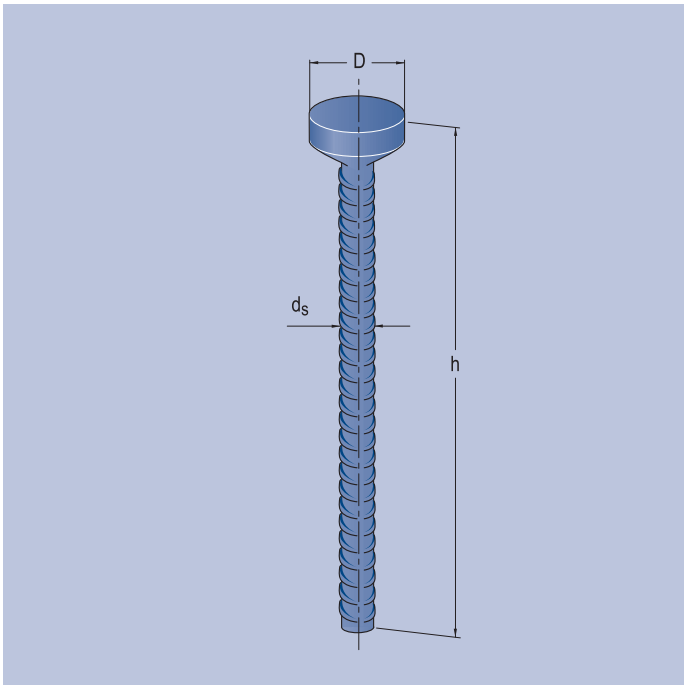
WK System

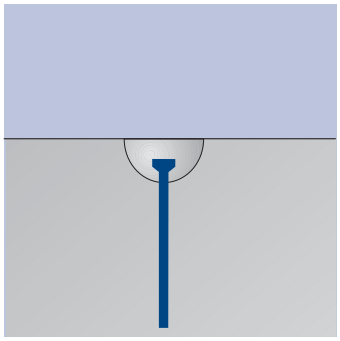
WK Anchor

PFEIFER-WK bar anchors are provided in combination with the WK Quicklift as lifting anchors of reinforced wall components. The straight bar end of the anchors facilitates installation in thin elements i ensures compound anchorage.

Advantages: Safe load application, unambiguous assignment through the letter code marking

Material:
Forged steel, black





Ref. No., plain	Type/Size	$N_{R,adm}$ [kN]	Dimensions [mm] d_S	D	h	weight [kg/piece]
05.182.020.380.2	WK 2.0	20	14	26	380	0,49
05.182.025.470.2	WK 2.5	25	14	26	470	0,60
05.182.040.520.2	WK 4.0	40	20	36	520	1,35
05.182.063.690.2	WK 6.3	63	25	47	690	2,81
05.182.080.840.2	WK 8.0	80	28	47	840	4,20
05.182.100.920.2	WK 10.0	100	28	47	920	4,50
05.182.150.1200.2	WK 15.0	150	36	70	1200	10,1
05.182.200.1400.2	WK 20.0	200	40	70	1400	14,3

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER DR Anchor

Item No. 05.180

Can be used for:
- on the face installation in flat elements

Usable by:
- trained and qualified personal

PFEIFER

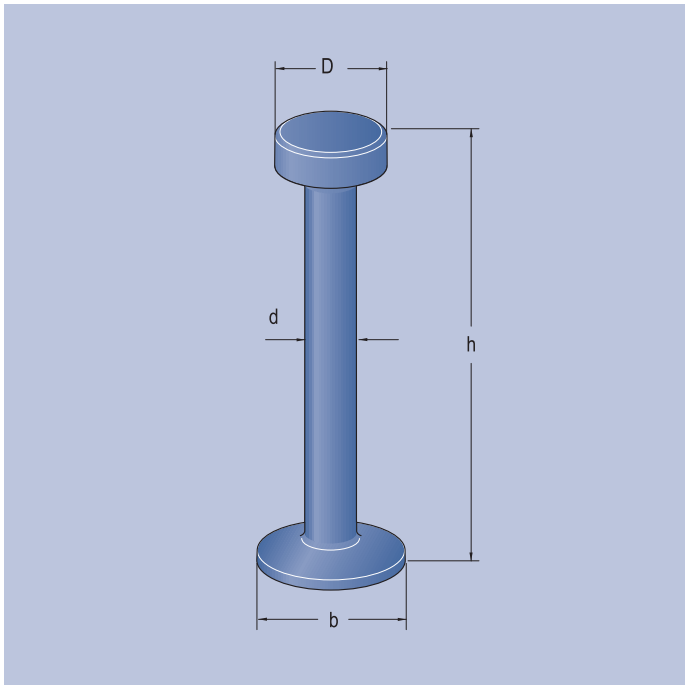
WK System

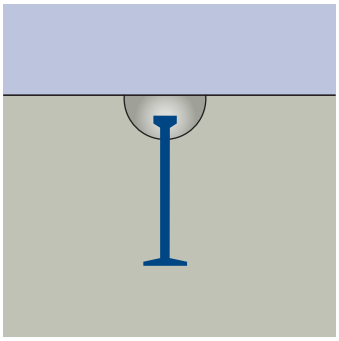
DR Anchor

The PFEIFER DR Anchor for walls, tubes and floors is intended, in combination with the PFEIFER WK Quicklift, to be an anchor in the WK System. The length of these anchors can be matched to the application and optimally selected for safe load application.

Advantages: Safe load application, unambiguous assignment through the letter code marking

Material:
Forged steel, black





Ref.-No.	Type/Size	$N_{R,adm}$* [kN]	Dimensions [mm] h	D	d	b	Weight approx. [kg/piece]
05.180.013.120.2	DR 1.3	13	120	18	10	25	0,10
05.180.025.170.2	DR 2.5	25	170	25	14	35	0,27
05.180.050.240.2	DR 5.0	50	240	36	20	50	0,76
05.180.075.300.2	DR 7.5	75	300	46	24	60	1,36
05.180.100.340.2	DR 10.0	100	340	46	28	70	1,98
05.180.150.400.2	DR 15.0	150	400	69	34	85	3,70
05.180.200.500.2	DR 20.0	200	500	69	39	99	5,87

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER DR Anchor with eye

Item-No. 05.187

Can be used for:
- on the face installation in flat elements

Usable by:
- trained and qualified personal

The PFEIFER DR Anchor with eye is intended, in combination with the PFEIFER WK Quicklift, to be an anchor for the transport of wall-type precast concrete elements. Anchoring of the load is done with the retention reinforcement provided by the customer.

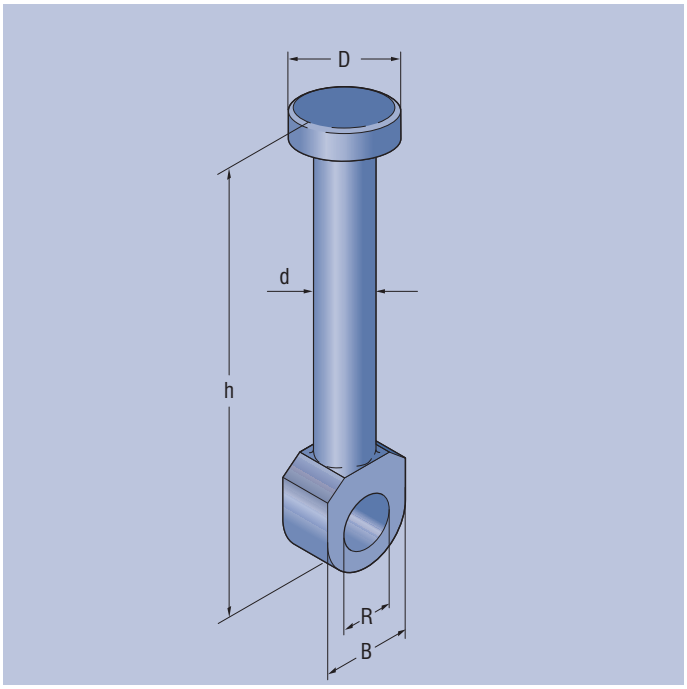
PFEIFER

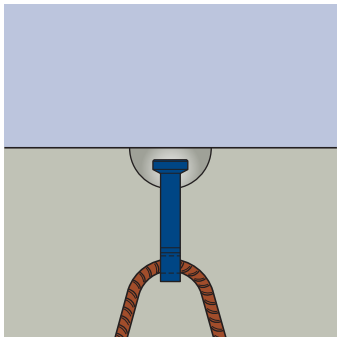
WK System

DR Anchor

Advantages: Safe load application, unambiguous assignment through the letter code marking

Material:
Forged steel, black





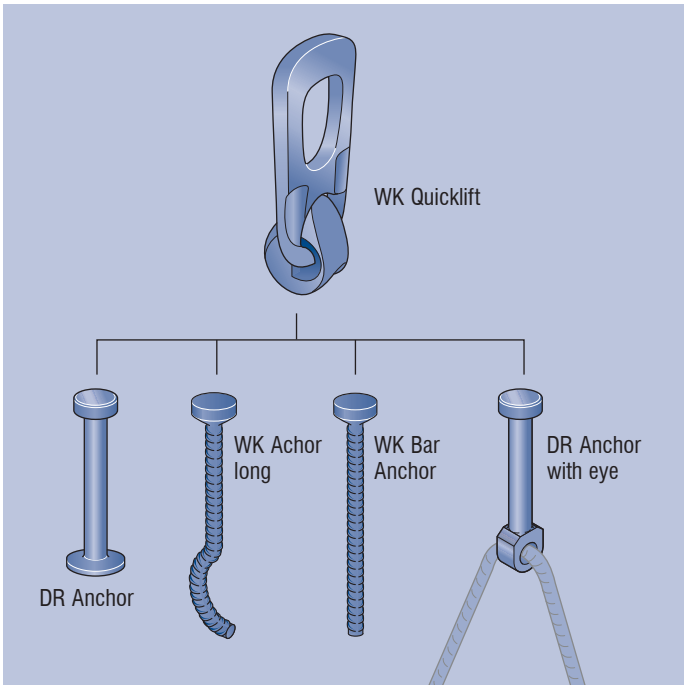
Ref.-No.	Type/Size	$N_{R,adm}$ [kN]	Dimensions [mm] h	D	d	B	R	Weight approx. [kg/piece]
05.187.013.065.2	DR 1.3	13	65	18	10	22	10	0,06
05.187.025.090.2	DR 2.5	25	90	25	14	32	15	0,16
05.187.050.120.2	DR 5.0	50	90	36	20	43	20	0,43
05.187.100.180.2	DR 10.0	100	115	46	28	63	31	1,17

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Instructions for installation and use for slab edge installation

System

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS



The DR/WK Anchor and the PFEIFER WK Quicklift are a variant of the WK System for transporting precast wall panels.

Notice: DR/WK Anchors were developed for a single time-limited use and must not be re-used. Re-attachment several times within one road transport chain from manufacture to assembly of a pre-cast concrete element is not classed as repeated use.

Notice: The term “size” corresponds to the load classes of VDI-BV-BS 6205.

Warning: The WK Quicklift must not be changed or modified in any way. Any modification can lead to reduced safety or even failure of the anchors and the fall of the structural element. Repair work is not permissible and discarded lifting devices must be disposed of.

Safety

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

The following working coefficient 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.

– Cable failure: $\gamma_s = 4{,}0$

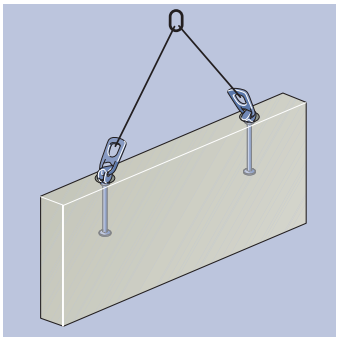
– Concrete failure: $\gamma_c = 2{,}1$

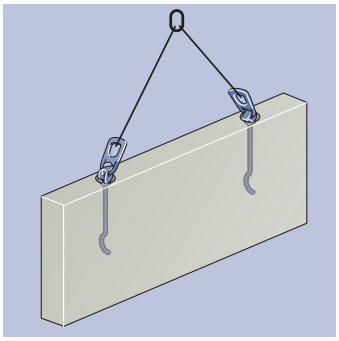
– Working coefficient (load side): $\psi_{dyn} = 1{,}3$

Notice: Lifting anchor for precast elements from constantly monitored factory production

Intended use

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS





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

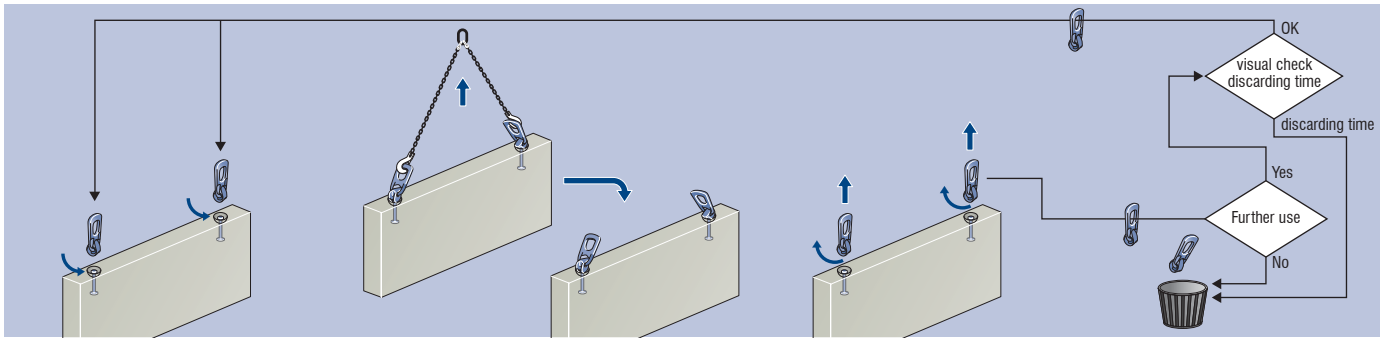
Warning: The use of accessories that are not part of this system, those of other manufacturers in particular, can reduce the carrying capacity and even result in the structural element falling. This causes a hazard to life and limb. Use only components of the PFEIFER WK System.

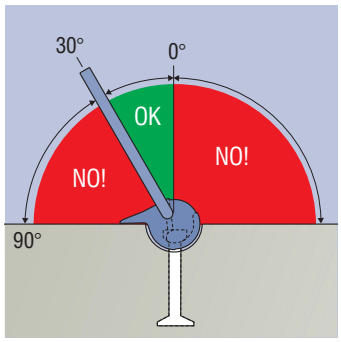
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

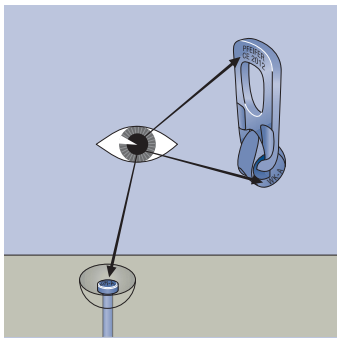
Use

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

Warning: Transversal shear load on DR Anchors is not permissible and can lead to failure of the anchor and hence to the structural element falling. This causes a hazard to life and limb. Anchors must be loaded only according to regulations.







Warning: Apply loads to the WK Quicklift only in the direction given in the instructions for installation and use. Loading outside the authorised angle range results in lower safety levels and represents a hazard to life and limb.

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.

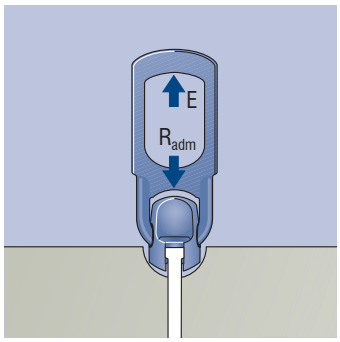
Notice: Use the markings on the anchor and lifting device to check that the system parts belong together.

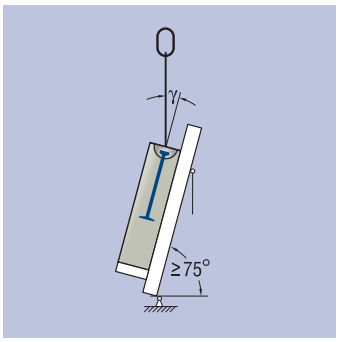
Information on the markings:
- Type/Size
- Year of manufacture
- EC marking
- Manufacturer

Dimensioning

$$E \leq R_{adm}$$

Notice: Dimensioning by a trained technical expert according to VDI/BV-BS 6205





Notice: When lifting from a tilting table at an angle $\gamma \leq 15°$, no special reinforcement is required. A transversal shear pull at more than 15° is not permissible.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

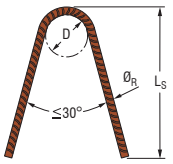
Table 1 – admissible resistance values DR Anchors and required reinforcement

	Type/Size	Anchor height h [mm]	$N_{R,adm}$ [kN]	Surface reinforcement pos. 1 [mm²/m]	Stirrup B 500 B – Pos.2				Long. reinf. pos. 3	
					n [-]	$Ø_B$ [mm]	L [mm]	S [mm]	S_1 [mm]	$Ø_L$ [mm]
	**DR 1.3**	120	13	1 x 188	2	8	700	–	30	2 x 8
	DR 2.5	170	25	2 x 188	2	8	750	–	50	2 x 8
	DR 5.0	240	50	2 x 188	2	10	950	–	75	2 x 10
	DR 7.5	300	75	2 x 188	4	10	1050	100	75	2 x 12
	DR 10.0	340	100	2 x 188	4	10	1050	100	75	2 x 14
	DR 15.0	400	150	2 x 335	6	12	1200	100	100	2 x 14
	DR 20.0	500	200	2 x 424	6	12	1500	100	100	2 x 14

Table 2 – admissible resistance values DR Anchors with eye and required reinforcement

	Type/Size	Anchor height h [mm]	$N_{R,adm}$ [kN]	Surface reinforcement pos. 1 [mm²/m]	Stirrup B 500 B – Pos.2				Long. reinf. pos. 3	
					n [-]	$Ø_B$ [mm]	L [mm]	S [mm]	S_1 [mm]	$Ø_L$ [mm]
	**DR 1.3**	65	13	1 x 188	2	8	700	–	30	2 x 8
	DR 2.5	90	25	2 x 188	2	8	750	–	50	2 x 10
	DR 5.0	90	50	2 x 188	2	10	950	–	75	2 x 10
	DR 10.0	115	100	2 x 188	4	10	1050	100	75	2 x 14

Table 3 – retention reinforcement, Eye Anchor

	Type/Size	Retention reinforcement			Retention reinforcement Eye Anchor
		L_S [mm]	D [mm]	$Ø_R$ [mm]	
	**DR 1.3**	400	40	8	
	DR 2.5	500	48	12 (13)	
	DR 5.0	850	64	16	
	DR 10.0	1000	140	25	

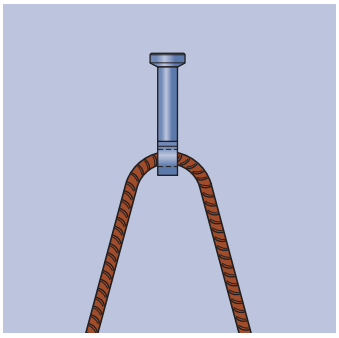
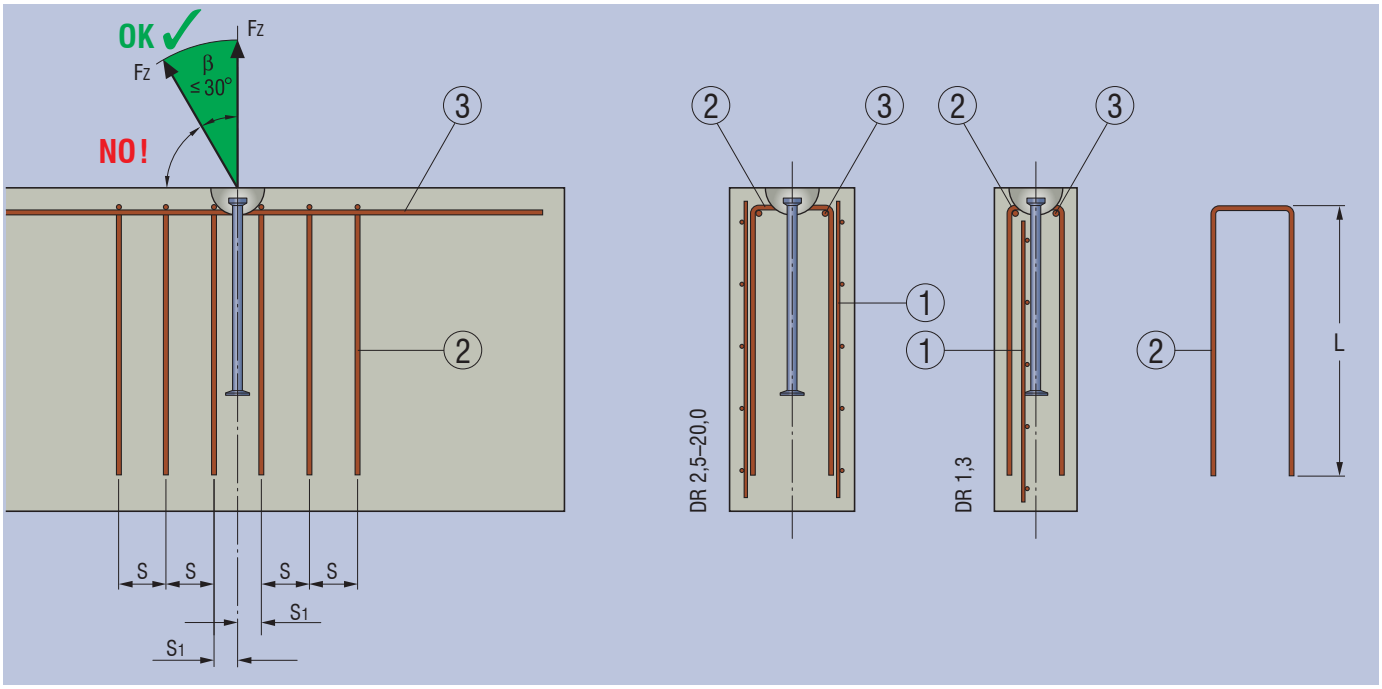


Table 4 – permissible resistances i required reinforcement WK anchors, long shape and WK bar anchor

	Type/Size	Anchor height h WK anchor, long shape WK bar anchor [mm]	$N_{R,adm}$ [kN]	Surface reinforcement (cross-wise) pos. 1 [mm²/m]	Stirrup B500S – Pos.2				Long. reinf. pos. 3	
					n [-]	$Ø_B$ [mm]	L [mm]	S [mm]	S_1 [mm]	$Ø_L$ [mm]
	**WK 2.0**	350/380	20	2 x 188	2	8	540	–	30	2 x 8
	WK 2.5	400/470	25	2 x 188	2	8	540	–	50	2 x 8
	WK 4.0	450/520	40	2 x 188	2	10	680	–	50	2 x 10
	WK 6.3	570/630	63	2 x 188	4	10	680	100	75	2 x 12
	WK 8.0	620/840	80	2 x 188	4	10	680	100	75	2 x 14
	WK 10.0	900/920	100	2 x 188	4	10	680	100	75	2 x 14
	WK 15.0	1200/1200	150	2 x 188	6	12	815	100	100	2 x 14
	WK 20.0	1400/1400	200	2 x 188	6	12	815	100	100	2 x 14

Notice: Installation only necessary from > 12.5°!

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017



Notice: Analogously this picture is valid for DR Eye Anchor / WK Anchor, long and WK Bar Anchor as well. Using the DR Eye Anchor the additional reinforcement based on table 3 has to be used.

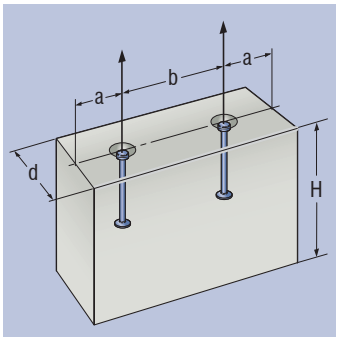


Table 5 – minimum dimensions and distances for DR Anchors

Type/Size	Anchor height h [mm]	Edge distance a [mm]	Minimum spacing b [mm]	Min. element height H [mm]	Min. element thickness d [mm]
DR 1.3	120	390	390	440	80
DR 2.5	170	445	445	800	100
DR 5.0	240	765	765	1000	160
DR 7.5	300	945	945	1100	180
DR 10.0	340	1065	1065	1100	240
DR 15.0	400	1245	1245	1250	350
DR 20.0	500	1545	1545	1550	450

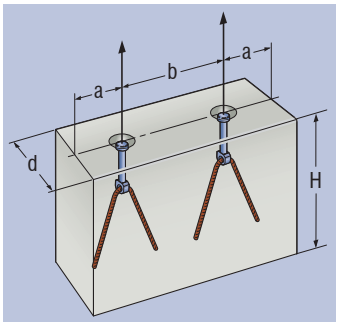


Table 6 – minimum dimensions and distances for DR Anchors with eye

Type/Size	Anchor height h [mm]	Edge distance a [mm]	Minimum spacing b [mm]	Min. element height H [mm]	Min. element thickness d [mm]
DR 1.3	65	250	500	750	80
DR 2.5	90	300	600	800	100
DR 5.0	90	400	800	1000	160
DR 10.0	115	600	1200	1200	240

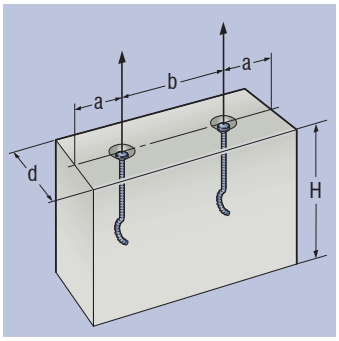


Table 7 – minimum dimensions spacings for WK anchors, long shape / WK bar anchors

Type/Size	Anchor height h [mm]	Edge distance a [mm]	Minimum spacing b [mm]	Min. element height H [mm]	Min. element thickness d [mm] 0° – ≤12,5° [mm]	Min. element thickness d [mm] >12,5°– 30° [mm]
WK 2.0	350/380	275	550	440	90	100
WK 2.5	400/470	300	600	800	100	100
WK 4.0	450/520	350	700	1000	120	140
WK 6.3	570/630	500	1000	1000	130	180
WK 8.0	620/840	500	1000	1100	140	200
WK 10.0	900/920	600	1200	1100	140	240
WK 15.0	1200/1200	1250	2500	1300	150	350
WK 20.0	1400/1400	1600	3200	1500	200	450

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

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

The WK sandwich lifting anchors from PFEIFER are part of the tried and tested PFEIFER-WK anchor system. The anchors are especially intended for the lifting and staggering of sandwich panels and are installed at the top face end of the load bearing layer. They offer PFEIFER customers a professional solution for this application case too.

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.
- 5 sizes from WK2.0 to WK15.0 available
- only one version for every position of the center of gravity

Safety

- In-process Quality Assurance using QA test plans: Tensile tests, dimensional checks
- Strictly defined manufacturing processes

Made in Germany

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

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER-WK sandwich lifting anchor

Item-No. 05.182

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

For use by:
- trained and qualified personal

PFEIFER

WK System

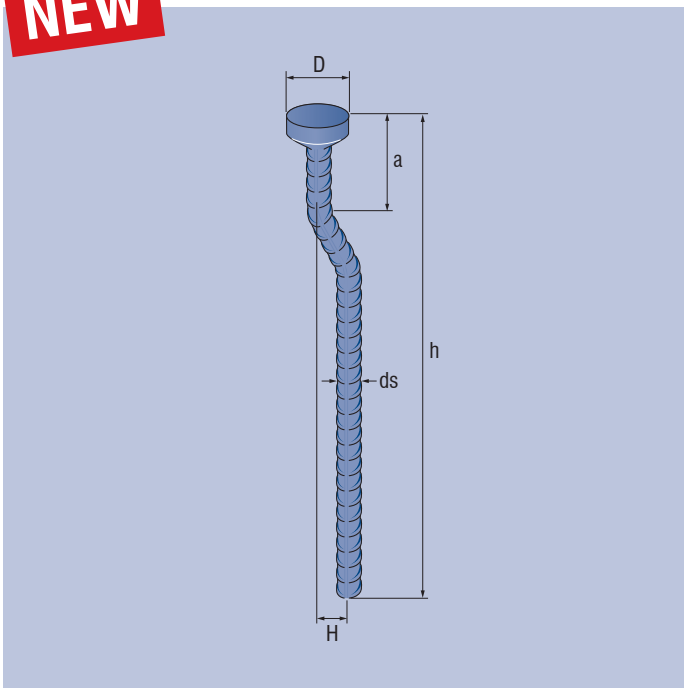
Lifting anchor

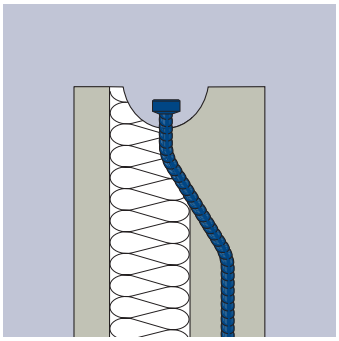
The WK sandwich lifting anchors are part of the tried and tested PFEIFER-WK anchor system.
It is designed for lifting and moving sandwich panels and is inserted from the top into the front side of the load bearing layer.

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:
Forged steel,
black

NEW





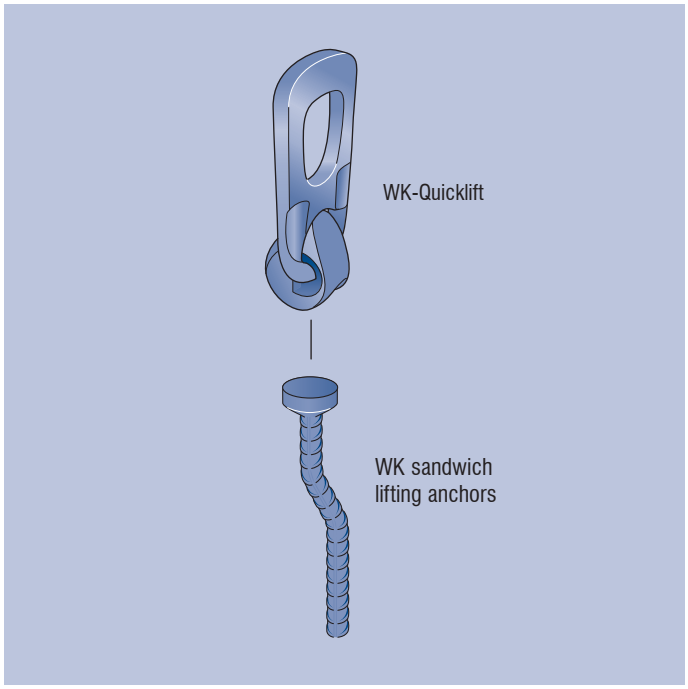
Ref. no. galvanized	Type/ Size	$N_{R,adm}$ [kN]	Dimensions [mm] D	d_S	a	H	h	Weight approx. [kg/piece]
05.182.020.690.2	WK 2.0	20	26	14	140	100	690	0,49
05.182.040.855.2	WK 4.0	40	36	20	140	120	855	1,35
05.182.063.1085.2	WK 6.3	63	47	25	140	120	1085	2,81
05.182.080.1185.2	WK 8.0	80	47	28	195	125	1185	4,20
05.182.150.1380.2	WK 15.0	125	70	36	235	140	1380	10,1

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Instructions for installation and use for front-sided installation

System

FOR PLANNERS, FOR PRECAST PLANTS, FOR USERS



The DR/WK Anchor and the PFEIFER WK Quicklift are a variant of the WK System for transporting precast wall panels.

Notice: WK Anchors were developed for a single time-limited use and must not be re-used. Re-attachment several times within one road transport chain from manufacture to assembly of a precast concrete element is not classed as repeated use.

Notice: The term “size” corresponds to the load classes of VDI-BV-BS 6205.

Warning: The WK Quicklift must not be changed or modified in any way. Any modification can lead to reduced safety or even failure of the anchors and the fall of the structural element. Repair work is not permissible and discarded lifting devices must be disposed of.

Safety

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

The following working coefficient 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.

– Cable failure: $\gamma_s = 4{,}0$

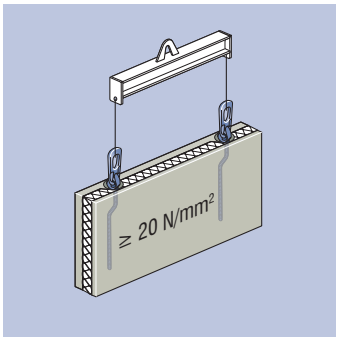
– Concrete failure: $\gamma_c = 2{,}1$

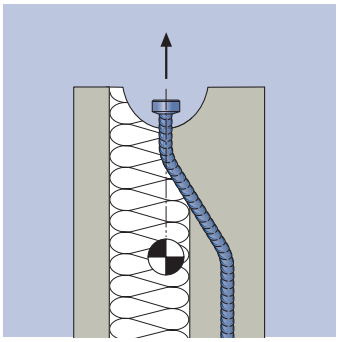
– Working coefficient (load side): $\psi_{dyn} = 1{,}3$

Notice: Lifting anchor for precast elements from constantly monitored factory production

Intended use

FOR PLANNERS, FOR PRECAST COMPANIES, FOR USERS





Notice: Due to the cropped shape, the anchor head can be positioned directly above the centre of gravity outside the centerline of the load bearing layer, even in the area of the insulation.

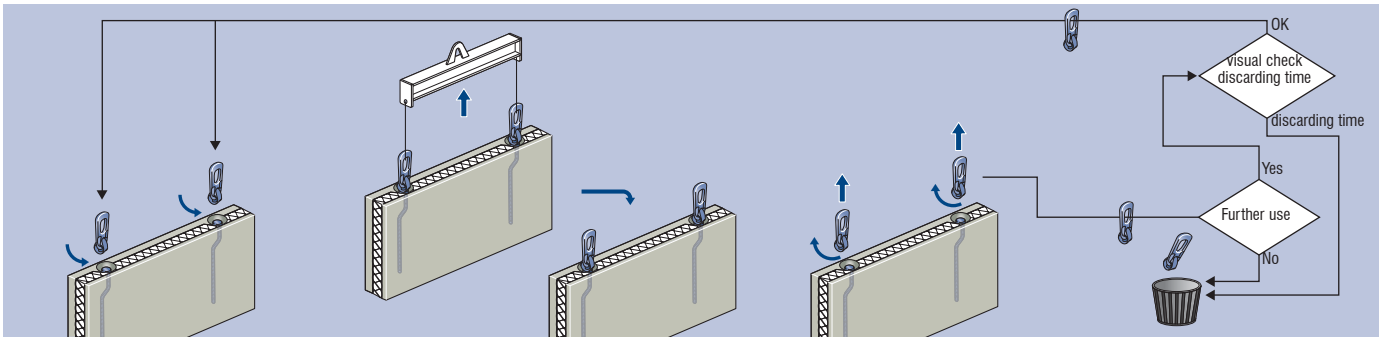
Warning: The use of non-matched system components can cause reduced safety levels and hazards to life and limb. Use exclusively PFEIFER components that are matched to each other!

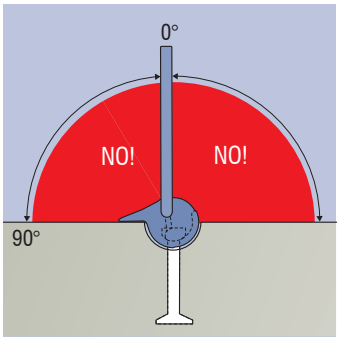
Notice: The cropped shape means that the socket axis is situated directly above the centre of gravity outside the central line of the load bearing layer, even in the insulation area.

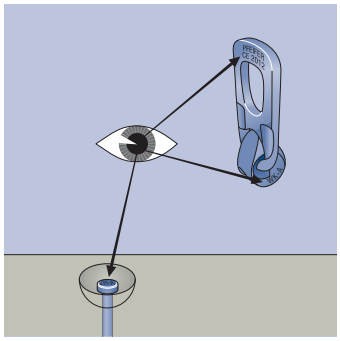
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Intended use

Tensile load	0 – 12,5°
Transversal shear load	**NO!**
Temperature	-20 to 80 °C







Warning: Apply loads to the WK Quicklift only in the direction given in the instructions for installation and use. Loading outside the authorised angle range results in lower safety levels and represents a hazard to life and limb.

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.

Notice: Use the markings on the anchor and lifting device to check that the system parts belong together.

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

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

$$E \leq R_{adm}$$

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

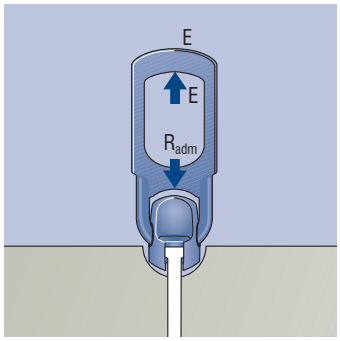
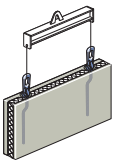
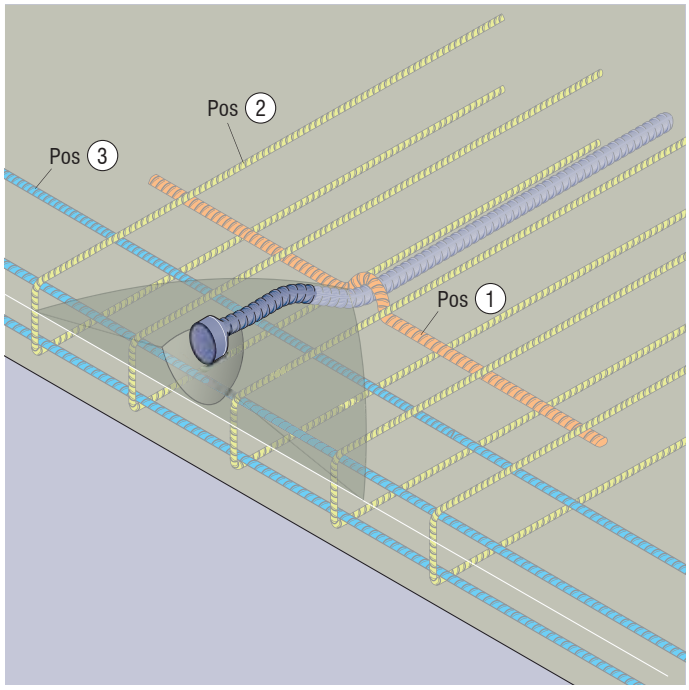


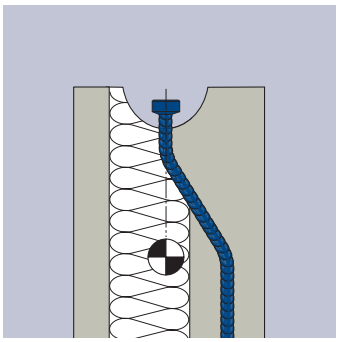
Table 1 – resistance

Load case	Type/Size	Minimum concrete cube compressive strength	Adm. resistance $N_{R,adm}$ [kN]	Surface reinforcement [mm²/m]
	**WK 2.0**	20 N/mm²	20	188
	WK 4.0	20 N/mm²	40	188
	WK 6.3	20 N/mm²	63	188
	WK 8.0	20 N/mm²	80	188
	WK 15.0	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 must lie with the anchor head exactly in the centre of mass. If you do not know where this is, it will be impossible to fit the anchors correctly.

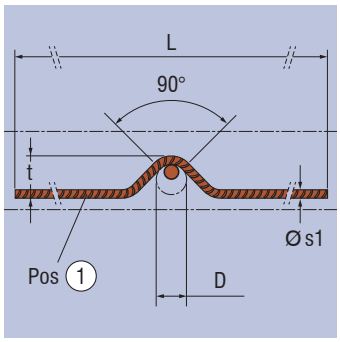
Notice: In the area of the anchor head and the turning there must be an additional concrete support wedge at the expense of the insulation.

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 sandwich lifting anchors with its 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]
WK 2.0	700	10	42	40
WK 4.0	700	12	50	48
WK 6.3	1000	14	74	56
WK 8.0	1200	16	90	64
WK 15.0	1300	20	86	140



Caution: Missing or incorrectly installed retention reinforcement of PFEIFER WK sandwich lifting anchors 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!

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Dimensioning

Table 3 – stirrup reinforcement B500 A/B – pos. 2

Type/Size	$\varnothing_{s,3}$ [mm]	Quantity n	L_3 [mm]
WK 2.0	8	6	700
WK 4.0	10	6	950
WK 6.3	10	6	1100
WK 8.0	12	6	1200
WK 15.0	14	6	1300

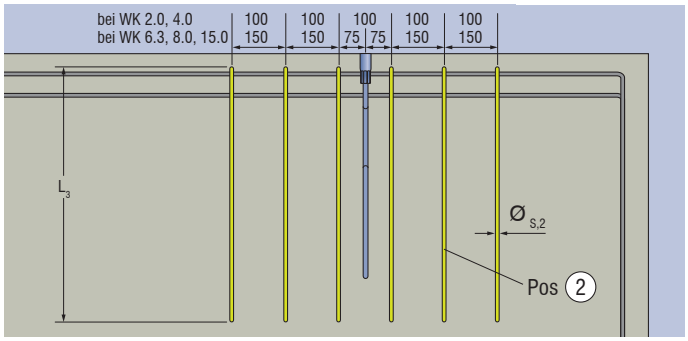
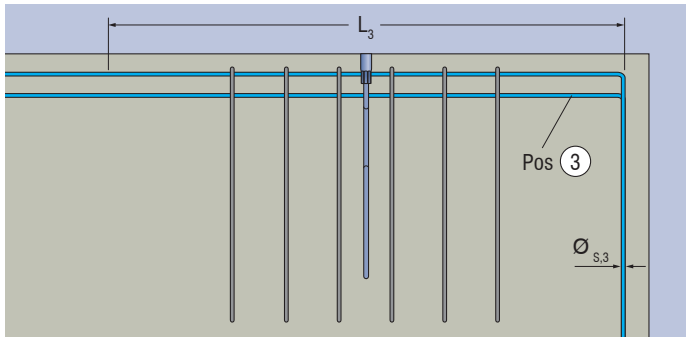
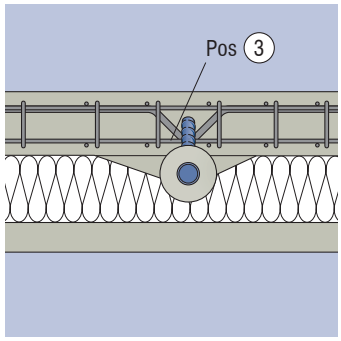


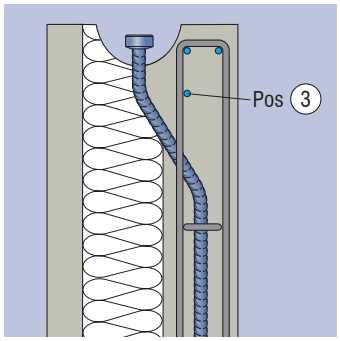
Table 4 – splitting tensile reinforcement B500 A/B – pos. 3

Type/Size	$\varnothing_{s,4}$ [mm]	Quantity n	L_4 [mm]
WK 2.0	8	3	1500
WK 4.0	8	3	1500
WK 6.3	10	3	1500
WK 8.0	12	3	1500
WK 15.0	12	3	1500

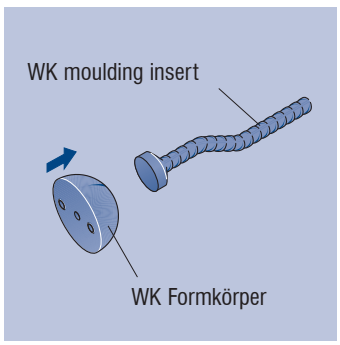
Notice: Reinforcement values in accordance with Tables 3 and 4 should be taken as minimum values. Existing reinforcement can therefore be taken into account if necessary.

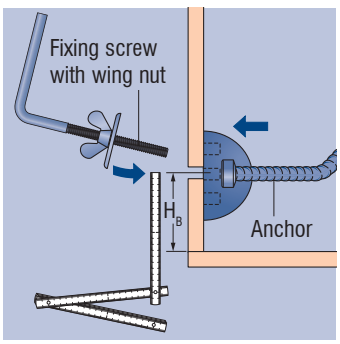


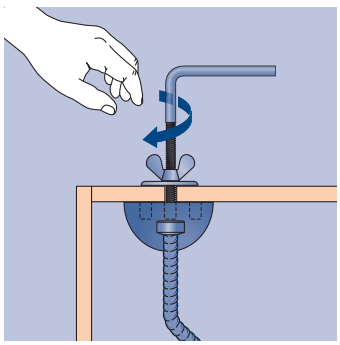


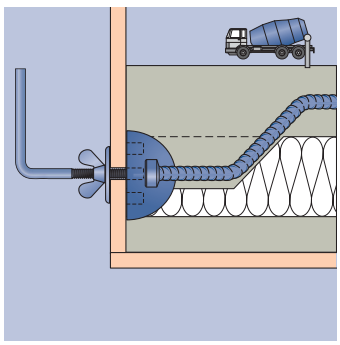


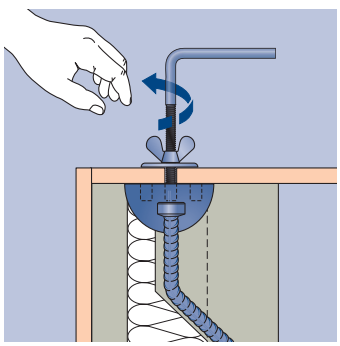
Installation

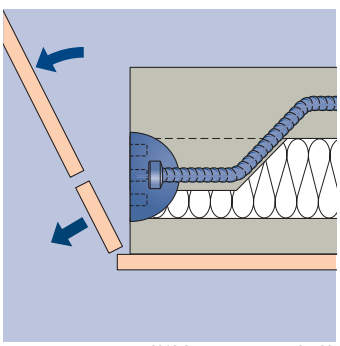


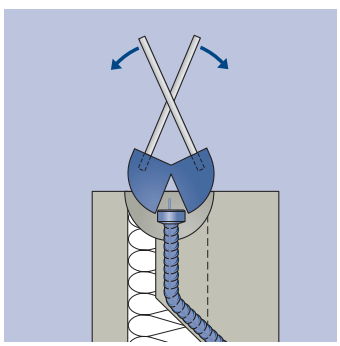












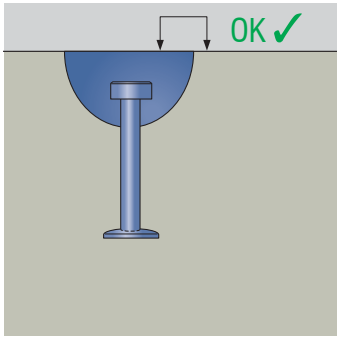
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

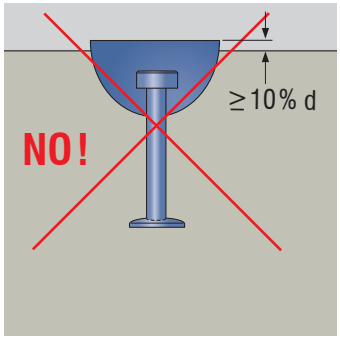
Caution: If the recessing block is too small, later attachment with the lifting device is not possible. If the recessing block is too large, correct attachment of the lifting device is also not possible; there is the risk of the WK Quicklift slipping out. Premature failure of the anchor and falling of the structural element can be the consequence. The size of recess block identified as appropriate must be used.

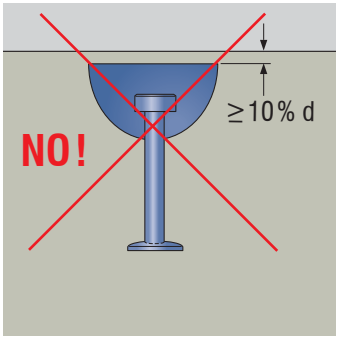
Notice: For correct and safe attachment of the lifting anchor to the formwork the suitable system-specific PFEIFER Fixing Accessories must be used.

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

Installation tolerances







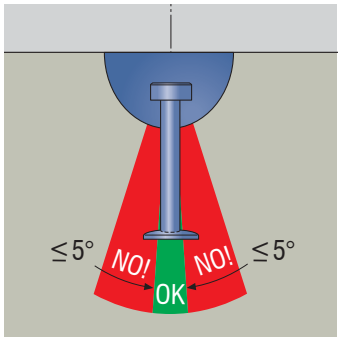
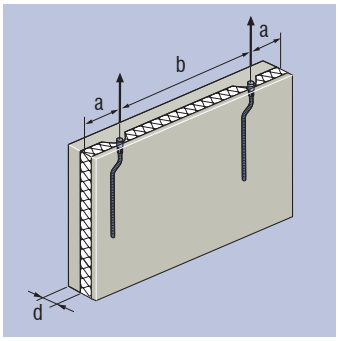
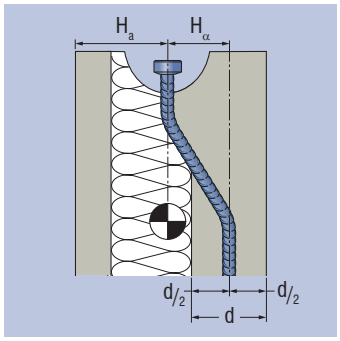


Table 6 – minimum dimensions and distances

Typ/Größe	d [mm]	a [mm]	b [mm]
WK 2.0	100	400	800
WK 4.0	110	500	1000
WK 6.3	140	750	1500
WK 8.0	160	750	1500
WK 15.0	160	750	1500

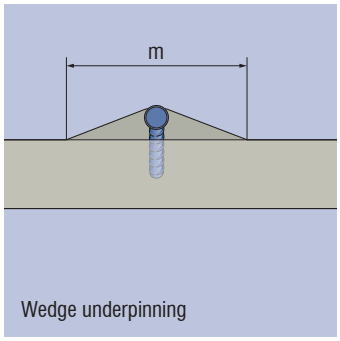


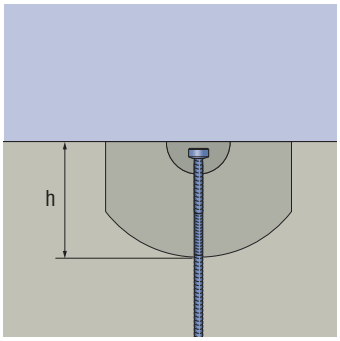


Caution: The anchors must be installed in the load bearing layer such that $d/_2$ is not undershot. The socket must always be positioned in the centre line.

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.





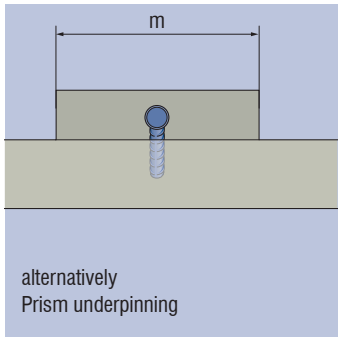


Table 8 – concrete underpinning – minimum dimensions of the concrete wedge

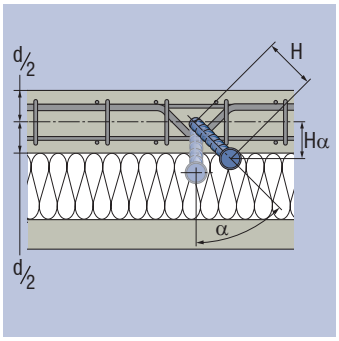
Type/Size	m [mm]	h [mm]
WK 2.0	260	250
WK 4.0	360	300
WK 6.3	400	300
WK 8.0	400	350
WK 15.0	460	450

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.

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!

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Rotated anchor position



Different locations of the centre of gravity can be created by rotating the PFEIFER WK 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 Ha depending on the angle of rotation α

Type/Size	α = 0° [mm]	α = 20° [mm]	α = 30° [mm]	α = 40° [mm]	α = 45° [mm]
WK 2.0	100	94	87	77	71
WK 4.0	120	113	104	92	85
WK 6.3	120	113	104	92	85
WK 8.0	125	117	108	96	86
WK 15.0	140	132	121	107	99

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER DR Anchor

Item No. 05.180

Can be used for:
- slab face installation in elements and tubes

PFEIFER

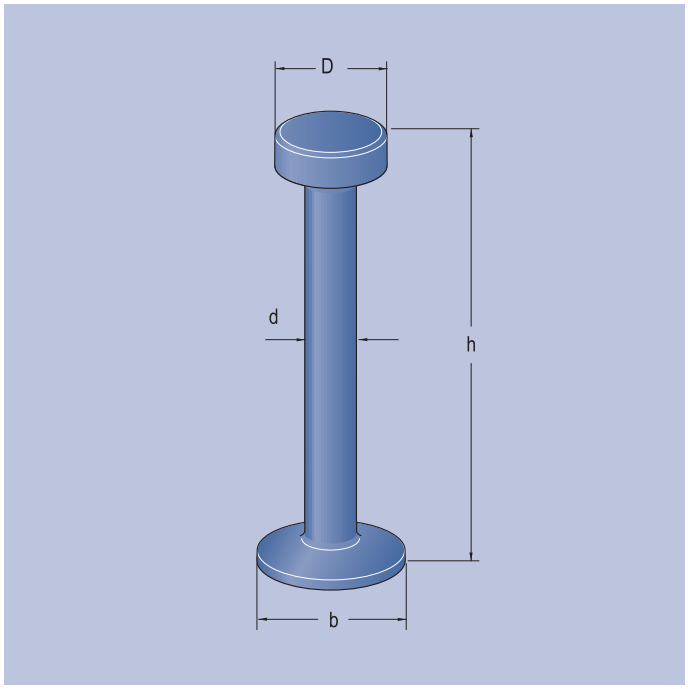
WK System

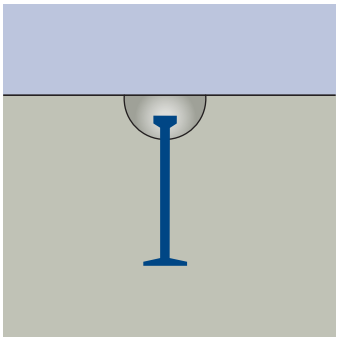
DR Anchor

The PFEIFER DR Anchor for walls, tubes and floors is intended, in combination with the PFEIFER WK Quicklift, to be an anchor in the WK System. The length of these anchors can be matched to the application and optimally selected for safe load application.

Advantages: Safe load application, unambiguous assignment through the letter code marking

Material:
Forged steel, black





Ref.-No.	Type/Size	$N_{R,adm}$* [kN]	Dimensions [mm] h	D	d	b	Weight approx. [kg/ piece]
05.180.013.h.2	DR 1.3	13	55, 65, 85, 120	18	10	25	0,06 – 0,10
05.180.025.h.2	DR 2.5	25	70, 85, 120, 140, 170	25	14	35	0,16 – 0,27
05.180.050.h.2	DR 5.0	50	75, 95, 120, 160, 180, 210, 240	36	20	50	0,34 – 0,76
05.180.075.h.2	DR 7.5	75	85, 95, 120, 140, 165, 200, 300	46	24	60	0,58 – 1,36
05.180.100.h.2	DR 10.0	100	120, 135, 150, 170, 200 220, 250, 340	46	28	70	0,93 – 1,98
05.180.150.h.2	DR 15.0	150	400	69	34	85	3,70
05.180.200.h.2	DR 20.0	200	500	69	39	99	5,87

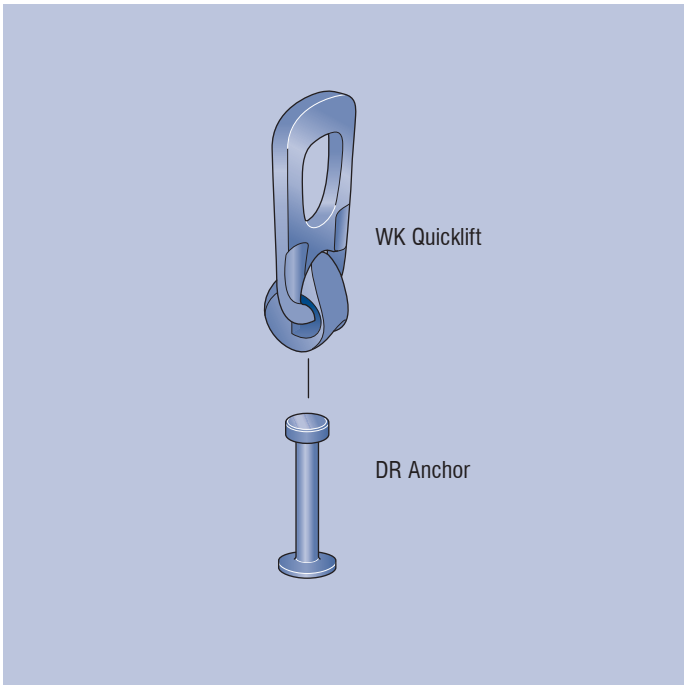
***Caution:** The resistance stated here represents the maximum possible resistance of the anchor size. To select the anchor, the resistance values from the Dimensioning section must be used.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Instructions for installation

System

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS



PFEIFER Quicklift with the DR Anchors is a variant of the WK System for transporting of laminar elements and pipes.

Notice: DR Anchors were developed for a single time-limited use and must not be re-used. Re-attachment several times within one road transport chain from manufacture to assembly of a precast concrete element is not classed as repeated use.

Notice: The term “size” corresponds to the load classes of VDI-BV-BS 6205.

Warning: The anchor system must not be changed or modified in any way! Any modification can lead to reduced safety or even failure of the anchors and the fall of the structural element. Only use anchors if they are in the defect-free original state.

Safety

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

The following working coefficient 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.

– Cable failure: $\gamma_s = 4{,}0$

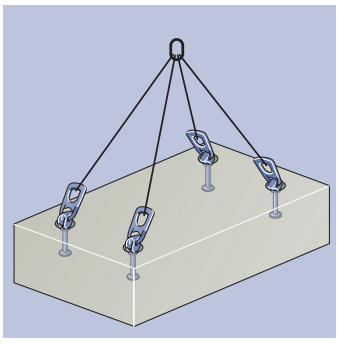
– Concrete failure: $\gamma_c = 2{,}1$

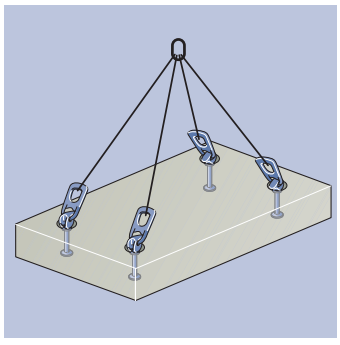
– Working coefficient (load side): $\psi_{dyn} = 1{,}3$

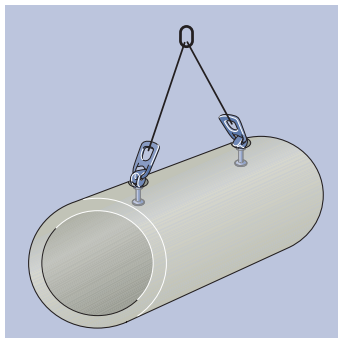
Notice: Lifting anchor for precast elements from constantly monitored factory production

Intended use

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS







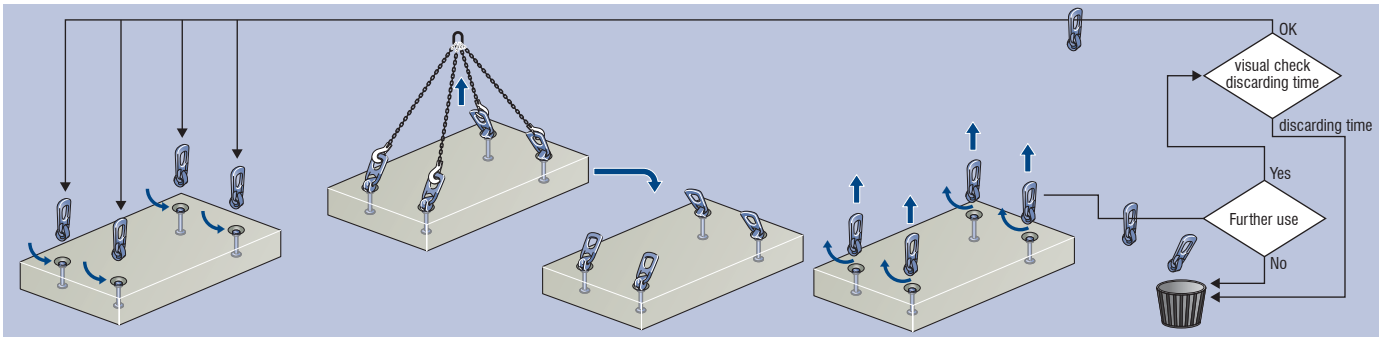
Caution: The anchors to be cast-in must be determined by the planning engineer. The instructions for installation and use of the selected anchor type must be complied with.

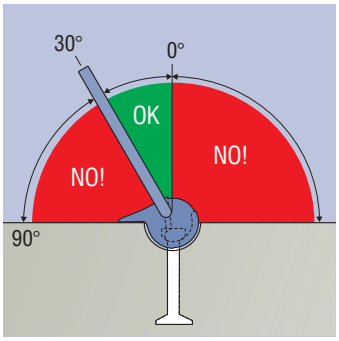
Warning: The use of accessories that are not part of this system, those of other manufacturers in particular, can reduce the carrying capacity and even result in the structural element falling. This causes a hazard to life and limb. Use only components of the PFEIFER WK System.

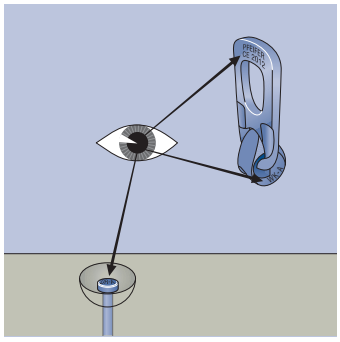
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Intended use

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







Warning: Apply loads to the WK Quicklift only in the direction given in the instructions for installation and use. Loading outside the authorised angle range results in lower safety levels and represents a hazard to life and limb.

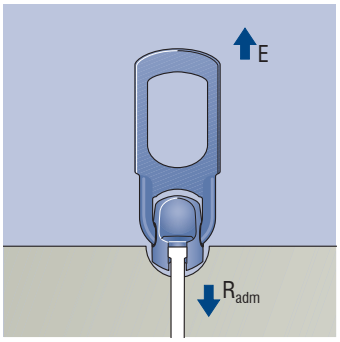
Caution: If the markings are missing or illegible the lifting devices cannot be correctly allocated to the anchor. This can result in items falling and causing a hazard to life and limb. Lifting devices and anchors with absent or illegible markings must be immediately taken out of service.

Notice: Use the markings on the anchor and lifting device to check that the system parts belong together.

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

Dimensioning

$$E \leq R_{adm}$$



Notice: Dimensioning by a trained technical expert according to VDI/BV-BS 6205

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Dimensioning

Table 1 – PFEIFER DR Anchor 1.3 – 10.0 permissible resistance values for normal slab thickness as in Table 4.

Type/Size	Anchors height	$N_{R,adm}$ [kN] for β=0-12,5°			$N_{R,adm}$ [kN] for β=12,5-30°			Surface reinforcement
	h [mm]	15 N/mm²	25 N/mm²	35 N/mm²	15 N/mm²	25 N/mm²	35 N/mm²	[mm²/m]
DR 1.3	55	11,5	13,0	13,0	9,8	12,7	13,0	
DR 1.3	65	13,0	13,0	13,0	12,2	13,0	13,0	188
DR 1.3	85	13,0	13,0	13,0	13,0	13,0	13,0	
DR 1.3	120	13,0	13,0	13,0	13,0	13,0	13,0	
DR 2.5	70	16,0	20,7	24,4	13,7	17,6	20,9	
DR 2.5	85	20,6	25,0	25,0	17,6	22,8	25,0	
DR 2.5	120	25,0	25,0	25,0	25,0	25,0	25,0	188
DR 2.5	140	25,0	25,0	25,0	25,0	25,0	25,0	
DR 2.5	170	25,0	25,0	25,0	25,0	25,0	25,0	
DR 5.0	75	18,7	24,2	28,6	16,0	20,7	24,5	
DR 5.0	95	25,3	32,7	38,7	21,6	27,9	33,0	
DR 5.0	120	34,4	44,4	50,0	29,4	38,0	44,9	
DR 5.0	160	50,0	50,0	50,0	43,4	50,0	50,0	188
DR 5.0	180	50,0	50,0	50,0	50,0	50,0	50,0	
DR 5.0	210	50,0	50,0	50,0	50,0	50,0	50,0	
DR 5.0	240	50,0	50,0	50,0	50,0	50,0	50,0	
DR 7.5	85	21,9	28,3	33,5	18,7	24,2	28,6	
DR 7.5	95	25,3	32,7	38,7	21,6	27,9	33,0	
DR 7.5	120	34,4	44,4	52,6	29,4	38,0	44,9	
DR 7.5	140	42,4	54,7	64,7	36,2	46,7	55,3	188
DR 7.5	165	53,0	68,4	75,0	45,3	58,5	69,2	
DR 7.5	200	69,2	75,0	75,0	59,1	75,0	75,0	
DR 7.5	300	75,0	75,0	75,0	75,0	75,0	75,0	
DR 10.0	120	34,4	44,4	52,6	29,4	38,0	44,9	
DR 10.0	135	40,3	52,1	61,6	34,4	44,5	52,6	
DR 10.0	150	46,5	60,1	71,1	39,7	51,3	60,7	
DR 10.0	170	55,2	71,3	84,4	47,2	60,9	72,1	188
DR 10.0	200	69,2	89,3	100,0	59,1	76,3	90,3	
DR 10.0	220	79,1	100,0	100,0	67,5	87,2	100,0	
DR 10.0	250	94,7	100,0	100,0	80,9	100,0	100,0	
DR 10.0	340	100,0	100,0	100,0	100,0	100,0	100,0	

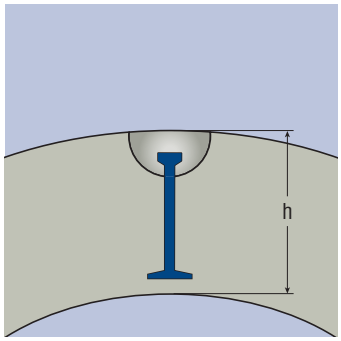
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Table 2 – PFEIFER DR Anchor 1.3 – 10.0 permissible resistance values for minimum slab thickness as in Table 4

Type/Size	Anchors height	$N_{R,adm}$ [kN] for β=0-12,5°			$N_{R,adm}$ [kN] for β=12,5-30°			Surface reinforcement
	h [mm]	15 N/mm²	25 N/mm²	35 N/mm²	15 N/mm²	25 N/mm²	35 N/mm²	[mm²/m]
DR 1.3	55	9,0	11,6	13,0	9,0	11,6	13,0	
DR 1.3	65	10,9	13,0	13,0	10,9	13,0	13,0	188
DR 1.3	85	13,0	13,0	13,0	13,0	13,0	13,0	
DR 1.3	120	13,0	13,0	13,0	13,0	13,0	13,0	
DR 2.5	70	12,0	15,5	18,3	12,0	15,5	18,3	
DR 2.5	85	15,1	19,5	23,1	15,1	19,5	23,1	
DR 2.5	120	23,2	25,0	25,0	23,2	25,0	25,0	188
DR 2.5	140	25,0	25,0	25,0	25,0	25,0	25,0	
DR 2.5	170	25,0	25,0	25,0	25,0	25,0	25,0	
DR 5.0	75	14,3	18,5	21,8	14,3	18,5	21,8	
DR 5.0	95	18,7	24,2	28,6	18,7	24,2	28,6	
DR 5.0	120	24,8	32,0	37,9	24,8	32,0	37,9	
DR 5.0	160	35,6	45,9	50,0	35,6	45,9	50,0	188
DR 5.0	180	41,4	50,0	50,0	41,4	50,0	50,0	
DR 5.0	210	50,0	50,0	50,0	50,0	50,0	50,0	
DR 5.0	240	50,0	50,0	50,0	50,0	50,0	50,0	
DR 7.5	85	16,5	21,3	25,2	16,5	21,3	25,2	
DR 7.5	95	18,7	24,2	28,6	18,7	24,2	28,6	
DR 7.5	120	24,8	32,0	37,9	24,8	32,0	37,9	
DR 7.5	140	30,0	38,8	45,9	30,0	38,8	45,9	188
DR 7.5	165	37,0	47,8	56,5	37,0	47,8	56,5	
DR 7.5	200	47,6	61,4	72,6	47,6	61,4	72,6	
DR 7.5	300	75,0	75,0	75,0	75,0	75,0	75,0	
DR 10.0	120	24,8	32,0	37,9	24,8	32,0	37,9	
DR 10.0	135	28,7	37,0	43,8	28,7	37,0	43,8	
DR 10.0	150	32,8	42,3	50,0	32,8	42,3	50,0	
DR 10.0	170	38,5	49,6	58,7	38,5	49,6	58,7	188
DR 10.0	200	47,6	61,4	72,6	47,6	61,4	72,6	
DR 10.0	220	54,0	69,7	82,4	54,0	69,7	82,4	
DR 10.0	250	64,1	82,7	97,9	64,1	82,7	97,9	
DR 10.0	340	97,6	100,0	100,0	97,6	100,0	100,0	

Table 3 – PFEIFER DR Anchor 1.3 – 10.0 – reduction factors for use in pipes

Typ	Anchors length	Pipe outer diameter [mm]					
	L [mm]	500	1000	1500	2000	2500	3000
DR	55	0,81	0,88	0,92	0,94	0,95	0,96
DR	85	0,74	0,84	0,89	0,91	0,93	0,94
DR	120	0,69	0,80	0,85	0,88	0,90	0,91
DR	170	0,62	0,75	0,81	0,85	0,87	0,89
DR	220	0,57	0,71	0,78	0,82	0,85	0,87
DR	340	0,46	0,63	0,71	0,76	0,79	0,82



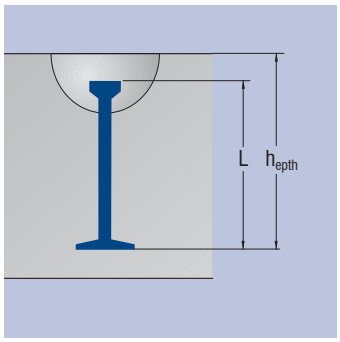
Notice: When using DR Anchors in pipes the resistance values must be recalculated from Tables 1 and 2 with the reduction factors from Table 3. The dimensioning then uses: red. $N_{R,adm,\ pipe} = N_{R,adm}$ · reduction factor

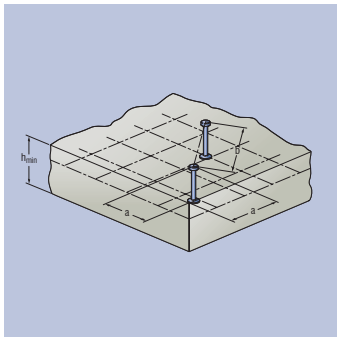
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Dimensioning

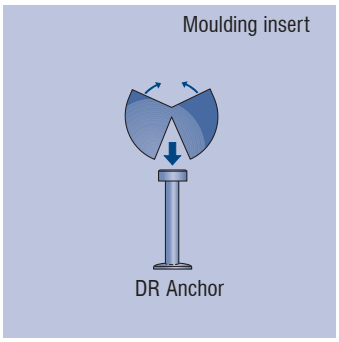
Table 4 – distances/element thicknesses

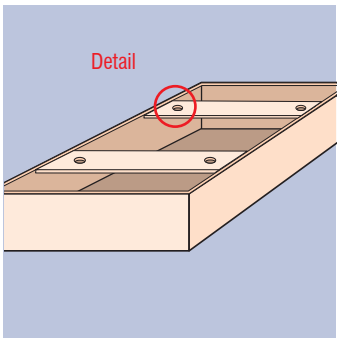
Type/Size	Anchors length L [mm]	anchorage depth h_{epth} [mm]	Edge distance a [mm]	Axis distance b [mm]	norm. slab thickness h [mm]	min. slab thickness h_{min} [mm]
DR 1.3	55	65	195	195	130	90
DR 1.3	65	75	225	225	150	100
DR 1.3	85	95	285	285	190	120
DR 1.3	120	130	390	390	260	155
DR 2.5	70	81	245	245	165	105
DR 2.5	85	96	290	290	195	120
DR 2.5	120	131	395	395	265	155
DR 2.5	140	151	455	455	305	175
DR 2.5	170	181	490	545	365	205
DR 5.0	75	90	270	270	180	120
DR 5.0	95	110	330	330	220	140
DR 5.0	120	135	405	405	270	165
DR 5.0	160	175	485	525	350	205
DR 5.0	180	195	500	585	390	225
DR 5.0	210	225	510	675	450	255
DR 5.0	240	255	510	765	510	285
DR 7.5	85	100	300	300	200	130
DR 7.5	95	110	330	330	220	140
DR 7.5	120	135	405	405	270	165
DR 7.5	140	155	460	465	310	185
DR 7.5	165	180	490	540	360	210
DR 7.5	200	215	510	645	430	245
DR 7.5	300	315	630	945	630	345
DR 10.0	120	135	405	405	270	165
DR 10.0	135	150	450	450	300	180
DR 10.0	150	165	475	495	330	195
DR 10.0	170	185	495	555	370	215
DR 10.0	200	215	510	645	430	245
DR 10.0	220	235	510	705	470	265
DR 10.0	250	265	530	795	530	295
DR 10.0	340	355	710	1065	710	385

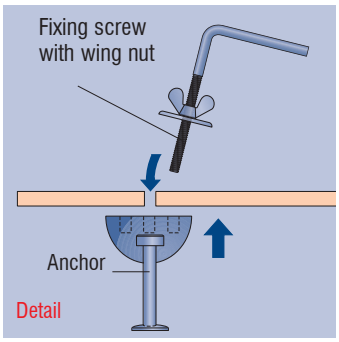


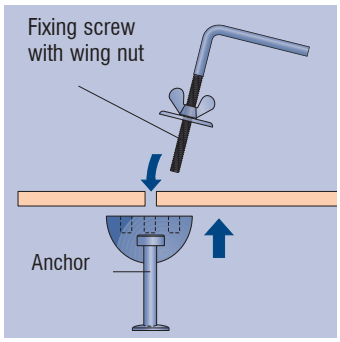


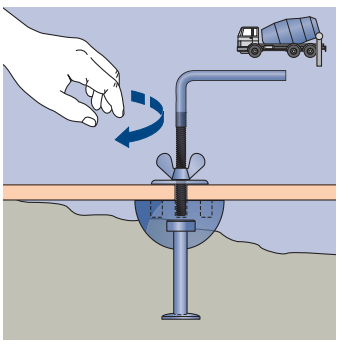
Installation

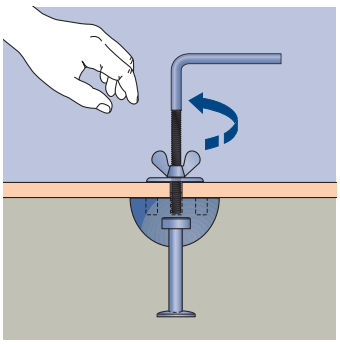


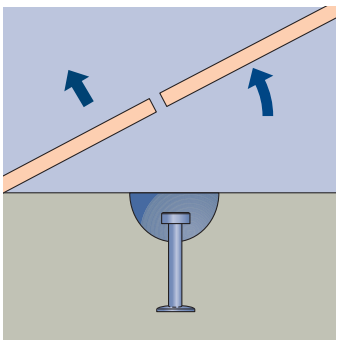


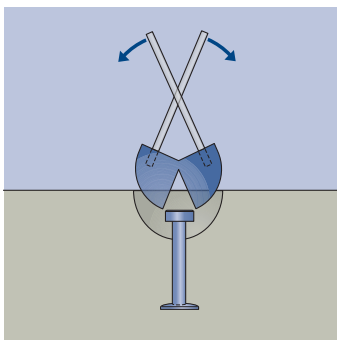












Caution: If the recessing block is too small, later attachment with the lifting device is not possible. If the recessing block is too large, correct attachment of the lifting device is also not possible; there is the risk of the WK Quicklift slipping out. Premature failure of the anchor and falling of the structural element can be the consequence. The size of recess block identified as appropriate must be used.

Notice: For correct and safe attachment of the lifting anchor to the formwork the appropriate system-specific fixing accessories (from PFEIFER) must be used.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER WK anchors for strongly reinforced, bar-shaped elements

Item-No. 05.185

Can be used for:
- edge and face element installation in columns-shaped structural elements

Usable by:
- trained and qualified personal

PFEIFER

WK System

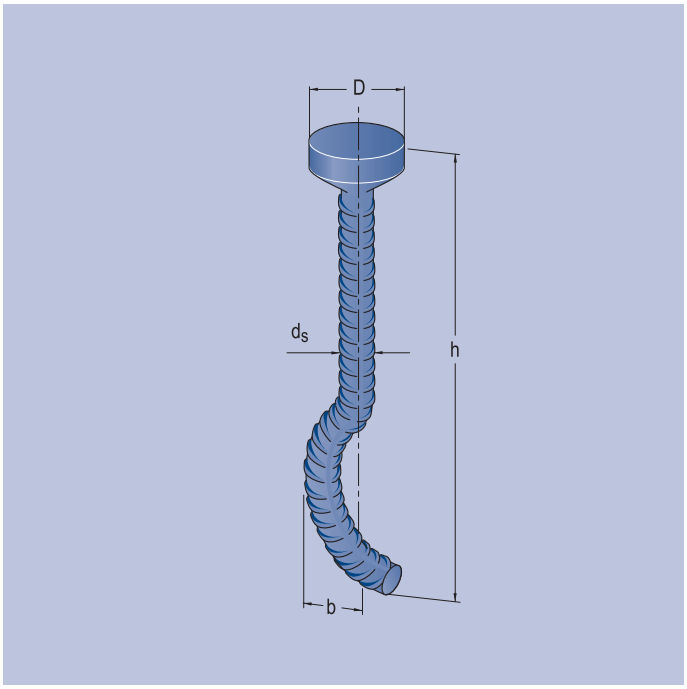
WK Anchor

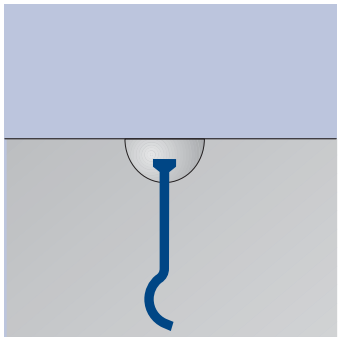
PFEIFER WK Anchors are, in combination with the WK Quicklift, intended to be lifting anchors for reinforced structural elements such as columns, girders etc. Because of the reinforcement already present in these structural elements, the short form of the anchor can safely transmit the forces.

Advantages: Safe load application, unambiguous assignment through the letter code marking

Material:
Forged steel, black

PFEIFER Made in Germany



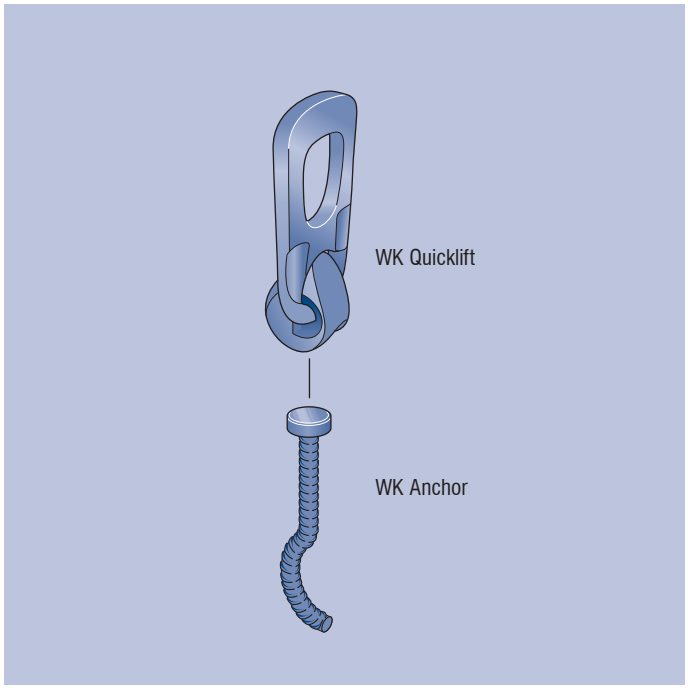


Ref. No., plain	Type/Size	$N_{R,adm}$ [kN]	$V_{R,adm}$ [kN]	d_s	Dimensions [mm] D	h	b	weight [kg/piece]
05.185.020.145.2	WK 2.0	20	10,0	14	26	145	26,5	0,22
05.185.025.190.2	WK 2.5	25	12,5	14	26	190	26,5	0,27
05.185.040.230.2	WK 4.0	40	20,0	20	36	230	44,0	0,66
05.185.063.270.2	WK 6.3	63	31,5	25	47	270	39,5	1,28
05.185.080.300.2	WK 8.0	80	40,0	28	47	300	52,0	1,59
05.185.100.325.2	WK 10.0	100	50,0	28	47	325	52,0	1,74
05.185.150.400.2	WK 15.0	150	75,0	36	70	400	73,0	3,80
05.185.200.500.2	WK 20.0	200	100,0	40	70	500	71,0	5,40

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

System

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS



PFEIFER Quicklift with the DR Anchor is a variant of the WK System for transporting column-shaped and heavily reinforced structural elements.

Notice: WK Anchors were developed for a single time-limited use and must not be re-used. Re-attachment several times within one road transport chain from manufacture to assembly of a precast concrete element is not classed as repeated use.

Notice: The term “size” corresponds to the load classes of VDI-BV-BS 6205.

Warning: The anchor system must not be changed or modified in any way. Any modification can lead to reduced safety or even failure of the anchors and the fall of the structural element. Only use anchors if they are in the defect-free original state.

Safety

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

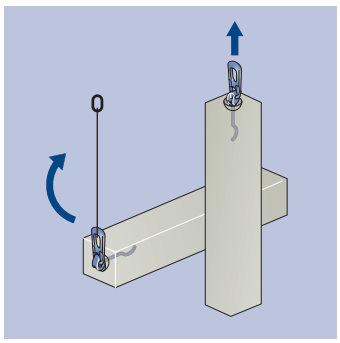
The following working coefficient values for the PFEIFER lifting anchor system are derived as follows in accordance with the VDI/BV-BS 6205 directive, with the prerequisite of the machinery directive 2006/42/EC.

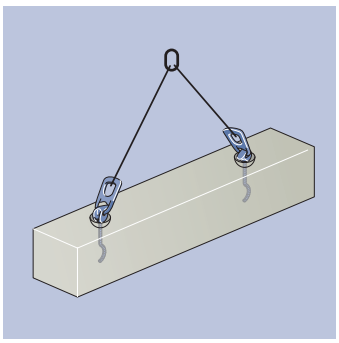
– Cable failure: $\gamma_s = 4{,}0$
– Concrete failure: $\gamma_c = 2{,}1$
– Working coefficient (load side): $\psi_{dyn} = 1{,}3$

Notice: **L**ifting anchor for precast elements from constantly monitored factory production

Intended use

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS





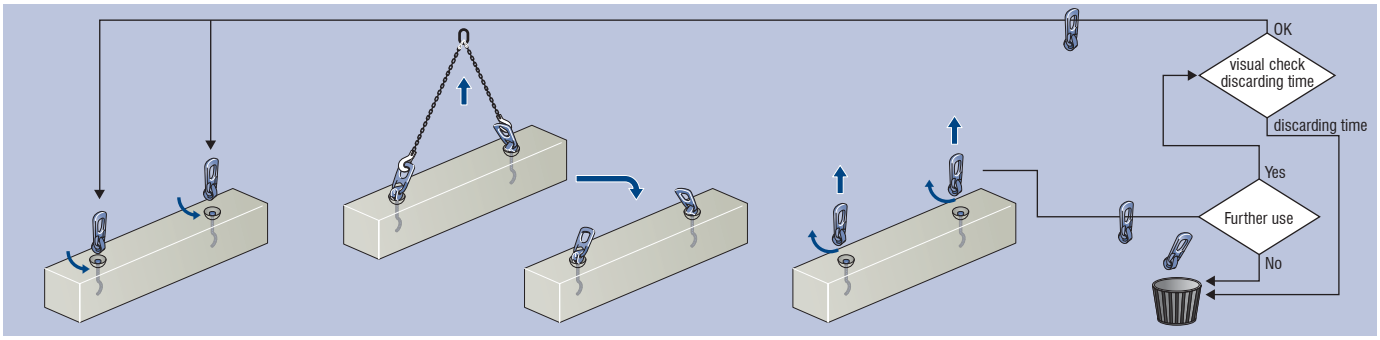
Warning: The use of accessories that are not part of this system, those of other manufacturers in particular, can reduce the carrying capacity and even result in the structural element falling. This causes a hazard to life and limb. Use only components of the PFEIFER WK System.

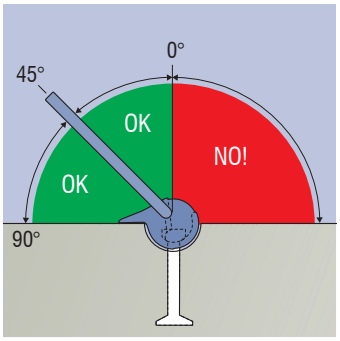
Caution: The anchors to be concreted-in must be determined by the planning engineer. The instructions for installation and use of the selected anchor type must be complied with.

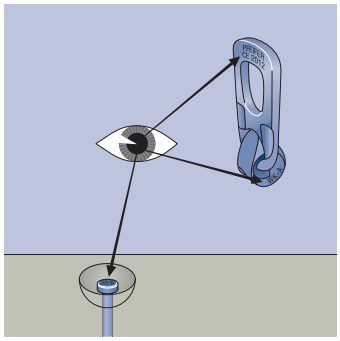
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Intended use

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







Notice: Use the markings on the anchor and lifting device to check that the system parts belong together.

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

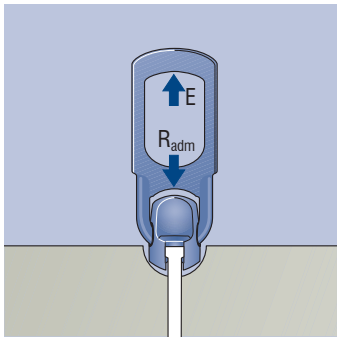
Warning: With incorrect use by loading perpendicular to the plane of the slot of the suspension ball (transversal shear load in the wrong direction) there is the risk of slipping out.

Warning: Loading the WK Quicklift beyond the permitted angle leads to reduced safety levels in the system, falling and danger to life. Loading of the lifting devices according to figure only.

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.

Dimensioning

$$E \leq R_{adm}$$



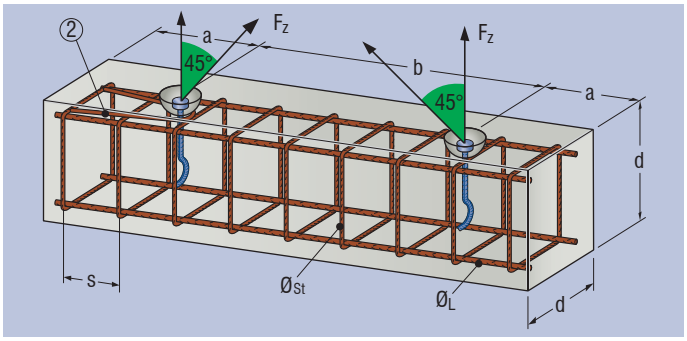
Notice: Dimensioning by a trained technical expert according to VDI/ BV-BS 6205

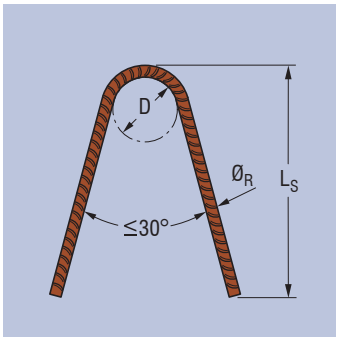
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Dimensioning

Table 1 – carrying capacity and reinforcement with longitudinal installation

Type/Size	$N_{R,adm.}$ [kN]	a [mm]	b [mm]	d [mm]	$Ø_{BÜ}$ [mm]	s [mm]	$Ø_L$ [mm]	D [mm]	$Ø_R$ [mm]	L_S [mm]
WK 2.0	20	350	700	170	6	150	12	32	8	300
WK 2.5	25	450	900	205	6	150	14	32	8	350
WK 4.0	40	600	1200	260	8	200	16	32	8	400
WK 6.3	63	700	1400	300	10	200	20	48	12	450
WK 8.0	80	750	1500	360	10	200	25	48	12	550
WK 10.0	100	800	1600	380	12	200	25	56	14	600
WK 12.5	125	850	1700	400	14	200	25	64	16	650
WK 15.0	150	1000	2000	450	16	200	28	64	16	800
WK 20.0	200	1200	2400	600	20	200	28	140	20	900



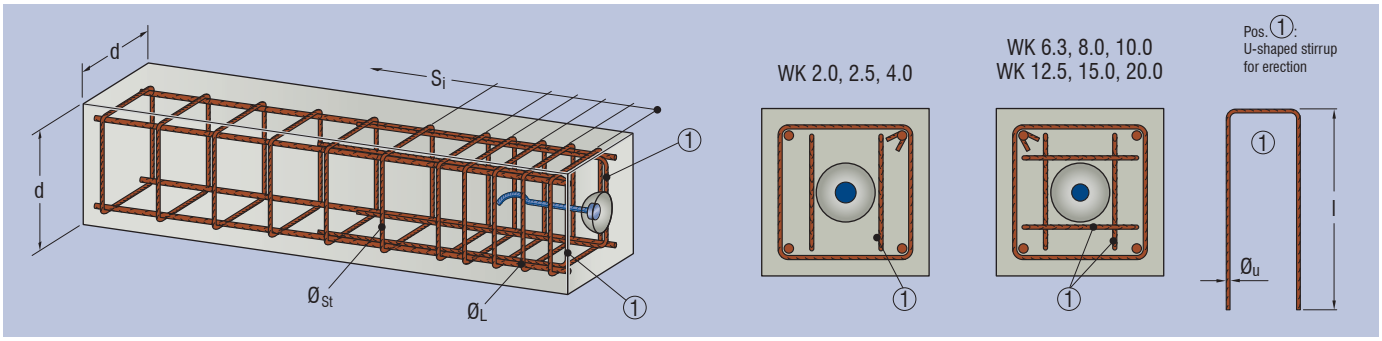


Notice: Install the parallel shear stirrup immediately under the recess block.

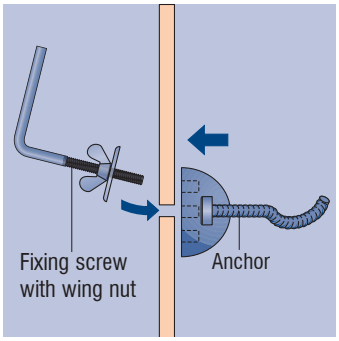
Notice: For precast elements with $\beta_w \geq 20$ N/mm², no parallel shear reinforcement is necessary. Otherwise, WK Anchors with parallel shear loading must always be installed with the correct parallel shear stirrup.

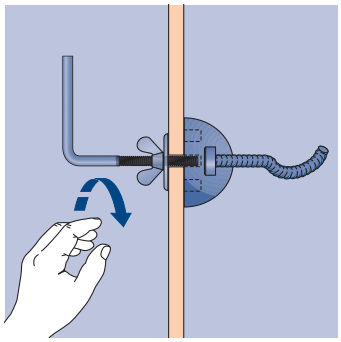
Table 2 – carrying capacity and reinforcement for erection and vertical lifting of column head

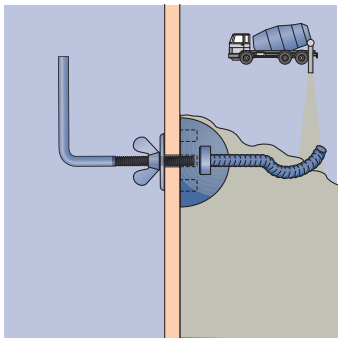
Type/Size	$N_{R,adm}$ [kN]	$V_{R,adm}$ [kN]	d [mm]	$Ø_{BÜ}$ [mm]	S_i [mm]	$Ø_L$ [mm]	Number U-Stirrup	$Ø_U$ [mm]	l [mm]
WK 2.0	20	10	170	8	30, 30, 50, 50, 125	12	2	6	500
WK 2.5	25	12,5	190	8	30, 30, 50, 50, 125	14	2	8	500
WK 4.0	40	20	260	10	30, 50, 50, 50, 50, 150	16	2	10	600
WK 6.3	63	31,5	300	12	30, 30, 50, 50, 50, 150	20	4	8	700
WK 8.0	80	40	360	12	30, 50, 50, 50, 50, 50, 250	25	4	10	750
WK 10.0	100	50	380	14	30, 50, 50, 50, 50, 50, 250	25	4	10	900
WK 12.5	125	62,5	400	16	30, 50, 50, 50, 50, 50, 250	25	4	12	950
WK 15.0	150	75	450	20	30, 50, 50, 50, 50, 50, 50, 300	28	4	14	1000
WK 20.0	200	100	600	20	30, 50, 50, 50, 50, 50, 50, 50, 50, 300	28	4	16	1500

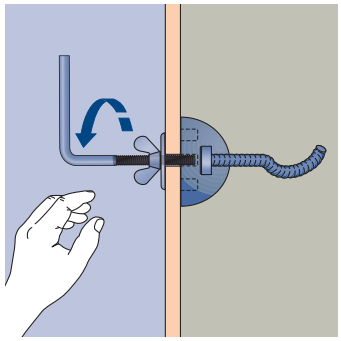


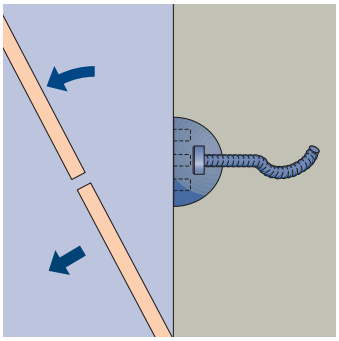
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

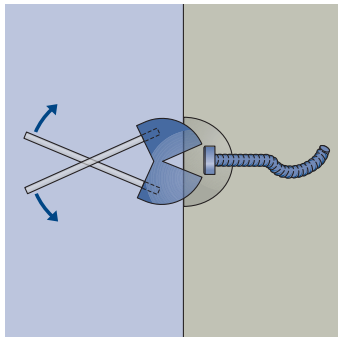








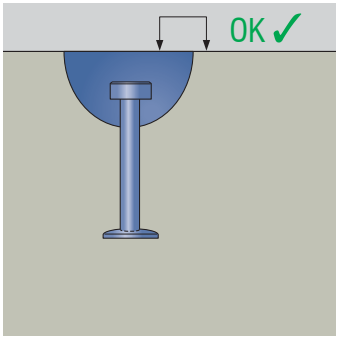


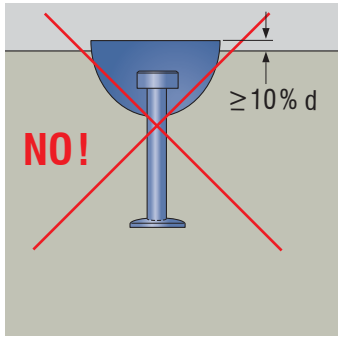


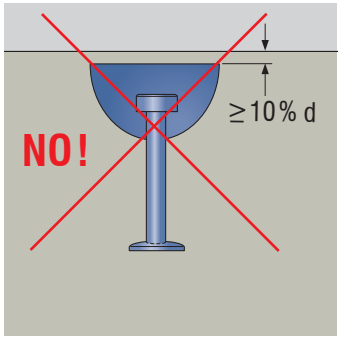
Caution: In the case of too large or too small moulding inserts, later attaching with the lifting device is not possible; there is the risk of the WK Quicklift slipping out. Premature failure of the anchor and falling of the structural element can be the consequence. The size of recess block identified as appropriate must be used.

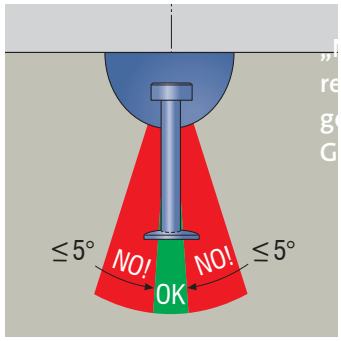
Notice: For correct and safe attachment of the lifting anchor to the formwork the suitable system-specific PFEIFER Fixing Accessories must be used.

Installation tolerances









© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER WK Anchor, for girders

Artikel Nr. 05.185

Can be used for:
- face-end installation in girders

Usable by:
- trained and qualified personal

PFEIFER-WK anchors are provided in combination with the WK Quicklift as lifting anchors of reinforced elements such as girders.

PFEIFER

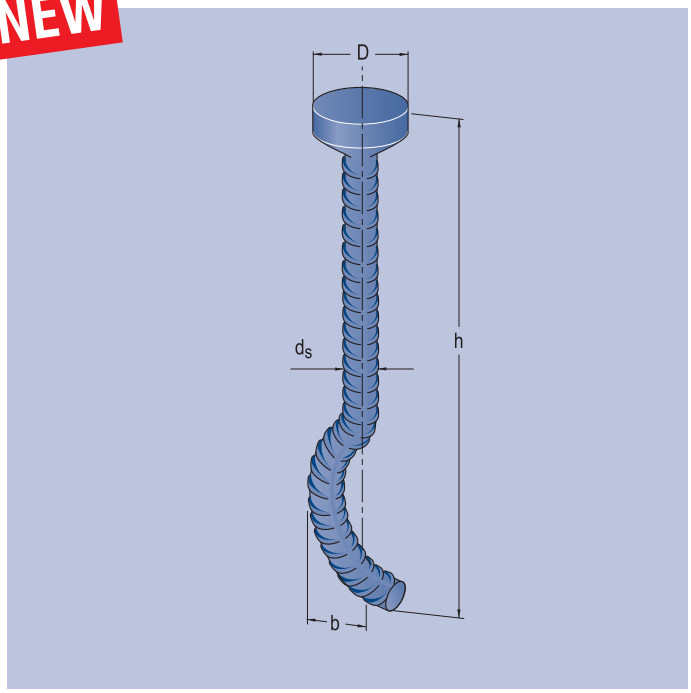
WK System

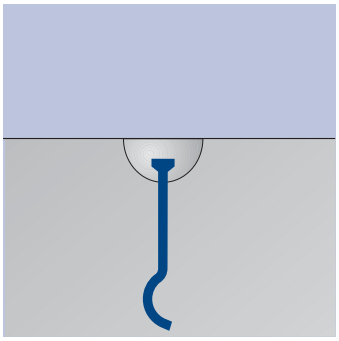
WK Anchor

Advantages: safe load application, unambiguous assignment through the letter code marking

Material:
Forged steel, black

NEW





Ref. No., plain	Type/Size	$N_{R,adm}$ [kN]	Dimensions [mm]				Weight [kg/piece]
			d_S	D	h	b	
05.185.100.550.2	WK 10.0	100	28	47	550	52	2,90
05.185.150.650.2	WK 15.0	150	36	70	650	73	5,87
05.185.200.800.2	WK 20.0	200	40	70	800	71	8,78

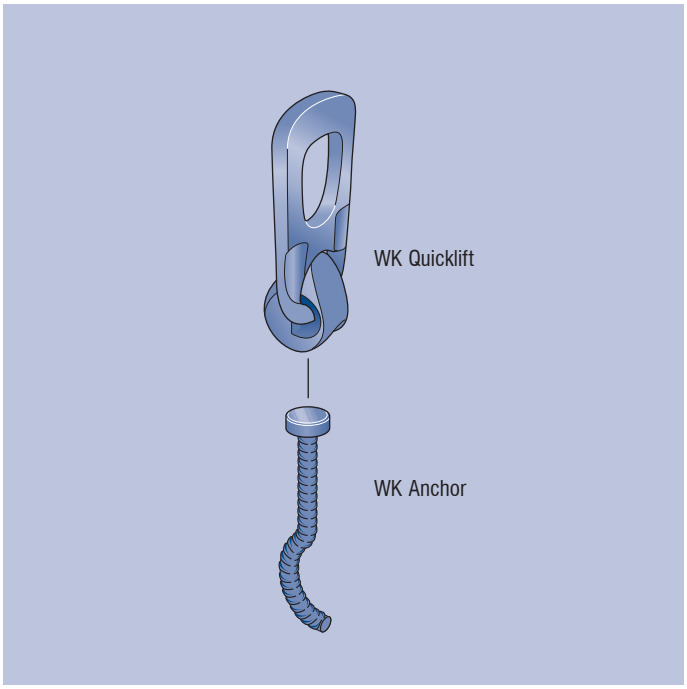
Caution: The resistance stated here represents the maximum possible resistance of the anchor size. To select the anchor, the resistance values from the “Dimensioning” section must be used.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Instructions for installation

System

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS



PFEIFER Quicklift with the DR Anchor is a variant of the WK System for transporting for girders.

Notice: WK Anchors were developed for a single time-limited use and must not be re-used. Re-attachment several times within one road transport chain from manufacture to assembly of a precast concrete element is not classed as repeated use.

Notice: The term “size” corresponds to the load classes of VDI-BV-BS 6205.

Warning: The anchor system must not be changed or modified in any way. Any modification can lead to reduced safety or even failure of the anchors and the fall of the structural element. Only use anchors if they are in the defect-free original state.

Safety

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

The following working coefficient 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.

– Cable failure: $\gamma_s = 4{,}0$

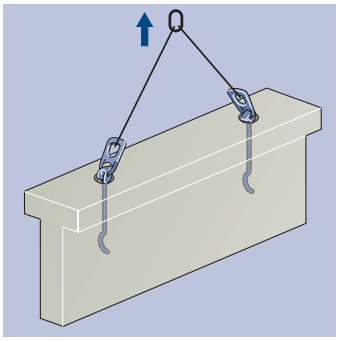
– Concrete failure: $\gamma_c = 2{,}1$

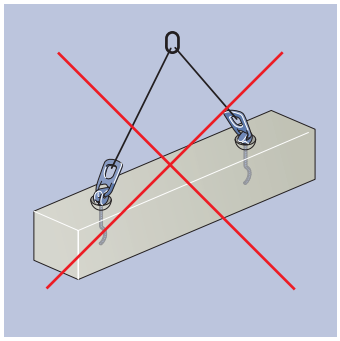
– Working coefficient (load side): $\psi_{dyn} = 1{,}3$

Notice: Lifting anchor for precast elements from constantly monitored factory production

Intended use

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS





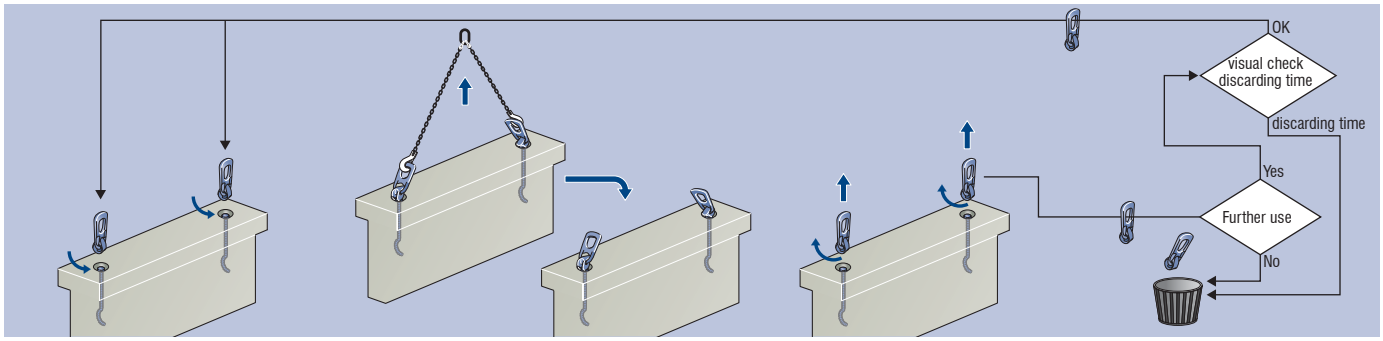
Warning: The use of accessories that are not part of this system, those of other manufacturers in particular, can reduce the carrying capacity and even result in the structural element falling. This causes a hazard to life and limb. Use only components of the PFEIFER WK System.

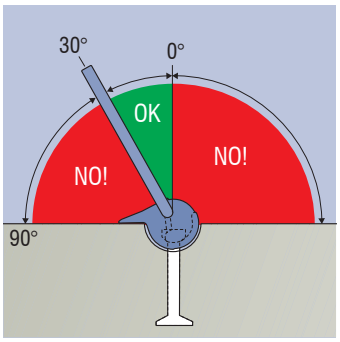
Caution: The anchors to be concreted-in must be determined by the planning engineer. The instructions for installation and use of the selected anchor type must be complied with.

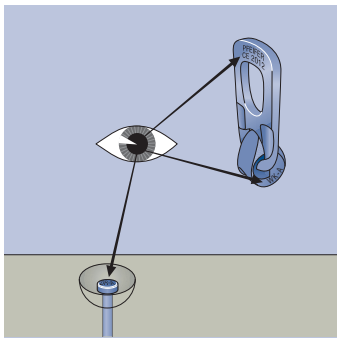
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Intended use

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







Notice: Use the markings on the anchor and lifting device to check that the system parts belong together.

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

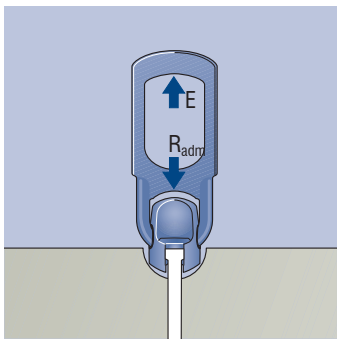
Warning: With incorrect use by loading perpendicular to the plane of the slot of the suspension ball (transversal shear load in the wrong direction) there is the risk of slipping out.

Warning: Loading the WK Quicklift beyond the permitted angle leads to reduced safety levels in the system, falling and danger to life. Loading of the lifting devices according to figure only.

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.

Dimensioning

$$E \leq R_{adm}$$

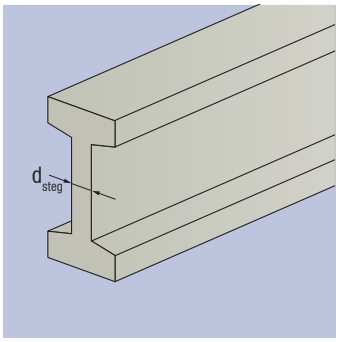


Notice: Dimensioning by a trained technical expert according to VDI/ BV-BS 6205

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Table 1 – permissible resistances in dependence on the web width and the concrete cube compressive strength

Type/Size	Minimum web width d_{Steg} [mm]	$N_{R, perm}$ [kN]			
		25 N/mm²	30 N/mm²	35 N/mm²	45 N/mm²
WK 10.0	100	71	78	85	98
	120	79	88	96	100
	140	88	98	100	100
WK 15.0	120	108	119	130	150
	140	119	132	144	150
WK 20.0	120	129	144	157	182
	140	141	157	171	197
	160	153	169	185	200



Notice: The permissible resistances stated in Table 1 apply respectively for a certain concrete cube compressive strength. When dimensioning the lifting anchors, the planning engineer must select a permissible resistance from Table 1. The concrete cube compressive strength linked with the permissible resistance must be declared as the minimum strength of the concrete element. This minimum strength must be included in the design and production plans!

Table 2 – basic reinforcement

Type/Size	Pos. 1 $A_{s,min}$ [cm²]	Pos. 2	Pos. 3	Pos. 4	
				0°–12,5°	> 12,5°–30°
WK 10.0	4,65	∅ 8 / 200	∅ 8 / 200	∅ 8 / 200	∅ 8 / 200
WK 15.0	4,65				∅ 8 / 200
WK 20.0	4,65				∅ 10 / 200

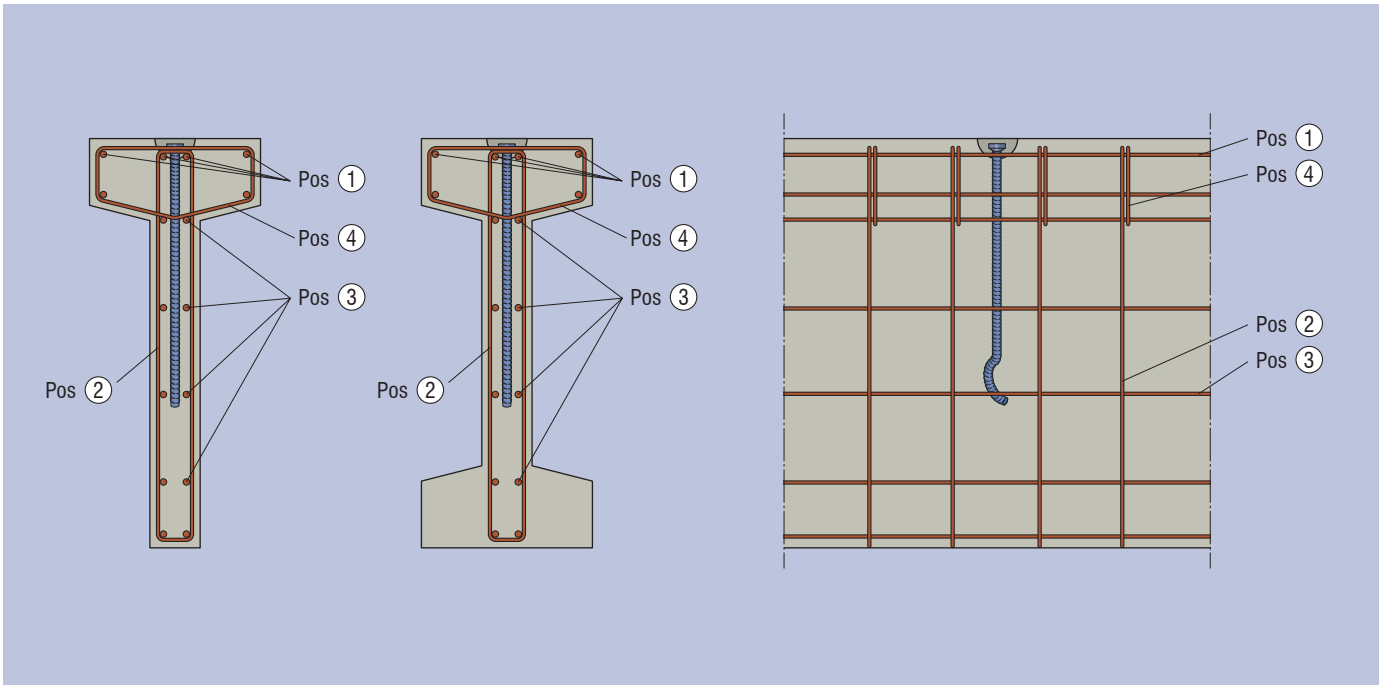
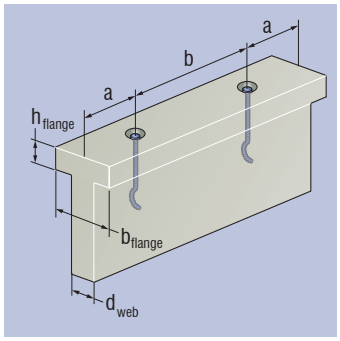


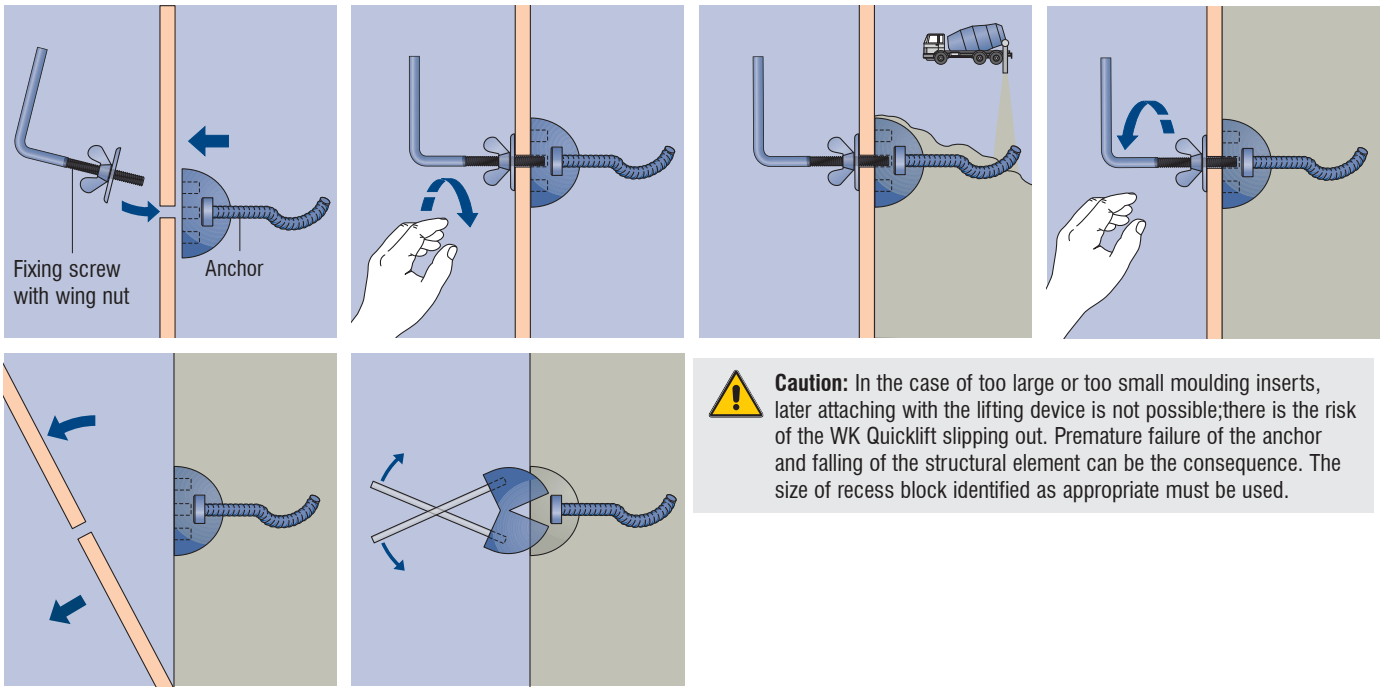
Table 3 – minimum dimensions and distances

Type/Size	d_{web} [mm]	d_{flange} [mm]	h_{flange} [mm]	a [mm]	b [mm]
WK 10.0	100 / 120 / 140	240	150	1000	2000
WK 15.0	120 / 140	350	150	1000	2000
WK 20.0	120 / 140 / 160	400	150	1200	2400



© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

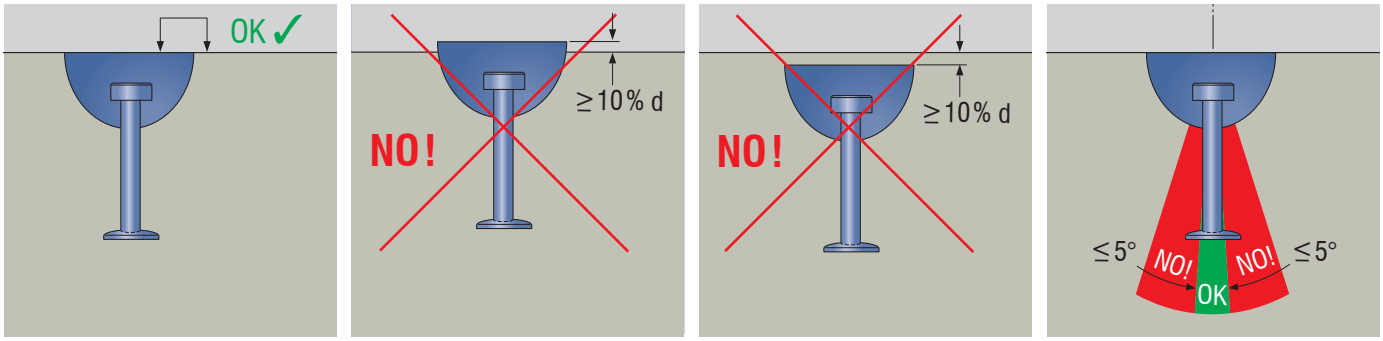
Installation



Caution: In the case of too large or too small moulding inserts, later attaching with the lifting device is not possible;there is the risk of the WK Quicklift slipping out. Premature failure of the anchor and falling of the structural element can be the consequence. The size of recess block identified as appropriate must be used.

Notice: For correct and safe attachment of the lifting anchor to the formwork the suitable system-specific PFEIFER Fixing Accessories must be used.

Installation tolerances



© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

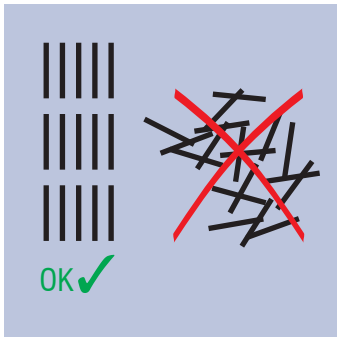
Misuses

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!

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 and 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.

Lagerung



Notice: Ensure damage-free storage.

Notice: Please store PFEIFER-WK anchor system product in a dry and protected place if possible. There is a risk of corrosion if there are large temperature changes or wet conditions in combination with road salt or sea water!

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Notes

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Makes transporting effortless: matching accessories

PFEIFER Accessories are part of the recognised PFEIFER WK System. 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

The range of accessories includes the WK Moulding Insert for safe attachment of the WK Anchors to the formwork and PFEIFER Fixing Screws.

PFEIFER Accessories

- Multilayer sealing lips prevent concrete slurry from penetrating into the moulding insert
- Safe and reliable formwork fixing
- Correctly sized hollow for optimal grip of the WK Quicklift

Made in Germany

- Safe manufacture under consistent conditions
- In-house quality assurance
- Continuous product development

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER WK Moulding Inserts

Item-No. 05.181

PFEIFER

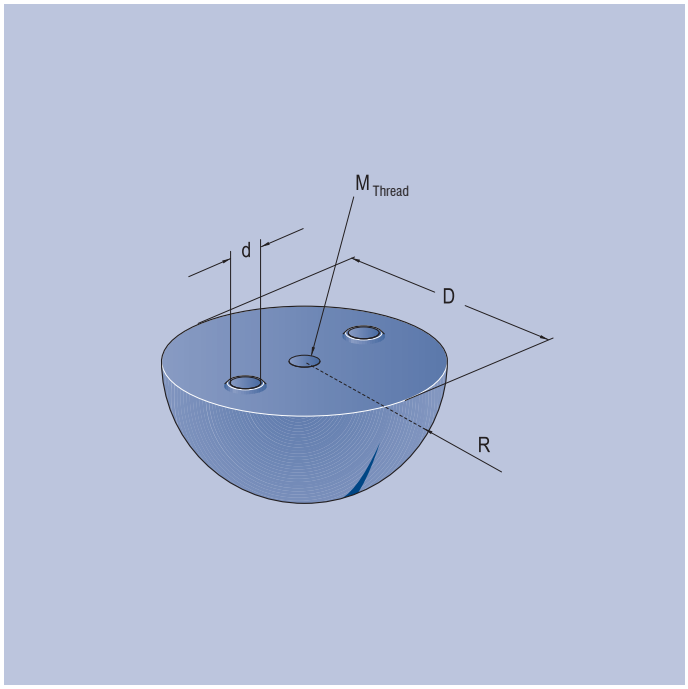
WK System

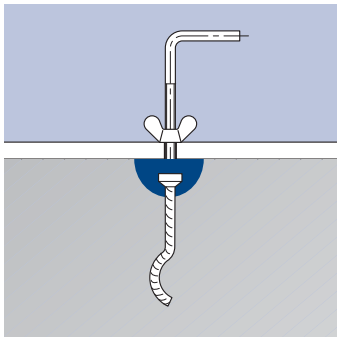
Accessories

The WK Moulding Insert enables the WK/DR Anchor to be safely and reliably fixed to the formwork. It is a part of the PFEIFER WK System. After the form stripping it is removed and leaves behind the correctly-sized hollow in the concrete, into which the WK Quicklift fits to attach to the anchor head.

Material:

Rubber
Retaining plate





Ref.-No. with thread plate	Ref.-No. with thread pin	Type/Size	Thread M	Dimensions [mm] R	D	d	Weight approx. kg/piece
05.181.013	**05.191.013**	WK/DR 1.3	M 8	30	60	7	0,11
05.181.025	**05.191.025**	WK/DR 2.0/2.5	M 10	37	76	7	0,15
05.181.040	**05.191.040**	WK/DR 4.0/5.0	M 10	47	97	11	0,30
05.181.063	**05.191.063**	WK/DR 6.3/7.5	M 10	59	121	11	0,51
05.181.100	**05.191.100**	WK/DR 8.0/10.0	M 10	59	121	11	0,50
05.181.125	**05.191.125**	WK/DR 12.5	M 10	80	165	11	1,20
05.181.150	**05.191.150**	WK/DR 15.0	M 10	80	165	11	1,20
05.181.200	**05.191.200**	WK/DR 20.0	M 10	80	165	11	1,20

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER Fixing Screws for WK Moulding Inserts

Item-No. 05.206

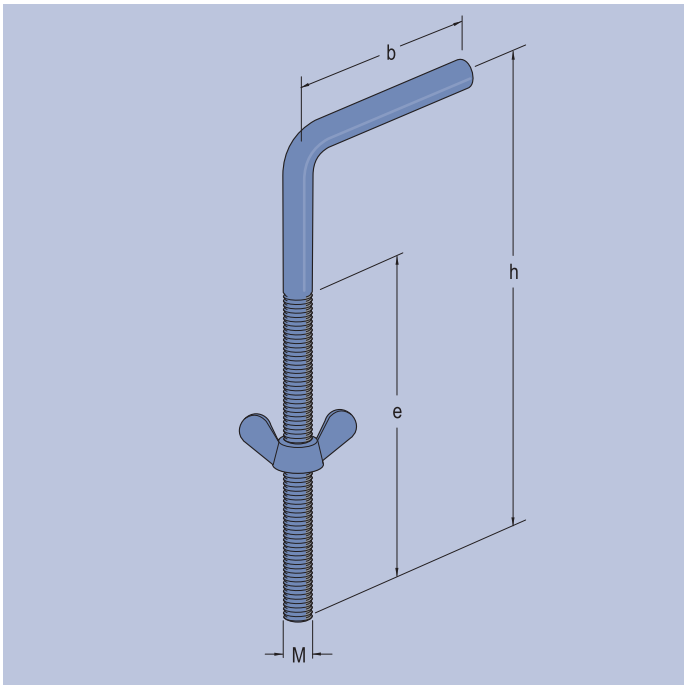
PFEIFER

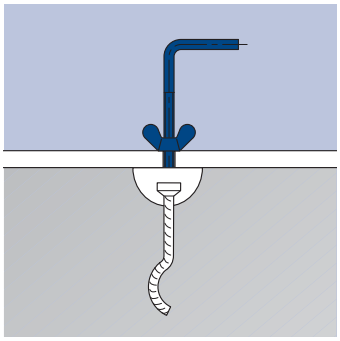
WK System

Accessories

With PFEIFER Fixing Screws, WK Moulding Inserts can be safely and quickly fixed to all formwork with correct dimensions and angles.

Material:
Steel, galvanized



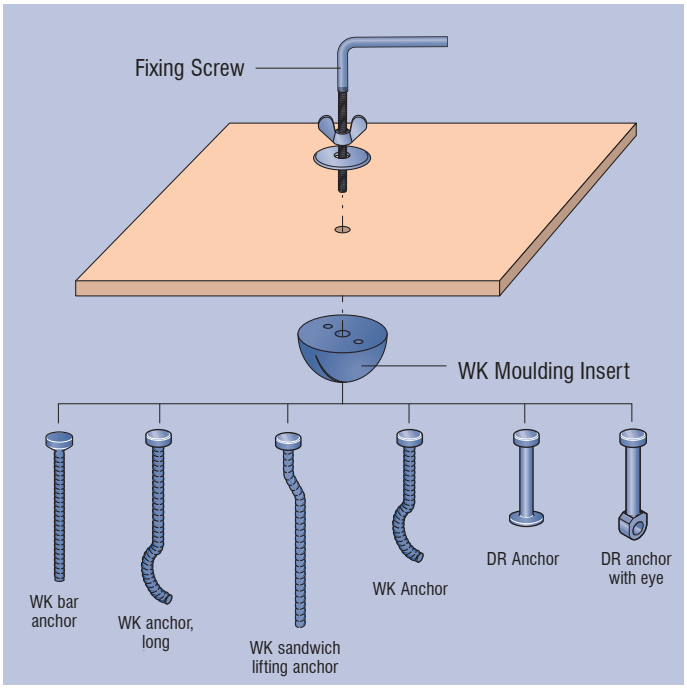


Ref.-No.	for WK moulding insert	Size d	Dimensions [mm] b	e	h	Weight approx. kg/piece
05.206.083	WK/DR 1.3	M 8	60	80	120	0,11
05.206.103	WK/DR 2.0–20.0	M 10	60	110	150	0,19

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

System

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS



This application of PFEIFER Accessories consists of:

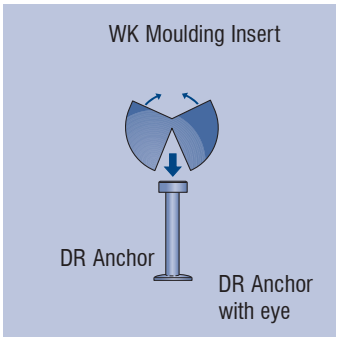
– **PFEIFER Fixing Screw**

– **PFEIFER WK Moulding Insert for the selected PFEIFER WK/DR Anchor**

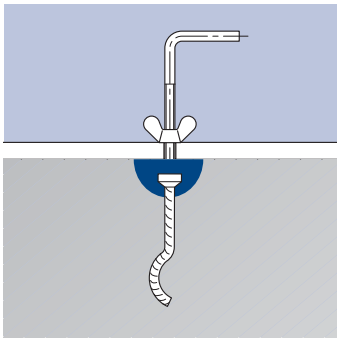
Use

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

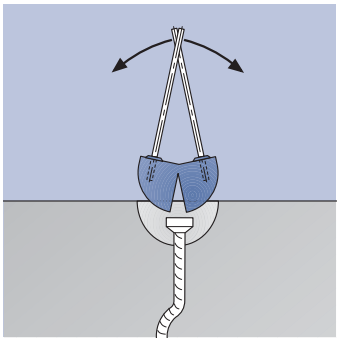
Installation:



Fastening to the formwork:



Removal of Moulding Insert:



Notice: The wing nut of the fixing screw must be tightened enough to press the whole moulding insert onto the formwork. Only that way is the gap between the two halves completely closed.

Caution: Under unfavourable conditions, e.g. storage of the moulding insert in release agent, the volume of the moulding insert can change. It should therefore be checked for the correct diameter before each use. Measurement deviations greater than 5% mean that the WK Moulding Insert should be discarded.

Notice: Before each use, the WK Moulding Insert must be check for usability. If there are apparent dimension differences or damage, it must not be used again.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Attaching is very quick: PFEIFER WK Lifting Devices

PFEIFER WK Quicklift is the reliable lifting device for the PFEIFER WK System. PFEIFER DR and PFEIFER WK Anchors can be attached rapidly and safely with the PFEIFER WK Quicklift. This enables problem-free moving and assembly of precast concrete elements.

System

- PFEIFER WK Quicklift for all anchors of the WK System
- Wide choice of associated anchors and accessories – all lifting operations can be done practically and safely

PFEIFER WK Quicklift

- Highest safety levels from 50 years of experience in the manufacture and use of lifting anchors
- Rapid and secure attachment
- Convenient in use
- Can be used for parallel and transversal shear pull

Made in Germany

- Safe manufacture under steady-state conditions
- In-house quality assurance
- Continuous product development
- High-ductility special precision-cast steel
- Controlled welding processes to applicable standards
- Supervision of welding and specialist welding engineer

Safety

- In-house production control, a permanent feature of our production for decades
- Certification in accordance with DIN EN 9001

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER WK Quicklift

Item-No. 05.184

PFEIFER

WK System

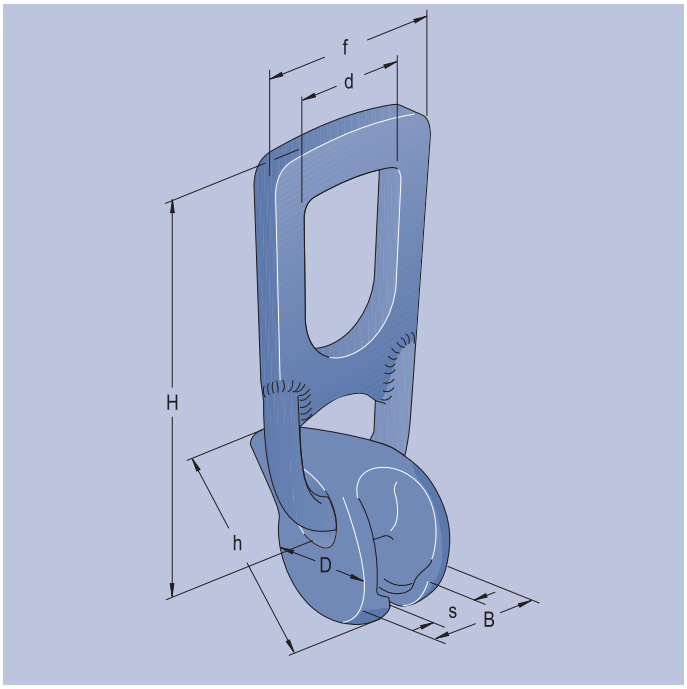
Lifting device

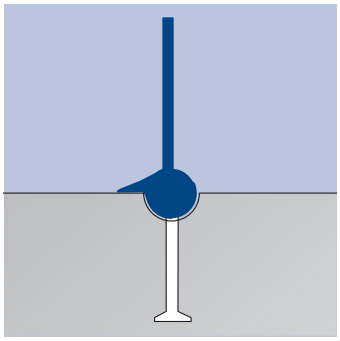
PFEIFER WK Quicklift is the strong and high-quality lifting device for the PFEIFER WK System.It is designed for use in combination with PFEIFER DR and PFEIFER WK Anchors. Simply threading the head over the slot of the suspension ball gives a secure connection between the lifting device and the anchor.

Advantages: Long service life, reliable lifting device, rapid attachment, unambiguous assignment from letter code identification

Material:

Hardened cast steel, hardened round steel, painted





PFEIFER WK Quicklift

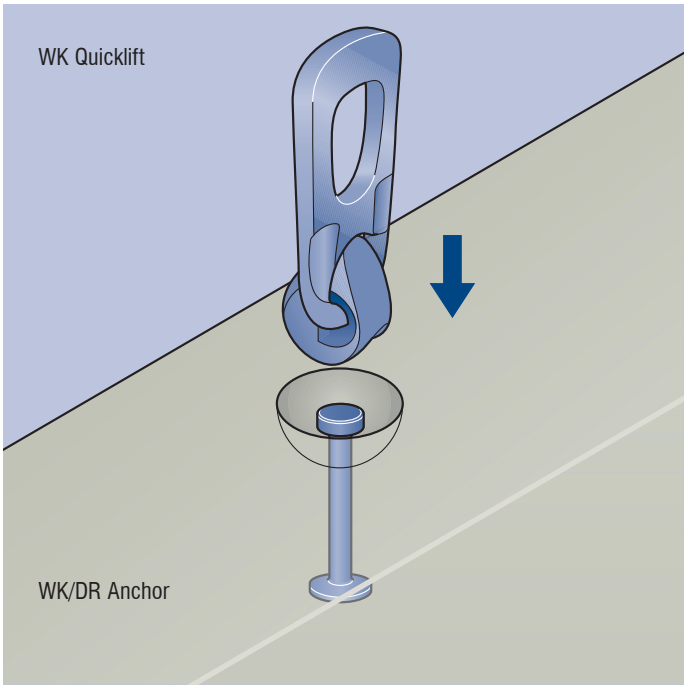
Ref.-No.	Type/Size	$N_{R,adm}$ [kN]	$V_{R,adm}$ [kN]	for anchors of size	Dims., [mm] D	H	h	B	s	d	f	Weight [kg/piece]
05.184.013.3	WK/DR 1.3	13	6,5	1.3	54	162	74	33	11,5	46	74	0,99
05.184.025.3	WK/DR 2.5	25	12,5	2.5	63	194	89	42	16,0	55	86	1,41
05.184.050.3	WK/DR 5.0	50	25,0	5.0	82	236	112	60	21,5	70	118	3,22
05.184.100.3	WK/DR 10.0	100	50,0	10.0	105	339	155	84	29,0	84	160	8,92
05.184.200.3	WK/DR 20.0	200	100,0	20.0	153	441	231	115	41,0	118	186	22,00

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Instructions for installation and use

System

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS



The PFEIFER WK Quicklift is always used together with PFEIFER WK/DR Anchors. In combination with cast-in PFEIFER Lifting Anchors it forms the matching lifting anchor system. The unambiguous assignment is done using head size and the stamp on the anchor head, the Quicklift ball and the lifter handle

Warning: The use of non-matched or external system components can cause reduced safety levels and is not admissible. This can cause a hazard to life and limb. Always use PFEIFER WK/DR components that are matched to each other.

Notice: The term “size” corresponds to the load classes of VDI-BV-BS 6205.

Safety

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

The following working coefficient 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.

– Cable failure: $\gamma_s = 4{,}0$

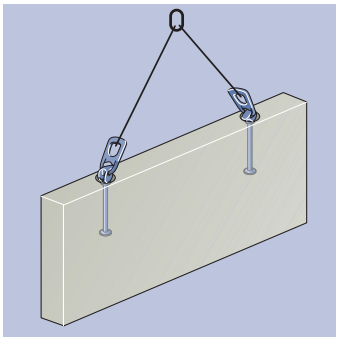
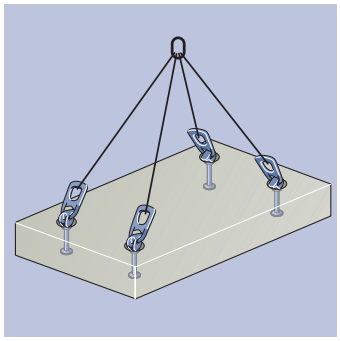
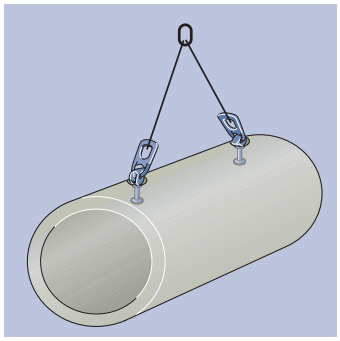
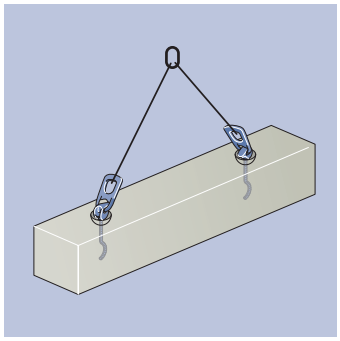
– Concrete failure: $\gamma_c = 2{,}1$

– Working coefficient (load side): $\psi_{dyn} = 1{,}3$

Notice: Lifting anchor for precast elements from constantly monitored factory production

Use

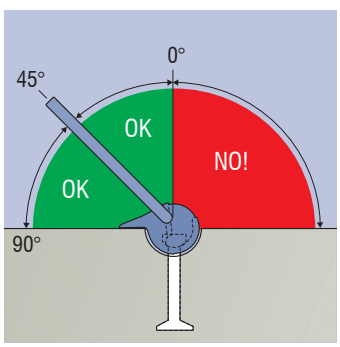
FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

Intended use

FOR PLANNERS · FOR PRECAST PLANTS · FOR USERS

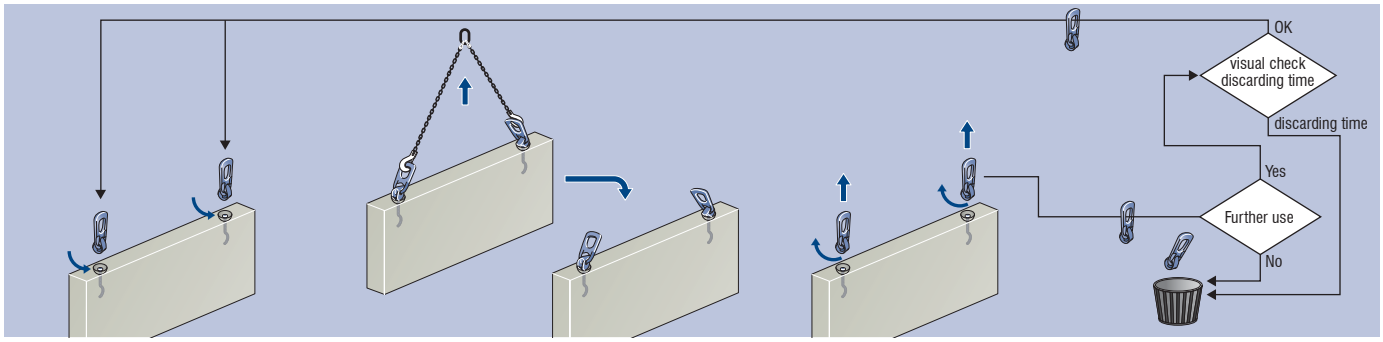
Tensile load	0 – 45°
Transverse shear load	OK ✓
Temperature	-20 to 80 °C



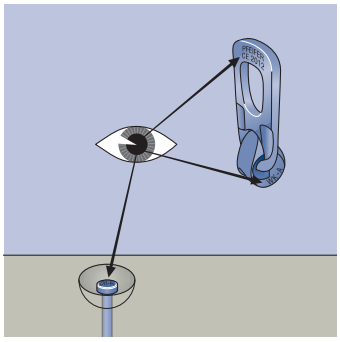
Warning: If the loading is perpendicular to the slot of the suspension ball (transversal shear pull in the wrong direction), against the lip or incorrectly inserted, there is the risk of slipping out and the construction element falling. This causes a hazard to life and limb. The WK Quicklift must always be fully inserted and loaded in the direction of the lip that makes contact with the concrete.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Intended use



Caution: Missing or illegible markings can make it not possible to allocate 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.



Caution: PFEIFER Quicklifts 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.

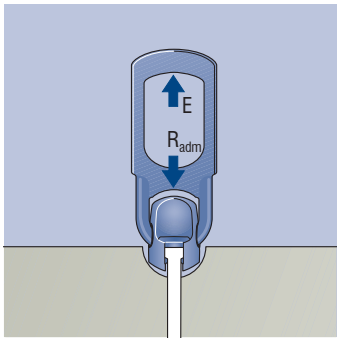
Use the markings on the WK Anchor and WK Quicklift to check that the system parts belong together.

Marking in the WK System:
– Type/Size
– Year of manufacture
– EC marking
– Manufacturer

Dimensioning

$$E \leq R_{adm}$$

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



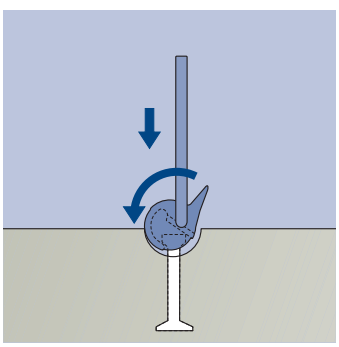
Admissible load (resistance)

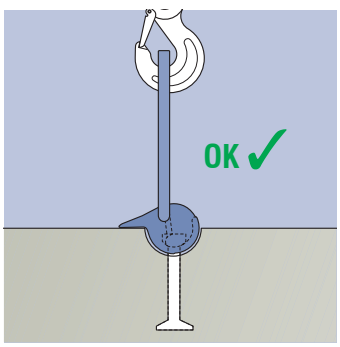
Type/Size	$N_{R,adm}$ [kN]	$V_{R,adm}$ [kN]	Can be used for
WK/DR 1.3	13	6.5	DR 1.3
WK/DR 2.5	25	12.5	DR 2.5 und WK 2.5
WK/DR 5.0	50	25.0	DR 5.0 und WK 5.0
WK/DR 10.0	100	50.0	DR 10.0 und WK 10.0
WK/DR 20.0	200	100.0	DR 20.0 und WK 20.0

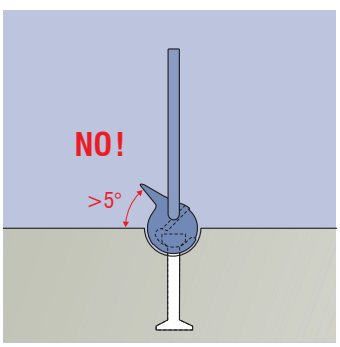
Caution: The anchors to be concreted-in must be determined by the planning engineer. The instructions for installation and use of the selected anchor must be complied with.

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

Installation



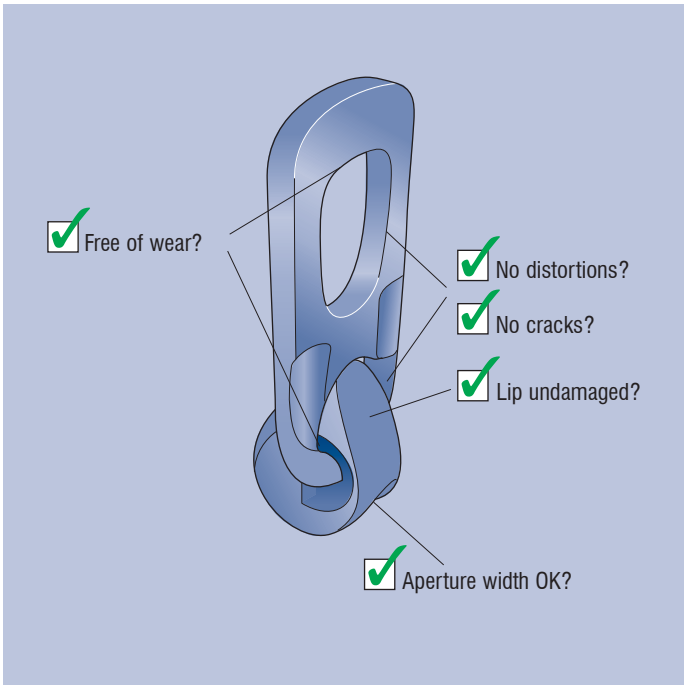


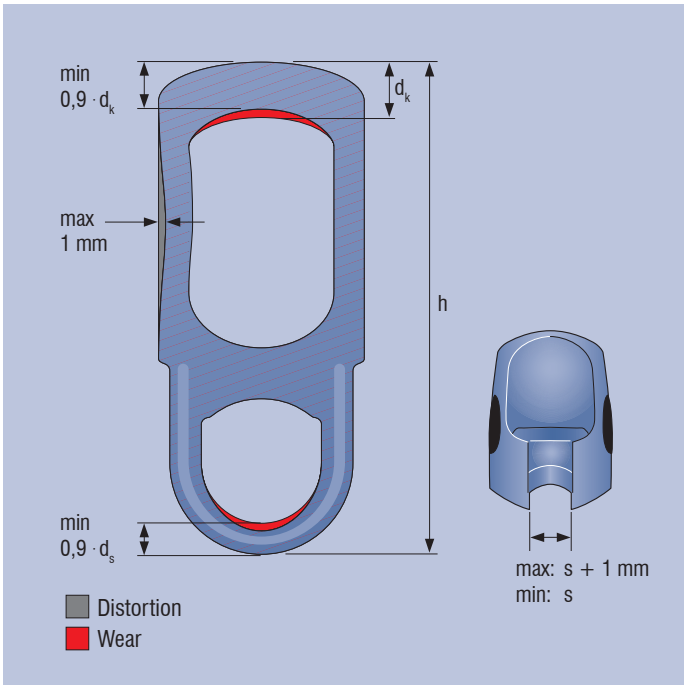


Warning: If the Quick-lift head is not fully attached there is a risk of the structural element falling and causing a hazard to life and limb. The head of the WK Quicklift must always be fully inserted until the lip is seated in position.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Original inspection and service life





When any of the following criteria are met, the PFEIFER Quicklift must not be used any longer and should be considered ready for discarding:

- Permanent distortion
- Cross-section reduction > 10%
- Elongation > 5%
- Cracks in the metal cross-section
- Corrosion pits
- Aperture width ≥ nominal value s+1 mm
- Evident distortions, signs of wear

Caution: Do not use WK Quicklifts which have an unreadable or missing identification label. They must be discarded.

Notice: As soon as the WK Quicklift is detected as having reached the end of its serviceable life, it must be clearly and unmistakably marked as unusable and made unusable. (e.g. separate the cast ball)

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

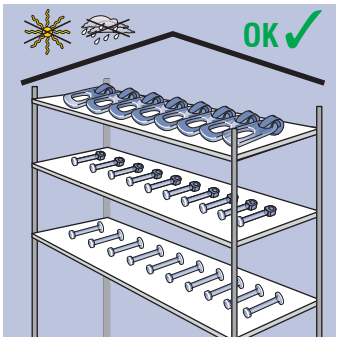
Caution: If the surface has significant corrosion there is the danger that the material is weakened or damaged. This can mean a hazard to life and limb.

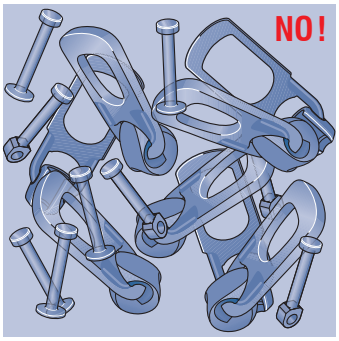
Warning: The WK Quicklift must not be changed or modified in any way. Any modification can lead to reduced safety or even failure of the anchors and the fall of the structural element. Repair work is not permissible and discarded lifting devices must be disposed of.

Dimensions and limit values

Type/Size	Aperture width s [mm]	Limit s [mm]	Suspension link height h [mm]	Limit h [mm]	Stirrup diameter d_s [mm]	Limit d_s [mm]	Dimension d_k [mm]	Limit d_k [mm]
WK/DR 1.3	11,5	12,5	162	170,1	12,0	10,8	20,0	18,0
WK/DR 2.5	16,0	17,0	194	203,7	14,0	12,6	25,0	22,5
WK/DR 5.0	21,5	22,5	236	247,8	20,0	18,0	37,0	33,3
WK/DR 10.0	29,0	30,0	339	356,0	28,0	25,2	50,0	45,0
WK/DR 20.0	41,0	42,0	441	463,1	38,0	34,2	75,0	67,5

Storage





Notice: Store the components of the WK System dry and protected. There is a risk of corrosion if there are large temperature changes, humid conditions or any contact with acids, road salt or sea water!

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Misuses

Warning: Use of the WK Quicklift 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.

Caution: Incorrect use can result in items falling and causing 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 and trained personnel.

Warning: Do not use WK Quicklifts for lashing concrete elements during transport or for any other use not covered by this document. This can result in items falling and causing a hazard to life and limb of persons. These WK Quicklift devices must be used only for lifting and moving precast concrete elements.

Important information about identification markings

The PFEIFER WK System includes the DR and WK Anchors. Because of the transition to VDI/BV-BS 6205, that should be seen as the national implementation of the machinery directive 2006/42/EC, a new safe identification is necessary. Since, during the transition period, products with the old and the new markings will still be around, the following table should provide a simple and safe assignment of Quicklift and anchors. PFEIFER WK products with the old and the new markings for a class of size/load can be mixed in the transition period without affecting safety.

Identification mark			Identification mark, OLD		
WK Quicklift	**DR Anchor**	**WK Anchor**	**WK Quicklift**	**DR Anchor**	**WK Anchor**
WK/DR 1.3	DR 1.3	–	WK/DR 1.3t	DR 1.3t	–
WK/DR 2.0/2.5	– DR 2.5	WK 2.0 WK 2.5	WK/DR 2.0/2.5t	– DR 2.5t	WK 2.0t WK 2.5t
WK/DR 4.0/5.0	– DR 5.0	WK 4.0 –	WK/DR 4.0/5.0t	– DR 5.0t	WK 4.0t –
WK/DR 6.3/10.0	– DR 7.5 – DR 10.0	WK 6.3 – WK 8.0 WK 10.0	WK/DR 6.3/10.0t	– DR 7.5t – DR 10.0t	WK 6.3t – WK 8.0t WK 10.0t
WK/DR 12.5/20.0	– DR 15.0 DR 20.0	WK 12.5 WK 15.0 WK 20.0	WK/DR 12.5/20.0t	– DR 15.0t DR 20.0t	WK 12.5t WK 15.0t WK 20.0t

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.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Eagle eyes: a sharp look at the details

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”.

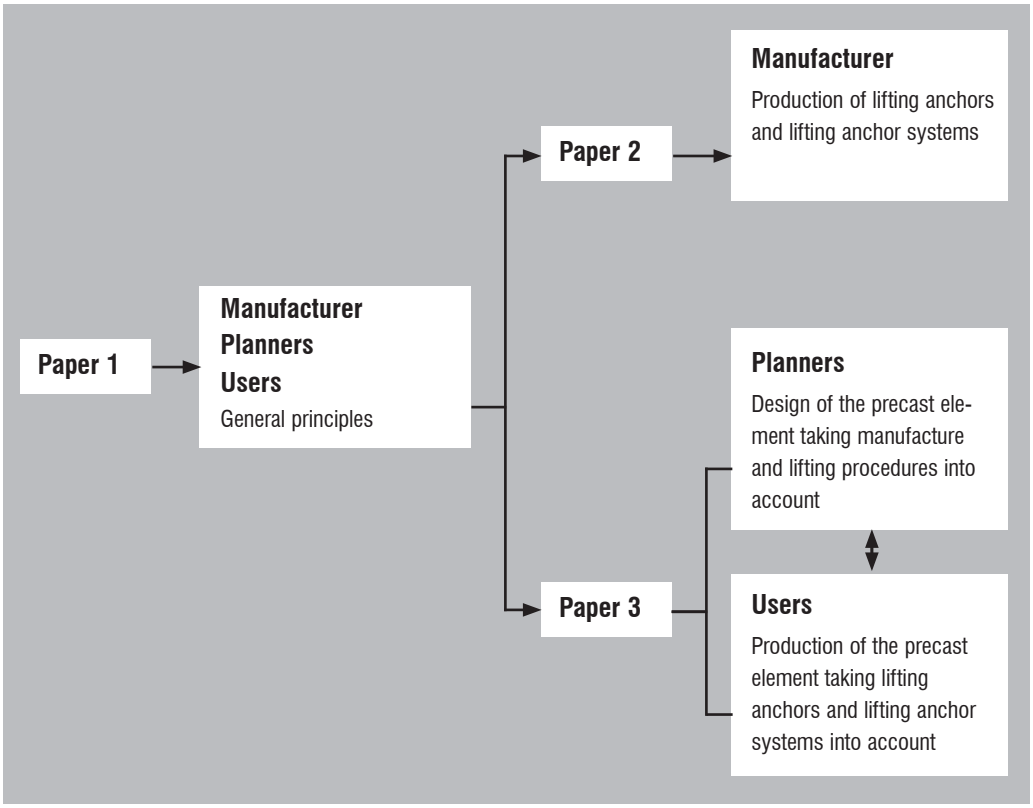
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

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

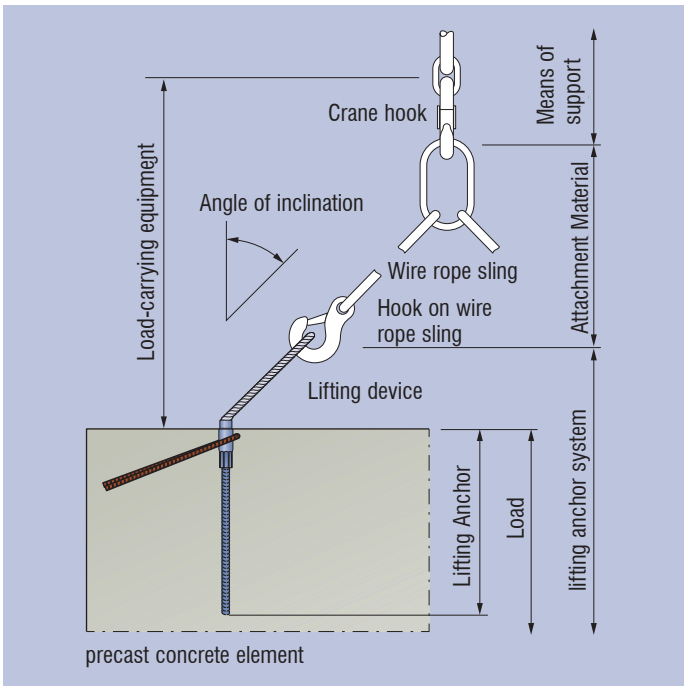
As shown in the following diagram, the three parts are relevant for different target groups



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 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.

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.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

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 uses must be accounted for. Partly also on the part of the precast plant (see also VDI/BV-BS directive Part 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)

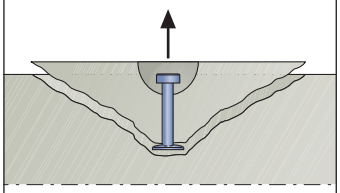
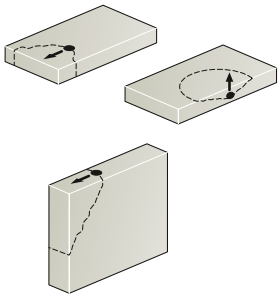
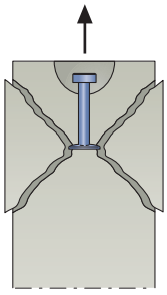
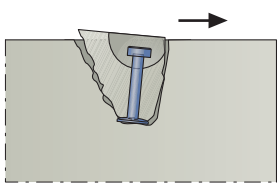
The admissible load (resistance) of the anchorage of lifting anchors and lifting anchor systems is determined, according to this directive, as follows:

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

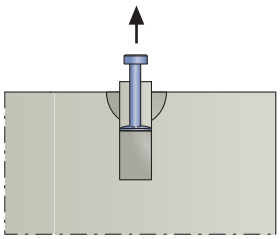
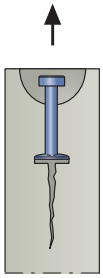
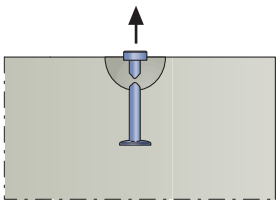
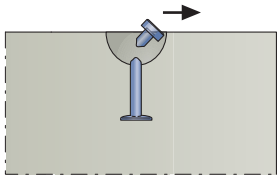
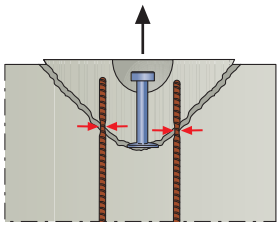
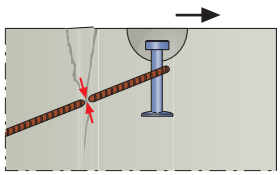
In this, the symbols are

R_k characteristic resistance of an anchorageg
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.		
Localized 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.		

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

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.

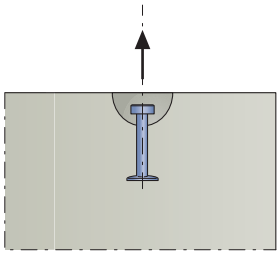
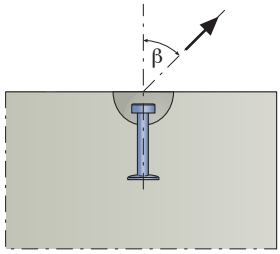
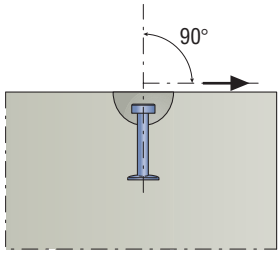
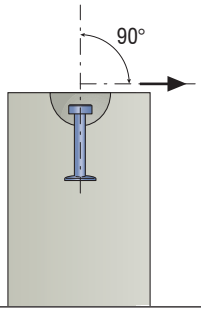
© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

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.	

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

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 Fadh

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

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. Dynamic 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 – 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

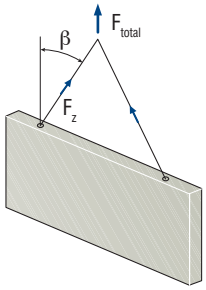
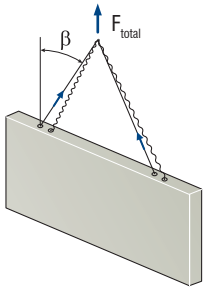
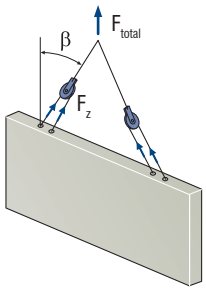
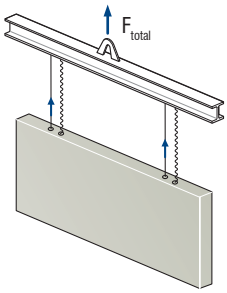
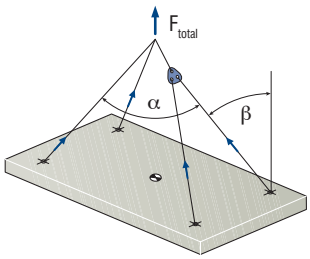
Table 3 – verifications

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

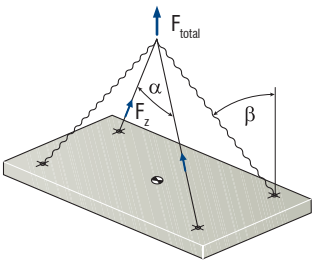
n = number of lifting anchors sharing the load

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Example elements

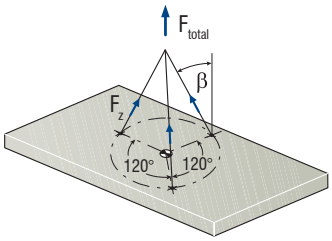
Use	
	**Load type: transport** - n = 2 - Shear pull factor z ≥ 1 (depends on angle β) - No formwork adhesion - Lifting load factor as in Table 1
	**Load type: transport** - n = 2 (no compensation within the pairs of anchors) - Shear pull factor z ≥ 1 (depends on angle β) - No formwork adhesion - Lifting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

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017



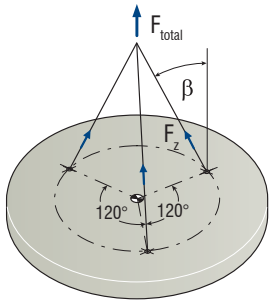
Load type: lifting of formwork
- n = 2
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- no lifting load factor

Load type: transport
- n = 2
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Lifting load factor as in Table 1



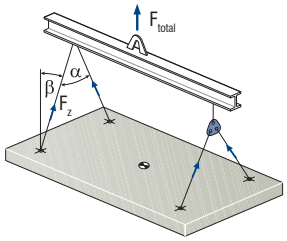
Load type: lifting of formwork
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- no lifting load factor

Load type: transport
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Lifting load factor as in Table 1



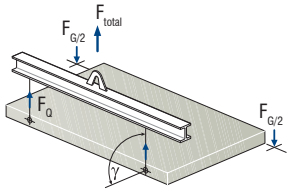
Load type: lifting of formwork
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- no lifting load factor

Load type: transport
- n = 3
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Lifting load factor as in Table 1



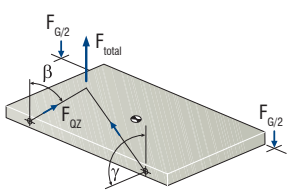
Load type: lifting of formwork
- n = 4
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion!
- no lifting load factor

Load type: transport
- n = 4
- Shear pull factor z ≥ 1 (depends on angle β)
- Formwork adhesion
- Lifting load factor as in Table 1



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

Load type: deposit/erecting/transport
- n = 2
- Shear pull factor z = 1
- No formwork adhesion
- Lifting load factor as in Table 1



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/transport
- n = 2
- Shear pull factor z ≥ 1 (depends on angle β)
- No formwork adhesion
- Lifting load factor as in Table 1

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Installation

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 recognizable after installation in the precast element. In each case the durable and clearly recognisable identification of the lifting anchor must ensure an unambiguous assignment of the compatible lifting device.

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 WK system.
Incorrectly installed or dirty lifting anchors or any with damage such as 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

After they have been used, anchors should be closed by appropriate means.

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

CE

EC Declaration of Conformity

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

The manufacturer

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

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

PFEIFER-Quicklift, 1.3, 2.5, 5.0, 10.0, 20.0
PFEIFER-DR Anchor, 1.3, 2.5, 5.0, 7.5, 10.0, 15.0, 20.0
PFEIFER-DR Anchor with eye, 1.3, 2.5, 5.0, 10.0
PFEIFER-WK Anchor, 2.0, 2.5, 4.0, 6.3, 8.0, 10.0, 12.5, 15.0, 20.0
PFEIFER-WK Anchor long, 2.0, 2.5, 4.0, 6.3, 8.0, 10.0, 15.0, 20.0
PFEIFER-WK Bar Anchor, 2.0, 2.5, 4.0, 6.3, 8.0, 10.0, 15.0, 20.0
PFEIFER WK sandwich lifting anchor

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
– Herr Dipl.-Ing. Christoph Neef
  Manager, Development Connecting and Lifting Systems, PFEIFER Seil- und Hebetechnik GmbH

PFEIFER Seil- und Hebetechnik GmbH
Memmingen, 14.09.2016

Dipl.-Ing. Matthias Kintscher
Manager, Business Area Connecting and Lifting Systems

Dipl.-Ing. Christoph Neef
Manager, Development Connecting and Lifting Systems

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

Notes

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

PFEIFER

Notes

© 2012 Copyright, PFEIFER, 87700 Memmingen / Translation of the original operating instructions / Technical modifications and errors excepted. Status 02/2017

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.info.

OUR LOCATIONS

Germany
Headquarters

PFEIFER SEIL- UND
HEBETECHNIK GMBH
Dr.-Karl-Lenz-Straße 66
D-87700 MEMMINGEN
Telefon +49(0)8331-937-312
Telefax +49(0)8331-937-342
E-Mail export-bt@pfeifer.de
Internet www.pfeifer.info

Fundlandstraße 29
D-45326 ESSEN
Tel. 0201-28966-0
Fax 0201-28966-20
E-Mail essen@jp-bautechnik.de

Markircher Straße 14
D-68229 MANNHEIM
Tel. 0621-4840340
Fax 0621-4840344
E-Mail mannheim@jp-bautechnik.de

Lechstraße 21
D-90451 NÜRNBERG
Tel. 0911-6427808
Fax 0911-6428472
E-Mail nuernberg@jp-bautechnik.de

Austria
PFEIFER SEIL- UND
HEBETECHNIK GMBH
Dr.-Karl-Lenz-Straße 66
D-87700 MEMMINGEN
Telefon +49(0)8331-937-290
Telefax +49(0)8331-937-342
E-Mail bautechnik@pfeifer.de

Denmark
JORDAHL & PFEIFER
Byggeteknik A/S
Risgårdevej 66,
DK-9640 Farsø
Tel. +45-9863-1900
E-Mail info@jordahl-pfeifer.dk

France
JORDAHL H-BAU France
Siège, 7 rue des Vallières Sud
25220 Chalezeule
Tél +33-3 81 25 04 65
Fax +33-3 81 25 07 96
E-Mail info@jordahl-hbau.fr

Spain
PFEIFER Cables y Equipos de
Elevación, SLU.
Avda. de los Pirineos,
25 – Nave 20
San Sebastián de los Reyes
ES-28703 MADRID
Tel. +34-916593185
Fax +34-916593139
E-Mail p-es@pfeifer.de

ES-08820 BARCELONA
Tel./Fax +34-93-6364662
Móvil +34-64-9154948
E-Mail frieda@pfeifer.de

Russia
OOO PFEIFER
KANATI & PODJÖMNIE TEHNOLOGII
RU-119017 MOSCOW
Pyzhevskiy pereulok,
h. 5, bld. 1, office 108
Tel. +7-495-363-01-27
Fax +7-495-363-01-28
E-Mail info@pfeiferrussia.ru

Ukraine
JORDAHL & PFEIFER
TECHNIKA BUDOWLANA
ul. Pawłyka 17a
76-018 IVANO-FRANKIVSK
Tel. +38067442-85-78 (Eastern Region)
Tel. +38067442-85-79 (Western Region)
E-Mail info@j-p.com.ua

Hungary
PFEIFER GARANT KFT.
Gyömröi út 128
HU-1103 BUDAPEST
Tel. +36-1-2601014
Fax +36-1-2620927
E-Mail info@pfeifer-garant.hu

Singapore
J&P BUILDING SYSTEMS PTE LTD.
No. 48 Toh Guan Road East
#08-104 Enterprise Hub
SG-SINGAPORE 608586
Tel. +65-6569-6131
Fax +65-6569-5286
E-Mail info@jnp.com.sg

UAE
EMIRATES GERMAN BUILDING
MATERIALS TRADING (LLC)
P.O. Box 18917
UAE-DUBAI
Tel. +971-4-2676644
Fax +971-4-2676646
E-Mail info@emirategerman.com

Switzerland
Pfeifer Seil- und Hebetechnik GmbH
Kurt Styger
Gebietsverkaufsleitung
Schweiz Bautechnik
Dr.-Karl-Lenz-Strasse 66
D-87700 Memmingen
Telefon: +41(0)797254931
Email: kstyger@pfeifer.de

United Kingdom
J&P BUILDING SYSTEMS LTD.
Unit 5 Thame Forty
Jane Morbey Road
GB-THAME, OXON OX9 3RR
Tel. +44-1844-215200
Fax +44-1844-263257
E-Mail enquiries@jp-uk.com

Czechia
JORDAHL & PFEIFER
STAVEBNI TECHNIKA S.R.O.
Bavorská 856/14
CZ-15500 PRAHA 5
Tel. +420-272700701
Fax +420-272703737
E-Mail info@jpcz.cz

Romania
S.C. JORDAHL & PFEIFER
TEHNICA DE ANCORARE S.R.L
Str. Malului Nr. 7, et.1
RO-550197 SIBIU JUD. SIBIU
Tel. +40 269 246 098
Fax +40 269 246 099
E-Mail info@jordahl-pfeifer.ro

Poland
JORDAHL & PFEIFER
TECHNIKA BUDOWLANA SP. Z O.O.
ul. Wrocławska 68
55-330 KRĘPICE k/Wrocławia
Tel. +48 71 39 68 264
Fax +48 71 39 68 105
E-Mail biuro@jordahl-pfeifer.pl

▶ For all other export countries please contact our headquarters in Germany.

02.17 AB/MA 224318