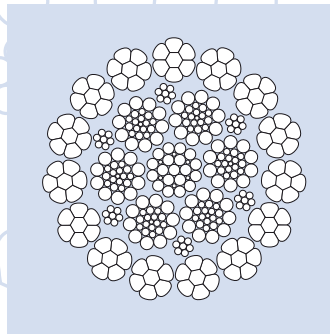




03/2018



**PFEIFER – Your specialist  
for ropes for tower cranes**

**PFEIFER  
SEIL- UND HEBETECHNIK  
GMBH**

DR.-KARL-LENZ-STRASSE 66  
DE-87700 MEMMINGEN  
PHONE +49 (0) 8331-937-301  
FAX +49 (0) 8331-937-123  
E-MAIL [wirerope@pfeifer.de](mailto:wirerope@pfeifer.de)  
INTERNET [www.wirerope.info](http://www.wirerope.info)



## Innovativ wire rope systems for tower cranes

Moving means to set things in motion, to unfold dynamics, to create things. For us in the PFEIFER group, to move is very specific: it means that with our products from Wire Rope Technology, Rope and Lifting and Building Systems elevators, heavy loads on cranes, sheet metal coils, workpieces and precast concrete elements move. Our cable structure buildings are known all over the world, and so is our extensive knowledge on the dynamics of wire rope in all applications.

Moving also means for us that we don't sit still, we study, we learn, we apply and we invest. There is a reason why the PFEIFER group is one of Europe's leading companies in Structures, Wire Rope Technology, Rope and Lifting and Building Systems.

We get things going – special requests by customers, efficient and practical solutions, technical expertise, quality and dependable service – these are the benefits for you as a partner.



**Gerhard Pfeifer,**  
President of the PFEIFER group



The PFEIFER group is one of Europe's leading companies in Structures, Wire Rope Technology, Rope and Lifting and Building Systems. The headquarters are located in Memmingen, Germany. Numerous service centres and subsidiaries worldwide are responsible for sales and distribution.

Ropes ready to use for cranes and construction machinery are our strength for years. We are the original equipment manufacturer of well-known construction machinery manufacturers, e.g. Liebherr, and have the comprehensive know-how in production and application of crane and construction machinery ropes.

The choice of a specific rope construction of our very extensive portfolio of ropes for your machine requires the special application- and rope-know-how of our consultants, because of the dependence on crane system, operation conditions and abrasion behaviour of the ropes.

Our complete documentation guarantees you traceability for all operations.

We guarantee rapid availability with our fully automatic high rack storage in Memmingen with a capacity of more than 4000 tons and further storages worldwide. Professional logistic partners ensure quick delivery.

**Reduce every risk and trust in our longtime experience of correct rope selection!**



→ Further information can be found under Products & Services at the PFEIFER web portal: [www.pfeifer.info/building-construction](http://www.pfeifer.info/building-construction)



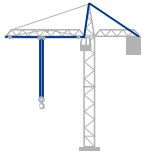
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# General information

## Requirements in wire ropes of tower cranes

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### Hoisting ropes

High rope speeds, small winch dimensions, as well as large hoisting heights are complex challenges, which require wire ropes with special properties. The resistance in multi-layer spooling plays a decisive role. The choice of the right end-termination is of high importance. We will be pleased to advise you!



### Trolley ropes

Large rope tension and frequent movement of the trolley require ropes with high bending strength and enormous breaking force in particular for boom in steep position. The packaging as rope ring or on reels on stands enables you easy mounting of the ropes.



### Luffing and pendant ropes

High tension fatigue loads and permanent weathering require the choice of luffing and pendant ropes regarding this criteria. Our luffing and pendant ropes enable you long operating times, when maintained correctly.

## PFEIFER added value advantage

---



- Complete documentation and traceability
- High availability
- Attractive price
- Own material test centre
- Comprehensive stock

PFEIFER analyses all properties of wire ropes and applied materials with extensive tests to choose the right wire rope for your application and to optimize the lifetime in your equipment.

**Reduce every risk and trust in our longtime experience in choosing the right ropes!**





# Hoisting ropes

Extract from our in stock rope range



## Liebherr

Type of crane	Rope diameter in mm	Rope length in m	ID-No. manufacturer
13H	7	83	900618030
20/26/28SE	9,2	96	773447001
20H/26H	9,2	110	900543430
26K.1	9,2	134	110169553
28/32K/SE	9,2	150	773446301
35K	9,2	159	775576501
35/40/42K	9,2	170	775575101
34K	9,2	180	773606801
42K.1	9,2	180	110114778
50/56K	9,2	212	775576801
63K/71K	10	215	775578501
71K	10	230	931739601
71EC	12	230	773344201
81K/81K.1	13	205	10178798
110ECB	16	175	10355041
91EC	16	178	773343701
110ECB	16	191	10342560
140ECH	16	200	773346201
112ECH	18	191	773364001
112ECH/ECB	18	195	773364001

## Potain

Type of crane	Rope diameter in mm	Rope length in m	ID-No. manufacturer
Igo MA21	8	99	H-81313-81
HD CF HDM	9	103	W-81313-48
321A/B/C	9	112	B-42313-57
326D	9	150	K-49313-70
CF30/HD32A	9	155	Q-74313-60
Igo32/28	9	156	T-81313-45
HD32B	9	157	B-81313-52
Igo36	9	158	T-8-81313-68
HD40/CF35A	9	172	C-81313-53
IG050	9	172	A-86313-02
331A/B/C	9	180	E-81313-55
331A/B/C	9	180	E-81313A55
336A	9	215	D-81313-54
336A/336B	9	215	D-81313A54
346A	10	220	Q-75313-18
IGO T85	10	237	T-85313-15
HDT80	11	230	W-79313-63
386 DM	13	259	B-53313-09



## Wolff

Type of crane	Rope diameter in mm	Rope length in m
WK71SL	12	322
WK5520	16	170
WK192SL	16	258
WK262SL	16	280

## Further manufacturers

- Arcomet
- FM Grove
- KSD
- Zoomlion
- Linden Comansa
- and further manufacturers



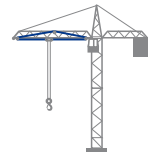
Detailed handling constructions you will find in our operating manual for stranded ropes in the PFEIFER download centre at:

→ [www.pfeifer.info/manual-strand-ropes](http://www.pfeifer.info/manual-strand-ropes)



# Trolley ropes

Extract from our in stock rope range



## Liebherr

Type of crane	Rope diameter in mm	Rope length in m	ID-No. manufacturer
20K neu	6	25,1	775509911
34K	6	33,5	773607301
35K	6	33,55	775572301
35/42K	6	36,5	775572701
42K.1	6	36,5	10114780
35K	6	66	775572201
34K	6	71,5	773607201
35/42K	6	72,5	775572801
42K.1	6	77,5	10114779
22/28SE26H	7	31,4	775551501
81K	7	52,5	10173683
28/32K	7	62	773406201
81K	7	89	10173684
63K	8	43	775582701
71K	8	44,5	775583201
50K	8	80	775580901
63K	8	86	775582601
71K	8	97	775583301
112ECH/ECB	8	112	773709801
140ECH	9	71	773374001

## Potain

Type of crane	Rope diameter in mm	Rope length in m	ID-No. manufacturer
HD32A	6	38,5	E-74313-50
HD32B/HD36	6	41,1	F-78313-90
IG032	6	53	G-81313-11
Igo32/36	6	55	J-81313-36
HD32A	6	55,4	D-74313-49
IG036	6	57	R-82313-93
HD32B	6	57,1	G-78313-91
C22-34	6	64	S-71313-50
Igo MA21	6	69,1	K-81313-83
CF30TL	6	80,5	N-81313-40
Igo36	6	84,5	S-81313-67
Igo50	6	100,3	R-82313-01
331A/331B	7,5	47	H-43313-90
336A	7,5	54	B-49313-85
346A	7,5	59	L-75313-14
326C/326D	7,5	79	T-43313-77
IGO T85	7,5	83,4	R-85313-13
331B/MD155	7,5	85	T-53313-71
336A	7,5	98	L-09313-72
346A	7,5	110,5	M-75313-15



Extract from our in stock rope range



## Wolff

Type of crane	Rope diameter in mm	Rope length in m
WK91SL	6	55
WK91SL	6	99
WK192SL	8	70
WK92SL	8	100
WK192SL	8	118

## Further manufacturers

- Arcomet
- FM Grove
- KSD
- Zoomlion
- Linden Comansa
- and further manufacturers



Detailed handling constructions you will find in our operating manual for stranded ropes in the PFEIFER download centre at:

→ [www.pfeifer.info/manual-strand-ropes](http://www.pfeifer.info/manual-strand-ropes)



# Luffing and pendant ropes

Extract from our in stock rope range



## Different manufacturers

*Trust in our experience and let us advise you!*

Detailed handling constructions you will find in our operating manual for stranded ropes in the PFEIFER download centre at:

→ [www.pfeifer.info/manual-strand-ropes](http://www.pfeifer.info/manual-strand-ropes)



## Swaged fork thimble PSH 518

## Thimbles



### Technical data

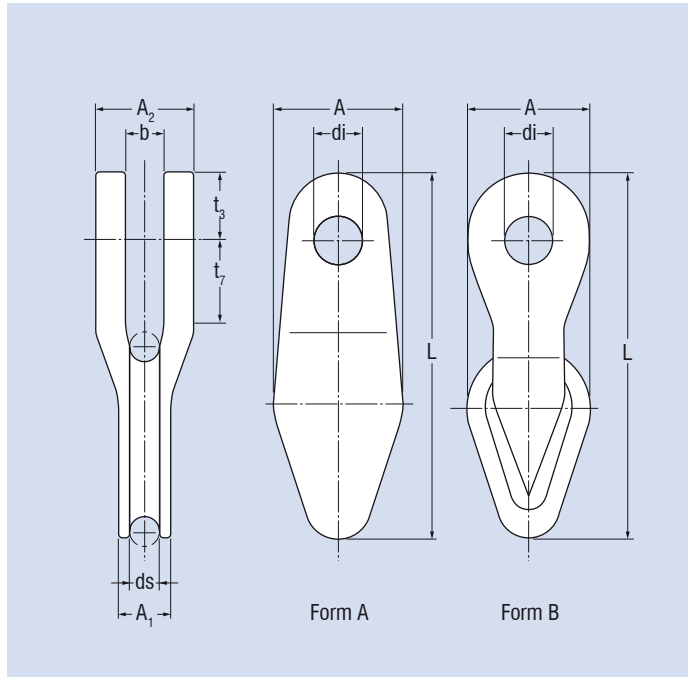
Material Cast steel (cold resistant to -40°C)  
Surface painted or galvanised

### Application area

Round strand rope pressed acc. to EN 13411-3

### Combination products

Solid thimble PSH 519  
Pin 518 P  
Ferrule acc. to EN 13411-3 510  
Safety spring 518 S



Don't use non-rotation resistant and rotation resistant ropes with a turnable fixed point (e. g. swivel). The end termination has to be fixed against rotation as well. If this is not observed considerable damage, serious injury or death will occur.

Reference no.	NG	ds	A	A <sub>1</sub>	A <sub>1</sub> Tol	A <sub>2</sub>	b	b Tol	di	di Tol	L	t <sub>3</sub>	t <sub>7</sub>	WLL	Weight
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kN	kg
111243	16	14 – 16	74	28	+5	58	24	+1	29	+1,5	210	39	50	95	2,5
111248	19	17 – 19	84	32	+5	64	31	+1	36	+1,5	251	44	55	135	3,52
111253	22	20 – 22	92	36	+5	82	32	+1	41	+1,5	282	56	60	180	6,08
199269	27	23 – 27	108	42	+6	91	38	+2	51	+1,5	330	60	80	270	9,64
201710	31	28 – 31	124	48	+7	104	42	+3	57	+1,5	386	73	100	350	13,7
111263	36	32 – 36	138	52	+7	117	46	+3	62	+1,5	432	79	110	475	19,71
111266	42	37 – 42	151	54	+7	105	55	+3	67	+1,5	524	105	130	620	22,42
230205	49	43 – 49	190	60	+7	115	65	+3	72	+1,5	582	111	145	795	27,1
111270	60	50 – 60	222	73	+7	135	75	+3	72	+1,5	681	140	160	1200	40
111274	68	61 – 68	262	80	+7	145	85	+3	82	+1,5	833	170	220	1650	67

WLL = maximum payload

Safety factor = 3,0

NG 14 to 36: Form A, NG 37-68: Form B

Dimensions correspond to nominal sizes without tolerance and without coating. Please contact us for exact measurements!

## Solid thimble PSH 519

## Thimbles



### Technical data

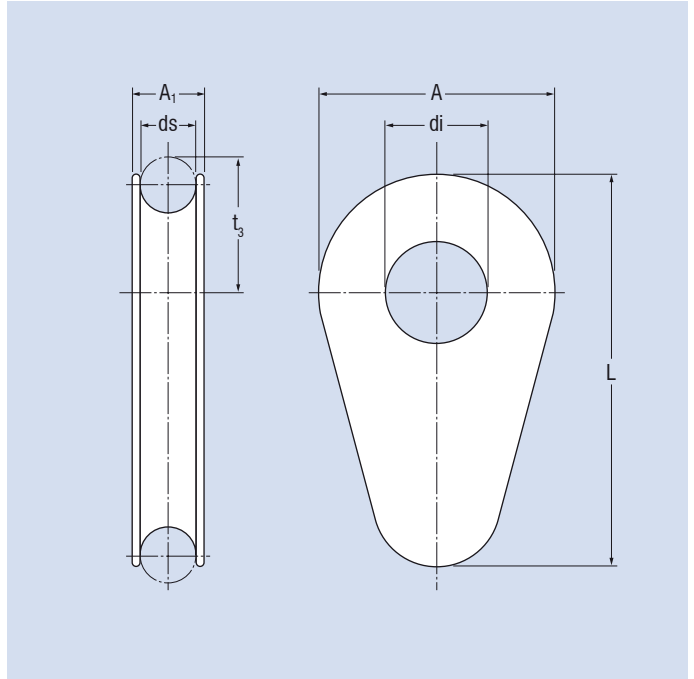
Material Cast steel (cold resistant to -40°C)  
Surface painted

### Application area

Round strand rope pressed acc. to EN 13411-3

### Combination products

Pin 518 P  
Swaged fork thimble PSH 518  
Ferrule acc. to EN 13411-3 510  
Safety spring 518 S



Don't use non-rotation resistant and rotation resistant ropes with a turnable fixed point (e. g. swivel). The end termination has to be fixed against rotation as well. If this is not observed considerable damage, serious injury or death will occur.

Reference no.	NG	ds mm	A mm	A <sub>1</sub> mm	A <sub>1</sub> Tol mm	di mm	di Tol mm	L mm	t <sub>3</sub> mm	WLL kN	Weight kg
149743	16	14 – 16	65	23	-2	29	+1,5	105	41	95	0,53
221033	19	17 – 19	77	30	-2	36	+1,5	129	49	135	1,21
111286	22	20 – 22	88	29	-2	41	+1,5	151	56	180	1,32
111289	27	23 – 27	104	36	-2 / +1	51	+1,5	186	70	270	2,17
111293	31	28 – 31	118	40	-2 / +1	57	+1,5	205	79	350	2,88
111298	36	32 – 36	132	44	-2 / +1	62	+1,5	227	88	475	3,86
111303	42	37 – 42	168	52	±2	67	+1,5	260	112	620	7,28
159823	49	43 – 49	186	60	±2	72	+1,5	296	118	795	11,14
111306	60	50 – 60	222	70	±2	72	+1,5	352	132	1200	16,66
221046	68	61 – 68	252	80	±2	82	+1,5	407	152	1650	24,3

WLL = maximum payload

Safety factor = 3,0

Dimensions correspond to nominal sizes without tolerance and without coating. Please contact us for exact measurements!

## Open wedge socket PSH

95A

Clamps



### Technical data

Material bolt	Quenched and tempered steel
Material housing	Cast steel (cold resistant to -40 °C)
Surface housing	Hot-dip galvanised
Material wedge	Cast steel (cold resistant to -40 °C)
Surface wedge	Hot-dip galvanised
Loss factor	0,8

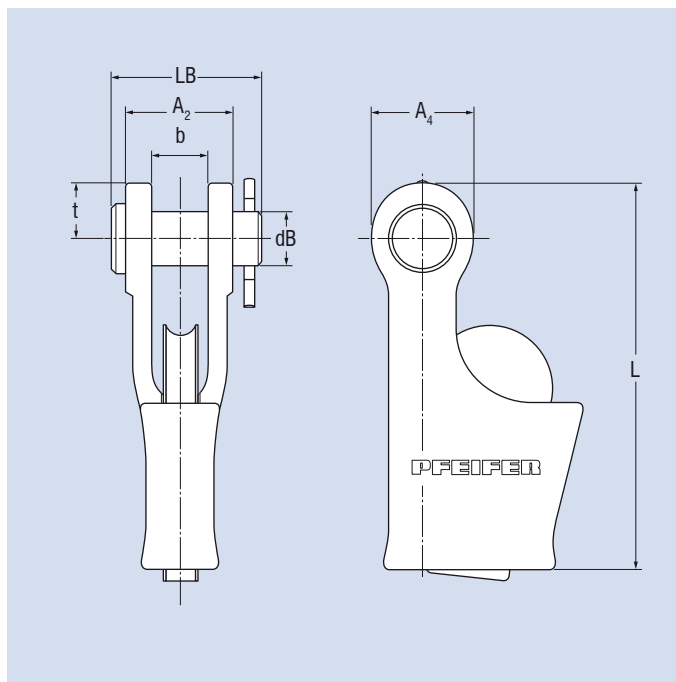
### Application area

Round strand ropes

### Combination products

Pouch Socket LH 570/85A

Swivel Pouch Socket LH 571/86A



Don't use non-rotation resistant and rotation resistant ropes with a turnable fixed point (e. g. swivel). The end termination has to be fixed against rotation as well. If this is not observed considerable damage, serious injury or death will occur.

Reference no.	NG	ds	A <sub>2</sub>	A <sub>4</sub>	b	dB	LB	L	t	WLL	MBL	Weight
		mm	mm	mm	mm	mm	mm	mm	mm	kN	kN	kg
289721	8 / 7	7	36	36	18	16	52	130	18	20	70	0,8
289720	8 / 8	8	36	36	18	16	52	130	18	20	70	0,8
270717	10 / 9	9	42,5	40	20,5	21	59,5	145	22	35	110	1,2
270733	10 / 10	10	42,5	40	20,5	21	59,5	145	22	35	110	1,2
270718	13 / 11	11	50	50	25	26	71	180	27	55	185	2,6
270734	13 / 12	12	50	50	25	26	71	180	27	55	185	2,6
270735	13 / 13	13	50	50	25	26	71	180	27	55	185	2,6
270719	17 / 13	13 – 14	60	58	32	30	85	225	31	95	316	4,7
270736	17 / 15	15 – 16	60	58	32	30	85	225	31	95	316	4,7
270737	17 / 17	17	60	58	32	30	85	225	31	95	316	4,7
270720	19 / 16	16 – 17	72	67	38	35	99	255	36,5	120	395	6,5
270738	19 / 18	18 – 19	72	67	38	35	99	255	36,5	120	395	6,5
270721	23 / 19	19 – 20	83	80	45	41	115	300	44	170	580	9,8
270739	23 / 21	21 – 23	83	80	45	41	115	300	44	170	580	9,8
270722	26 / 23	23 – 24	96	96	51	50	129	330	53	220	740	14,5
270741	26 / 25	25 – 26	96	96	51	50	129	330	53	220	740	14,5
270724	29 / 27	27 – 29	107	108	57	57	145	375	59	275	920	20
270726	33 / 30	30 – 31	120	115	63	63,5	159	425	63,5	355	1190	31
270728	33 / 32	32 – 33	120	115	63	63,5	159	425	63,5	355	1190	31

Additional sizes on enquiry.

Dimensions correspond to nominal sizes without tolerance and without coating. Please contact us for exact measurements!

# Rope end terminations

Special end terminations  
on request

## Swivel PSH Fork - Eye 42A

Swivels



### Technical data

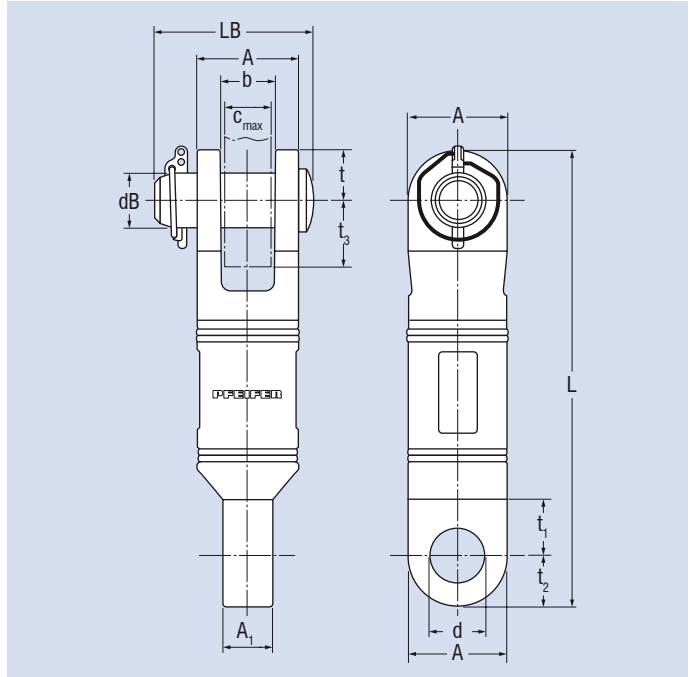
Material	Socket body	Cast steel
	Pin	Cold resistant to $-40\text{ }^{\circ}\text{C}$ Quenched and tempered steel
Surface	Socket body	Painted
	Pin	Nitrided
	Security locking pin	Galvanized

### Application area

High performance rotation-resistant ropes

### Combination products

Pouch Socket PSH



Don't use non-rotation resistant and rotation resistant ropes with a turnable fixed point (e. g. swivel).

The end termination has to be fixed against rotation as well.

If this is not observed considerable damage, serious injury or death will occur.

Reference no.	NG	A	A <sub>1</sub>	d	dB	L	LB	b	t	t <sub>1</sub>	t <sub>2</sub>	t <sub>3</sub>	c <sub>max</sub>	m	WLL
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kN
234402	16	60	29	31,5	30	281	98	32	30	34	30	57,5	31	13,6	85
234403	19	72	35	36,5	35	335	115	38	36	40	36	62,5	37	19	120
234404	22	83	42	42,5	41	378	129	45	41,5	47	41,5	67,5	44	26,6	160
234133	26	95	48	51,5	50	425	149	51	47,5	53	47,5	72,5	50	37,5	220
234276	29	107	54	58,5	57	467	164	57	53,5	59	53,5	77,5	56	52	275
234394	32	120	60	65	63,5	513	180	63	60	65	60	82,5	62	70,8	335
234397	36	134	67	75	73,5	574	203	70	67	72	67	90	69	99,2	425
234398	40	150	73	82,5	81	630	222	77	75	78	75	100	75	136	520
234399	44	165	81	86,5	85	683	242	85	82,5	86	82,5	110	83	172,5	630
234400	48	180	90	91,5	90	740	263	94	90	95	90	120	92	227,6	755
234401	52	196	100	96,5	95	801	282	104	98	105	98	130	102	289,7	885

WLL = maximum payload

t<sub>3</sub> = maximum dimension

Dimensions correspond to nominal sizes without tolerance and without coating. Please contact us for exact measurements!

Other sizes on request!

PFEIFER-reels and PFEIFER-stands for reels –  
the perfect combination for your ropes:

- Optimized packaging sizes
- Simplified transport –  
to be taken by forklift
- Stands for reels are gently  
for reels and ropes
- Prevention of transport mistakes  
and resulting damages
- Heat treatment according to ISPM 15

Further possibilities of packaging  
of ropes on reels:

- Planked reels
- Seaworthy packing



- Depending on your needs we can pack your ropes  
in wooden boxes according to ISPM 15.
- Of course we follow your special requirements as  
well.
- All our shipments are insured to provide maximum  
customer service.

# Further products and services

## Rope accessories



### Connecting links

For fast and simple connection and fastening options of steel wire ropes

Available in various versions



### Swivels

To avoid the rope torque being transmitted to the load and thus causing great damage



### Bolts

For fast and stable securing in the most diverse areas of application



### Manual strand ropes

Detailed manual for the proper use of your strand ropes with useful tips to extend the rope lifetime

Further languages on request

Included in each Rope Service Starter Kit and the measurement equipment cases 75/150 or available as PDF in the PFEIFER download centre at:



→ [www.pfeifer.info/manual-strand-ropes](http://www.pfeifer.info/manual-strand-ropes)



## Rope service and rope handling



### Rope lubrication RL-S & RL-B

Product		Part.-No.
12 x Spray	600 ml	245066
Bucket	10 l	212406
Bucket	30 l	212405

Maintain your wire ropes with the proper re-lubricant and extend the lifetime.

Save costs for new ropes and rope changes by extended lifetime.

We can offer re-lubricating large rope lengths using a special re-lubrication device. Our service team comes to you worldwide and saves you cost intensive trips with your crane.



### Rope measurement

- Groove gauges
- Caliper gauges
- Sets

Use our special measurement devices from the rope specialist to reduce costs by extending the lifetime.

Based on our long-term practical experience of rope drive inspection, we created a measurement devices program. These measurement devices are used by our rope experts for each inspection and thereby approved for general use.



### Tools for working on ropes

- Crimping pliers
- Wire rope cutter

So that you can also easily carry out minor work on ropes, PFEIFER offers you a selection of different tools for working on ropes.



### Rope assembly aids

- Winding blocks
- Rope tensioning clamps
- Cable grips

PFEIFER rope assembly aids assist you reliably in the attachment and replacement of your steel ropes.



### Innovative packaging solutions

- Reels
- Stand for reels

PFEIFER-reels and PFEIFER-stands for reels – the perfect combination for your ropes:

- Optimized packaging sizes
- Simplified transport – to be taken by forklift
- Stands for reels are gentle for reels and ropes
- Prevention of transport mistakes and resulting damages
- Heat treatment according to ISPM 15

## Rope services



### Rope assembly

PFEIFER is expert in all kinds of rope assembly – from the high-precision manufacturing of the finest ropes for medical technology to the precise cutting to length of crane hoisting ropes and the casting of ropes with the largest of diameters.



### End connection design

Standard or tailor-made – through our own development and production every rope receives the optimal connection.



### Rope stocking



### Rope inspection



### Technical rope seminar

Interested in a seminar at your premises?

We would be pleased to provide you with an individual offer.



### Rope application consultancy

Through the correct selection of ropes and end connections to suit the conditions of use you can achieve the most economical lifetime, reduce possible dangers and avoid high failure costs.



### Repair service

Steel wire ropes are subject to wear in tough continuous use and can be damaged by external influences. PFEIFER offers you a rope repair in original rope quality at your premises.

PFEIFER guarantees fast availability in one of the industry's largest stock assortments and a capacity of well over 4000 tonnes in a fully automatic rope warehouse in Memmingen and in further warehouses all over the world. High-performance logistics partners guarantee fast delivery. Thanks to optimised packaging, every reel reaches its destination worldwide well protected.

After the delivery of the optimum rope we support our customers and are happy to assist with all questions regarding the rope application.

We analyse optimization potentials at rope winches and drives, check ropes for damages and abrasion to extend the lifetime and reduce rope change and down time costs.

**We do this job on a daily basis – worldwide.**

Using discarded products or disregarding basics of proper application by the use of wire ropes can cause enormous danger for humans and material.

Trained employees increase safety in your company, avoid accidents and reduce costs.

In our established technical seminars, our competent and experienced instructors train your staff in latest standards and in all theoretical and practical issues.

## Rope services

### Rope analysis

- PFEIFER analyses with extensive tests in the central Rope and Material Test Centre all properties of wire ropes and applied materials at the headquarter in Memmingen as well as at further machines at PFEIFER DRAKO in Mülheim/Ruhr. Also necessary tests can be done locally in our global subsidiaries.
- Aware that not only the usual catalog values such as weight per meter and minimum breaking force decide on the performance of wire ropes, all properties of the ropes are determined at PFEIFER in extensive tests.
- Equipped with this knowledge, we will choose the right wire rope for your application and so we optimize the lifetime of your equipment.



Test Facility for Determining Bending Fatigue



Spectral Analysis



Magnaflux Test



Rope Efficiency Test Facility

Multi Layer Spooling Test Tower

#### Further Offers:

- Test Facility for Lateral Pressure Resistance
- Coat Thickness Measuring
- Ultrasonic
- Torsion Test Facility
- Microscopic Analysis
- Elongation and Pull Test Facility
- Hardness Test
- Notch Impact Test
- Dye Penetrate Test



Tension Fatigue Test Facility

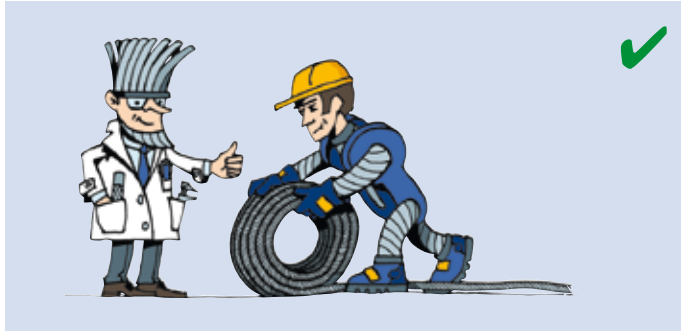
Pull Test Facility  
800 kN



Pull Test Facility  
6,000 kN

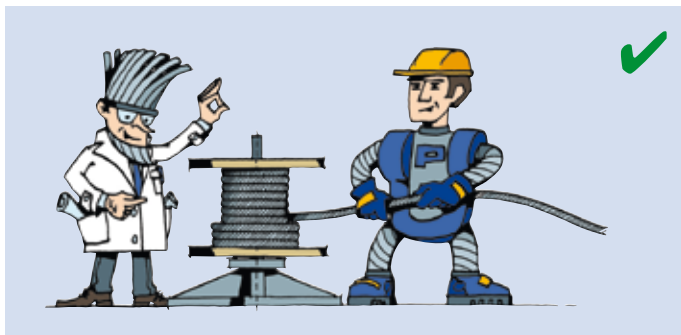
# Correct handling of wire ropes

## Spooling of wire ropes



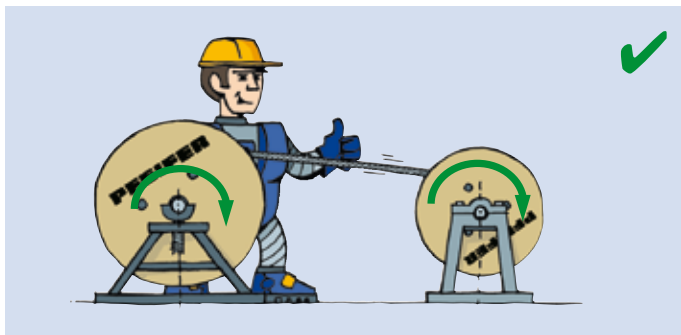
### Correct

Lay wire rope rings on clean ground. Please consider the preferred bending direction when rewinding the rope.



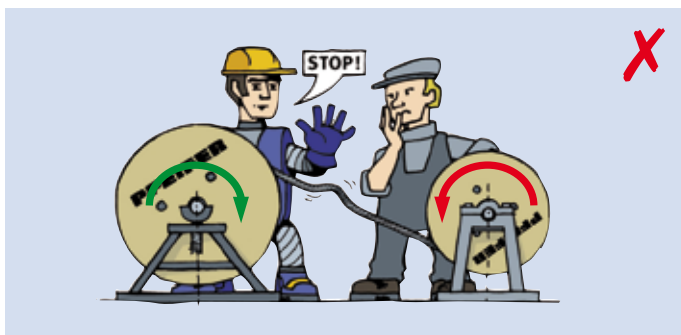
### Correct

Place reel on a suitable frame or spike, draw-off straight. Make absolutely sure that the rope is not fouled.



### Correct

When winding on a rope drum, pay attention to the direction of rotation and the right distance between reel and drum. A too small distance can cause torsional damage in the rope during later operation.



### Wrong

Drawing-off the rope of a ring or over the flange of the reel as well as counterwise spooling cause "twist" for each winding in the rope. Loops may occur, which may result in bends under tension.

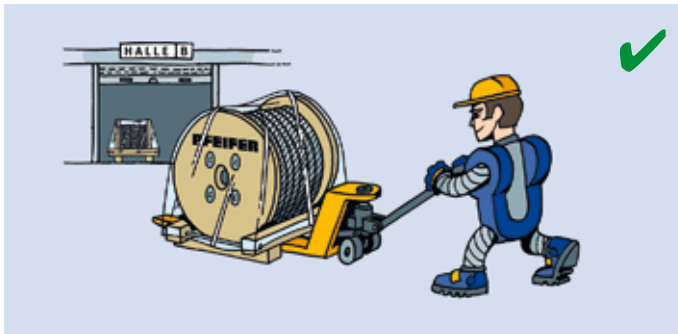


Detailed handling constructions you will find in our operating manual for stranded ropes in the PFEIFER download centre at:

→ [www.pfeifer.info/manual-strand-ropes](http://www.pfeifer.info/manual-strand-ropes)

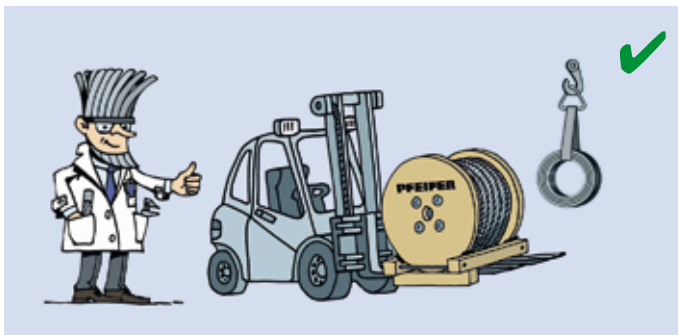


## Storage and transport of wire ropes



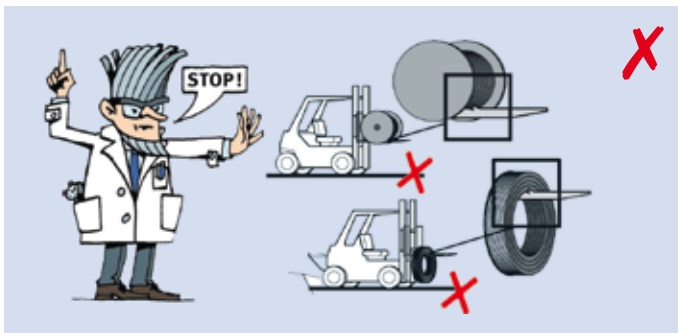
**Correct**

Store wire ropes dry and cool. Avoid ground contact, so that humidity can not taper the rope. Take off air and water tight transport packing. Humidity causes oxidation.



**Correct**

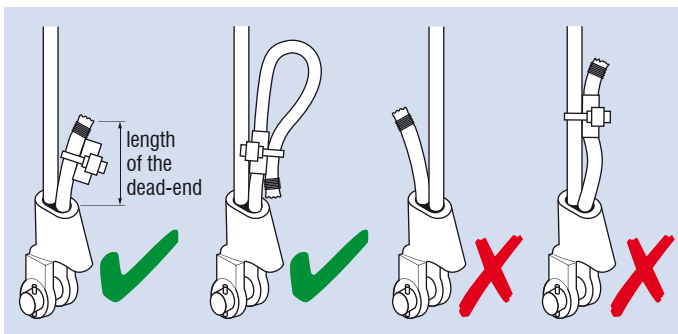
Protect the rope of crushes and kinks.



**Wrong**

Improper transportation of wire rope reels and rings will cause irreparable damage to wires, strands or the rope structure.

## Instructions for use



**! Instruction**

When a rope is to be re-terminated with a wedge socket assembly this can only be achieved by shortening the rope. No part of any previous flattening and/or damaged rope should be on the standing part of the rope or within the clamping area between either side of the socket body and the wedge.

With the use of wedge sockets the rope is introduced on the balanced side so that under load the center line of the rope is in-line with the bolt hole. The dead end is passed through the asymmetric side and is secured with a rope clip.

The length of the dead-end should be 10 x the nominal rope diameter, at least 150 mm. The rope clip must be applied only to the loose, unloaded rope end, never on both strands. The maximum operating temperature for wedge sockets is 200 °C / 400 F.

Detailed handling constructions you will find in our operating manual for wedge sockets in the PFEIFER download centre at:

→ [www.pfeifer.info/manual-wedge-socket](http://www.pfeifer.info/manual-wedge-socket)



# Installation of wire ropes

Wire ropes can easily be damaged and must therefore be handled with utmost care during transport and unloading.

Only the installation of an untwisted and undamaged rope will guarantee a trouble-free operation. Ropes must always be uncoiled from the reel or the ring in the direction of winding. Lateral uncoiling of the rope causes twisting and can lead to destruction by kink formation. It is recommended to use a frame-mounted reel for coiling the rope onto the drum. Coiling in the direction of bend gives an excellent fit on the drum and avoids that any additional tension is built-up in the rope. Never drag ropes over soil or dirt.

For installing the new rope it has to be fixed to the still mounted old one or an auxiliary rope. Connection between the two ropes can be achieved either by a cable grip or two welded pad eyes connected with a swivel. Any transmission of torsion to the new rope from either the old one or the auxiliary rope must be definitively avoided. Nonrotating ropes must be protected from torsion by insertion of a swivel.

**Multi-layer operation requires that even the lower layers must be tightly coiled with a pretension of 1–2% of the minimum breaking load of the rope. It is attained by braking the reel.**

The end termination of non-rotation resistant and rotation resistant ropes has to be fixed on both end terminations against rotation.

**It is NOT allowed to use non-rotation resistant or rotation resistant ropes with a turnable fixed point (e. g. swivel).**

**If the lower layers on the drum are hardly or seldom used the pretension of the entire rope has to be renewed from time to time. To renew the pretension in the hoist ropes the complete rope has to be spooled off and wound up again with tension of approximately 2% of the minimum breaking force or 10% of the maximum line pull force in operation. Ropes work most efficient if it is always used the entire rope length.**

If the rope areas are used unequal the rope can be turned after a certain time. In multi-layer spooling the lifetime of the rope can be significantly extended by cutting away the length of half the drum diameter from the rope at the fastening point of the drum. Through this procedure the predamaged rope areas are relocated from the climbing zones on the drum into the parallel zones. The shortening procedure can be carried out, at most, two times.

# Discarding time for wire ropes according to ISO 4309

## Exemplary for single layer and parallel-closed ropes

Number of visible wire breaks, reached or exceeded, occurring in single-layer and parallel-closed ropes, signalling discard of rope

RCN	Total number of load-bearing wires in the outer layer of strands in the rope <sup>a</sup> <i>n</i>	Number of visible outer wire breaks <sup>b</sup>					
		Sections of rope, running over steel sheaves and/or spooled on a single layer drum (random distribution of wire breaks)				Sections of wire rope spooled onto a multilayer drum <sup>c</sup>	
		Classes M1 to M4 or class unknown <sup>d</sup>				All Classes	
		Ordinary lay		Langs lay		Ordinary and langs lay	
		over a length of					
		6 <i>d</i> <sup>e</sup>	30 <i>d</i> <sup>e</sup>	6 <i>d</i> <sup>e</sup>	30 <i>d</i> <sup>e</sup>	6 <i>d</i> <sup>e</sup>	30 <i>d</i> <sup>e</sup>
01	$n \leq 50$	2	4	1	2	4	8
02	$51 \leq n \leq 75$	3	6	2	3	6	12
03	$76 \leq n \leq 100$	4	8	2	4	8	16
04	$101 \leq n \leq 120$	5	10	2	5	10	20
05	$121 \leq n \leq 140$	6	11	3	6	12	22
06	$141 \leq n \leq 160$	6	13	3	6	12	26
07	$161 \leq n \leq 180$	7	14	4	7	14	28
08	$181 \leq n \leq 200$	8	16	4	8	16	32
09	$201 \leq n \leq 220$	9	18	4	9	18	36
10	$221 \leq n \leq 240$	10	19	5	10	20	38
11	$241 \leq n \leq 260$	10	21	5	10	20	42
12	$261 \leq n \leq 280$	11	22	6	11	22	44
13	$281 \leq n \leq 300$	12	24	6	12	24	48
	$n > 300$	$0,04 \times n$	$0,08 \times n$	$0,02 \times n$	$0,04 \times n$	$0,08 \times n$	$0,16 \times n$

NOTE Ropes having outer strands of Seale construction where the number of wires in each strand is 19 or less (e. g. 6 × 19 Seale) are placed in this table two rows above that row in which the construction would normally be placed based on the number of load bearing wires in the outer layer of strands.

RCN = Rope category number

<sup>a</sup> For the purpose of this International Standard, filler wires are not regarded as load-bearing wires and are not included in the values of *n*.

<sup>b</sup> A broken wire has two ends (counted as one wire).

<sup>c</sup> The values apply to deterioration that occurs at the cross-over zones and interference between wraps due to fleet angle effects (and not to those sections of rope which only work in sheaves and do not spool on the drum).

<sup>d</sup> Twice the number of broken wires listed may be applied to ropes on mechanisms whose classification is known to be M5 to M8.

<sup>e</sup> *d* = nominal rope diameter

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## Discard

**⚠ Warning: Considering security ropes should be taken off operation in time, if one of the following criterias apply:**

- Broken strand
- Local concentration of wire breaks
- Achievement of type and number of wire breaks according to the tablets
- Corkscrew deformation (fig. 1)
- Corkscrew (fig. 2)
- Hairpin like escape of wires (fig. 3)
- Decrease of diameter – regarding the nominal rope diameter
- Local increase of diameter
- Heavy corrosion: The surface of the wires is strongly affected or rusty dust comes out of the rope
- Loose rope structure (fig. 4)
- Constriction (fig. 5)
- Kinks or flattened areas (fig. 6 + 8)
- Bends or other deformations (fig 7)
- bluish discoloration, broken or fused wires due to heat effects or electric arc

If several of the above mentioned criterias apply, they need to be considered in their entirety. Therefore ropes need to be discarded, if none of the criteria are completely but some partially fulfilled. For example: Light Corkscrew with some broken wires.

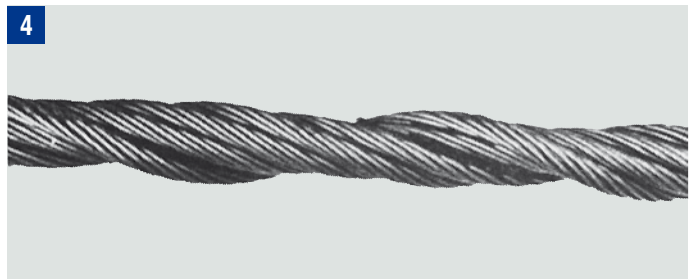
The above criteria are an excerpt from the ISO 4309 maintenance and care, inspection and storage. Consequently, these criteria do not replace the instructions and requirements for inspection and maintenance of wire ropes as written in the standard. For evaluation of the discard criteria please refer to our original operating manual for strand ropes!

If in doubt on the estimation of the cable damage, the rope must be discarded or your rope specialist needs to be contacted: [wirerope@pfeifer.de](mailto:wirerope@pfeifer.de) or via phone +49 (0) 83 31-937-301.

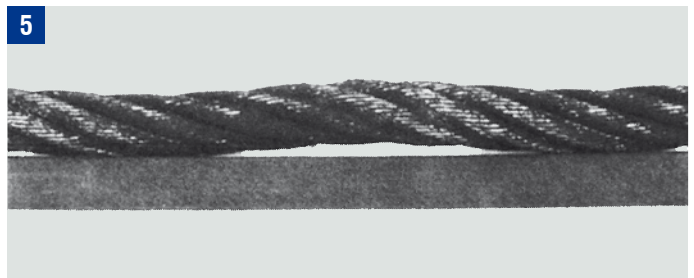
Looping on a wire rope



Through corrosion and wear heavy loose strand



Constriction due to a broken rope core



Flattened wire rope caused by over-ride



Corkscrew deformation



Basket deformation



Bend caused by a pinched rope sling



Kind caused by mechanical impact



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### GERMANY

#### ■ Memmingen

TEL +49-8331-937-301  
E-MAIL [wirerope@pfeifer.de](mailto:wirerope@pfeifer.de)  
WEB [www.pfeifer.info](http://www.pfeifer.info)

#### ■ Hamburg

TEL +49-40-780-463-0  
E-MAIL [psh-hamburg@pfeifer.de](mailto:psh-hamburg@pfeifer.de)  
WEB [www.pfeifer.info](http://www.pfeifer.info)

### AUSTRIA

#### ■ Asten

TEL +43-7224-66224-0  
E-MAIL [info@pfeifer-austria.at](mailto:info@pfeifer-austria.at)  
WEB [www.pfeifer-austria.at](http://www.pfeifer-austria.at)

### CHINA

#### ■ Shanghai

TEL +86-21-56778006  
E-MAIL [info@pfeifer.com.cn](mailto:info@pfeifer.com.cn)  
WEB [www.pfeifer.com.cn](http://www.pfeifer.com.cn)

### HUNGARY

#### ■ Budapest

TEL +36-1-2601014  
E-MAIL [info@pfeifer-garant.hu](mailto:info@pfeifer-garant.hu)  
WEB [www.pfeifer-garant.hu](http://www.pfeifer-garant.hu)

### LUXEMBOURG

#### ■ Schiffflange

TEL +352-574242  
E-MAIL [info@pfeifer-sogequip.lu](mailto:info@pfeifer-sogequip.lu)  
WEB [www.pfeifer-sogequip.lu](http://www.pfeifer-sogequip.lu)

### POLAND

#### ■ Wrocław

TEL +48-71-3980760  
E-MAIL [info@pfeifer.pl](mailto:info@pfeifer.pl)  
WEB [www.pfeifer.pl](http://www.pfeifer.pl)

### RUSSIA

#### ■ Moscow

TEL +7-812-740-12-27  
E-MAIL [info@pfeiferrussia.ru](mailto:info@pfeiferrussia.ru)  
WEB [www.pfeiferrussia.ru](http://www.pfeiferrussia.ru)

#### ■ St. Petersburg

TEL +7-812-740-12-24  
E-MAIL [info@pfeiferrussia.ru](mailto:info@pfeiferrussia.ru)  
WEB [www.pfeiferrussia.ru](http://www.pfeiferrussia.ru)

### SPAIN

#### ■ Madrid

TEL +34-91-659-3185  
E-MAIL [p-es@pfeifer.de](mailto:p-es@pfeifer.de)  
WEB [www.pfeifer.es](http://www.pfeifer.es)

### SWITZERLAND

#### ■ Knonau

TEL +41-44-768-55-55  
E-MAIL [info@pfeifer-isofer.ch](mailto:info@pfeifer-isofer.ch)  
WEB [www.pfeifer-isofer.ch](http://www.pfeifer-isofer.ch)

### UNITED KINGDOM

#### ■ Crewe

TEL +44-1270-587728  
E-MAIL [sales@pfeiferdrako.co.uk](mailto:sales@pfeiferdrako.co.uk)  
WEB [www.pfeifer.co.uk](http://www.pfeifer.co.uk)

#### ■ Southampton

TEL +44-23-8066-5470  
E-MAIL [sales@ropeandtackle.com](mailto:sales@ropeandtackle.com)  
WEB [www.ropeandtackle.com](http://www.ropeandtackle.com)

### USA

#### ■ Hampton

TEL +1-757-825-2544  
E-MAIL [info@pfeifer.us.com](mailto:info@pfeifer.us.com)  
WEB [www.pfeifer.us.com](http://www.pfeifer.us.com)

#### ■ Houston

TEL +1-832-827-2923  
E-MAIL [info@pfeifer.us.com](mailto:info@pfeifer.us.com)  
WEB [www.pfeifer.us.com](http://www.pfeifer.us.com)

### VAE

#### ■ Dubai

TEL +971-4-883-8445  
E-MAIL [sales@pfeifer.ae](mailto:sales@pfeifer.ae)  
WEB [www.pfeifer.ae](http://www.pfeifer.ae)