

PFEIFER



04/2016

**PFEIFER – Your specialist
for ropes in goods handling**

**PFEIFER
SEIL- UND HEBETECHNIK
GMBH**

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Innovativ wire rope systems in goods handling

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 the wire rope, lifting and construction technology, we power cranes, elevators, metal coils and work pieces, precast concrete parts and heavy loads. 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 the leading companies for wire ropes, anchoring and lifting systems as well as cable structures in Europe

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.



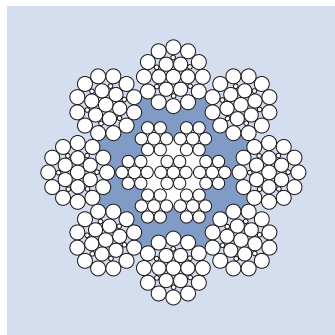
Gerhard Pfeifer,
President of PFEIFER group



The PFEIFER group is one of the leading companies for wire ropes, anchoring and lifting systems as well as cable structures in Europe. The headquarters are located in Memmingen, Germany and distributes through several service centres and subsidiaries in Europe, North America and Asia.

The usual performances of rope drives at applications like goods-, bulk handling-, gravel conveyor- and incineration plant systems require right-handed (sZ) and left-handed (zS) non-rotation-resistant hoist ropes of the same construction and production.

The choice of a specific rope construction of our very extensive portfolio of non-rotation-resistant ropes for your plant requires the special application- and rope-know-how of our consultants, because of the dependence on cranesystem, operating conditions and abrasion behaviour of the rope – Please let our experts advise you!

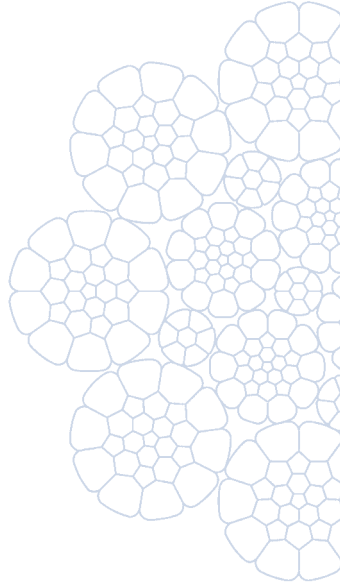


Content

General information	
PFEIFER rope classification	4
PFEIFER added value advantage	4
Requirements in wirerope of handling facilities . . .	5
Hoisting and closing ropes	
Stranded wire ropes – Premium Line	6
Stranded wire ropes – High Performance Line . . .	7
Stranded wire ropes – Performance Line	8
Not compacted wire ropes – Premium Line	9
Not compacted wire ropes – High Performance Line	10
Not compacted wire ropes – Performance Line	11
Not compacted wire ropes – Standard Line	12
Rope end terminations	
Rope Pear Socket Nemag 57A	14
Asymmetric wedge socket PSH 95A	15
Swaged thimble acc. to DIN 6899 BF Swaging acc. to EN 13411-3 521	16
Further practical products and accessories from PFEIFER	17
For the care of your wire ropes	18
Approved wire rope quality	19
Correct handling of wire ropes	
Spooling of wire ropes	20
Storage and transport of wire ropes	21
Instructions for use	21
Installation of wire ropes	22
Discarding time for wire ropes according to ISO 4309-2012	22
Discard	23

General information

PFEIFER rope classification



Premium

- Highest bending cycles performance
- Very good characteristic values of performance also on the limits
- High structural stability
- High breaking force

High-Performance

- High bending cycles performance
- High structural stability

Performance Line

- High bending cycles performance

Standard Line

- Standard bending cycles performance

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!

Please let our experts advise you!



Requirements in wireropes of handling facilities



Technical requirements

- Sufficient breaking force –
minimum breaking force \geq data of crane test book / original rope
- Stable rope structure (not susceptible to structural damages like birdcage, corkscrew, loop formations, ...)
- High bending cycles performance
- Suitable end terminations
- High, reproducible quality

Maintenance

- Safe signalling of the discarding time (extraneous wear)
- Easy assembly – packaging to special customer demands (cable-ring, disposable reel)



Hoisting and closing ropes

Extract from our in stock rope range

Stranded wire ropes – Premium Line

P 129

High Performance Rope

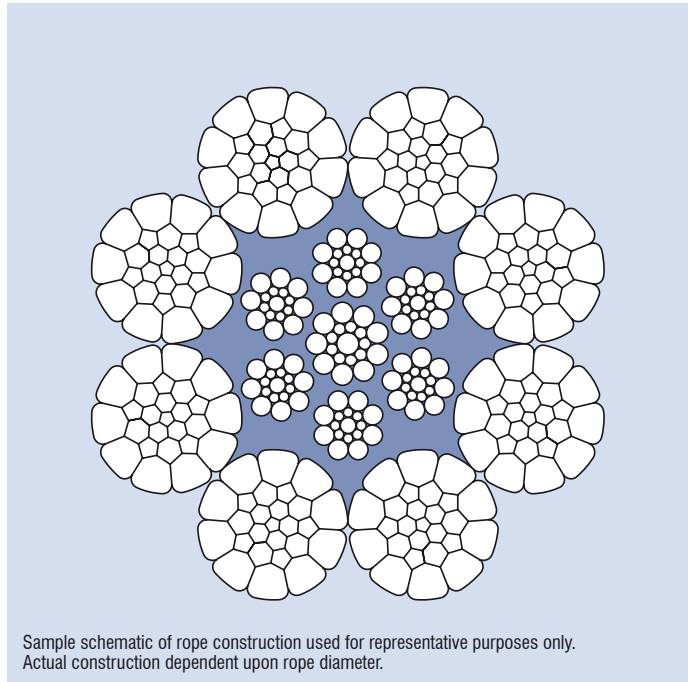
Technical data

average fill factor	0,675
average spinning loss factor 1770 N/mm ²	0,85
average spinning loss factor 1960 N/mm ²	0,85
average spinning loss factor 2160 N/mm ²	0,84
core	plastic coated steel core – therefore increased structural strength
lay type	ordinary lay
lay direction	choice of right hand or left hand
compacting	strands compacted – thereby extra wear resistant
finish	choice of bright or galvanised
rope diameter tolerance	0 / +4,5%

diameter range	number of load bearing wires within the outer strands	RCN according ISO 4309
from 4 – 14 mm	152	04
from 15 – 44 mm	208	09
from 45 – 69 mm	288	13
from 70 – 100 mm	328	13



WARNING: Never use with a swivel – failure to comply may result in serious damages and injuries



Nominal rope Ø mm	Weight approx. kg/100 m	Minimum breaking force F _{min}	Minimum breaking force F _{min}	Minimum breaking force F _{min}
		1770 N/mm ² kN	1960 N/mm ² kN	2160 N/mm ² kN
16	121	204	226	246
17	136	230	255	278
18	153	258	286	312
19	170	288	319	347
20	189	319	354	385
21	208	352	389	424
22	228	386	428	465
23	250	422	468	509
24	272	459	509	554
25	295	498	552	601
26	319	539	597	650
27	344	581	643	701
28	370	626	693	754
29	397	671	743	809
30	425	718	795	866
31	457	772	855	932
32	487	823	911	992
33	518	875	969	1055
34	549	929	1030	1121
35	582	984	1090	1187
36	616	1041	1153	1256

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Hoisting and closing ropes

Extract from our in stock rope range



Stranded wire ropes – High Performance Line

P 929

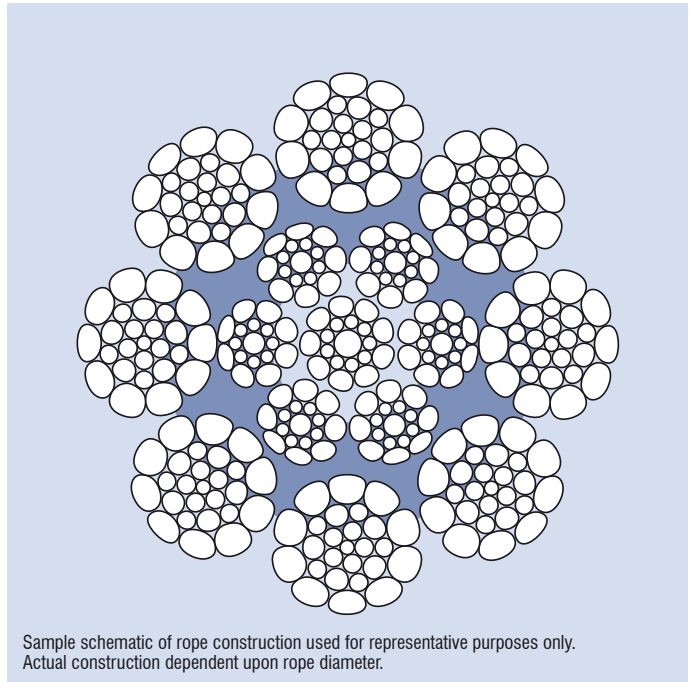
High Performance Rope

Technical data

average fill factor	0,66
average spinning loss factor	0,852
core	plastic coated steel core – therefore increased structural strength
lay type	choice of regular/ordinary lay or lang's lay
lay direction	choice of right hand or left hand
compacting	compacted rope – therefore particularly resistance to crushing and abrasion
finish	choice of bright or galvanised
rope diameter tolerance	+2%/+4%

diameter range	number of load bearing wires within the outer strands	RCN according ISO 4309
from 16 – 54 mm	208	09
from 56 – 72 mm	328	13+

WARNING: Never use with a swivel – failure to comply may result in serious damages and injuries



Sample schematic of rope construction used for representative purposes only. Actual construction dependent upon rope diameter.

Nominal rope Ø mm	Weight approx. kg/100 m	Minimum breaking force F _{min}	
		1960 N/mm ² kN	2160 N/mm ² kN
16	116	229	249
17	136	259	281
18	152	290	315
19	169	323	351
20	187	358	389
22	226	434	471
24	269	516	560
25	288	544	590,5
26	315	606	657
28	365	701	761
30	412	805	874
32	472	917	995
34	532	1035	1124
36	597	1161	1260

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Hoisting and closing ropes

Extract from our in stock rope range

Stranded wire ropes – Performance Line

P 1025

High Performance Rope

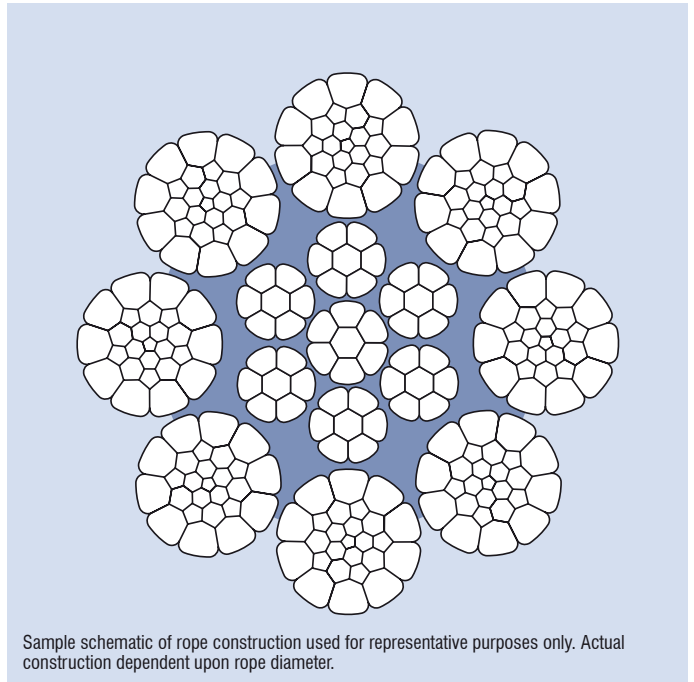
Technical data

average fill factor	0,672
average spinning loss factor 1960 N/mm ²	0,85
average spinning loss factor 2160 N/mm ²	0,81
core	full plastic impregnation of the compacted steel core to further extend fatigue life, improve structural stability
lay type	ordinary lay
lay direction	choice of right hand or left hand
compacting	strands compacted – thereby extra wear resistant
finish	galvanized
rope diameter tolerance	+0/+5%

diameter range	number of load bearing wires within the outer strands	RCN according ISO 4309
from 13 – 15 mm	136	03
from 16 – 28 mm	208	09
from 30 – 42 mm	248	11
from 44 – 60 mm	288	13



WARNING: Never use with a swivel – failure to comply may result in serious damages and injuries



Nominal rope Ø mm	Weight approx. kg/100 m	Minimum breaking force F _{min}	
		1960 N/mm ² kN	2160 N/mm ² kN
16	114,8	221	232
18	147,9	285	299
19	163,2	314	330
20	183,8	354	372
22	217,3	419	439
24	254,8	510	535
26	305,4	589	618
28	355,4	686	719

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Hoisting and closing ropes

Extract from our in stock rope range

PFEIFER

Not compacted wire ropes – Premium Line

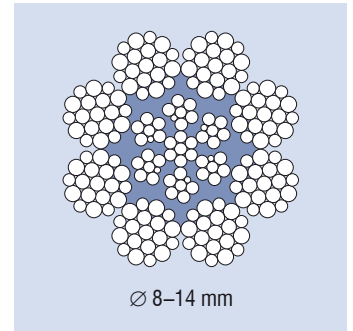
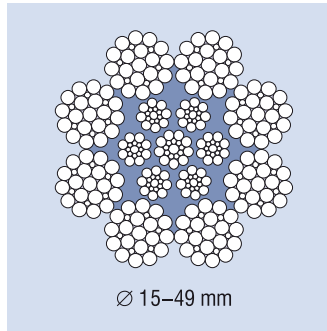
P 124

High Performance Rope

Technical data

average fill factor	0,6226
average spinning loss factor 1770 N/mm ²	0,845
average spinning loss factor 1960 N/mm ²	0,845
average spinning loss factor 2160 N/mm ²	0,835
core	plastic coated steel core – therefore increased structural strength
lay type	ordinary lay
lay direction	choice of right hand or left hand
compacting	not compacted
finish	choice of bright or galvanised
rope diameter tolerance	0/+ 4,5%

diameter range	number of load bearing wires within the outer strands	RCN according ISO 4309
from 4 – 49 mm	152	06
from 50 – 69 mm	288	13
from 70 – 90 mm	328	13



Sample schematic of rope construction used for representative purposes only. Actual construction dependent upon rope diameter.



WARNING: Never use with a swivel – failure to comply may result in serious damages and injuries

Nominal rope Ø mm	Weight approx. kg/100 m	Minimum breaking force F _{min}	
		1770 N/mm ² kN	1960 N/mm ² kN
16	116	187	208
17	130	210	233
18	146	236	262
19	161	260	289
20	178	288	320
21	195	315	351
22	223	361	401
23	241	390	434
24	261	422	469
25	285	462	513
26	307	497	552
27	326	528	587
28	358	580	645
29	382	620	689
30	409	663	736
31	434	703	781
32	459	745	827
33	497	806	896
34	528	855	951
35	545	884	982
36	588	953	1058

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Hoisting and closing ropes

Extract from our in stock rope range

Not compacted wire ropes – High Performance Line

P 324

High Performance Rope

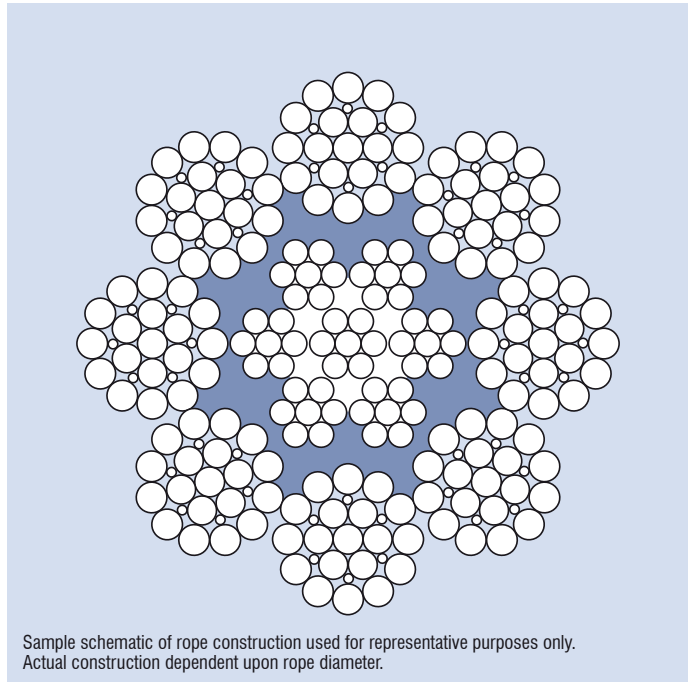
Technical data

average fill factor	0,606
average spinning loss factor	0,891
core	plastic coated steel core – therefore increased structural strength
lay type	ordinary lay
lay direction	choice of right hand or left hand
compacting	not compacted
finish	choice of bright or galvanised
rope diameter tolerance	+2/ +4%

	number of load bearing wires within the outer strands	RCN according ISO 4309
diameter range from 10 – 42 mm	152	06



WARNING: Never use with a swivel – failure to comply may result in serious damages and injuries



Sample schematic of rope construction used for representative purposes only. Actual construction dependent upon rope diameter.

Nominal rope Ø mm	Weight approx. kg/100 m	Minimum breaking force F_{min}	
		1960 N/mm ² kN	2160 N/mm ² kN
16	108	212,7	234,5
18	137	269,3	296,8
19	153	300,1	330,7
20	169	332,4	366,4
22	205	402,3	443,3
24	243	478,7	527,6
26	285	561,9	619,2
28	331	651,6	718,2
30	380	748,1	824,3
32	432	851,2	938
34	488	960,9	1058,9
36	548	1077,2	1187,1

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Not compacted wire ropes – Performance Line

P 1024

High Performance Rope

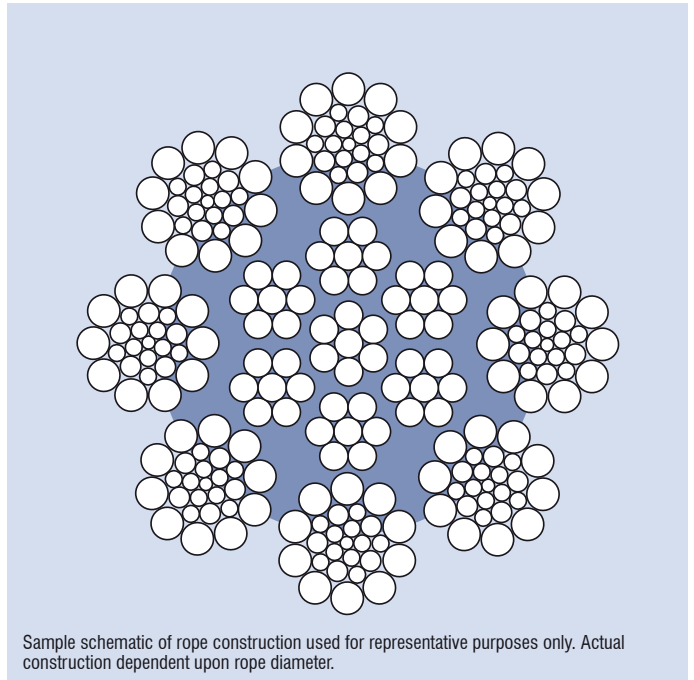
Technical data

average fill factor	0,634
average spinning loss factor	0,83
core	plastic coated steel core – therefore increased structural strength
lay type	choice of regular/ordinary lay or lang's lay
lay direction	choice of right hand or left hand
compacting	not compacted
finish	galvanized
rope diameter tolerance	+0/+5%

diameter range	number of load bearing wires within the outer strands	RCN according ISO 4309
from 13 – 15 mm	136	03
from 16 – 28 mm	208	09
from 30 – 44 mm	248	11
from 46 – 62 mm	288	13



WARNING: Never use with a swivel – failure to comply may result in serious damages and injuries



Nominal rope Ø mm	Weight approx. kg/100 m	Minimum breaking force F_{min} 1960 N/mm ² kN
16	110,7	209
18	138,6	262
19	153,1	289
20	172	325
22	206,6	391
24	246,6	469
26	286	541
28	336,9	637

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Hoisting and closing ropes

Extract from our in stock rope range

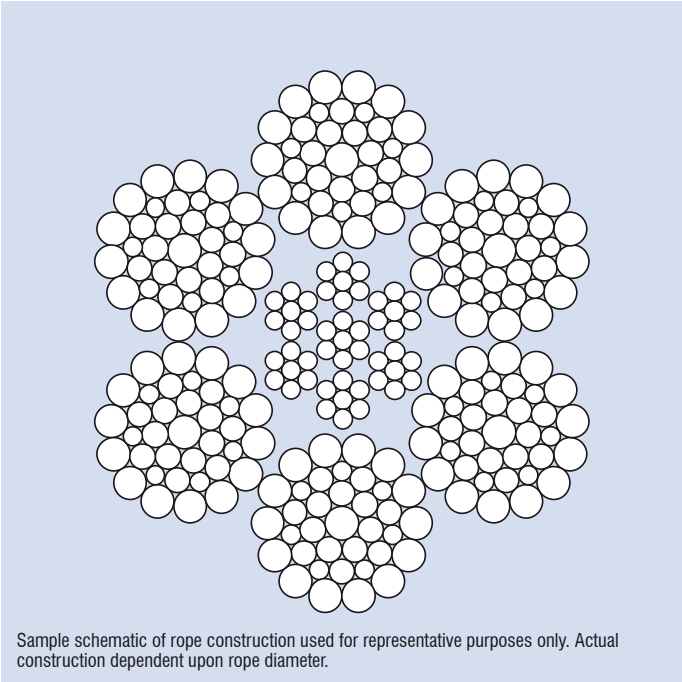
Not compacted wire ropes – Standard Line

6 x 36 Warrington-Seale WC

Round strand rope

Technical data

average fill factor	0,586	
core	steel core (IWRC or WSC)	
lay type	ordinary lay	
lay direction	choice of right hand or left hand	
compacting	not compacted	
finish	choice of bright or galvanised	
diameter range	number of load bearing wires within the outer strands	RCN according ISO 4309
from 0 – 60 mm	216	09



Sample schematic of rope construction used for representative purposes only. Actual construction dependent upon rope diameter.

Nominal rope Ø mm	Nominal rope Ø inch	Weight approx. kg/100 m	Minimum breaking force F_{min}		
			1770 N/mm ² kN	1960 N/mm ² kN	2160 N/mm ² kN
16		105	161	179	197
18		133	204	226	249
20		164	252	279	308
22		198	305	338	372
24		236	363	402	443
26		276	426	472	520
28		321	494	547	603
32		419	645	715	787
36		530	817	904	997

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Hoisting and closing ropes

Extract from our in stock rope range



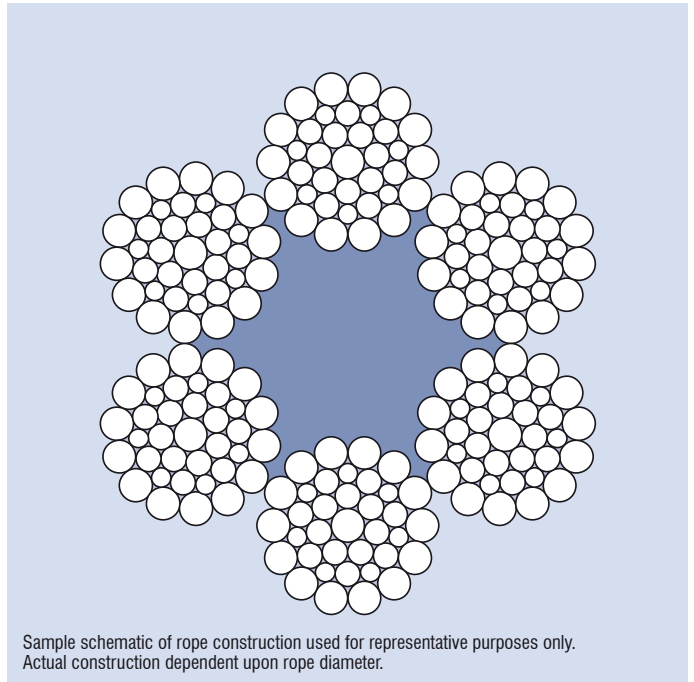
Not compacted wire ropes – Standard Line

6 x 36 Warrington-Seale FC

Round strand rope

Technical data

average fill factor	0,5	
core	fibre core (NFC or SFC)	
lay type	ordinary lay	
lay direction	right hand	
compacting	not compacted	
finish	choice of bright or galvanised	
diameter range	number of load bearing wires within the outer strands	RCN according ISO 4309
from 8 – 60 mm	216	09



Nominal rope Ø mm	Weight approx. kg/100 m	Minimum breaking force F_{min}	
		1770 N/mm ² kN	1960 N/mm ² kN
16	94	150	166
18	119	189	210
20	147	234	259
22	178	283	313
24	211	336	373
26	248	395	437
28	288	458	507
32	376	598	662
36	476	757	838

Please refer to our operating manual stranded ropes! Available at www.pfeifer.de

Rope end terminations

Rope Pear Socket Nemag 57A

Socket



Technical data

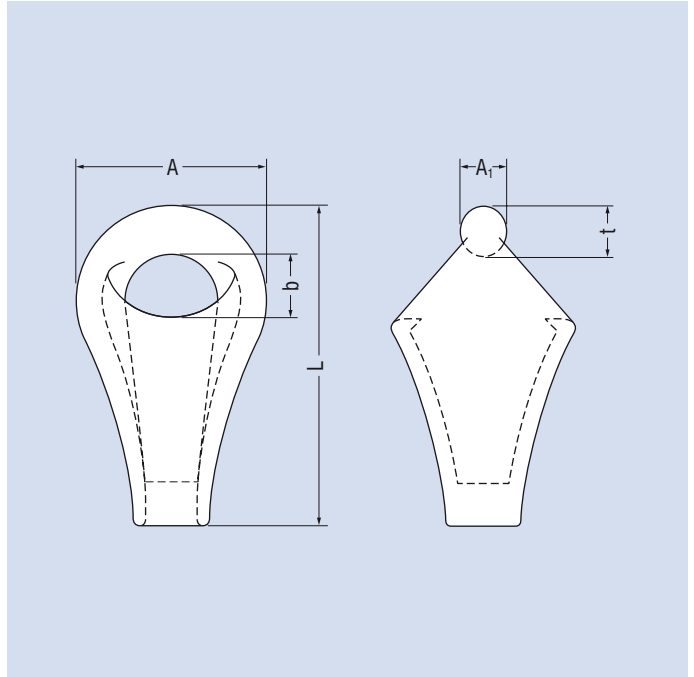
Material Cast steel
Cold resistant to $-20\text{ }^{\circ}\text{C}$
Surface plain

Application area

Nominal tensile strength $\leq 2160\text{ N/mm}^2$
Round strand ropes

Combination products

Screwed link Nemag 548
Connecting link Nemag 548



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 ₁ mm	L mm	b mm	t mm	m kg	MBL kN	WLL kg
257934	4	16 – 17	70	17,5	123	26	19,5	0,9	22,5	3000
244865	5	18 – 19	84	19	135	30	21	1,3	27,5	4500
244866	6	20 – 21	84	21	152	33	23	1,7	35	5000
244867	7	22 – 24	100	23	166	37	26	2,3	42,5	7000
244868	8	25 – 27	100	25	186	39	28	3,2	52,5	8000
244869	9	28 – 30	120	27	202	40	31	4,1	70	11000
244870	10	31 – 33	120	28,5	222	45	32	5,2	85	13000
244871	11	34 – 36	142	31,5	239	50	36	6,4	95	15000

The working load is the recommended maximum load for grabbing operations when Quick Release Links and Rope Pear Sockets are passing over a special cable sheave. For other applications a safety factor in line with official international and national guidelines has to be adhered to.

Asymmetric wedge socket PSH

95A

Clamp



Technical data

Material	Socket body	Cold resistant to - 40 °C
	wedge	Cold resistant to - 40 °C
Surface	Pin	Cold resistant to - 40 °C
	Socket body	Hot-dip galvanised
	wedge	Hot-dip galvanised

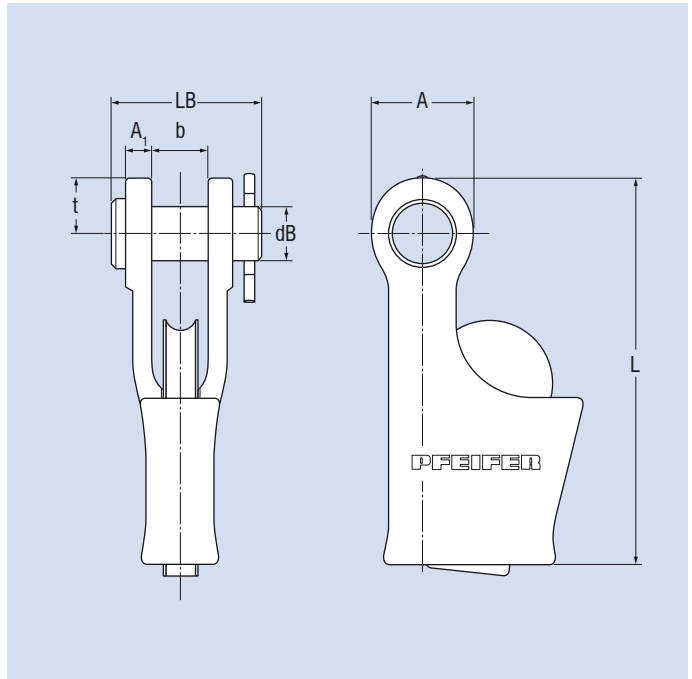
Application area

Round strand ropes

Combination products

Pouch Socket LH 570

Swivel Pouch Socket LH 571



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 ₁ mm	dB mm	L mm	LB mm	b mm	t mm	m kg	WLL kg
270736	17 / 15	15 – 16	58	14	30	225	85	32	31	4,7	915
270737	17 / 17	17	58	14	30	225	85	32	31	4,7	915
270720	19 / 16	16 – 17	67	17	35	255	99	38	36,5	6,5	1220
270738	19 / 18	18 – 19	67	17	35	255	99	38	36,5	6,5	1220
270721	23 / 19	19 – 20	80	19	41	300	115	45	44	9,8	1730
270739	23 / 21	21 – 23	80	19	41	300	115	45	44	9,8	1730
270722	26 / 23	23 – 24	96	22,5	50	330	129	51	53	14,5	2240
270741	26 / 25	25 – 26	96	22,5	50	330	129	51	53	14,5	2240
270724	29 / 27	27 – 29	108	25	57	375	145	57	59	20	2800
270726	33 / 30	30 – 31	115	28,5	63,5	425	159	63	63,5	31	3565
270728	33 / 32	32 – 33	115	28,5	63,5	425	159	63	63,5	31	3565

Rope end terminations

Swaged thimble acc. to DIN 6899 BF Swaging acc. to EN 13411-3 521

Thimbles



Technical data

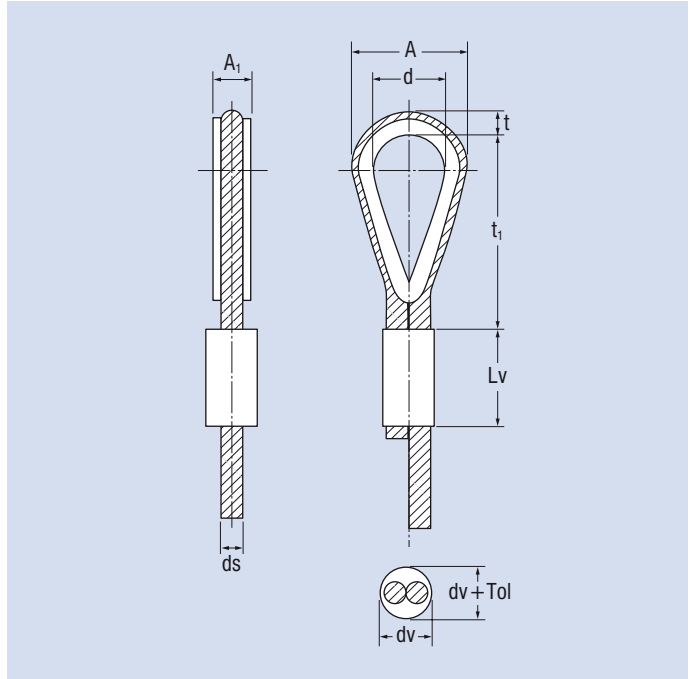
Material	Ferrule Thimble	EN AW-ALMg2 (B) S235JR
Surface	Thimble	Galvanized

Application area

Round strand rope (acc. to average filling factor f)

Fill factor range

Fill factor f	f1: $\leq 0,36$ f2: $0,36 < f \leq 0,62$ f3: $0,62 < f$
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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.

ds	A	A ₁	d	t	t ₁	Lv _{1_max}	dv ₁	Tol ₁	Lv _{2_max}	dv ₂	Tol ₂	Lv _{3_max}	dv ₃	Tol ₃
mm	mm	mm	mm	mm	mm	f1	f1	f1	f2	f2	f2	f3	f3	f3
16	86	23	40	22	104	65	32	+0,7	80	36	+0,9	89	40	+0,9
18	98	25,5	45	25,5	117	73	36	+0,9	89	40	+0,9	101	44	+0,9
20	108	28	50	27,5	131	81	40	+0,9	100	44	+0,9	111	48	+1,6
22	121	31	56	31	146	89	44	+0,9	109	48	+1,6	122	52	+1,6
24	132	34	62	33,5	159	97	48	+1,6	119	52	+1,6	134	56	+1,6
26	147	36	70	36,5	178	105	52	+1,6	129	56	+1,6	144	60	+1,4
28	157	38	75	39	191	114	56	+1,6	138	60	+1,4	155	64	+1,4
30	167	41	80	41,5	204	121	60	+1,4	149	64	+1,4	167	68	+1,4
32	187	43	95	43,5	233	130	64	+1,4	159	68	+1,4	177	72	+1,6
34	197	45	100	46	246	139	68	+1,4	168	72	+1,6	187	76	+1,6
36	213	47	110	48,5	268	146	72	+1,6	177	76	+1,6	198	80	+1,6

Maximum dimensions of t₁ including tolerance

Minimum dimensions of d including tolerance

Further practical products and accessories from PFEIFER



Pouch socket system

Fast and safe re-reeving of wire ropes with the PFEIFER pouch socket system



Lubricant RL-S

Relubricate your wire rope with the right relubricant to extend the lifetime tremendously.



Shakels

For lifting and connecting loads



Rope winding device Winder Willy

Gentle rope handling and protection against mechanical damage



Caliper

Enables quick and easy check – wide jaws avoid measuring faults



Rope pulleys ...

... from the rack or adapted are also among our specialties.

Rope measurement devices program

- 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 the following measurement devices program. These measurement devices are used by our rope experts for each inspection and thereby approved for general use.



For the care of your wire ropes

Further products and services for the care of your wire ropes

Manual Wire ropes



Detailed manual for the proper use of your wire ropes with useful tips to extend the rope lifetime, in German, English, French, Spanish, Italian, Russian, Chinese and Polish language

Further languages on request

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



→ www.pfeifer.de/en/wire-rope-technology/download

Re-Lubricant 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.

Re-lubricant service



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.

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

Rope inspections



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.

Technical seminars



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.

Interested in a seminar at your premises?

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

- PFEIFER analyses with extensive tests in the central Rope and Material Test Centre all properties of wire ropes and applied materials at the headquarters 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
6000 kN

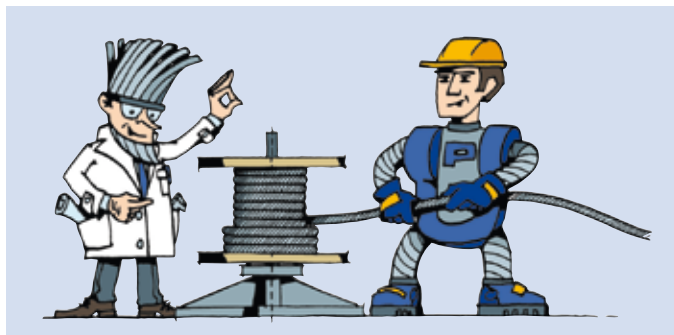
Correct handling of wire ropes

Spooling of wire ropes



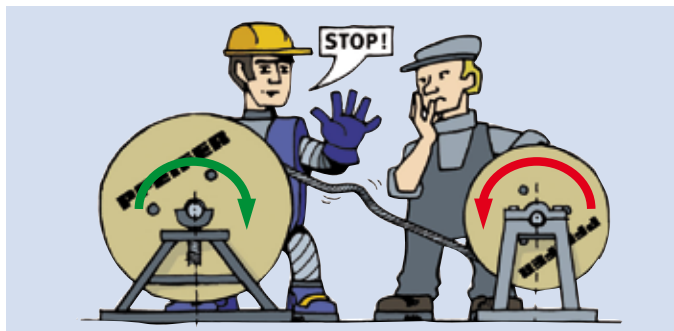
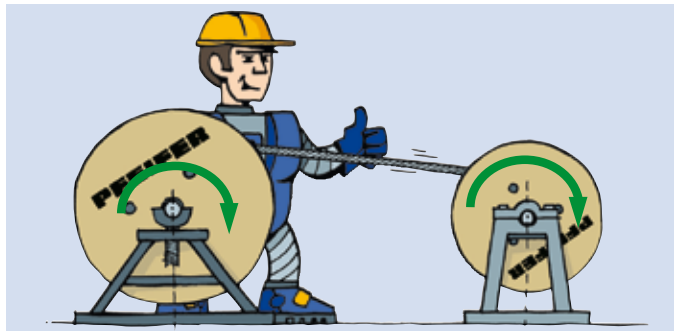
Correct:

Lay wire rope rings on clean ground. Please consider the preferred bending direction when re-winding the rope.



Correct:

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

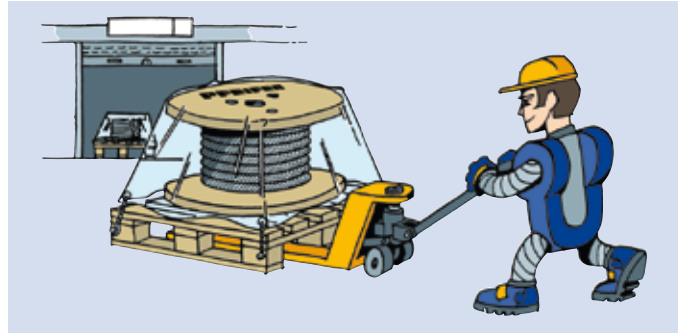


Wrong:

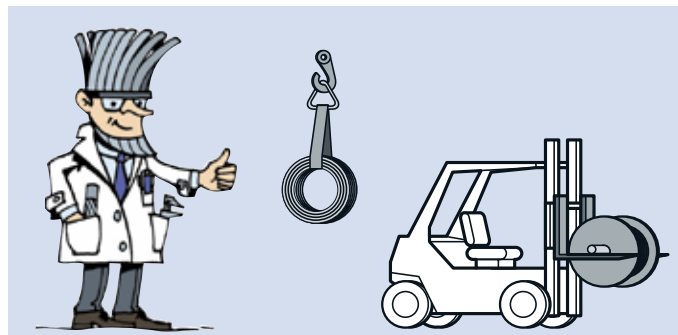
Drawing-off the rope of a ring or over the flange of the reel as well as counterwise spooling cause "twist" for each winding in the rope. Loops may occur, which may result in bends under tension.



Storage and transport of wire ropes



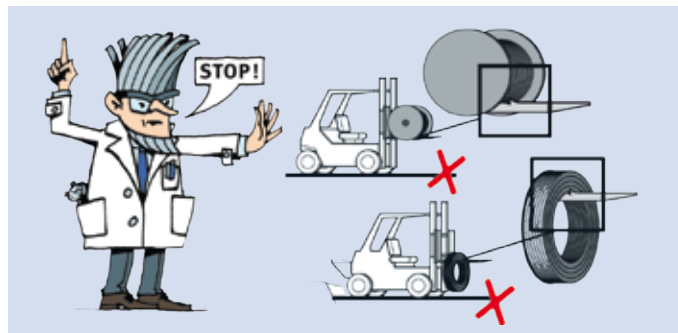
Correct:
Store wire ropes dry and cool. Avoid ground contact, so that humidity can not taper the rope. Take off air and water tight transport packing. Humidity causes oxidation.



Correct:
Protect the rope of crushes and kinks.



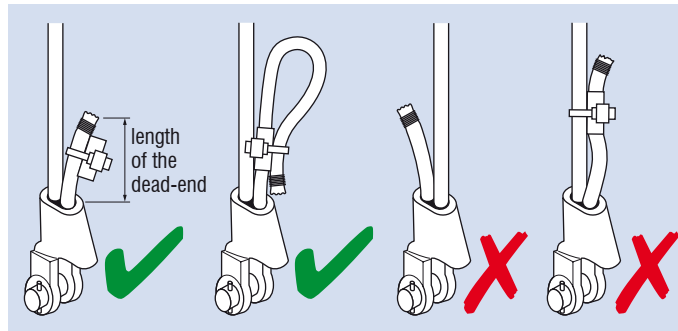
Detailed version of the PFEIFER Original operation manual
→ www.pfeifer.de/en/wire-rope-technology



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



Instructions for use



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 deadend 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.

PFEIFER 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.

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 "Chinese finger" 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 life time 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 4309-2012

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 ^a <i>n</i>	Number of visible outer wire breaks ^b					
		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 ^c	
		Classes M1 to M4 or class unknown ^d				All Classes	
		Ordinary lay		Langs lay		Ordinary and langs lay	
		over a length of					
		6 <i>d</i> ^e	30 <i>d</i> ^e	6 <i>d</i> ^e	30 <i>d</i> ^e	6 <i>d</i> ^e	30 <i>d</i> ^e
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

^a 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*.

^b A broken wire has two ends (counted as one wire).

^c 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).

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

^e *d* = nominal rope diameter



Discard

⚠ Warning: Considering security crane 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
- At least two wire breaks in strand valley or adjacent strands within one lay length (approx. $6 \times d$)
- Corkscrew deformation of more than $1/10$ of the rope diameter ($g/d \geq 0,1$); d: nominal rope diameter, g: height of waviness
- Corkscrew (fig. 2)
- Hairpin like escape of wires (fig. 3)
- Decrease of diameter – regarding the nominal rope diameter – at uniform decrease of:
 - 7,5% at non-rotation resistant ropes with steel core
 - 5,0% at rotation resistant ropes
- Local increase of diameter of more than 5% compared with the diameter of the rest of the rope
- 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.

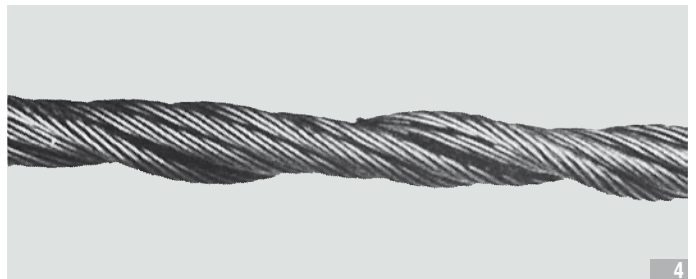
The above criteria are an excerpt from the ISO 4309-2010 maintenance and care, inspection and storage. Consequently, these criteria do not replace the instructions and requirements for inspection and maintenance of wire ropes as written in the standard.

If in doubt on the estimation of the cable damage, the rope must be discarded or your rope specialist needs to be contacted: wireropes@pfeifer.de or via phone +49 (0) 83 31-937-267.

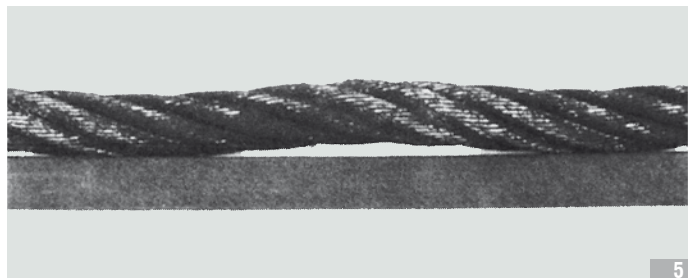
Looping on a wire rope



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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