

Operating instructions for steel wire rope slings, Chains and synthetic fibers



Single and multileg
sling ropes



Single and multileg
attachment chains



Textile slings and textile
components of slings

**Please read the following before
of the sling before putting it
into operation and keep them!**

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1. General

1.1 Scope

The following operating instructions have been drawn up in accordance with Directive 2006/42/EC (Machinery Directive) and deal with single and multileg slings in accordance with EN 13414, chains in accordance with EN 818, textile slings in accordance with EN 1492 and associated individual parts for slings in accordance with EN 1677. The operating manual is intended to help avoid hazards to people and slings.

Jakob AG excludes all liability for damage and injury if these instructions and corresponding legal standards and regulations are not observed, the products are tampered with or the products are used improperly or contrary to their intended purpose.

National regulations of SUVA or of the employers' liability insurance associations and accident insurance funds must be taken into account, e.g. SUVA learning units or DGUV Information 209-013 "Anschläger" (as of 2012).

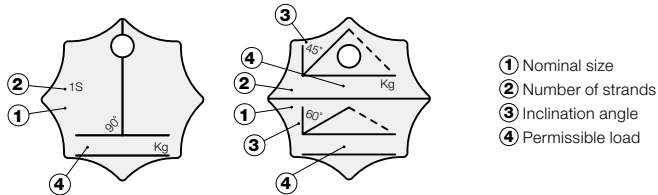
1.2 Safety regulations

Users of slings must be instructed and trained to contribute to the safe use of wire ropes, chains and textile slings by knowing and respecting their properties and working conditions. Pay attention to your safety and the safety of those around you!

Before use:

Before each use, check the slings for proper condition and possible damage. Worn or damaged slings must be replaced.

The load capacity of the sling in question can be taken from the load plate or, in the case of textile slings, from the sewn-in label. The tags of slings are constructed as follows:



Single-leg sling gear

multileg gear

The mass of the load must be known. The working load limit (WLL) of the sling must not be exceeded. Otherwise, they must be taken out of service immediately after overloads and replaced. Legs must not be twisted or knotted.

The position of the center of gravity must be known or determined. The angle of inclination of a strand must not be greater than 60°. Three- and four-leg slings must be as evenly inclined and distributed as possible on the load to be lifted.

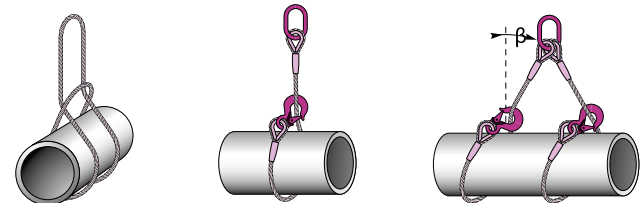
During use:

Pay attention to possible pinch points. Do not reach under sling loops. Empty legs are to be hooked into the upper ring. Sharp edges are to be reduced by suitable protectors, see Section 2.1, 3.1 and 4.1.

The load must be free to move and, if necessary, guided by a guide rope. The ring and shackle must be free to move and rest in the bottom of the hook. Hooks must not be loaded at the tip. The reduction factors for different arrangements must be taken into account, e.g. for multileg hangers with inclined strands:

Angle of inclination β from vertical	Load capacity of a strand	In the case of multi-strand sling setups, the strands must be arranged as evenly as possible. For four-strand arrangements, only three strands are counted as load-bearing.
0°	100 %	
up to 45°	70 %	
45° to 60	50 %	

When interlaced or when inserting the strand into the hook, a reduction in load capacity of 20 % must be taken into account.



Choker hitch

Choker hitch by insertion in the hook

Double choker hitch by insertion in the hook

Never stand under suspended loads!

After use:

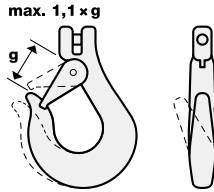
If necessary, slings should be professionally cleaned and hung up in a suitable, dry place.

1.3 Review and general discard criteria

Lifting gear must be visually inspected for proper condition before each use. Lifting gear without or with illegible identification tags must not be used. For specific discard criteria for ropes, chains and textile slings, see Section 2.2, 3.2 and 4.2.

An inspection and, if necessary, repair must be carried out by a competent person at least once a year. In the case of increased operating frequencies, the test interval must be reduced.

Fittings and accessories must be taken out of service in case of visible mechanical damage, diameter reduction exceeding 5 % or deformations exceeding 10 %.



1.4 Disposal

At the time of their disposal, sling ropes and chains predominantly constitute steel scrap as a raw material and must therefore be sent to the appropriate specialist companies for recycling.

2. Single and multileg sling ropes



2.1 Supplementary general information

The operating temperature of wire rope slings is between $-40\text{ }^{\circ}\text{C}$ and $100\text{ }^{\circ}\text{C}$. They can only withstand the heat of a fire for a short time.

Sling ropes must not be placed around sharp edges with a radius smaller than the rope diameter. To reduce the impact of an edge, place suitable protection under the sling.

2.2 Supplementary discard criteria for sling ropes

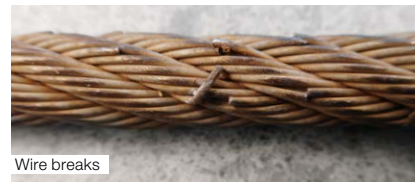
When visually inspecting the ropes, pay particular attention to external damage and corrosion. Deformed wires and strands can remain without tension under load, so that the rope cross-section is only partially subjected to the entire load. Therefore, sling ropes with visible deformations such as kinks, pitches and warps are ready for discarding. If there are visible wire breaks or corrosion, a sling rope is equally ready for discarding. The pictures on the next page show examples of the discard criteria bends, kinks, wire breaks, warping and corrosion.



Bend



Bend



Wire breaks



Warping



Wire breaks

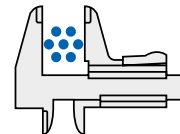


Corrosion

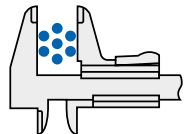


Kink

Correct



Incorrect



When measuring the diameter of wire rope slings, make sure that the caliper is correctly positioned. The rope diameter is permitted to drop by a maximum of 10 % below the nominal diameter.

3. Single and multiple strand sling chains



3.1 Supplementary general information

The operating temperature of the chain slings is $-40\text{ }^{\circ}\text{C}$ to $+200\text{ }^{\circ}\text{C}$.

At higher temperatures, the load capacity must be reduced according to the table opposite.

Chain temperature	Residual load capacity in % of the table
+ 200 °C to + 300 °C	90 %
+ 300 °C to + 400 °C	75 %

Grade 8, 10 and 12 chains must not be used in acidic and alkaline environments or with other corrosive media. Here, invisible embrittlement and cracks can occur.

Chain slings may only be adjusted in length by means of suitable shortening hooks. Knots and bending loads on individual chain links must be avoided at all costs.

Sling chains must not be placed around sharp edges with a radius smaller than the nominal thickness of the chain. To reduce the impact of an edge, place a suitable protector under the chain.

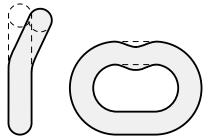
3.2 Supplementary discard criteria for sling chains

When visually inspecting the chains, pay particular attention to external damage and corrosion. If bent or otherwise deformed chain links are found, the chain must be taken out of service. After known special events (e.g. impact load, jamming, fire, acid contact), the sling must be taken out of service.

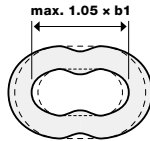
If the chain has elongated locally or over its entire length by more than 5 %, the sling must be taken out of service.

The nominal thickness must not have decreased by more than 10 % at any point.

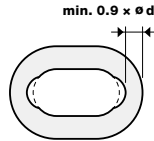
The following graphics show examples of how to determine the discard criteria on a chain:



Chains with local damage such as bent links, cracks or notches are ready for discarding.



At no point may the chain have an elongation of more than 5 %.



Reduction of the chain thickness must not exceed 10 %.

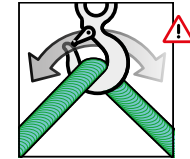
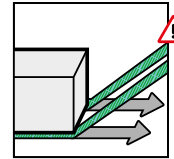
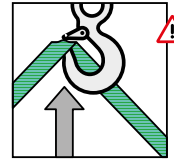
4. Textile slings and textile components of slings



4.1 Supplementary general information

The operating temperature of polyester textile slings is $-40\text{ }^{\circ}\text{C}$ to $100\text{ }^{\circ}\text{C}$.

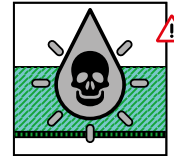
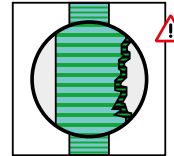
The products must be loaded evenly over the entire width. Point loads can lead to tearing of the sling. Movements over hooks, bolts and rings or between the load and other stationary elements such as floors, walls or structural elements must be absolutely avoided. Round slings and lifting slings must not be knotted!



Any form of sharp edges must be compensated by suitable edge protection. Pure abrasion protection hoses ("fire hoses") must not be used as edge protection.

4.2 Supplementary discard criteria for textile slings

In case of visible wear, local damage – especially at the main seams – or exposure to heat, acids and alkalis, textile slings must be discarded.



Load capacity table for wire rope slings

All lead capacity values in kilograms (kg)

Load factor	1.0		0.8		1.4		1.0		1.12		2.1		1.5	
	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$
Rope- Φ [mm]														
Φ mm	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$
8	700	560	980	700	780	1050	780	1050	1470	1050	1470	1050	1470	
10	1050	840	1470	1050	1180	1580	1180	1580	2210	1580	2210	1580	2210	
12	1550	1240	2170	1550	1740	2330	1740	2330	3260	2330	3260	2330	3260	
14	2120	1700	2970	2120	2370	3180	2370	3180	4450	3180	4450	3180	4450	
16	2700	2160	3780	2700	3020	4050	3020	4050	5670	4050	5670	4050	5670	
20	4350	3480	6090	4350	4870	6530	4870	6530	9140	6530	9140	6530	9140	
22	5200	4160	7280	5200	5820	7800	5820	7800	10920	7800	10920	7800	10920	
24	6300	5040	8820	6300	7060	9450	7060	9450	13230	9450	13230	9450	13230	
26	7200	5760	10080	7200	8060	10800	8060	10800	15120	10800	15120	10800	15120	
28	8400	6720	11760	8400	9410	12600	9410	12600	17640	12600	17640	12600	17640	
30	9500	7600	13300	9500	10640	14250	10640	14250	19950	14250	19950	14250	19950	
32	11000	8800	15400	11000	13320	16500	13320	16500	23100	16500	23100	16500	23100	
36	14000	11200	19600	14000	15680	21000	15680	21000	29400	21000	29400	21000	29400	
38	15100	12680	21140	15100	16910	22650	16910	22650	31710	22650	31710	22650	31710	

Load capacity table for sling chains

All lead capacity values in kilograms (kg)

Load factor	1.0		0.8		1.4		1.0		1.1		2.1		1.5	
	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$
Nominal Size (mm)														
$\beta = 0^\circ$	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$
GK8	1120	900	1600	1120	1230	1700	1230	1700	2360	1700	2360	1700	2360	
6	1500	1200	2120	1500	1650	2240	1650	2240	3150	2240	3150	2240	3150	
7	2000	1600	2800	2000	2200	3000	2200	3000	4250	3000	4250	3000	4250	
8	3150	2520	4250	3150	3460	4700	3460	4700	6700	4700	6700	4700	6700	
10	5300	4240	7500	5300	5830	8000	5830	8000	11200	8000	11200	8000	11200	
13	8000	6400	11200	8000	8800	11800	8800	11800	17000	11800	17000	11800	17000	
GK10	2500	2000	3500	2500	2750	3750	2750	3750	5250	3750	5250	3750	5250	
8	4000	3200	5600	4000	4400	6000	4400	6000	8400	6000	8400	6000	8400	
10	6700	5360	9380	6700	7370	10050	7370	10050	14070	10050	14070	10050	14070	
GK12	3000	2360	4250	3000	3350	4500	3350	4500	6300	4500	6300	4500	6300	
8	5000	4000	7100	5000	5600	7500	5600	7500	10600	7500	10600	7500	10600	
10	8000	6400	11200	8000	8800	11800	8800	11800	17000	11800	17000	11800	17000	

Load factor	1.0	0.8	1.4	1.0	1.1	2.1	1.5
Identifi- cation color							
kg	$\beta = 0^\circ$	$\beta = 0^\circ$	$\beta = 0-45^\circ$	$\beta = 45-60^\circ$	$\beta = 0-45^\circ$	$\beta = 7-45^\circ$	$\beta = 45-60^\circ$
1000	1000	800	1400	1000	1100	2100	1500
2000	2000	1600	2800	2000	2200	4200	3000
3000	3000	2400	4200	3000	3300	6300	4500
4000	4000	3200	5600	4000	4400	8400	6000
5000	5000	4000	7000	5000	5500	10500	7500
6000	6000	4800	8400	6000	6600	12600	9000
8000	8000	6400	11200	8000	8800	16800	12000
10000	10000	8000	14000	10000	11000	21000	15000

EC Declaration of Conformity according to Directive 2006/42/EC

As a manufacturer for products of rope and lifting technology

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Hereby declares that the following products are compliant with Directive 2006/42/EC:

**Sling wire ropes of strength classes 1770 and 1960 N/mm²
 1 to 4 legs or endless spliced with connecting elements**

In addition, the following harmonized standards were taken into account:

- EN 12385-4. Steel wire ropes – Safety – Part 4
- EN 13411-3. Terminations for steel wire ropes – Safety – Part 3
- EN 13414. Steel wire rope slings – safety. Parts 1 and 2
- EN 1677. Single parts for slings – Safety. Parts 1 to 6

**Grade 8, 10 and 12 sling chains
 1 to 4 legs or endless with connecting elements**

In addition, the following harmonized standards were taken into account:

- EN 818. Short link round steel chains for lifting purposes – Safety. Parts 1 to 7
- EN 1677. Single parts for slings – Safety. Parts 1 to 6

Polyester textile lifting slings and round slings

In addition, the following harmonized standards were taken into account:

- EN 1492. Textile slings – Safety. Parts 1 and 2
- EN 1677. Single parts for slings – Safety. Parts 1 to 6

The serial number and year of manufacture can be found on the respective load capacity tag.

The associated Jakob AG operating instructions must be observed.

The quality management system of Jakob AG is certified by SQS Zollikofen (CH) with document no. 44783 dated 15.09.2018 according to ISO 9001:2015.

Trubschachen (CH), May 2020

Dr.-Ing. Konstantin Kühner

Peter Jakob



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our testing service?**

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