SELDIS polysteen

PRODUCT INFORMATION

USER INFORMATION

Steel rope lifting slings in service

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Usage guidelines

Usage
Sling ropes must only be used for lifting loads and only under supervision of trained personnel in accordance with operating instructions and existing safety regulations, with due consideration of prevailing operating conditions.

Working load limit
The working load limit is the maximum weight the rope is safe to lift. It is derived from the minimum breaking force of the rope divided by the design factor (safety factor, normally 5, minus a value that considers the influence from the end fitting, or, for cable lay ropes, the realization factor), multiplied by the mode factor, this being dependent, amongst others, on the tilt angle (maximum 60°) for multileg or endless slings. An extremely important aspect to consider is strength loss, i.e. if the value D/d falls short of 2 for single leg sling ropes, or D/d (depending on rope construction) falls short of 4 to 6 for endless slings (D/d = diameter of lift point divided by rope diameter). Where the load symmetry (even load distribution, central point of gravity) is not guaranteed for multileg lifting procedures, two legs maximum must be assumed as load bearing, based on the widest tilt angle, and this applied to all legs.

Dimensioning
Steel rope lifting slings with a diameter of less than 8mm are not permissible. The length of a steel rope lifting sling is the distance between the bearing points, including end fittings. If specific length precision is required for eye or endless slings, the measurements of the end fittings must be considered. The aperture angle of loops must not exceed 50°. The free rope length between ferrules must be a minimum of 20·d, between splices a minimum of 15·d. Permissible deviation of actual rope sling length from nominal length is ±1% or 2·d. In the case of multileg slings the length of the individual ropes must deviate by no more ±1% or 2·d, if spliced or as grommet ±0.5% or 1·d if swaged (d = nominal rope diameter).

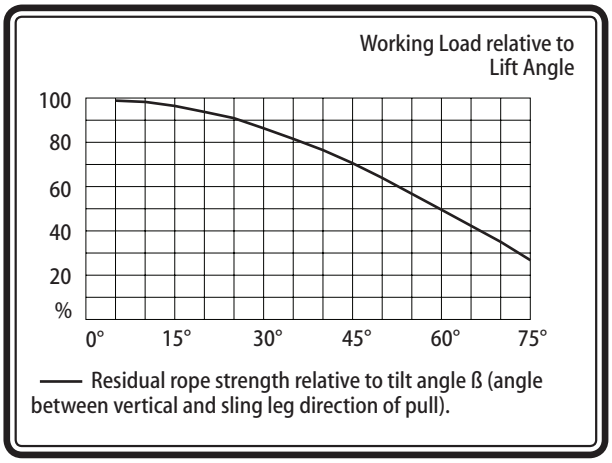
Rope terminations and fittings
The inner length of end loops roughly equals 15·d, the inner width (largely dependent on material) 7.5·d, however at least three times hook width (d = nominal rope diameter). End fittings must be attached with thimbles. Intermediate links must be used to connect suspension link and ropes on three and four leg slings.

Marking
Steel rope lifting slings must be permanently marked at the ferrule (single leg) or by tag (multileg or spliced). The marking should clearly show manufacturer's label of origin, test identification number (reference to certification), working load limit (if appropriate, for tilt angles) and all legal international markings, to the extent that local regulations do not require further details. The contents of the certification document with the rope sling include certification number, test identification number, name and address of supplier, relevant standards, description of rope sling and all individual components, working load limit (if appropriate, for different tilt angles).

Inspection
Before first and every subsequent use steel rope lifting slings should be carefully inspected for visual signs of damage and their safe condition established. Slings should be examined by a trained person every year, at shorter intervals if conditions of service require.

Precautions

- The load to be lifted must be free to move; avoid swinging, tilting or dropping load through choice of suitable fastening, trial lift or repositioning of lifting points, use of guide ropes, spreaders or beams, avoid sudden or jerky movements.
- Do not knot ropes.
- Rope contact area must be outside ferrules or splices, or joints (marked red) in grommet slings.
- Do not pull unprotected ropes over sharp edges.



- The edge radius must be no smaller than the nominal rope diameter (if necessary use edge protectors).
- Lifting capacity is reduced
  - if load is not symmetrical
  - in choke hitch mode
  - operating temperature outside limits in table (see chapter 'Rope terminations')
  - end fittings with diameter less than 2·d in eyes of single leg and 4·d in endless slings (d = nominal rope diameter).
- Do not untwist ropes when under load.
- If rope is multiwound around load ensure rope turns are parallel to each other (no crossing).
- Do not use in acids or alkalis.
- Do not apply load to hook points
- Avoid tilt angles (ß) less than 15° (danger of instable load suspension).
- Master links or eyes and thimbles must move freely in crane hooks.
- Do not join ropes with different lay directions.
- Do not use eight-strand rope with fibre core, or single leg/endless cable lay ropes with a nominal diameter exceeding 60mm made from strand rope with fibre core.
- Repairs must only be performed by trained personnel.

Storage and maintenance

- Steel sling ropes not in service should be hung in a suitable place away from potential causes of damage.
- Do not store on the ground.
- If rope is going to be out of service for a prolonged period, clean, dry and protect rope from corrosion (e.g. apply light coating of oil).

Operating termperature of steel wire rope slings
Efficiencies

Temperature	Efficiency Fibre core	Efficiency Steel core
All ropes:		
-40° bis ≥+100	°100%	100%
+100° bis ≥+200°	not permitted	90%
+200° bis ≥+300°	not permitted	75%
+300° bis ≥+400°	not permitted	65%
über +400°	not permitted	not permitted
Ropes with aluminium swaged ferrules:		
-40° bis ≥+100°	100%	100%
+100° bis ≥+150°	not permitted	90%
über + 150°	not permitted	not permitted

No remaining reduction of working load after cooling down to normal temperature when used within permissible range of temperature. Ropes to be discarded when exposed to higher temperatures.

Temperature = Surface temperature in °C

Removal from service

Discard in the event of:

- Missing or incomplete marking
- Fittings or components damaged (squashed, notched, fractured, stretched)
- Damaged rope end fabrication
- Fitting or its attachment damaged
- Rope is worn (more than 10% reduction of nominal diameter)
- Fittings or components worn (more than 5% reduction of cross section)
- One or more broken strands
- Loosening of external strand layer between rope end fabrications
- Deformation of the rope structure
- Compressions in the exposed rope length
- Compressions in the sling contact area with more than four wire breakages in stranded ropes or 10 in cable lay ropes
- Kink formation
- Scars caused by corrosion
- Overheating of the rope (loss of lubricant, discoloration of wire material)
- Local concentration of wire breakage
- More than maximum number of broken wires as per table

Maximum number of visible broken wires before discard

on a length of	3d	6d	30d
• stranded rope	4	6	16
• cable lay rope	10	15	40

d = Nominal rope diameter

General

Further information on steel ropes can be found in the chapters 'Steel ropes in perspective' and 'Steel ropes in service'.

These usage guidelines are based on existing European recommendations and standards. Further to these, consideration should also be taken of applicable local, national and international legislation, standards, directives and regulations from official societies (professional organisations, classification bodies, etc.) with regard to equipment safety (personal protection, industrial safety, accident prevention), as well as recommendations and operating instructions from manufacturers and/or operators of the equipment being used (lifting gear, conveyor systems, etc.).

In case of doubt about rope properties, suitability or safety requirements consult rope manufacturer or supplier.