

Installation and Assembly of Tubes

General

An operation safe and till duration trouble-free of an energy leadership chain system only can be ensured if the choice and the installation of the tubes take into account the special requirements at the use of sheathed lines into energy chains. Himself applies to the choice and the installation of the energy chain the same. The operating time to be reached at most is determined by the influence factors represented in the following substantially.

Tube choice

Flexibility

The tubes must have a sufficient Flexibilität. This means they must be suitable for a dynamic continuous operation by the used materials and her structural construction and the smallest permitted bend radius given by the tube manufacturer may not be fallen below.

Outer layer/coat material

The coat material should therefore the outer layer of the tube show low rubbing values and high abrasion resistances -- - into combination with the materials of the energy chain. After the previous experiences pure jacketed tubes fulfill these requirements well. Rubber or pvc is suitable for tubes as coat material into energy chains of some. Special footbridge divisions are then required to ensure an adequate business behavior. Losses in the operating time to be reached at most have to be expected, however.

Identification of tubes

Tubes must ongoingly be marked with the following details durably in distances of not more than 0.5 m:

- Manufacturer
- Type
- Calling himself distance
- Quarter and year of the production

Identification of sheathed lines:

Sheathed lines must be marked with the following details durably:

- Characteristic of the sheathed line manufacturer
- Assembly date (year and month of the production)
- Maximum permissible dynamic business excess pressure

Choice and assessment of the energy chain

It has to be taken into account at medium tubes and particularly hydraulics tubes that the tubes learn a lengths and diameter change at Druckbeaufschlagung. This form change must the energy chain for inside crosscut at the assessment be taken into account by a corresponding clearance. Footbridge divisions can be provided with a game of at least 20% of the tube diameter for sheathed lines into energy chains.

By situation footbridges the vertical subdivision by inter-footbridges and at a multilayer transfer takes care that the horizontal separation the tubes aren't in direct contact and only low friction appears to the especially select materials of the chain components.

At a multilayer transfer of sheathed lines, as a rule, situation footbridges are required for the separation. 20% of the tube diameter as freedom to provide are also in a vertical direction.

The best experiences are the chain for inside crosscut with hole footbridges for the division. If these cannot be used, are particularly to recommend rolling footbridges for hydraulics tubes.

Requirements for installation and assembly

Before bringing in into the energy leadership chain are to interpret on the whole length just and to pressurize with business excess pressure if possible the tubes to ensure a tension and spin free installation. If the tubes already show deformation distortions like bend formation or a twisting inclination, is to warn into energy leadership chains against a use since it is then to start out from an early wear. In this case contact the tube manufacturer or suppliers.

At the transfer and assembly of sheathed lines into energy leadership chains the volume increase of the tubes also has to be taken into account at Druckbeaufschlagung which lets herself be seen in a lengths and diameter increase. To the compensation of this form change the chain is a greatest possible game of the tube bend to inside contour to provide (tube in the pressureless condition).

Sheathed lines must be installed so, that her natural situation and movement isn't hindered.

Sheathed lines may not be used by outer influences either for the business on train, torsion and compression. You must be protected against damages by outer mechanical, thermal and chemical influences (chain choice!)

Sheathed lines must be transferred or safeguarded so that an endangering persons or environment at the failure of the sheathed line is avoided. (Endangering can for example be reduced by protection covers or protection.)

The tubes shall because of the length change and the possible Pulsation of the tubes by changing Druckbeaufschlagung (see above) only at a chain end -- most possible -- the mobile connection they are fixing or train relieving (cf. illus.1). The other end should mobile, most possible freely be led with compensation possibility from the chain in lengthways direction. It is an as broad as possible to assemble strain relief sparing the sheathed line. Bruises as well as sharp-edged contours have to be avoided in every case.

The distance from the tube connection up to the turning area should at least 1.5-fold the tube diameter (1.5 D) correspond.

Requirements for the operation of sheathed lines

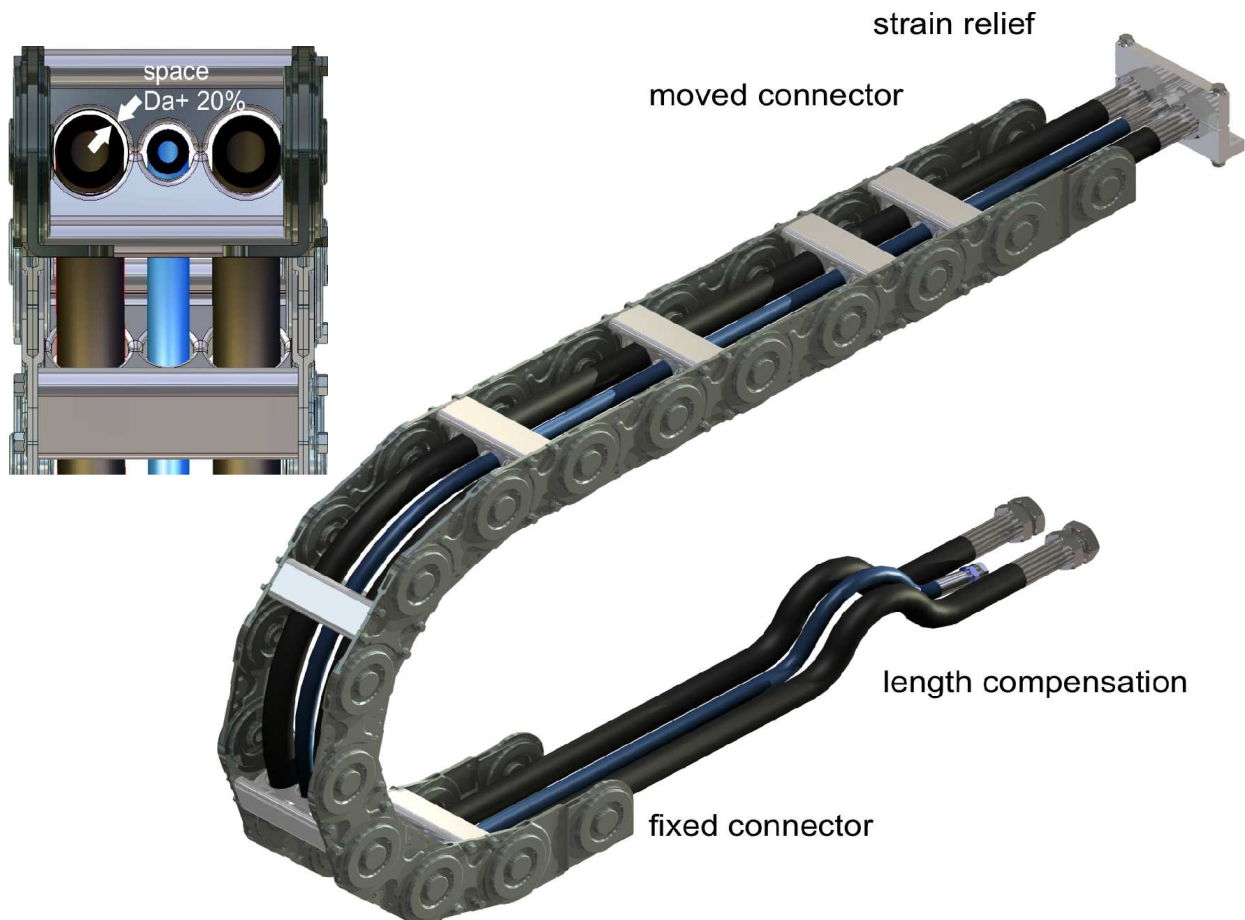
Sheathed lines have to be checked regularly depending on use for the business in energy chains. Has particularly to be paid attention on a faultless installation situation and wear and tear appearances (movings, sticking places, Scheuerstellen etc.).

Are as required and depending on use sheathed lines to check well-informed for her work sure condition through one, however, at least once a year.

If in the examination defects are noticed, these have to be immediately removed or measures have to be taken for the remedy geeignete.

Check list sheathed lines into energy leadership chains:

	yes	no
Are the sheathed lines verdrallt built-in?	<input type="checkbox"/>	<input type="checkbox"/>
Is the natural situation or movement of the sheathed line hinders?	<input type="checkbox"/>	<input type="checkbox"/>
Is train, torsion or compression of the sheathed line available?	<input type="checkbox"/>	<input type="checkbox"/>
The smallest bend radius given by the manufacturer of the sheathed line is fallen at the movement or in the interruption?	<input type="checkbox"/>	<input type="checkbox"/>
An outer mechanical, thermal or chemical use of the sheathed line is available?	<input type="checkbox"/>	<input type="checkbox"/>
Are tubes over-lacquered?	<input type="checkbox"/>	<input type="checkbox"/>
Is (the outer layer damaged Scheuerstellen, slice, rip or the like)?	<input type="checkbox"/>	<input type="checkbox"/>
Is the outer layer brittle (crack formation of the tube material)?	<input type="checkbox"/>	<input type="checkbox"/>
Are squeezing places available?	<input type="checkbox"/>	<input type="checkbox"/>
Is a formation of bubbles recognizable?	<input type="checkbox"/>	<input type="checkbox"/>
Are leaks available at the tube fitting?	<input type="checkbox"/>	<input type="checkbox"/>
Deformation distortions, damages od, are. other on-due dates at the tube fitting?	<input type="checkbox"/>	<input type="checkbox"/>
Is a corrosion layer in the tube fitting?	<input type="checkbox"/>	<input type="checkbox"/>
Is a discoloration of the outer layer of the sheathed line recognizable?	<input type="checkbox"/>	<input type="checkbox"/>
Is the fixed use duration exceeded?	<input type="checkbox"/>	<input type="checkbox"/>
(Storage life tube < 4 year, storage life sheathed line < 2 year, Use duration sheathed line < 6 year) Is the most obvious examining interval exceeded?	<input type="checkbox"/>	<input type="checkbox"/>
Are the wearing out improper or not at all train relieved or fixed?	<input type="checkbox"/>	<input type="checkbox"/>
Is for all sheathed lines and in every place in the energy leadership chain a clearance of 20% of the tube diameter fallen?	<input type="checkbox"/>	<input type="checkbox"/>
Are recognize wear places (tube, footbridge chain)	<input type="checkbox"/>	<input type="checkbox"/>



Illus. 1: Schematic representation for the installation and assembly of sheathed lines into energy chains