

General Instructions for the Installation of Prefabricated Cable Tension Members

1. Scope:

This General Installation Documentation applies to PFEIFER cable tension members as specified in "European Technical Assessment ETA-11/0160"

2. Applicable Technical Documents:

European Technical Assessment ETA-11/0160

DIN 1076 "Engineering Structures in Connection with Roads"

DIN EN ISO 1461 "Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles"

3. Delivery and Laying-Up Cable Tension Members:

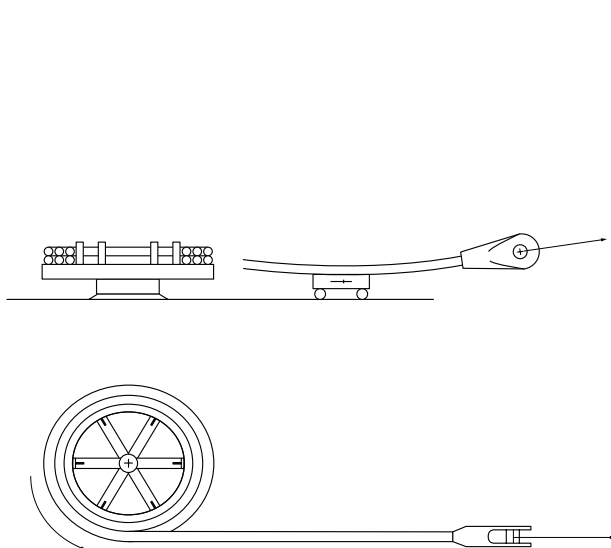
The cables are factory stretched and marked under prescribed loads. Fabricated cable length has been taken into account cable creep and cone settlement among other factors. For that reason, cables come "shorter" to the construction site, then might have been stated in the order. This may result in a need for increased installation force. $T=20\text{ °C}$ was taken as a basis unless stated to the contrary.

Cable tension members are normally delivered to the construction site in coils or spooled on a reel. Spooled cables must be stored in dry conditions after delivery to the construction site and kept in a dry place. Use an appropriate turntable for reeling off the coils or an appropriate winding frame for unwinding the reels. Turntable and winding frame should be equipped with a braking device.

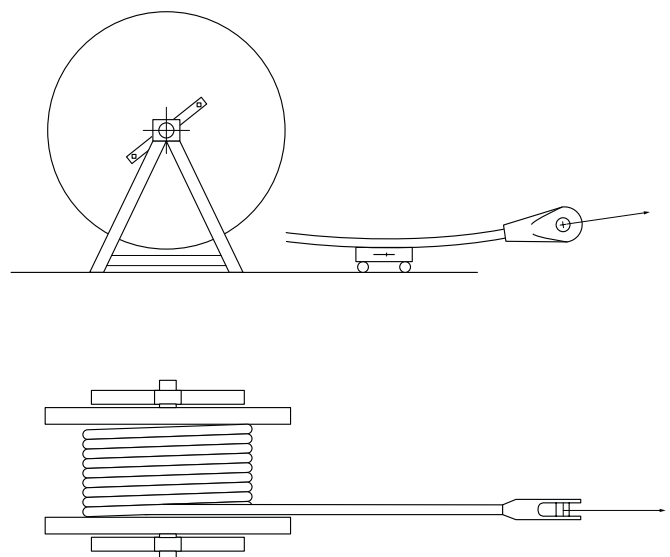
The following points must be observed when unwinding the cables:

- Cable tension members must not be twisted. (Observe marking line!)
- Cable tension members must not be pulled over sharp edges.
- Cable tension members must not be kinked. (Cables and end fittings must be supported accordingly)
- Bending radius at cable must not be less than $R = 15 \times$ cable diameter.
- Corrosion protection must not be damaged.

Turntable



Winding frame



4. Removing Packing Material:

To avoid contamination or damages, any existing packing material should be removed from cable end fittings or from attached cable clamps until shortly before installation.

5. Checking points before installation:

All cable tension members must be thoroughly checked prior to installation for any damage that might have occurred during transportation.

Pay particular attention to the following points:

- Damage to corrosion protection
- Damage to threads on end fittings
- Damage to cable wires

Do not use damaged parts!

If any damage to corrosion protection should have been detected, it should be repaired as quickly as possible.

Damage of galvanized surfaces have to be treated with zinc dust paint, see DIN EN ISO 1461 (the concerning surfaces have to be degreased before). Following this treatment, an additional coat of corrosion protection can be applied

6. Preparing for Installation:

Any existing threads on cable end fittings must be thoroughly cleaned and greased before installation.

Damaged or contaminated threads must not be installed since this may result in seizure of the threads and, therefore, until for their intended use.

Unless agreed otherwise, turnbuckles (e. g. Type 624, 625, 626, 627, 984, 985, 864 and partly 803 and 804) are delivered in "fully screwed-in state" (shortest length), in order to avoid any damage to the threads. Therefore, these turnbuckles must be set to "fitting length" (usually in the central position) before installation. See the data sheets for the respective central positions' setting values.

Note on cable tension members from unalloyed steel:

Generally existing threads on hot galvanized and zinc-sprayed cable end fittings are normally bright and have temporary corrosion protection only.

These threads therefore need to be degreased immediately after installation and should receive permanent corrosion protection afterwards.

7. Installation:

Cable installation would normally take place in accordance with an "Erection Plan" as prepared by a 3rd party structural engineer. This plan must specify all key points important for cables (e. g. installation procedure, installation sequence, pre-tension forces, etc.).

All cables are marked and tagged for their intended position on a structure. Cable tension members must not be erected in a twisted way. As a rule, a marking line is placed on each full locked cable tension member for checking purposes. This marking line must not look twisted after the erection process.

Cable tension members are usually pulled to their final position using an appropriate pulling device (e. g. winch) or lifted to their fitting position with an appropriate temporary device (e. g. lifting tackle, cross bar). As already described under Point 3, make sure that the cable tension members do not become damaged. Make sure that cable tension members will not be kinked, particularly when lifting with a temporary tensioning device.

In case of heavy cable tension members, for example, deployment of appropriate deflection saddles (deflection radius = min. 15 x cable diameter) can prevent the cable from kinking at the rigging points.

Application of pre-tension forces must take place via appropriate devices (hydraulic cylinders). Any existing threads on cable end fittings may only be used for adjustments and not for the application of prestressing forces. The thread minimum screw-in depths must be complied with. The actual screw-in depths must be documented by the person responsible for installation.

In the case of screwed-on nuts take care that the minimum threaded projections acc. to DIN EN 1090-2 are complied with.

Unless provided otherwise, thread on cable end fitting must be secured against coming loose after adjustment (e. g. using a counternut or gluing with screw-locking adhesive). Particularly all screws of the locking covers must be glued. Appropriate Loctite screw-locking adhesives or similar products from other manufacturers may be used for securing parts. Be sure to observe the processing information of the respective manufacturers (pretreatment of the surfaces to be glued).

Remove all seizing wires from the cable tension members after the installation process. The seizing wires (seizings) on the cable end may remain on the cable during the installation process. They prevent individual wires from popping out from a cable under an excessive bending. Be sure to remove the seizings after the installation process since they may otherwise have detrimental effect on corrosion protection.

Note on cables with inner filling:

In the case of loaded cables, the inner filling used during production and stranding of rolled cables can come out and possibly stain the cable surface. This excess filling substance can be easily removed from a cable. Please contact Pfeifer for advise.

Max. skew position of the cable connection lugs:

The max. skew position of the cable connection lugs (deviation from the cable axis) must not exceed 1°. There may be slight "birdcaging" (loosening of the outer wire layer) in the case of very short cables with swaged-cable end fittings in the unloaded condition. The cable construction would close again with a load introduced at installation. Slight "birdcaging" in the unloaded condition has no detrimental effects on a cable carrying capacity.

EN ISO 7089-200HV-tzn washers need to be arranged under the counternuts when using spelter sockets type 803 and type 804. Washers of steel type 34CrNiMo6+QT have to be used for sizes non in stock. Exactly symmetrical arrangement of the threaded rods needs to be observed when installing spelter sockets of type 803 and type 804, in order to avoid eccentric loads for the sleeves. Unequal distribution of cable force and adverse constraining forces are therefore eliminated for type 803 and type 804.

Equal and even tightening of both threaded rods has to take place when installing the adjustable spelter sockets of type 803 and type 804. The difference of free threaded rods in their final state may be max. 2 mm. The erection company has to certify conformity of their work with the requirements of the "European Technical Assessment ETA-11/0160" pertaining to installation of prefabricated cables incl. end fittings and lug plate connections.

8. Monitoring cable structures:

Cable structures need to be monitored and checked at regular intervals. In the absence of specific requirements for a structure, this monitoring and checking may take place on the basis of DIN 1076 "Engineering Structures in Connection with Roads".

Date of issue, contact data