



GENERAL INFORMATION ON CABLE INSTALLATION

General Drum Handling

Before commencing installation, the cable drums should be checked to determine that they have been received in good order and condition. The end caps should also be checked for integrity to ensure that moisture has not entered the cable.

The arrow painted on the side of the drum indicates the direction for rolling. If the drum is rolled in the opposite direction then the layers of cable will become loose.

Rolling of the cable drum should be avoided as much as possible.

Lifting of cable drums should be carried out carefully by cranes or forklifts.

Cable drums should not be dropped as damaged can occur to the cable and /or the drum.

Drum Positioning

All drum moving or lifting should be carried out in a safe manner in accordance with the requirements of the Occupational Safety and Health regulations. Drum pay off stands must be capable of carrying the full weight of the drum of cable and withstanding the additional forces when the cable is being pulled off.

Drums are normally mounted so that the cable is pulled from the top of the drum.

When paying off, the drum rotates in the opposite direction to the arrow on the side of the drum.

During paying off, the cable inner end moves backwards and slack turns can develop within the cable drum. Unless the cable end is checked and re-secured at frequent intervals during the paying off, the slack may develop into kinks in the cable.

Drums should preferably be mounted at the start of a reasonably long straight section of the cable trench.

A method of braking the cable drum during paying off must be provided to control the pay off and prevent over running.



Trench Preparation

All trench excavation must be carried out in accordance with the local authority regulations and Occupational Safety and Health regulations.

The cable trench should be prepared with cable rollers spaced every 2 to 3 metres in the straight sections.

The spacing of the rollers should be frequent enough to prevent the cable touching the ground during pulling.

Any corners should be made as large as practical and corner rollers provided at any bend in the route. Spacings of the rollers on corners or bends will need to be more frequent than for the straight sections.

Long rollers may be required between the drum payoff position and the start of the trench to allow for the cable reeling off across the width of the drum.

Duct Preparation

Ducts should be clean and smooth and fitted with a bellmouth at the entry point.

The duct exit point should also be fitted with a bellmouth if the end of the duct is followed by a bend.

There should be a depression in the bottom of the trench at the entry to a duct to allow gravel and other objects to fall off the cable and not get dragged into the duct with the cable.

Moisture

Cut ends or opened sheath must be protected and sealed from moisture.

After cutting the cable, the ends must be re-sealed by an effective method such as a heat shrinkable cable end cap.

When using a pulling stocking, any cable end seal must be checked for integrity before the pull and replaced when broken or torn.

When using pulling eyes attached to the conductor, the pulling eye must be sealed to the cable sheath to prevent the entry of moisture.

Cable with cut ends, damaged end caps or opened sheath must never be dropped into water.



Cable Laying and Pulling

When installing any cable, irrespective of the type of insulation (i.e. paper, EPR, XLPE, etc), it should be handled with due care otherwise damage may occur to the sheath.

All cable laying and pulling cable off drums should be carried out in a safe manner in accordance with the requirements of the Occupational Safety and Health regulations.

To attach the pulling rope to the leading end of the cable, a cable pulling stocking is normally used, but cable pulling eyes are available that can be fitted to the conductor(s).

A swivel should be fitted between the pulling eye and the winch cable to prevent torsional loads being transferred to the cable during pulling.

It must be emphasised to staff laying the cable that the cable is a high-value commodity and is very sensitive to damage.

In order to prevent damage to the corrosion protection and insulation properties of the cable sheath, the cable must not be dragged over sharp objects and must not be bent too sharply.

Attention is drawn to the fact that as the temperature decreases PVC compounds become increasingly stiff and brittle, with the result that if the cable is bent too quickly to too small a radius or is struck sharply at temperatures in the region of 0°C or lower, there is a risk of shattering the PVC components.

Cables with PVC components should not be laid when the cable temperature or the ambient temperature has been below 5°C during the previous 24 hours.

The cable should preferably be pulled into position in one continuous pull.

When pulled by winch, the winch operator must observe the dynamometer or tension measuring device to avoid the cable pulling tension from being exceeded.

After each length of cable is placed in position, the end caps should be checked for damage to ensure that moisture can not enter the cable. Any suspect end caps should be replaced.

When lengths of cable are being cut from a drum or when the drum is not emptied completely, the ends of any cut length should be sealed with an end cap, such as a heat shrink end cap, to prevent the ingress of moisture.

When installing heat shrink end caps, the surface of the cable sheath where the end cap is to fit should be cleaned and roughened to provide a key by sanding with coarse sandpaper.

If a length of cable is being left on a drum for use in the future, the cable ends must be sealed and the tail tied off. The tying off of the tail may be carried out by attaching a heavy cord to the cable behind the end cap, pulling up any slack cable, then anchoring the cord to the drum flange with a staple. The bottom end should also be checked as it may also require to be re-secured, particularly if the cable has "worked back".



Care must be taken to ensure that the end cap is secure and not likely to be stripped off by the cord. It is also important to ensure that the cord is not likely to slip off the cable and allow the cable end to flick back and cause injury.

Nails should not be driven through the sheath to secure the cable, as this will allow moisture to penetrate into the cable.

Backfilling and Reinstatement

Prior to backfilling, a visual inspection should be carried out and the following checked.

- The cables have a proper bedding.
- The spacing is correct if there is more than one cable in the trench.
- Pulling equipment is removed.
- Cables are suitably supported at duct entries and the ducts sealed to prevent entry of moisture and vermin.
- The cable is free of obvious damage caused by installation.
- The end caps should be checked for integrity to ensure that moisture can not enter the cable.

The bedding and initial backfill must be stone free sand or soil to prevent damage to the cable sheath.

If a special backfill with a low thermal resistivity is required to obtain the required continuous current rating for the cable circuits, regular tests on the supplied material should be performed to ensure that the thermal resistivity of the material does not exceed the design requirements. Usually a maximum of 1.2 K.m/W.

All backfill material should be compacted to reduce the thermal resistivity and drying out properties of the materials.

The reinstatement should be carried out to comply with the local authority requirements.