TRANSPORTATION, HANDLING, STORAGE OF THE DRUMS, LAYING OF THE CABLES AND LABELING GUIDLINE

Introduction

All cable drums have to be handled with delicate care and they shall be stored safely. Improper handling procedures, handling equipment or storage conditions can easily cause damage like broken drums and rotten reels or visible or invisible damage of the cable itself.

Main danger comes from invisible and unexpected damages leading to unusable cables. Therefore some base rules shall be followed. The cable itself must always be protected and may not be touched improperly during transport and storage. A drum, damaged by handling or showing signs of wear or rotting must be checked. Special handling procedures may be necessary.

This document is a collection of instructions and methods for safe cable usage once the cables leave the manufacturing unit.

Document consists of below parts:

- Drum Handling
- Drum and Cable Inspection
- Storage Requirements
- Laying of the Cables
- How to Manage Cable and Drum Damage
- Labeling on Drum

This document is intended to offer guidance to the cable transporter and/or installer compiling methods and recommended practices for safe cable handling and storage once the cables leave the manufacturing unit for standard/generic types of "Erse Kablo" productions.

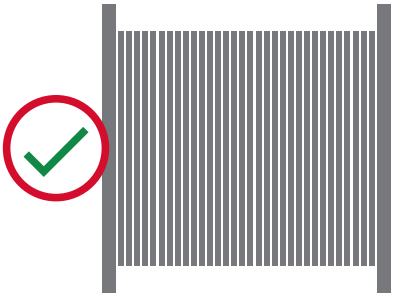
It is recommended that the safety rules of an establishment, relative to cable drums, should follow the guidance given unless practices equal to or better than those quoted are in being.

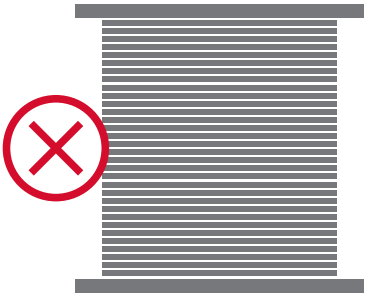
DRUM HANDLING

All cables will be supplied on wooden drums that are treated to give protection against premature deterioration of component parts.

Wooden drums are closed with thick flex covering material unless there is a special demand.

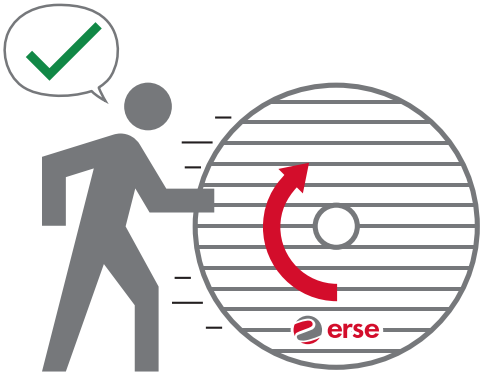
Drums must be handled only in the upright position, not on the flanges.





The rolling of the drum in the direction of the arrow ensures that there is no tendency for the cable to loosen its wind on the drum.

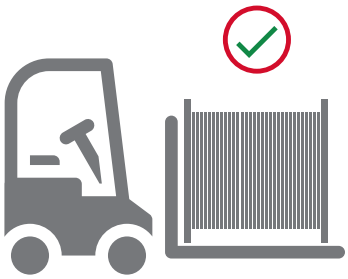
If arrow sign is missed, drums may be rolled but only in the direction to cable winding, to keep cable from loosening the drum.



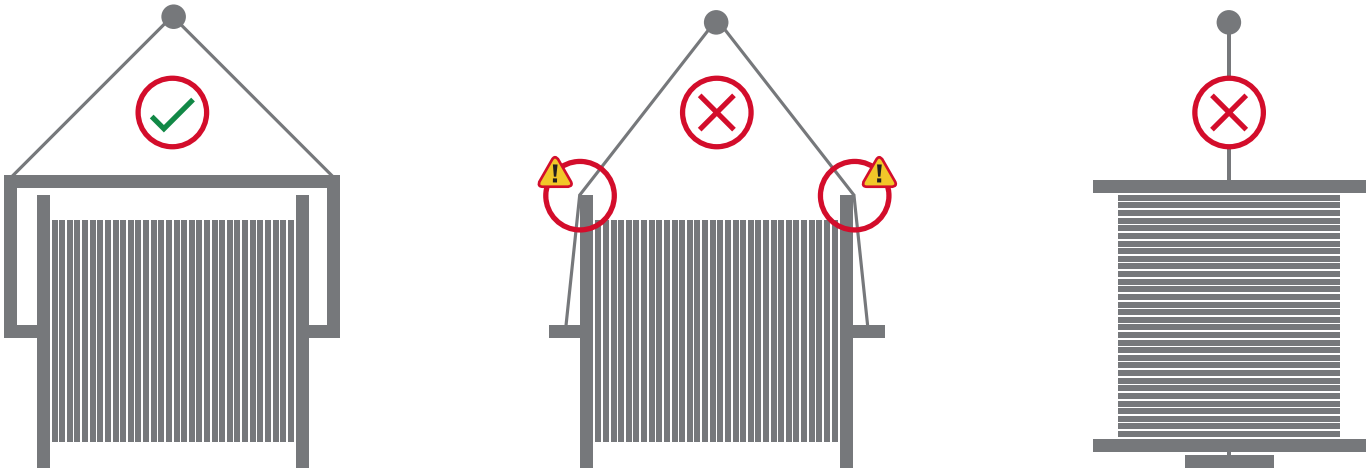
The movement of cable drums by motorised forklift truck is the preferred method. Most drums of cable are within a weight range that permits their movement by this method.

In general, the forklift truck method of drum handling is only applicable where a hard and level ground surface is available. This is required in the intended storage area. It is also necessary to ensure that the forklift truck forks are capable of traversing the width of the drum and provide support to both flanges.

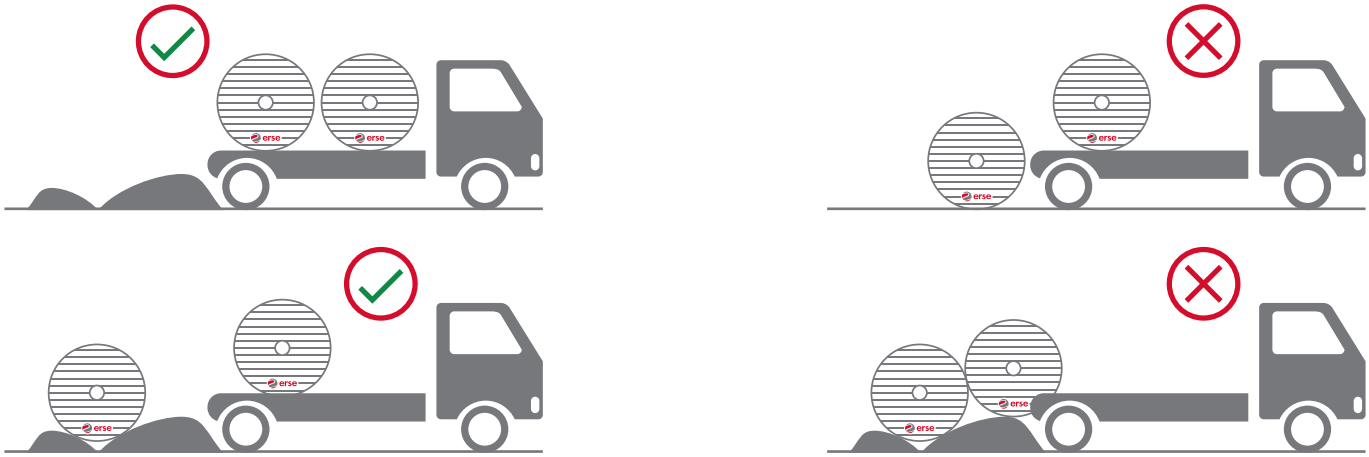
Drums may never be dropped from a truck, ramp or container, even from a small height.



Some drums may be of sufficient length and weight to require cranes to load and unload from transport vehicles. In this case, it will be necessary to ensure that a spreader bar of sufficient length is used to ensure the lifting chains do not compress the drum flanges.



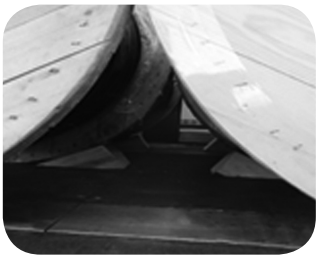
When forklift or crane is not available, a makeshift ramp with approximate inclination of 1:4 should be constructed. The cable drum should then be rolled over this ramp by means of ropes or winches. Additionally, a sand bed at the foot of the ramp can be build to brake the rolling cable drum.



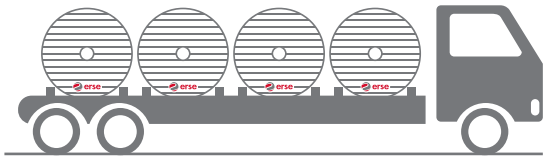
Drum Handling in Truck

During transportation, cable drums must be securely restrained to prevent their movement and the possibility of a serious mishap in which the cable could be damaged beyond repair.

A special chocking system is required when transporting drums with lorry or trucks. Rafters are fastened to the vehicle bed before positioning the drums. It can be superimposed up to 120 cm. drums.



“Bore perpendicular” chocking
The drums are placed parallel to the lorry axis.



“Bore paralel” chocking
The drums are placed perpendicular to the lorry axis.

Provided that the diameter of the drums is less than the width of the lorry, they can be loaded “bore paralel chocking”

DRUM and CABLE INSPECTION

Cable and drum should be inspected when received at the storage area. Cable and drum should also be inspected before removal from the storage area.

Wooden drums should be inspected to ensure that the drum cleats (or slats or battens) are not damaged.

If any damage has occurred in transit the cleats should be carefully removed to verify if any damage has occurred to the cable. Normally the outer layer of cable on the drum has adequate space between it and the inside of the drum cleats to prevent cable damage.

Additionally, inspection must include an assessment of the state of the drum due to transport vibration and movement, weathering or environmental damage.

In changeable dry and wet weather, or consistently dry and hot weather (near or above 30˚C), the wooden section of the drum shrinks and the whole drum could become unstable and cause damage to the cable when the drum is moved.

Therefore, the transverse bolts must be tightened with a torque wrench before the drums are moved otherwise the drums could collapse during this operation.

This procedure is to be adhered to in all installation projects before wooden drums are handled since the effects of vibration, movement, the climate and duration of exposure to the environment can be extensive.

Note that timbers of the drum flanges and barrels that have shrunk are likely to have loose nails as well as the bolts, but loose nails are harder to correct. It will be necessary to apply caution and vigilance during the cable unwinding to identify and reduce the damage to the cable produced by the loose nails.

A heat shrink cap should be applied ensuring a tight seal to the cable outer layer.

The following is recommended, so if the cap or sealing has been absent for a long time (more than one month); or the cable end faces up toward the sky; or the end cap has been absent during periods of rain; or any form of cable end deterioration / ageing / swelling / or soiling is observed, then the cable end should be cut back 300 mm. and re-examined for presence of moisture and cut back further when moisture is found, and a new end cap must be applied to the cable end, ensuring a tight seal to the cable outer layer.

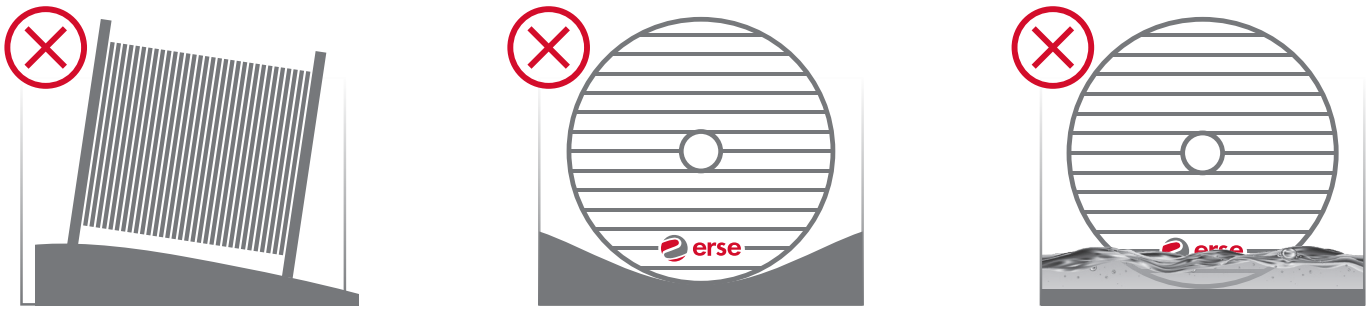
When any damage to the drum cleats (or slats or battens), or slackening of the cable layers has occurred, or drums moved when unstable, then cable damage is possible and it is necessary to contact the nearest Erse Kablo representative to assess the situation and advise of an appropriate solution.

STORAGE REQUIREMENTS

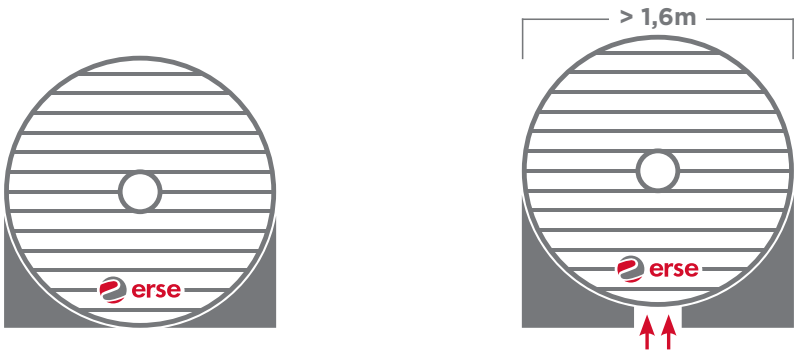
Drum Storage

Drums should be stored on a level and firm surface (e.g. timber baulks, firm gravel, or concrete), on the flange edges (not with the flange flat on the ground), such that they will not be standing in water or in continually damp conditions, and restricted from rolling.

Failure to provide these conditions is likely to result in timber rot and weakening of the flange with potential breaks of the flange or collapse of the drum to the point where the cable itself will rest on the ground. Any of these will make installation of the cable more problematic or impossible. The drums shall not be standing in direct contact with water or damp soil to avoid rotting of the drum.



Wedges must be used to retain drums. Wedges must be positioned at flange edges and not between flanges. The use of stones are not recommended.



Wooden cable drums can be stored in the open for a period of at least 18 months.

If cable drums are required to be stored for periods longer than two years it is recommended that they are stored in an enclosed area sheltered from the environment.

Slowing the rate of deterioration for any drum, can only be done by storage in a covered dry area.

Cable Storage

Cables are supplied with heat shrinkable end caps and tapes sealing to prevent ingress of moisture or water. Cable drums should be handled such that damage to the cable sheath or to sealing heat shrinkable end caps and tapes do not occur as this would subsequently permit the ingress of moisture.

If the cable is used progressively (partial length is cut off and used) the exposed end must be immediately sealed with a new heat shrinkable end caps or tapes.

Electricians' PVC tape is then wrapped around the junction of the end cap and the cable sheath to reinforce the seal.

Cables with coloured outer sheaths should not be stored in direct sunlight to prevent fading of the colour. Cables should be protected against direct sun light with suitable protection package such as black plastic sheeting, lagging etc.

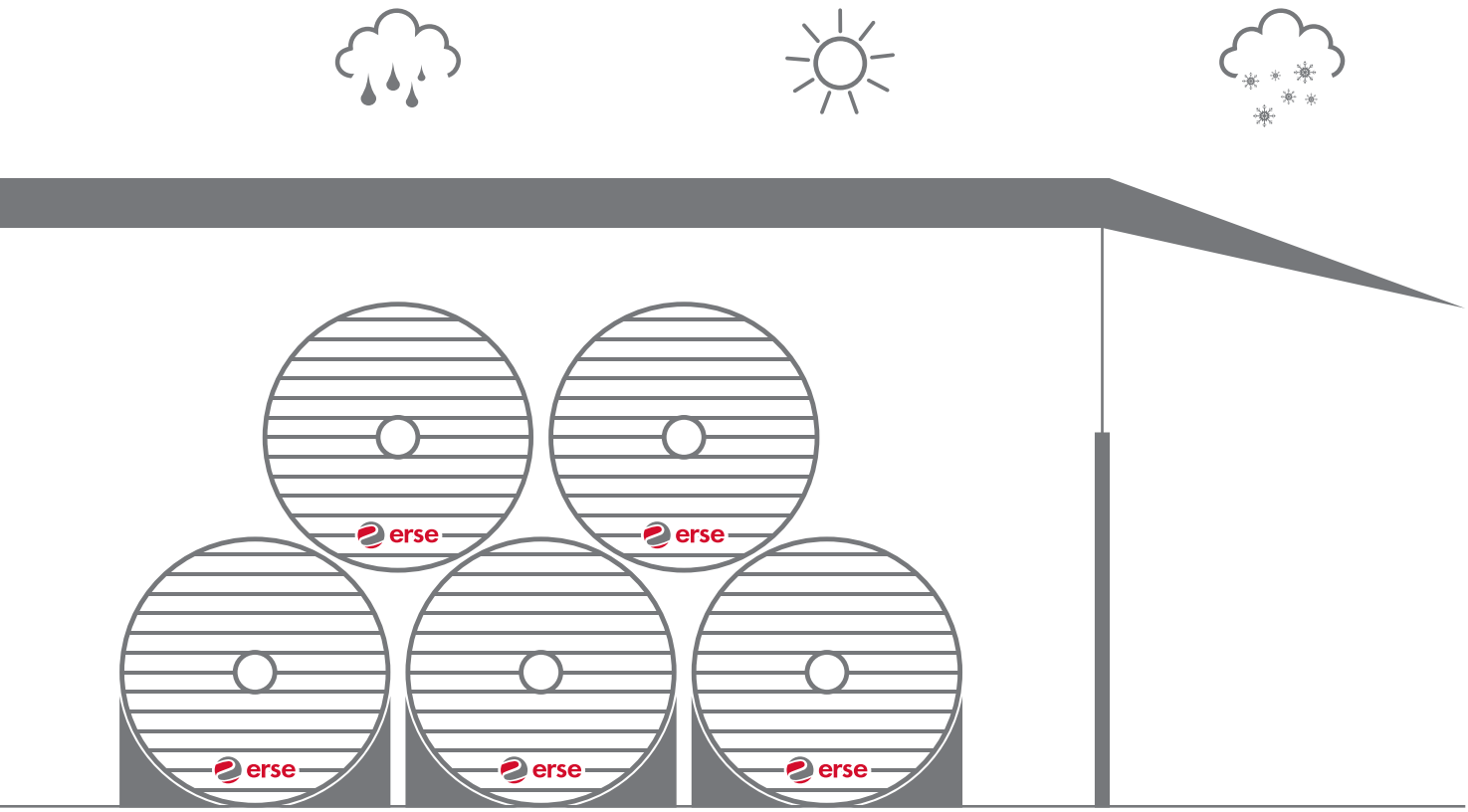
If storage is likely to last more than 6 months, drums should be stored in order to be protected from effects like rain, sunlight etc.

Cables (especially with black sheath) exposed to direct sunlight will become warmer than the ambient temperature. It must be ensured that the temperature of the cable will not exceed the allowed maximum temperature for storage. To avoid direct exposure to sunlight the cable shall be protected with suitable package, such as a dark foil, and/or by storage in shadow.

Beside the general rules, please refer to the technical data mentioned below:

Max. Storage Temperature: *+40°C*

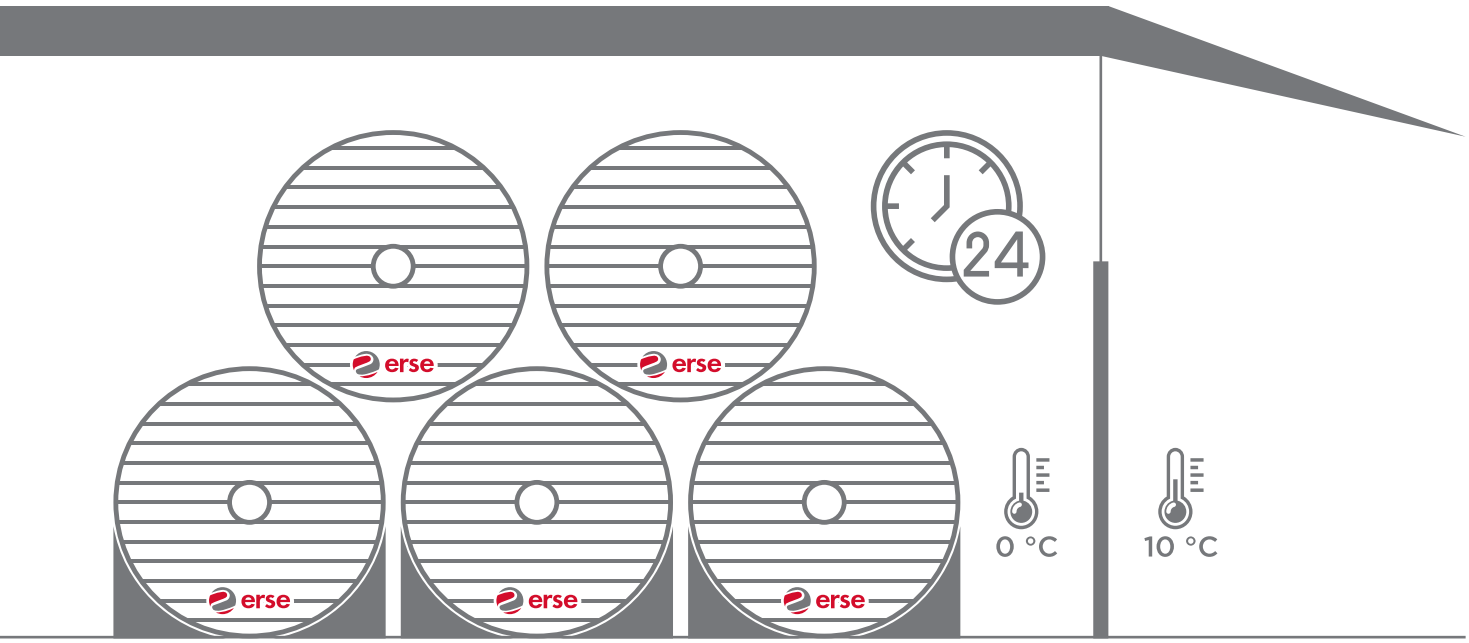
Note: *Transportation and storage temperature up to -25°C may be acceptable for cables which have resistance against lower air condition. (for more information please contact tehcnical departments of Erse Kablo)*



LAYING OF THE CABLES

Drum and Cable Preparation

If the external temperature is below -5°C, you should postpone cable pulling. If installation of cables is necessary, it is imperative to store them, before unreeling, in warmed room above +10°C for at least 24 hours. Unreeling has to be done within 2 hours using a slow and regular speed (around 20m./minute) without shock.



When removing drum cleats (or slats or battens), care should be taken that the cable sheath is not accidentally damaged.

It has been found that some cables with sheath materials that are affected by warmer ambient temperatures (near or above 30°C, which means that actual cable surface temperature will be higher than ambient temperature) or that are affected by the tension with which they are wound onto the drum, may tend to exhibit some adhesion between the layers and turns of the cable. This adhesion, if strong enough, may cause the cable to resist the unwinding and interfere with the installation. Remedial action is to ensure that the turns are pulled off by hand or equipment, to ensure a smooth installation pull.

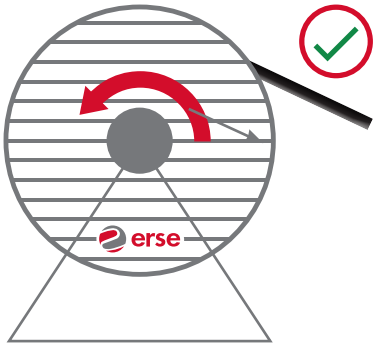
Rotation of Drum

It should be noted that when pulling the cable off the drum, the arrow will point in the opposite direction to the rotation of the drum.

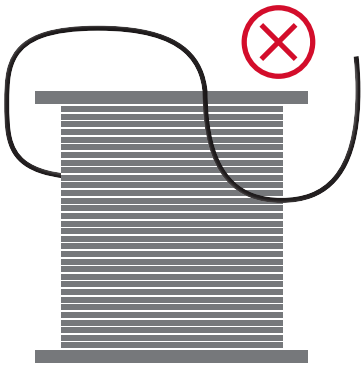
The lower end of the cable should be free.

Drums should be unreeled without exceeding the maximum allowed pulling force of the cable.

The minimum bending radius of the cable should be equal to or greater than 15x of the outer diameter of the cable.



Cables should be unwound as shown.



Cables should not be unwound in this way.

Note: *The arrow on the drum flange does not indicate direction of unwinding.*

Maximum Pulling Tension

Pulling strength based on conductor types should be 50 N/mm of cross section for copper conductors.

Use pulleys on the ground with regular frequency in order not to damage the cable in ground level installations.

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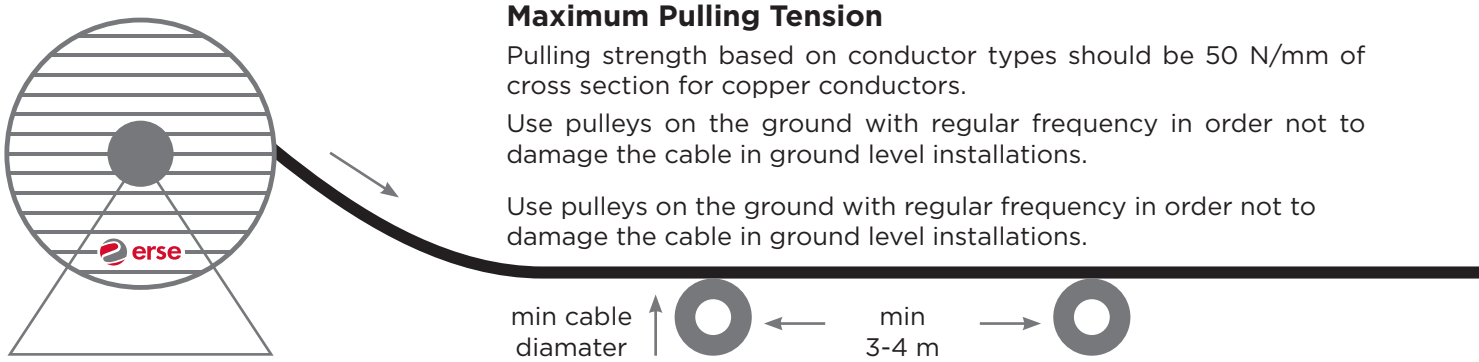


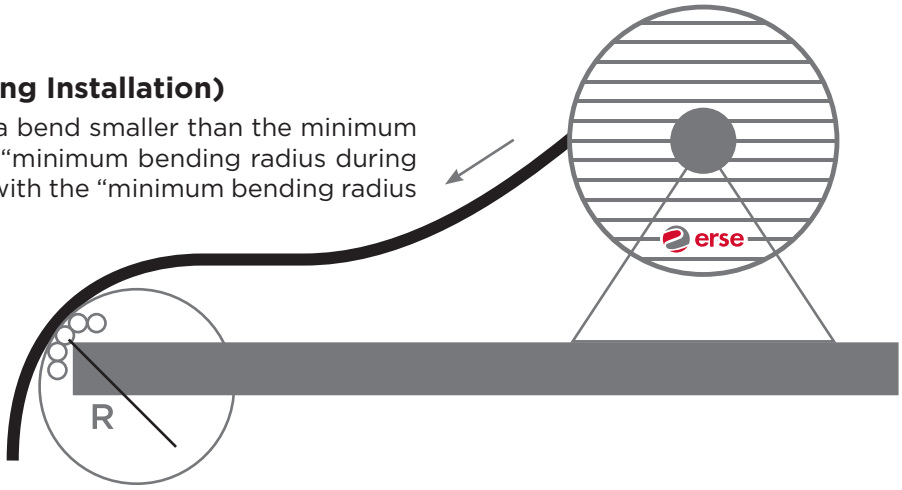
Maintaining the Tightness of Timber Drums

Timber drums may be transported long distances or moved many times in storage, which can cause a loosening of the bolts that hold the cable drum firm and functional. It is therefore appropriate to check and tighten bolts whenever it appears that the bolts or nuts are loose.

Minimum Bending Radius (During Installation)

The cable must not be subjected to a bend smaller than the minimum bending radius (given at tds as the “minimum bending radius during installation” and not to be confused with the “minimum bending radius after installation”)

Use pulleys on the ground with regular frequency in order not to damage the cable in ground level installations.



Side Wall Bearing Pressure

The cable should not be exposed to lateral pressure exceeding the side wall bearing pressure.

If this happens, it is common for the tear to continue during cable pulling and for the tear to accumulate at a point in the bending and an increase in the cable tension.

HOW TO MANAGE DRUM and CABLE DAMAGE

Timber drums do deteriorate over time when exposed to the weather and the level of deterioration is dependent on the variety and type of weather to which the drum is exposed.

Temperate or colder environments are the most kind to the ageing process, but wetness can induce rot in the timber and wetness concurrent high temperatures (as may be found in tropical areas) will accelerate the rotting process. The most obvious point of fastest deterioration is the contact point of the timber drum to the ground, so it is essential for the drums to be stored on a firm gravel surface or on concrete and that the drum is not allowed to rest with the flange in water.

Dry and hot environments (near and above 35°C) will have the effect of drying out the timber and inducing timber shrinkage. The metal components (bolts, shafts, and nails) that hold the timbers in place will therefore need to be tightened to avoid a loose assembly of timber that will not tolerate the forces of transport and unwinding of the cable during an installation.

With a drum that has aged or deteriorated, it is necessary that the transverse bolts (flange to flange, also known as “barrel bolts”) are inspected and tightened and the bolts holding the steel plate at the spindle hole are to be tightened. Inspection is required before lifting or moving the drum and also after a few turns of the drum at installation and at intervals during the installation.

One effect of loose barrel bolts is that the tension on the cable during installation may be sufficient for the cable end being pulled to force its way between other cable turns on the drum or between cable and the drum flange. Trying to pry that embedded cable out can become difficult and may result in damage to the cable.

It is also important that the shaft or spindles used to support the drum during unwinding or installation of the cable are close to the size of the hole provided in the drum. Shafts or supports that are too small will tend to gouge the spindle hole so that rotation of the drum becomes uneven, usually leading to additional damage and greater gouging of the spindle hole which leads to greater difficulty in using the drum and cable and could even escalate to a point that winding is no longer possible.

Should it be apparent that spindle hole damage continues to occur then a larger spindle hole needs to be formed or a Erse Kablo representative be contacted for assistance.

Looseness in the bolts around a spindle plate may induce similar problems. This is why these bolts also need to be tightened.

Lubrication of the shaft or spindle is advised when the timbers around the spindle hole or around the spindle plate are suspected of being weakened by ageing. The lubrication will relieve rotational forces on the timbers and on the spindle plate bolts and the timbers they are bolted to.

It is more difficult to tighten loose nails and some nails that are under the cable will not be accessible. Thus care is required to make observations and take corrective actions to avoid cable damage.

In those cases where damage is not avoidable then the following corrective actions are recommended:

a) In the case of the damage being sustained on the surface of the cable sheath and not penetrating much of the thickness (say depth of damage less than 1.5 mm. or 50% of the total thickness, whichever is smallest) then no repair action is required.

b) Should it be desired to repair deeper damage or broken or torn or slit sheath, then a heat shrink sleeve to cover all such damage is acceptable and most commonly used for such repairs.

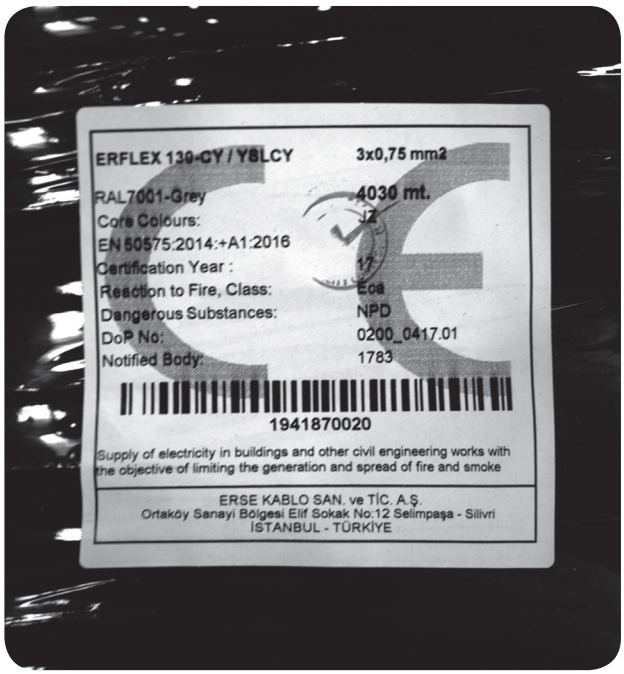
In terms of cable longevity, for damage deeper than 1.5 mm. or 50% of the sheath thickness, a heat shrink sleeve over the damage restores the function of the sheath.

And should the cable sheath be torn or broken or slit, a heat shrink sleeve over this damage restores the function of the sheath.

LABELING ON DRUM

Labels should be attached on drum or pallet. It must be read easily by a hand-held scanner and visible. Drums must be labelled to allow easy and quick identification of the cable and of main handling issues:

- Identification labels showing cable type, length, code no., etc.



ERSE KABLO SAN. & TİC. A.Ş.

Head Office
Halil Rıfat Paşa Mh. Yüzer Havuz Sk. No: 5-9
Şişli, İstanbul / Turkey
T. +90 (212) 320 26 80 (pbx) **F.** +90 (212) 320 26 84

Factory
Ortaköy Sanayi Bölgesi Elif Sk. No:12
Silivri, İstanbul / Turkey
T. +90 (212) 734 37 00 (pbx) **F.** +90 (212) 734 37 01

/ ersekablo

sales@ersekablo.com.tr

ersekablo.com.tr