# Installation Guide For Opitcal Fibre Cable

## Tight Buffer (TB) Cable Supplement

### Table of Contents

***Important Note: Installation is to be performed by qualified service personnel***

## 1. Foreword

This document forms part of a series of documents related to optical fibre installation. Please see below for further information.

This document provides specific information related to **Tight Buffer (TB)** fibre cables.

The General "Installation Guide For Optical Fibre Cable" document provides information related to key topics that need to be followed during installation.

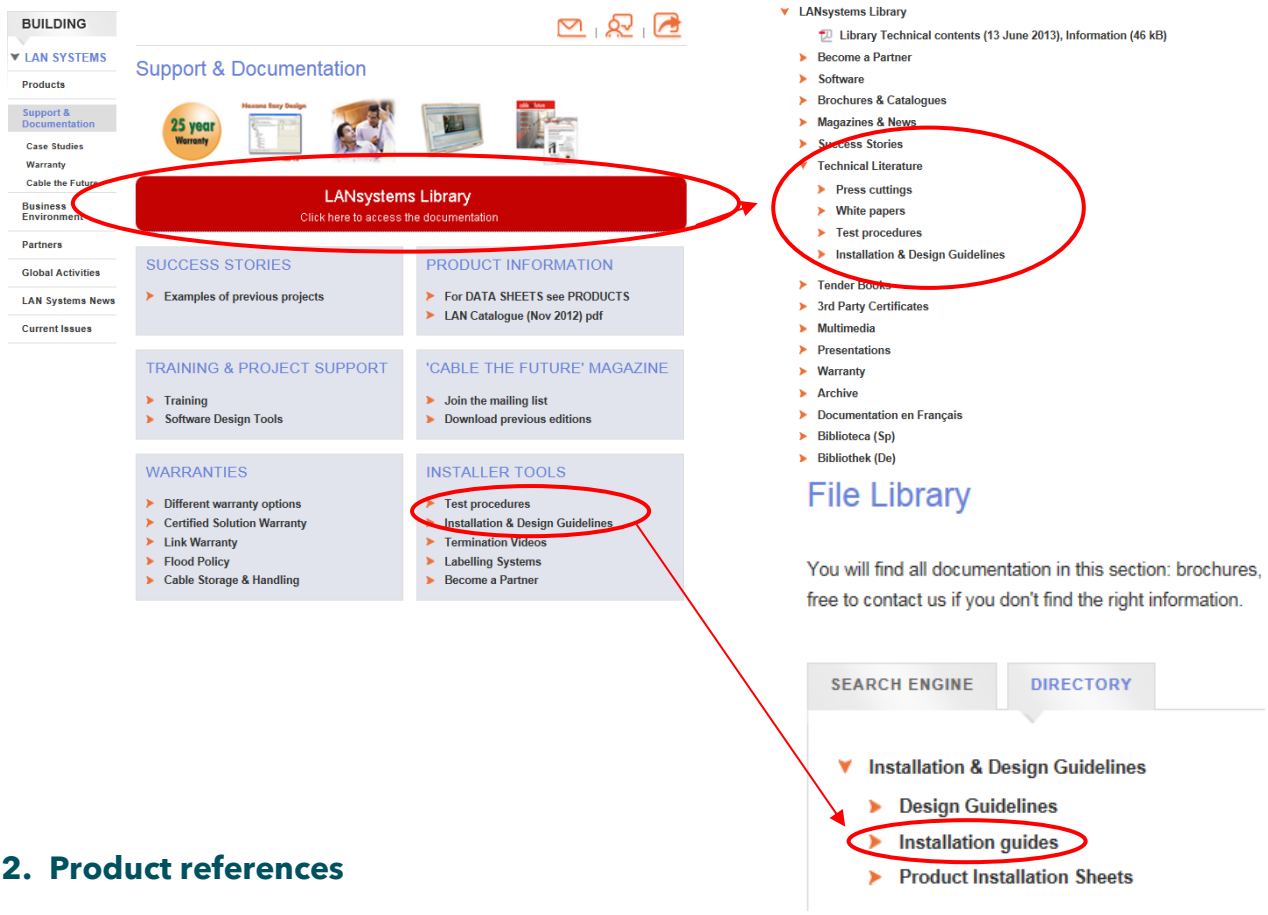
The following guides provide more detailed information on handling requirements for specific cable types:

- Tight Buffer Cable Supplement (this document)
- Loose Tube Cable Supplement
- Micro-Bundle Cable Supplement
- Pre-Terminated Cable Supplement

In addition, there is also a General Installation guide (for both copper and fibre) which includes further information.

**Please note:** The Aginode warranty may be invalidated if the cables have not been properly stored or handled according to Aginode Cabling Solutions (NCS) requirements.

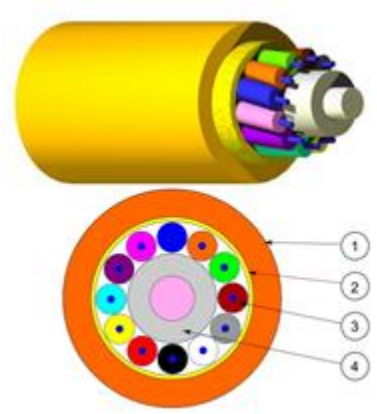
When logged into the NCS site, all these documents and also others relating to design and installation testing etc can be found here




## 2. Product references

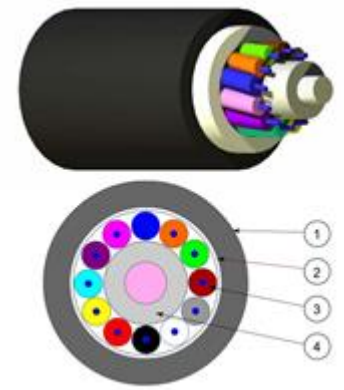
The rules described in the following chapters are applicable to the following NCS OF cable ranges:

### LANmark-OF Tight Buffer Indoor (N16x.TBINxx)




1. Outer sheath in LSZH material
2. Aramid Yarns
3. Optical fibre (900 um)
4. Central Strength element (not for 2 fibres)

## LANmark-OF Tight Buffer Universal (N16x.TBUNxx)




1. LSZH outer sheath with UV resistant additive
2. Watertight glass yarns
3. Optical fibres (900 um)
4. Central strength element

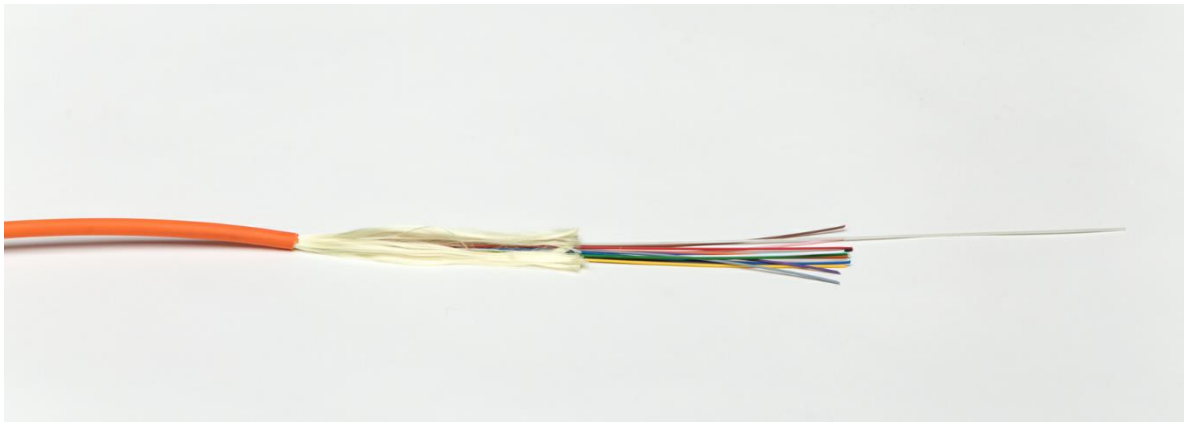
## 3. Tight Buffer OF cable pulling recommendations

**Important note**

In any fibre optic cable the load has be applied to the strength members of the cable (central strength element and glass/aramid yarns).

Failure to lock the cable components together can lead to elongation of the jacket material which will cause irreparable damage to the fibres resulting in significant performance degradation.

Remove approximately 200mm of the jacket and cut the internal elements as shown in the picture.



To ensure that the pulling force will be applied on the whole cable structure, wrap the cable end with a strong adhesive tape to lock all the cable components together.

Fix the cable to the pulling rope / tape using a specially designed pulling grip for optical fibre cable (length of 600mm minimum) to ensure that the pulling tension is well distributed on all cable components (outer sheath and reinforcing elements).

Before termination, approximately 3m of cable should be cut off to remove any piece that may have suffered stress from the pulling tape or grip.

## 3.1. About Intermediate Pulling

In many installations the distance to be covered is short and the path is straight enough to allow the cable to be easily pulled (with a pulling grip correctly installed onto the cable end) without the need for intermediate pulling.

However, on longer runs it may be necessary to pull the cable at intermediate points if the pulling force to be applied on the cable, to pull it in one go through the duct, would exceed the max pulling force allowed by the manufacturer.

**Important note about Tight Buffer (TB) cable structure**

NEVER grab the outer sheath (jacket) of a TB cable when trying to pull cable out of a duct.

If a cable is grabbed by hand, the point pressure that is applied in this manner may cause the outer sheath to be elongated as well as causing the fibres to be stretched.

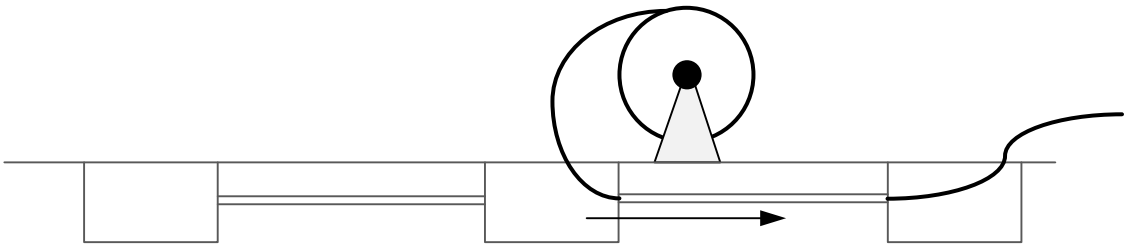
When the cable is then released, the optical fibres will then pull back and bunch up within the cable structure, which will cause irreparable damage to the fibres resulting in significant performance degradation.

It is therefore imperative that the pulling load be applied to the strength members of the cable.

For long runs the pulling operation must be accomplished in two or more stages.

The pulling can be started at the middle of the run where a maintenance hole is located. The cable pulling will then be undertaken in both directions.

The cable is first pulled through the duct in one direction (directly from the reel).



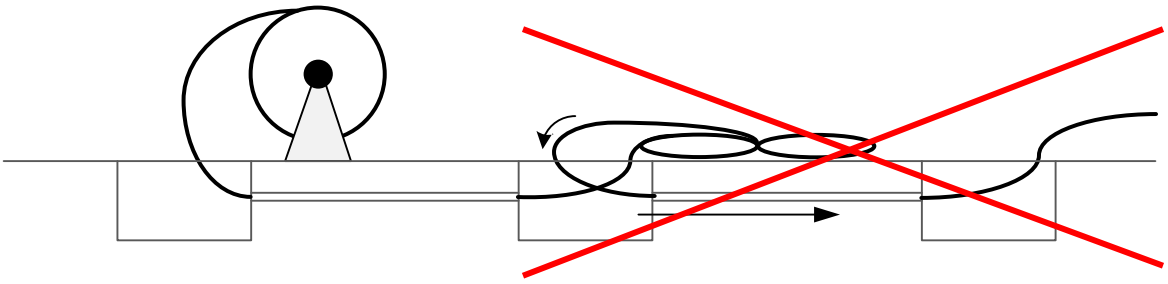
**Attention**: when the end of a TB cable is coming out of the duct at the pull end, the operators have to continue to pull the necessary length of cable out of the maintenance hole by applying the force to the pulling grip, whatever the length of the cable to be pulled out.

In no circumstances should the pulling force be applied directly onto the jacket of the cables as explained in the important note located at the beginning of this chapter.

As a consequence we do not recommend using TB cable to create outdoor backbone links requiring several pulls to reach the full length of the path in one direction.

The use of TB cable shall be limited to medium runs having just one intermediate maintenance hole.

For pulling in stages the following configuration is not recommended for Tight Buffer cable because of the force needed to be applied on the cable jacket at the intermediate stage.



Configuration not recommended using Tight Buffer cables

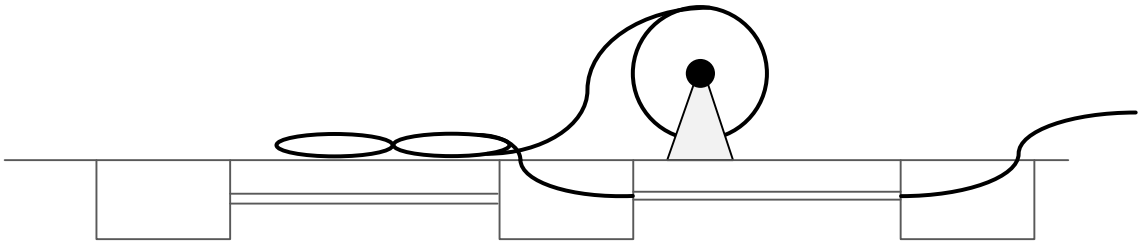
The following method is however recommended.

When the pull in the first direction is completed the remaining required cable shall be reeled off the drum and then placed on the ground in a figure of "8" pattern.

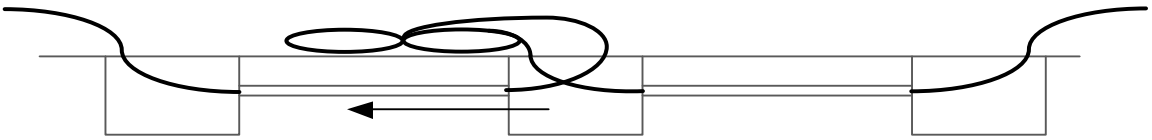
Note

Be sure to minimize the load on the cable by rotating the drum rather than just pulling on the cable itself and at all times respect the minimum bending radius of the cable.

The end of the cable will be on the top of the figure of “8” so the cable roll must not be flipped over.



The other end of the cable should then be pulled through the duct using the procedure described for the first end.

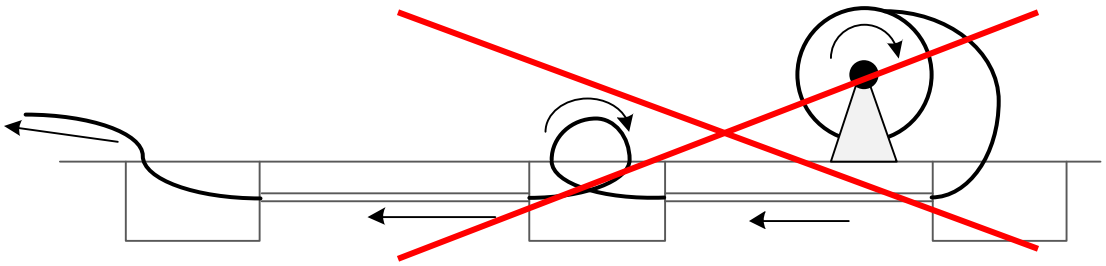


It is not recommended to lay the cable directly on the ground. A protection layer should be installed to protect the cable as shown on the picture.

Note

When pulling cables through intermediate maintenance holes a continuous pull method is sometimes used with workers pulling the cable at different locations at the same time.

This method cannot be applied to Tight Buffer cable.



**Continuous pull method**

Pulling directly on the outer jacket with an excessive force will cause a compression of the fibre and create significant loss increase.

This process can only be applied if the force to be applied on the cable by the hands of the workers does not cause any deformation of the outer jacket. That is the reason why the process is not applicable when installing TB cable structures.

## 4. Cable stripping

For any fibre count or cable type, some of the cable outer jacket will have to be removed to expose the fibres for the termination process.

Outside plant cables that will be terminated in trays may need 2m of jacket to be removed.

*Recommended lengths are provided in the Aginode patch panel installation guides available from our website.*

Tight Buffer cable jackets can be removed using round cable slitters or other tools that will not damage the interior of the core.

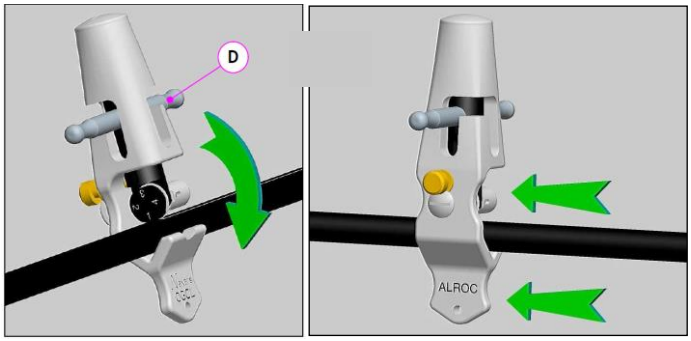
Aginode recommends the use of tools designed specifically for the purpose.

Although not recommended it can also be done with a knife or a cutter if this is the only option available.

Carefully score the jacket all around with the knife (not too deeply to avoid damaging the fibres) and bend the jacket away from score. If the cut is located less than 50cm to the end of the cable the cut part of the jacket can be slid off.

Tight Buffer Outer jacket stripping tool

The Aginode recommended tool, adapted to TB cable structure, is designed to cut the jacket longitudinally and around as shown here below.




**OGCL stripping tool - NCS part number: N890.131**

### 4.1. Cable Jacket removal process

We recommend removing lengths of maximum 500 mm. – Repeat the process for longer lengths.

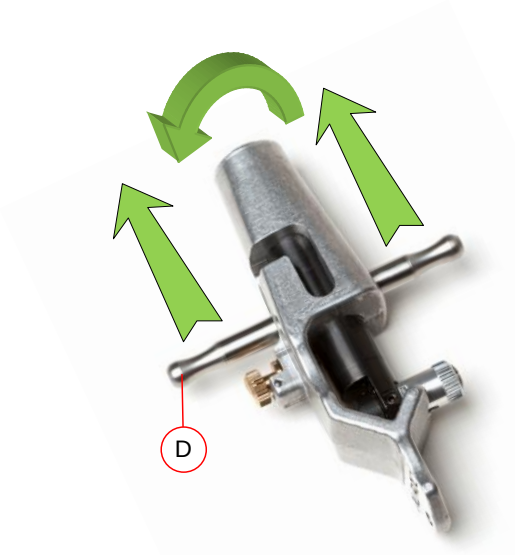
For a complete and detailed description of the process please refer to the OGCL tool user manual

1. Adjust the blade of the tool according to the thickness of the cable sheath:

   ➔ Mark 2 for TB cables

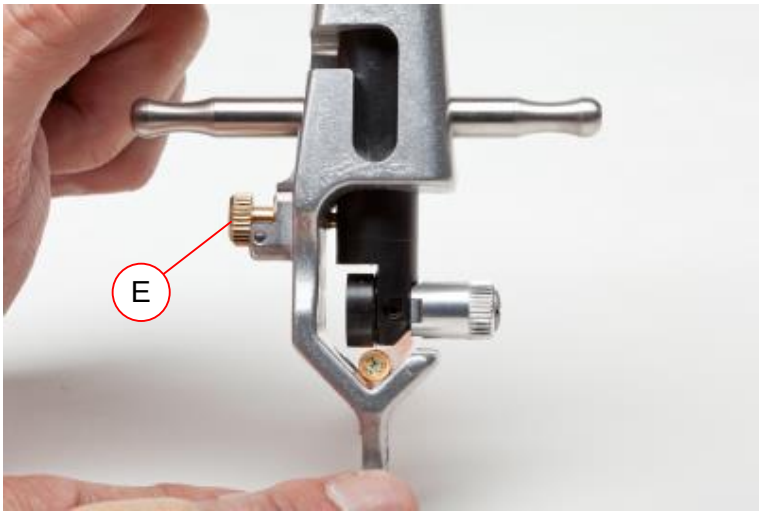
We recommend first testing the tool setting on a spare piece of cable

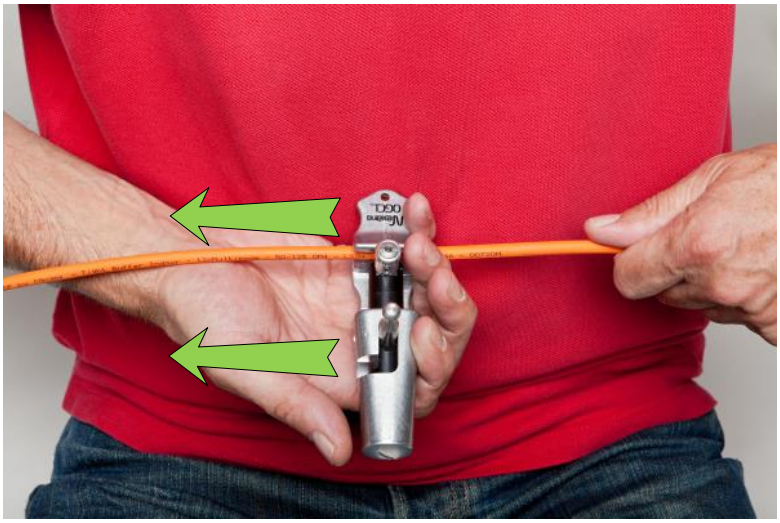
2. Set the tool in longitudinal cutting mode using D (pull + turn)



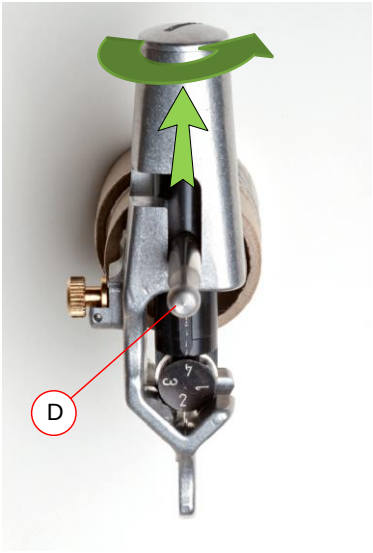

3. Cut the jacket longitudinally using the part of the tool dedicated to this operation

Note: the blade first has to be set into the right position to adjust the penetration into the jacket and then locked using E



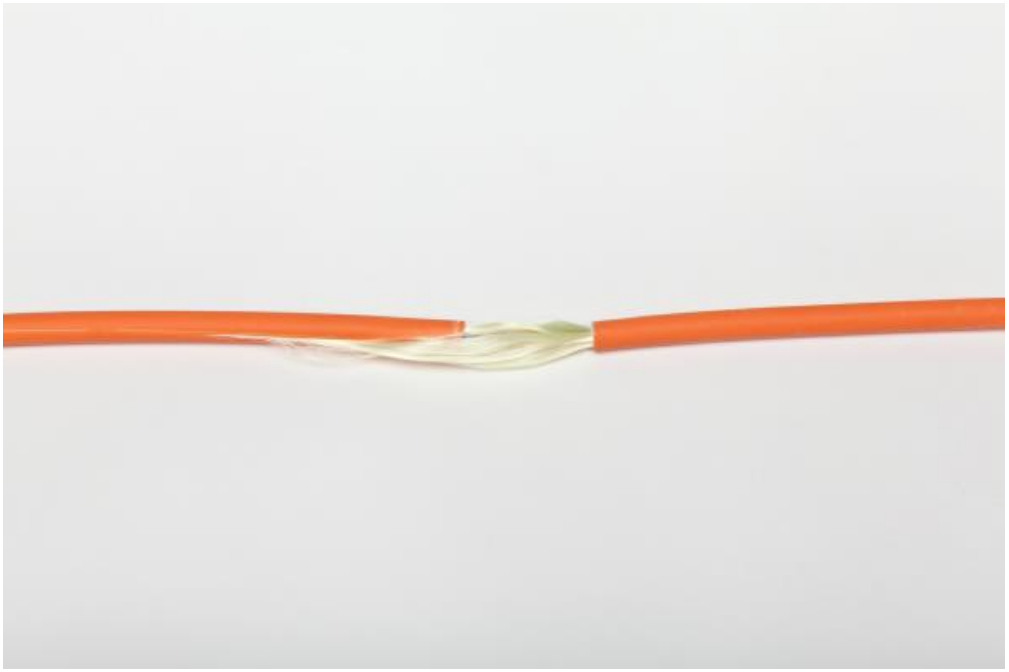


4. Set the tool in the circular cutting mode using D (pull + turn)



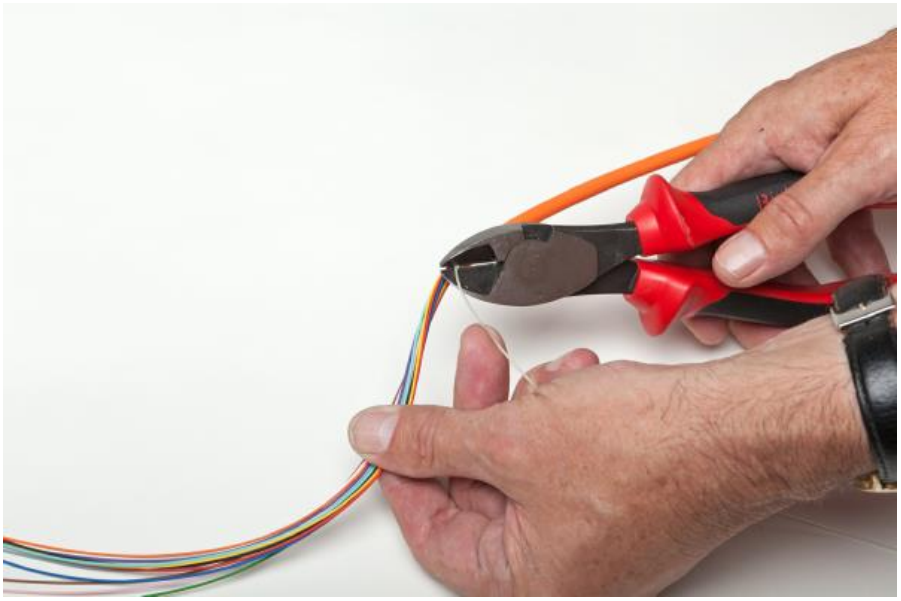
5. Install the tool on the cable with the blade located at the end of the longitudinal cut and rotate the tool around the cable to cut the jacket

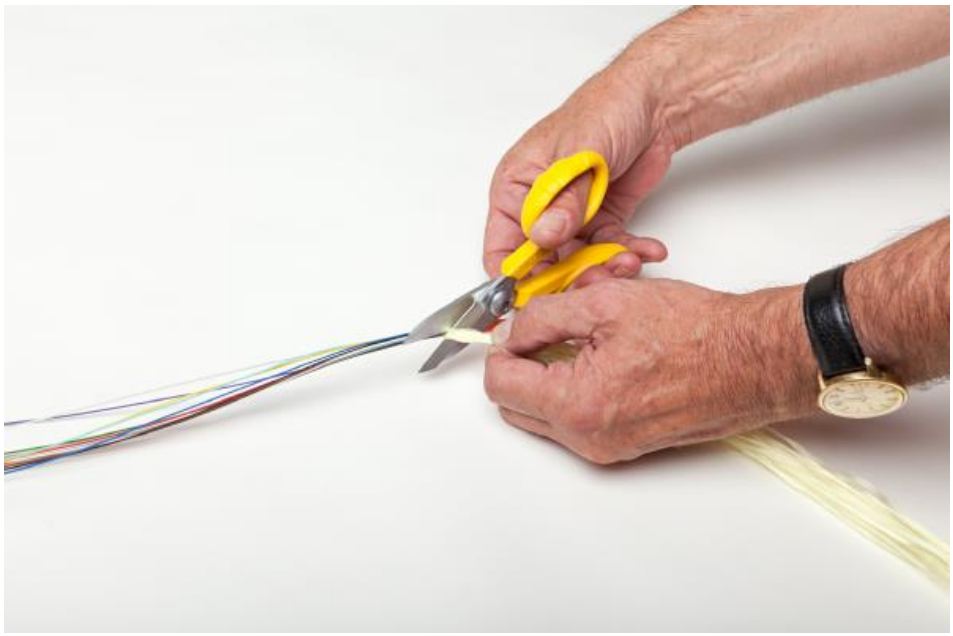

6. Remove the jacket



Note: for the removal of short length of jacket the longitudinal cut is not necessary

7. Cut the central strength element and use the appropriate scissors to remove aramid or glass yarns





## 4.2. Fibre termination

In Tight Buffer tube cable structures the fibres are protected by a 900µm coating.

Both direct termination with anaerobic field installable connectors and splicing of pigtails can be performed onto 900µm coated fibres.

## 5. Fibre identification

| Fibre | Colour | |
|---|---|---|
| 1 | Blue | |
| 2 | Orange | |
| 3 | Green | |
| 4 | Brown | |
| 5 | Grey | |
| 6 | White | |
| 7 | Red | |
| 8 | Black | |
| 9 | Yellow | |
| 10 | Violet | |
| 11 | Pink | |
| 12 | Turquoise | |
| 13 | Blue + 1 ring | I |
| 14 | Orange + 1 ring | I |
| 15 | Green + 1 ring | I |
| 16 | Brown + 1 ring | I |
| 17 | Grey + 1 ring | I |
| 18 | White + 1 ring | I |
| 19 | Blue + 2 rings | II |
| 20 | Orange + 2 rings | II |
| 21 | Green + 2 rings | II |
| 22 | Brown + 2 rings | II |
| 23 | Grey + 2 rings | II |
| 24 | White + 2 rings | II |

## Disclaimer

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