Installation Guide

OPTICAL FIBRE CABLE
MICRO-BUNDLE (MB) CABLE SUPPLEMENT

January 2014

Nexans

Nexans Cabling Solutions

INSTALLATION GUIDE FOR OPTICAL FIBRE CABLE

MICRO-BUNDLE (MB) CABLE SUPPLEMENT

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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 **Micro-Bundle (MB)** fibre cables.

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

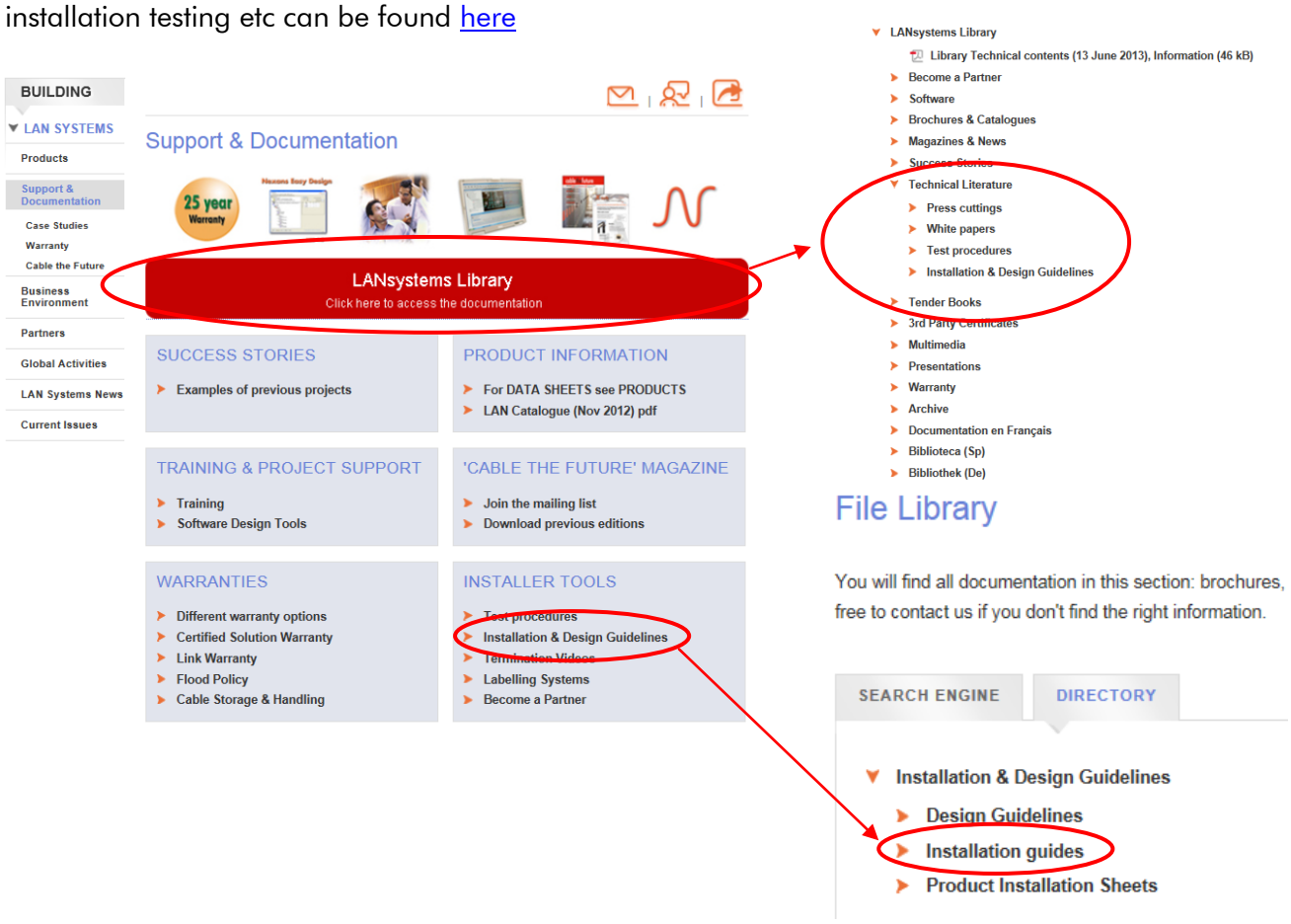
The following guides provide more detailed information on handling requirements for specific cable types:

- Tight Buffer Cable Supplement
- Loose Tube Cable Supplement
- Micro-Bundle Cable Supplement (this document)
- 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 Nexans warranty may be invalidated if the cables have not been properly stored or handled according to Nexans Cabling Solutions (NCS) requirements.

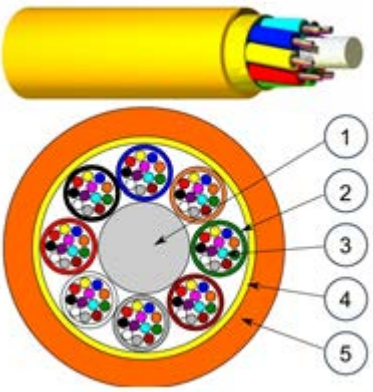
When logged into the NCS site, all these documents and also others relating to design and installation testing etc can be found here



2. Product references

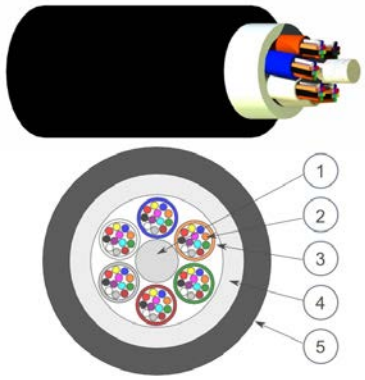
The rules described in the following chapters are applicable to the following NCS OF cable ranges:

LANmark-OF Micro-Bundle Indoor (N16x.MBINxx)



1. Central strength element
2. Micro-Bundle with 12 fibres
3. Optical fibre (250 µm)
4. Reinforced aramid yarns
5. Outer sheath in LSZH material

LANmark-OF Micro-Bundle Universal (N16x.MBUNxx)



1. Central strength element
2. Optical fibre (250 µm)
3. Micro-Bundle with 12 fibres
4. Reinforced watertight glass yarns
5. Outer sheath in LSZH material with UV resistant additive

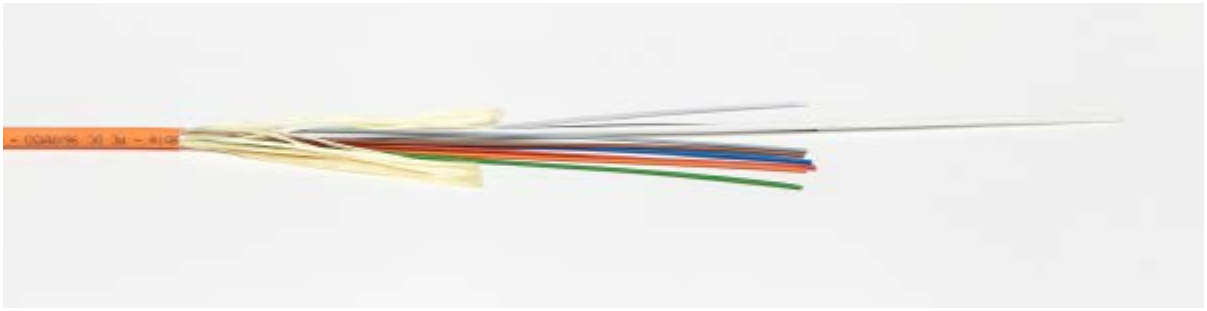
3. Micro-Bundle OF cable pulling recommendations

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 on the picture.



To ensure that the pulling force will be applied on all 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

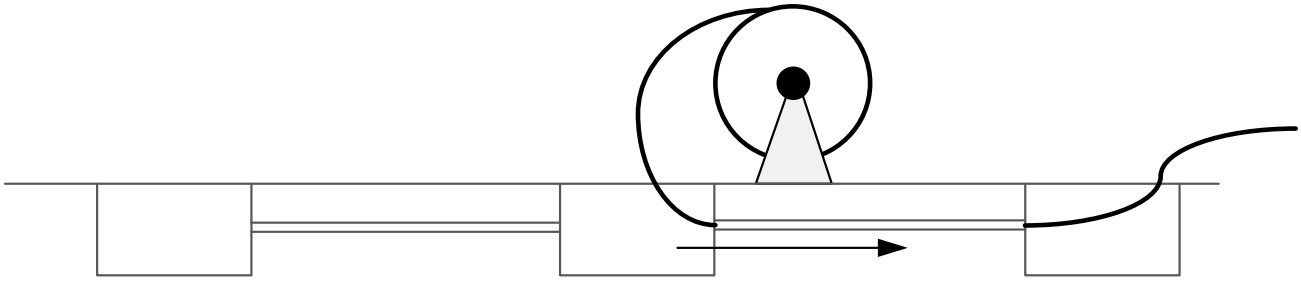
In many installations the distance to be covered is short and the path is straight enough to allow the cable to be easily pulled (with a pulling grip correctly installed onto the cable end) without the need for intermediate pulling.

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 Micro-Bundle (MB) cable structure
NEVER grab the outer sheath (jacket) of a MB 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 has been placed. The cable pulling will then be undertaken in both directions.

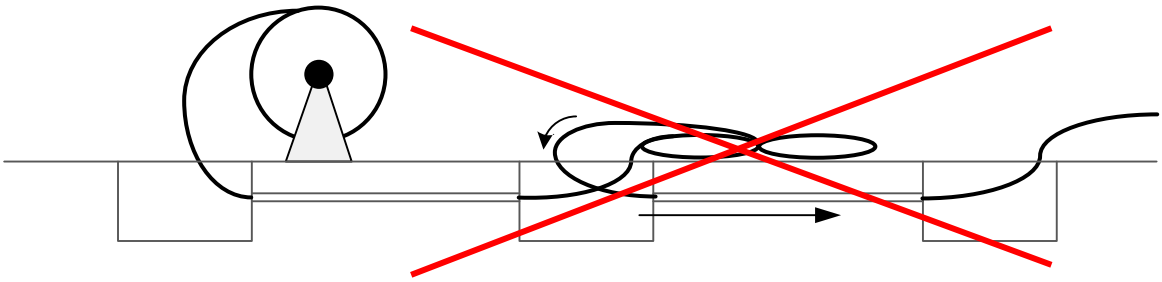
The cable is first pulled through the duct in one direction (directly from the reel).



Attention: when the end of a MB 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 MB cable to create outdoor backbone links requiring several pulls to reach the full length of the path in one direction.
The use of MB cable shall be limited to medium runs having just one intermediate maintenance hole.

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



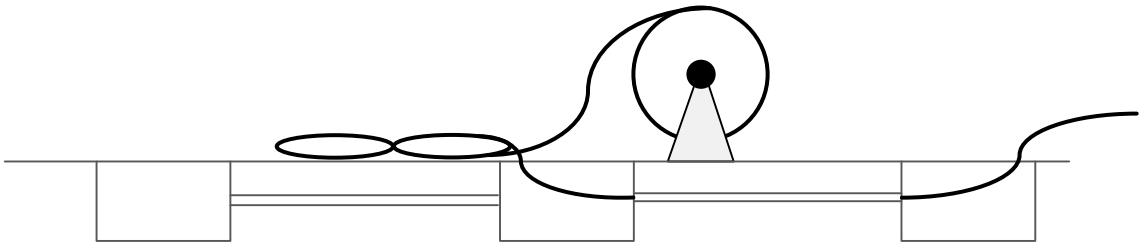
Configuration not recommended using Micro-Bundle cables

The following method is however recommended.

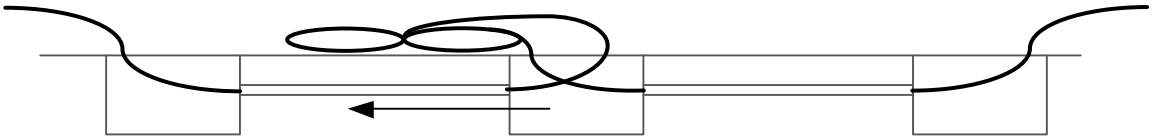
When the pull in the first direction is completed the remaining required cable shall be reeled off the drum and then placed on the ground in a figure of "8" pattern.

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.



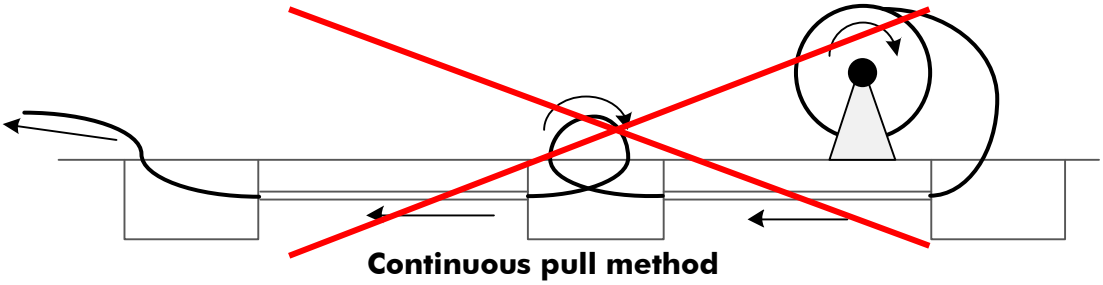
The other end of the cable should then be pulled through the duct using the procedure described for the first end.



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 Micro-Bundle 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 MB cable structures.

4. Cable stripping

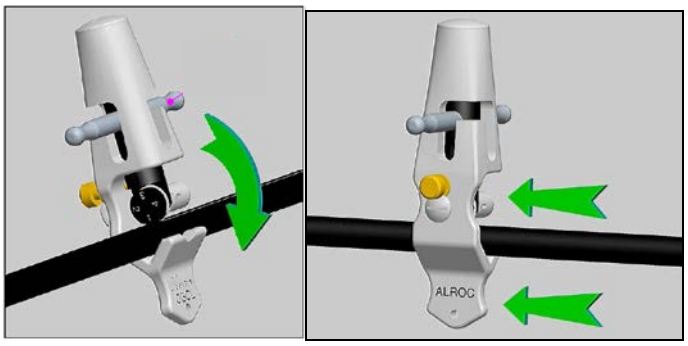
For any fibre count or cable type, some of the cable outer jacket will have to be removed to expose the fibres for the termination process.

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

Recommended length are provided in the Nexans patch panel installation guides available from our website

Micro-Bundle outer jacket stripping tool
Micro-Bundle cable jackets can be removed using round cable slitters or other tools that will not damage the interior of the core.

The Nexans recommended jacket stripping tool, adapted to MB cable structure, has been developed 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 1 metre. – Repeat the process for longer lengths.
For a complete and detailed description of the process please refer to the OGCL tool user manual

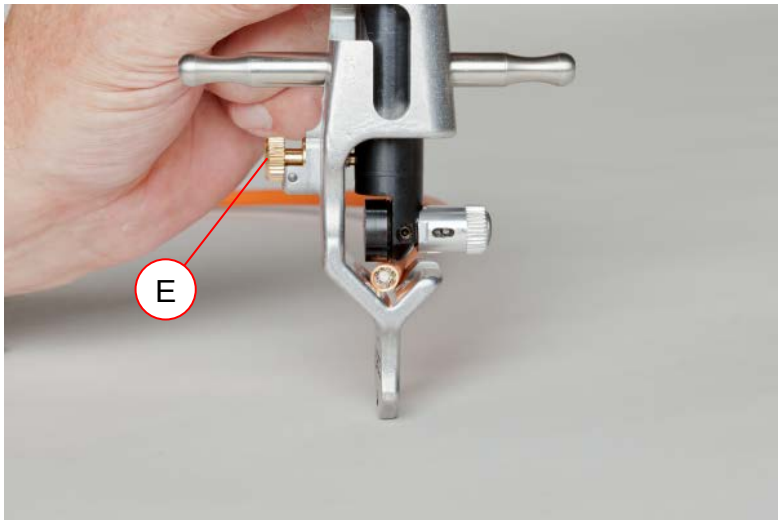
1. Adjust the blade of the tool according to the thickness of the cable sheath

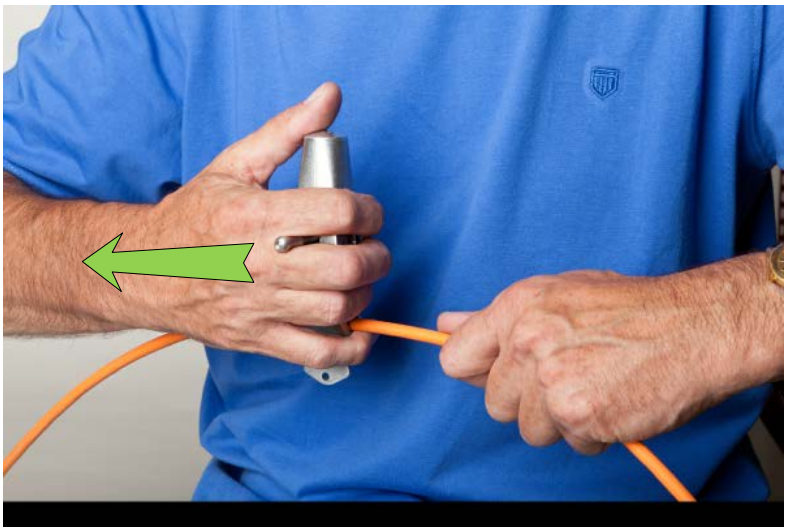
➔ Mark 2 for MB cables

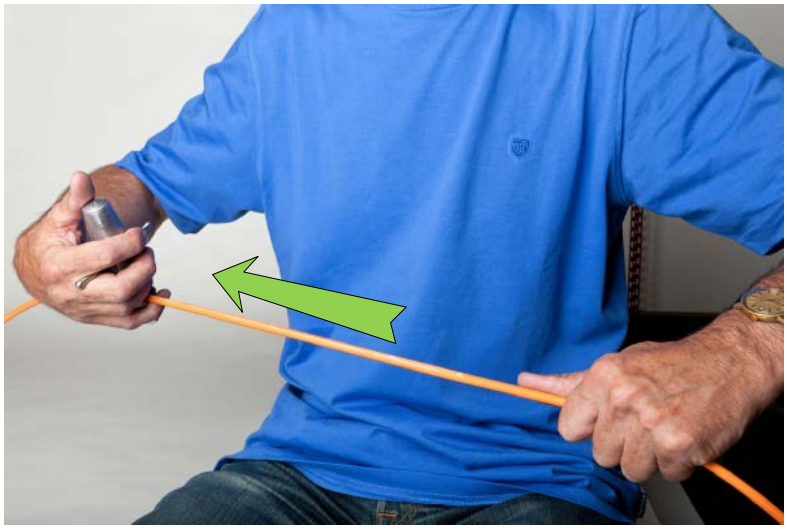
We recommend first testing the tool setting on a spare piece of cable

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





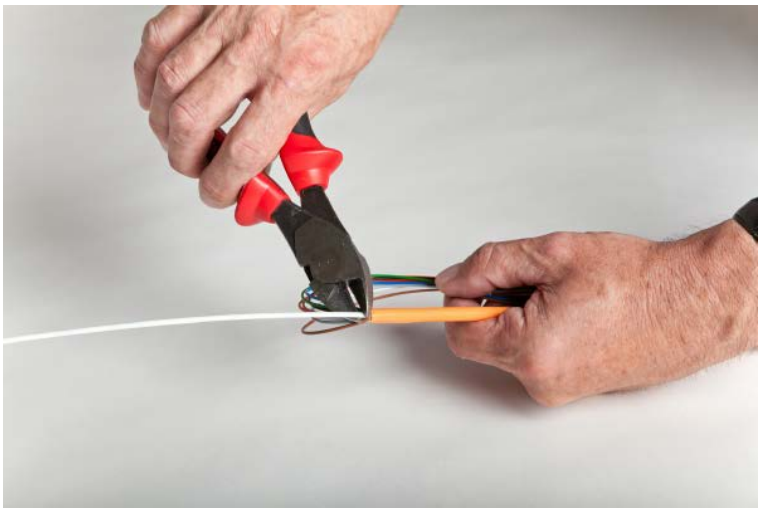


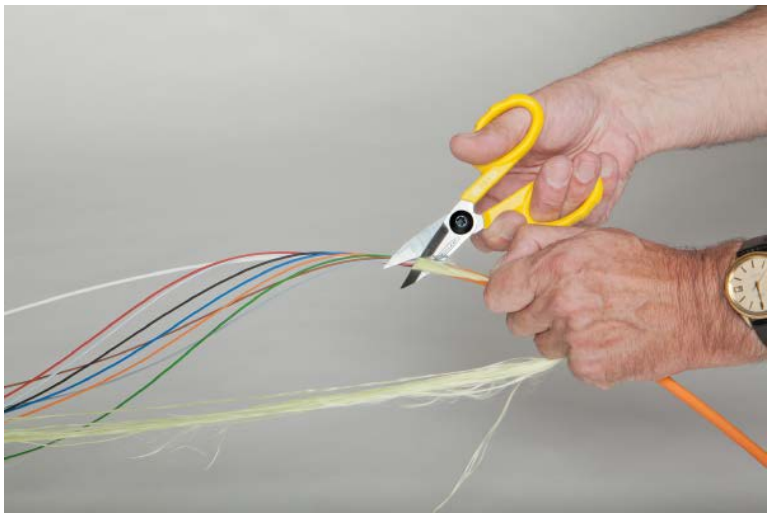
4. Set the tool in the circular cutting mode using D (pull + turn)

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

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





4.2. Fibre preparation

In Micro-Bundle cables the fibres are contained in an advanced flexible LSZH tube having a diameter of 1.3mm.
The tubes contain a small amount of jelly. As a consequence the fibres need to be cleaned before the termination process.

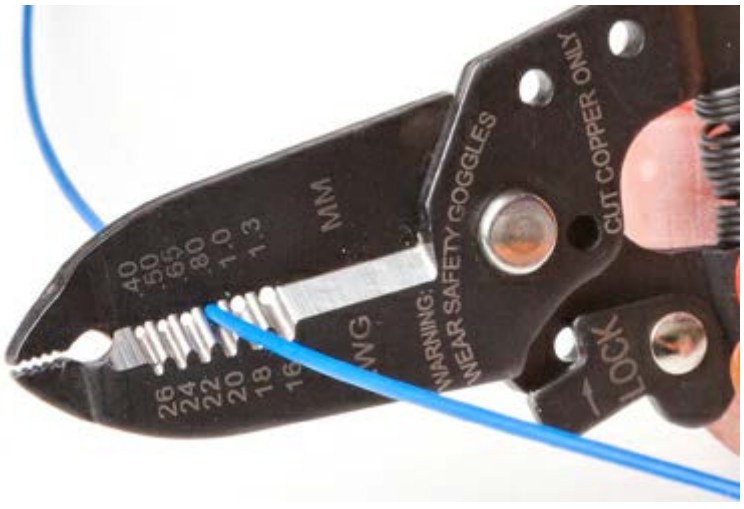
Recommended materials

- Stripper tool (**Multi-Wire stripper 821 - Ripley / Miller** or equivalent)
- Low-lint paper (**LANmark-OF Wipes for Anaerobic Toolkit – N102.226** or equivalent)
- Fibre degreaser (**LANmark-OF degreaser 0,5l – N890.123** or equivalent)

Note
The recommended material has been selected according to their good performance.
For instance the Nexans high performance degreaser is a natural biodegradable and non-toxic solvent that perfectly cleans the coated fibres but doesn't remove the color of the fibre coating and doesn't affect the fibre and its coating.
An appropriate equivalent product could be used but the use of a non specific fibre degreaser is not recommended as it could damage the fibres and therefore invalidate the guarantee.

Stripping and fibre preparation process

1. Insert the Micro-Bundle into the position 20AWG / .80 mm of the tool

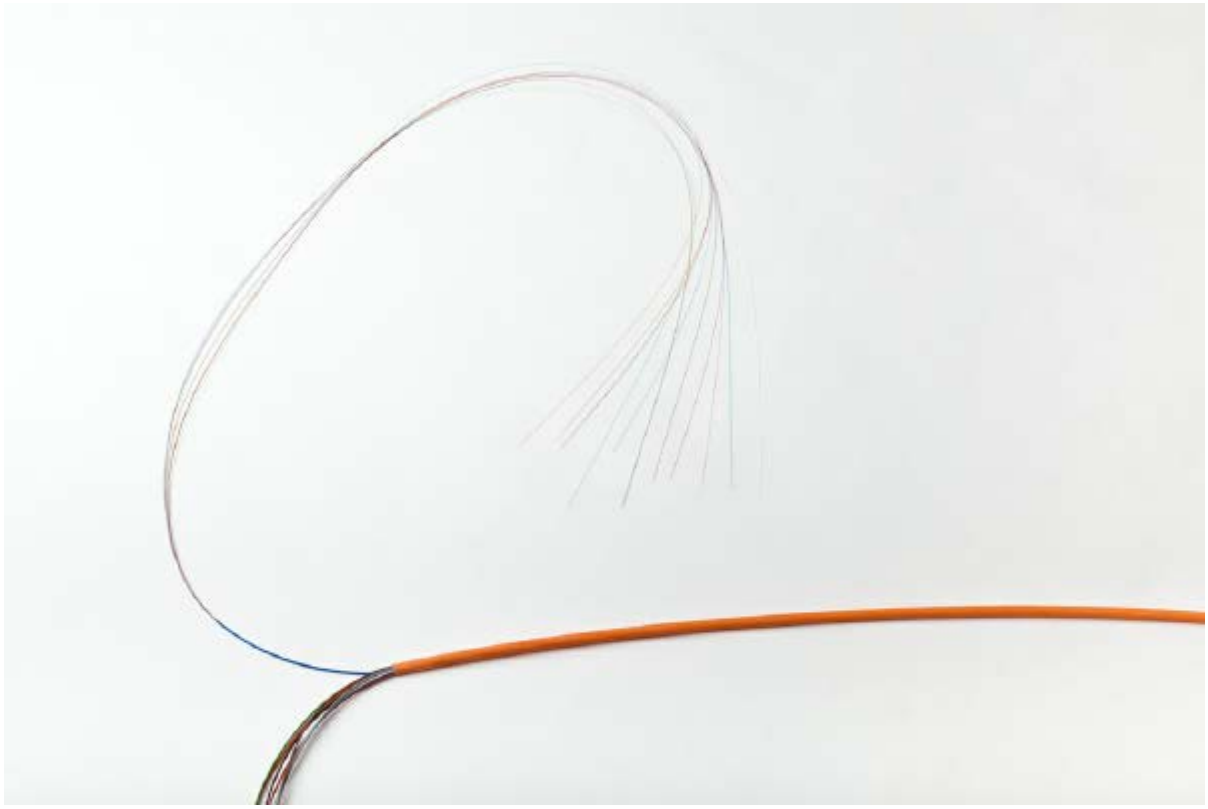


2. Cut and strip the Micro-Bundle

Micro-Bundles contain a small amount of jelly. The fibres shall be carefully cleaned using an appropriate degreaser before termination.

3. Impregnate the cleaning paper with the degreaser and wipe the group of fibres from end to end – wiping in the direction away from the jacket

4. Split the fibres and repeat the cleaning process until each fibre is perfectly clean



Perfectly clean fibres ready for termination

4.3. Fibre termination

In Micro-Bundle cable structures the fibres are only protected by a 250µm coating.

Direct termination with anaerobic field installable connectors is not recommended on these types of fibres.
Pigtail splicing is preferred.

Please refer to the pigtail splicing recommendations contained in the General "Installation Guide For Optical Fibre Cable" document.

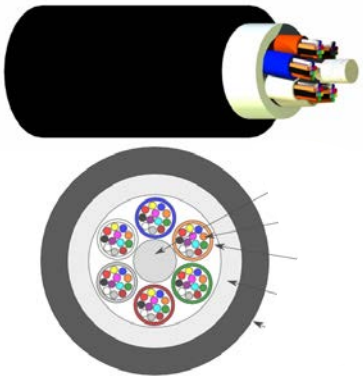
5. Fibre identification

5.1. Fibre numbering (up to 12 fibres)

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	

5.2. Bundle numbering (Micro-Bundle structure – more than 12 fibres)

Bundle	Colour	
1	Blue	
2	Orange	
3	Green	
4	Brown	
5	Grey	
6	White	
7	Red	
8	Black	



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www.nexans.com/LANsystems – info.ncs@nexans.com

Nexans Cabling Solutions Belgium
Alsembergsesteenweg 2, b3
B-1501 Buizingen

Nexans Cabling Solutions UK
and Intelligent Enterprise Solutions
Competence Centre
2 Faraday Office Park - Faraday Road
Basingstoke - Hampshire RG24 8QQ

Nexans Cabling Solutions France
4-10, rue Mozart
92587 Clichy Cedex