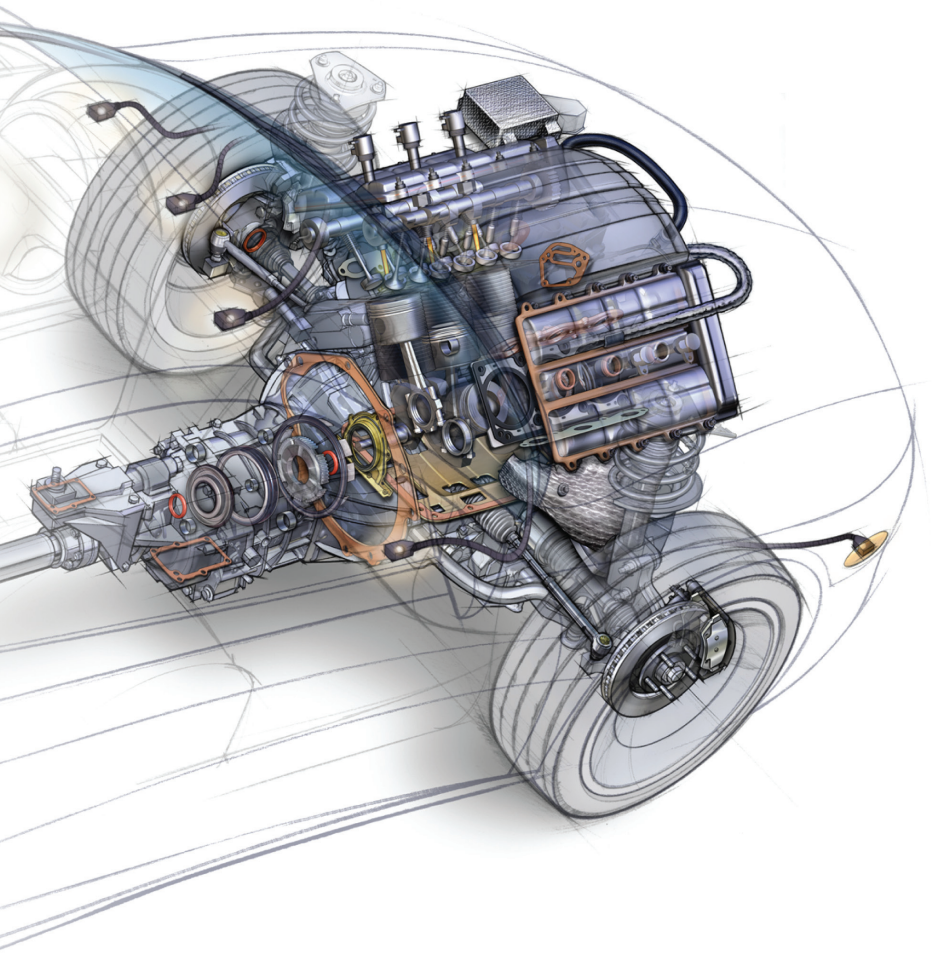
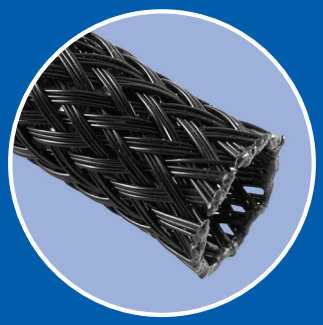
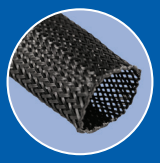
BentleyHarris®
Protection Products

Recommendation Guide

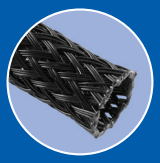


FlexFit®
Flexguard®
QuietSleeve®

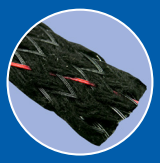




FlexFit®



Flexguard®

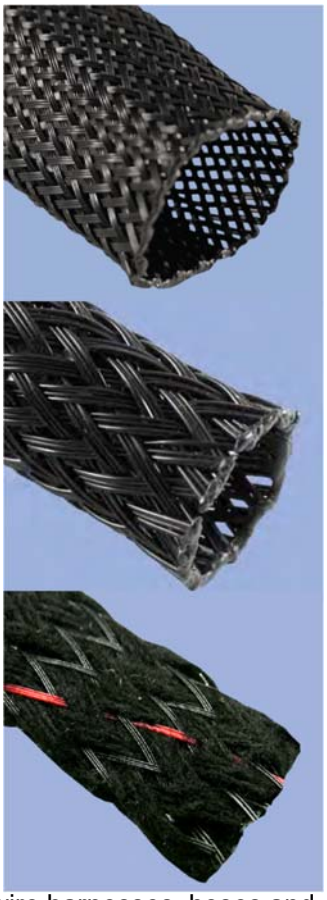


QuietSleeve®

MKG/08-15/FF-FG-QS-C

FEDERAL MOGUL
Systems Protection

General Product Description



FlexFit® and **FlexGuard®** are tubular constructions designed to provide mechanical protection for wire harnesses or hoses in severe abrasion situations.

QuietSleeve® is a tubular product line designed to provide sound dampening for wire harnesses.

Manufactured from mono-filaments, multi-filaments or a combination of both, their low weight braided assembly provides a high level of protection in even the most severe environments, including continuous exposure to sheet metal edges and sharp bolts.

The braided construction allows the **FlexFit®**, **FlexGuard®** and **QuietSleeve®** to show an expansion ratio which varies depending on the type specified but always enables an easy positioning over long lengths, including configurations where the sleeve must be slid above connectors already installed or where the sleeve must be fit on a hose with changing diameter or complex shape.

The product range covers operating temperatures from -70°C (-94°F) to °260°C (500°F) and applications from 1 mm (3/64”) to 140 mm (5-1/2”).

Note: The enclosed installation procedures describe installation on wire harnesses, hoses and tubes. For installation on other applications, please come back to us.

Availability and Storage Conditions

FlexFit®, **FlexGuard®** and **QuietSleeve®** are delivered in spools or cut lengths.

Our spools in which splices can be found follow the UTE-C-93-641 delivery standard for automotive. The minimum length of the product delivered will be 7 meters continuous with a maximum of 3 splices by spool (= 4 lengths).

Cut parts follow the GALIA (ODETTE) packaging standard. They are delivered in cartons with carton based adhesive which makes the packaging fully recyclable. Cartons vary in dimensions depending on length and sleeve size.

Standard storage condition: Inside and away from humidity and dust

Standard shelf-life	Temperature of storage	Relative Humidity
5 years	[0 – 50°C]	Up to 75%

When long storage time is expected, it is recommended for spools to wrap the sleeves with a plastic foil to avoid the penetration of dust or any foreign objects.

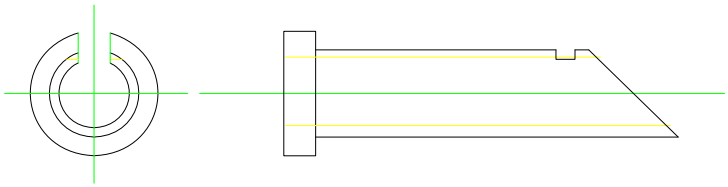
Installation on wire harnesses

Installation Method 1

Using the expansion of the sleeve and for small connectors

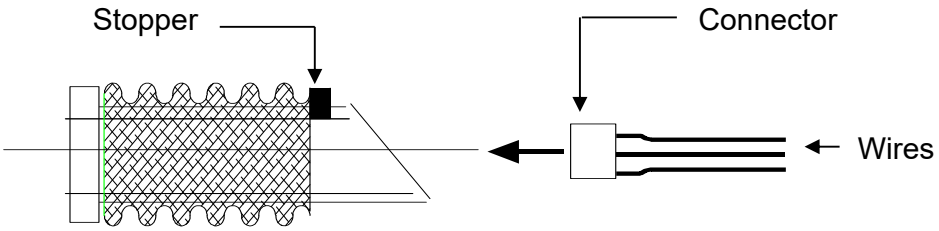
Tooling necessary: Round or oval bevel-edged tube

Benefits: On small lengths and harnesses with multiple end branches



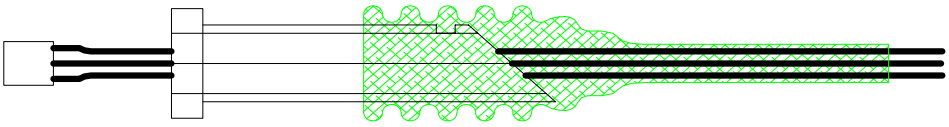
A. Compress the sleeve on the tube

Compress the sleeve on the tube then hold in place with a stopper or manually.



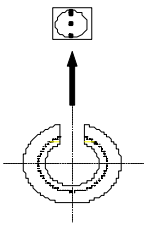
B. Insert the connector

Insert the connector through the tube then release the sleeve

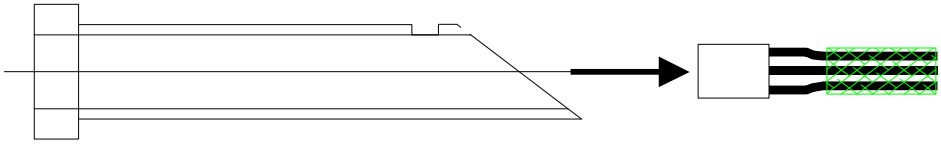


C. Remove the wire bundle

Vertically via the specially designed slit



Horizontally

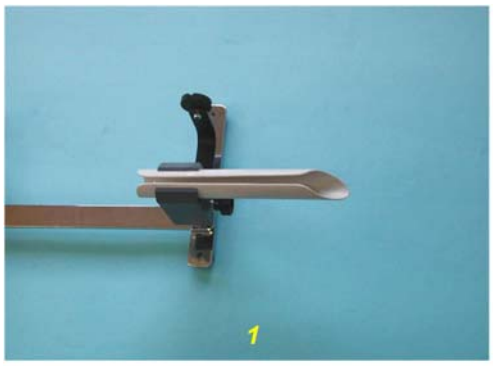


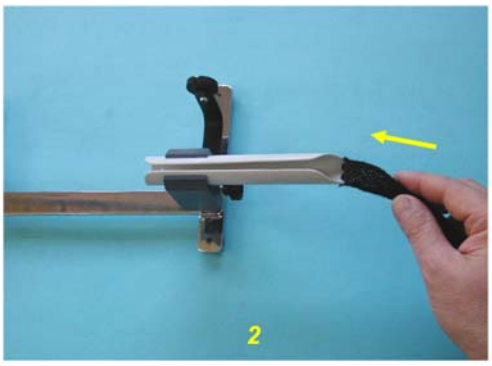
Note: The tool is interchangeable and can be used either manually or fixed horizontally or vertically to a cabling table.

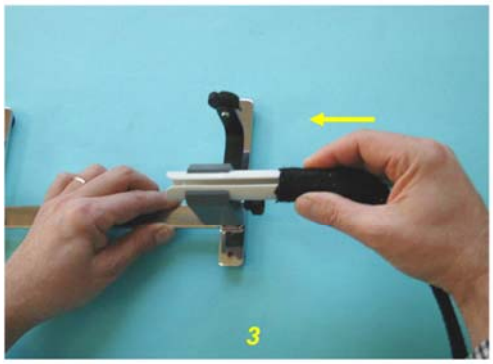
Installation Method 1

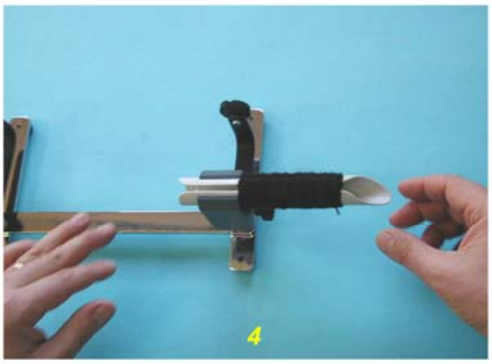
The process, step by step for a wire harness without branches.

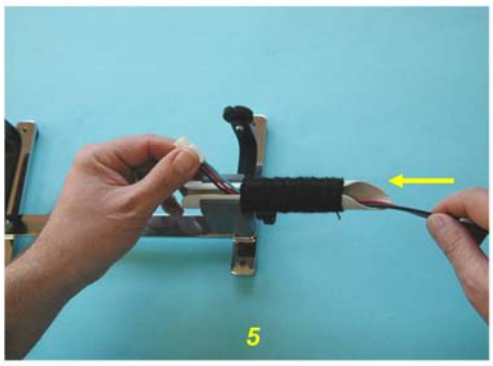
The length of the tool will be customized to fit the application protected length.

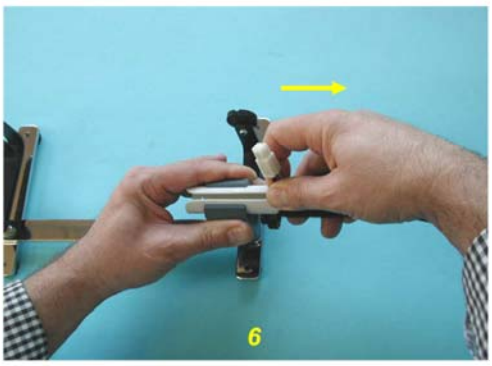


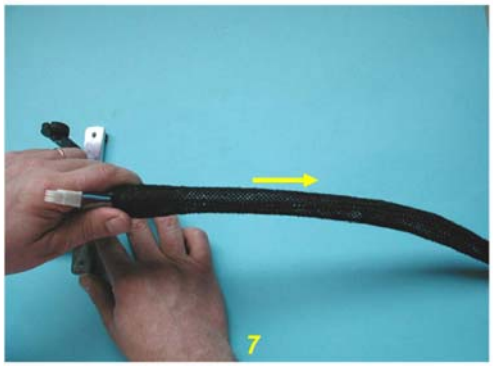


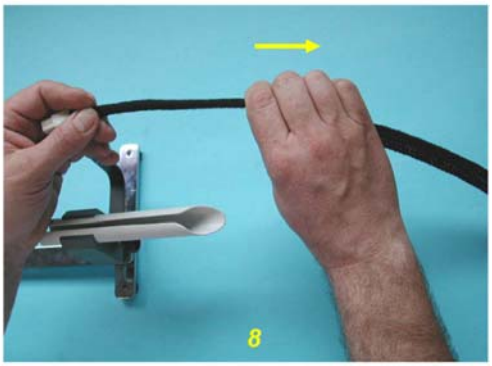












Installation Method 2

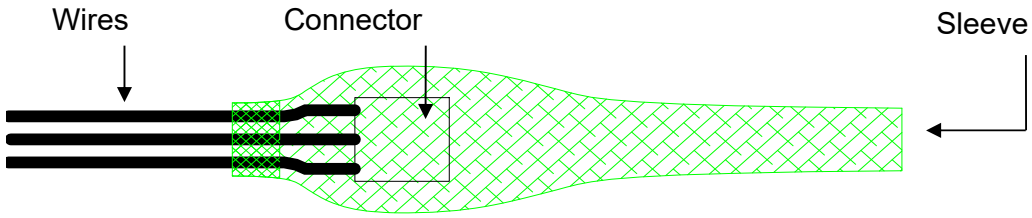
Using the expansion of the sleeve on big connectors

Tooling necessary: No tooling

Benefits: On long lengths requiring and aesthetic finishing of the ends (no fray)

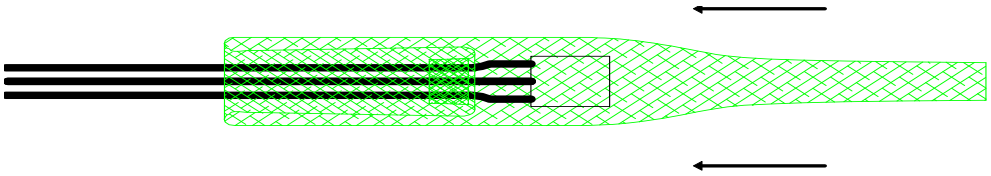
A. Expand over the connector and attach

1. Expand the sleeve to allow it to go over the connector
2. Install an adhesive on the other side of the connector to create an attachment point (Note: a clip or a heat-shrinkable cover could be used as well

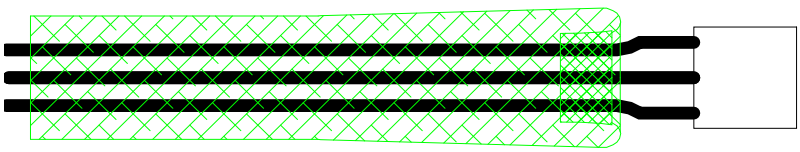


B. Reverse the sleeve on the other side of the connector

The sleeve is pushed on the other side of the connector



The ends are aesthetic without any fray, the sleeve is fixed on the harness and does not slide.



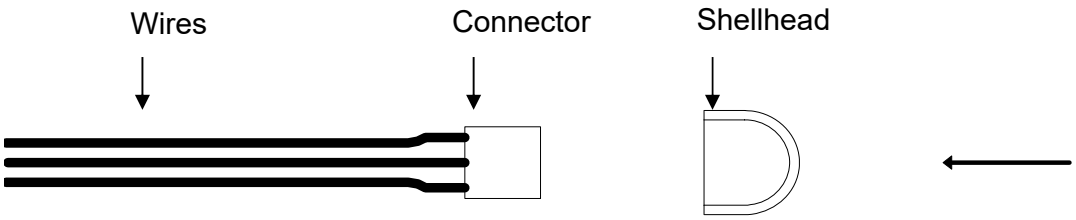
Installation Method 3

Using a “shellhead” shaped tool for open textiles pattern

Tooling necessary: Shellhead shaped tool

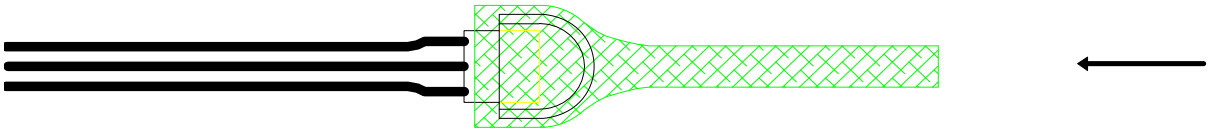
Benefits: For small lengths (50 to 500 mm)

A. Install the tool on the connector



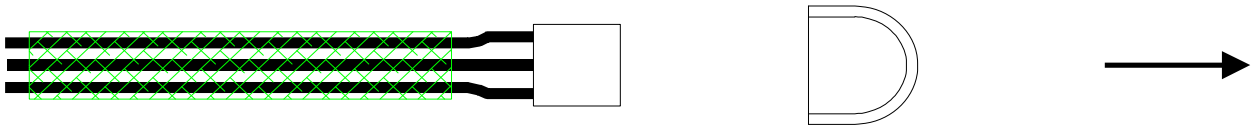
B. Expand the sleeve over the connector

The sleeve slides easily thanks to the tool over the connector



C. Withdraw the tool

Take off the tool from the head of the connector



Note: For the installation on long lengths, it is possible to solder a rigid wire onto the tool head

Installation Method 4

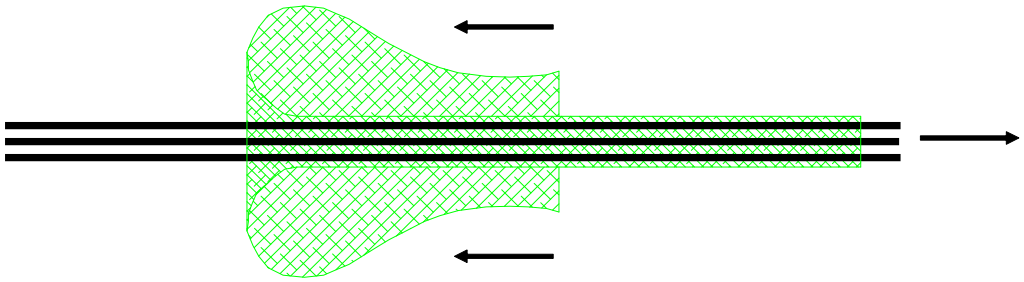
Pushing the sleeve into a "Cornet" shape

Tooling necessary: Not tooling

Benefits: For small lengths (50 to 500 mm)

A. Fold the sleeve inside itself without wires to create a "cornet"

B. Install the wires one at a time inside the "cornet" and install connectors



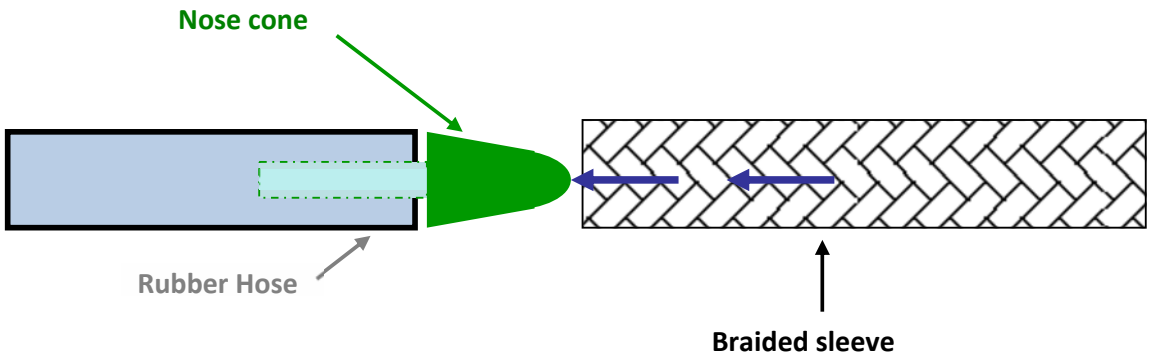
C. Fold back the sleeve to its original position

Installation on rubber hoses

Installation Method 1

"Nose cone" use

Benefits: For small size hoses ≤ 20 mm



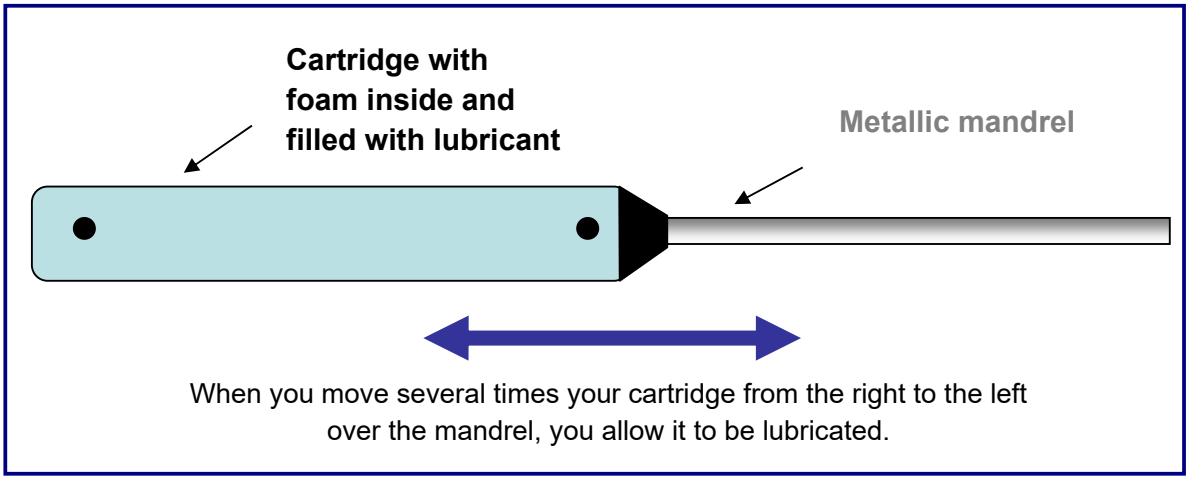
Installation Method 2

Lubricated Metalic mandrel use for large size hoses

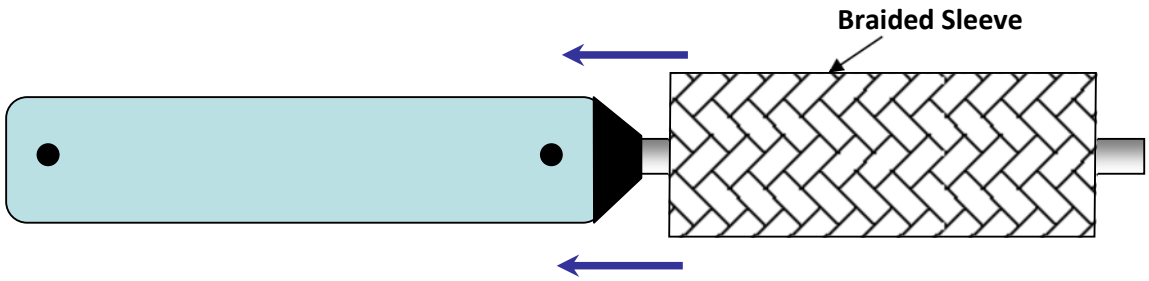
Benefits: For rubber hoses with large sizes and/or with complex shapes

The use of a metallic mandrel combined with a cartridge filled of lubricant should make the installation simple.

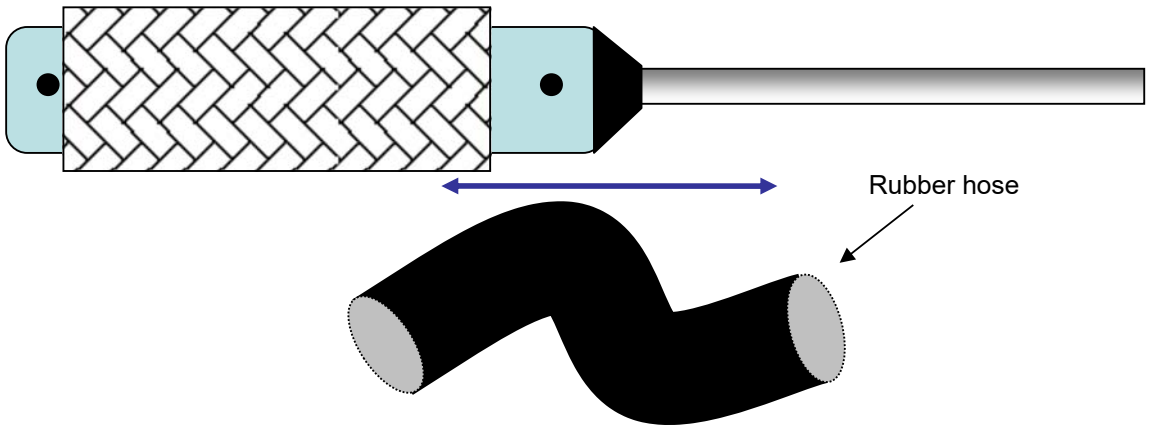
Tool description



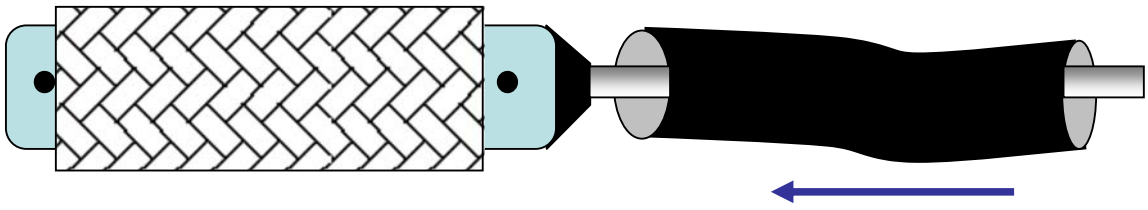
A. First, use a mandrel suitable to the size of the braided sleeve you are using. Then, install the sleeve by the end of the mandrel by pushing it.



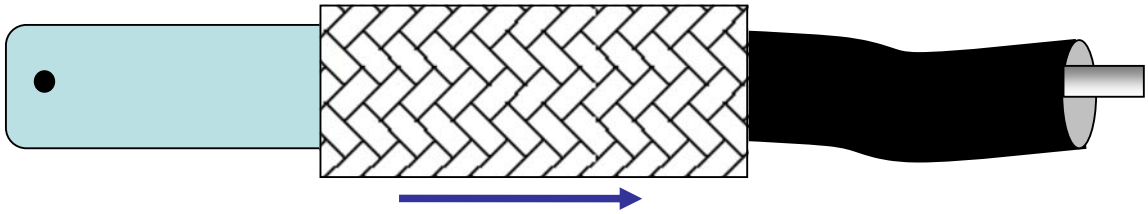
B. The sleeve has to cover completely the cartridge. Make the cartridge move alongside the mandrel to lubricate it.



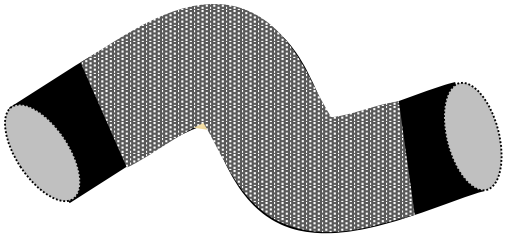
C. Install the rubber hose you want to be protected on the metallic mandrel. It changes temporarily the shape of the hose and makes the braided sleeve installation easier.



D. Make the braided sleeve slide on your hose by pushing it and remove after your hose from the mandrel.



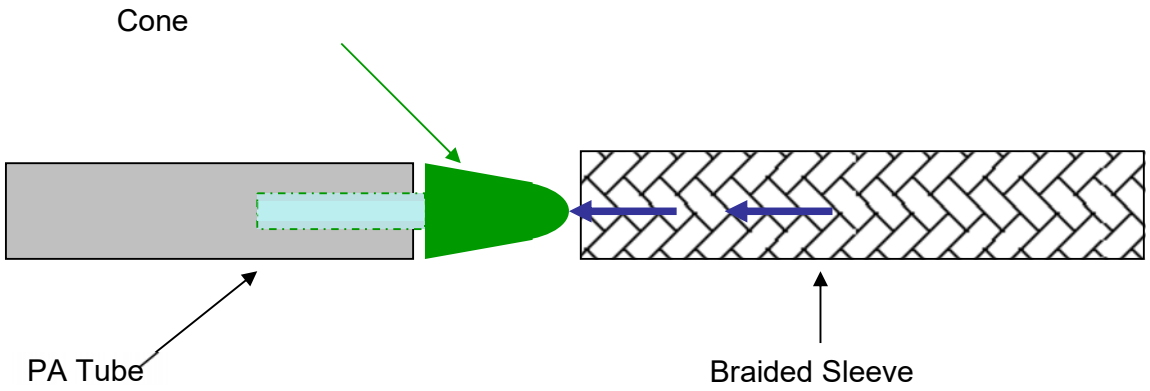
E. Your hose is now protected with the braided sleeve.



Installation on tubes

Installation Method 1

“Nose cone” use

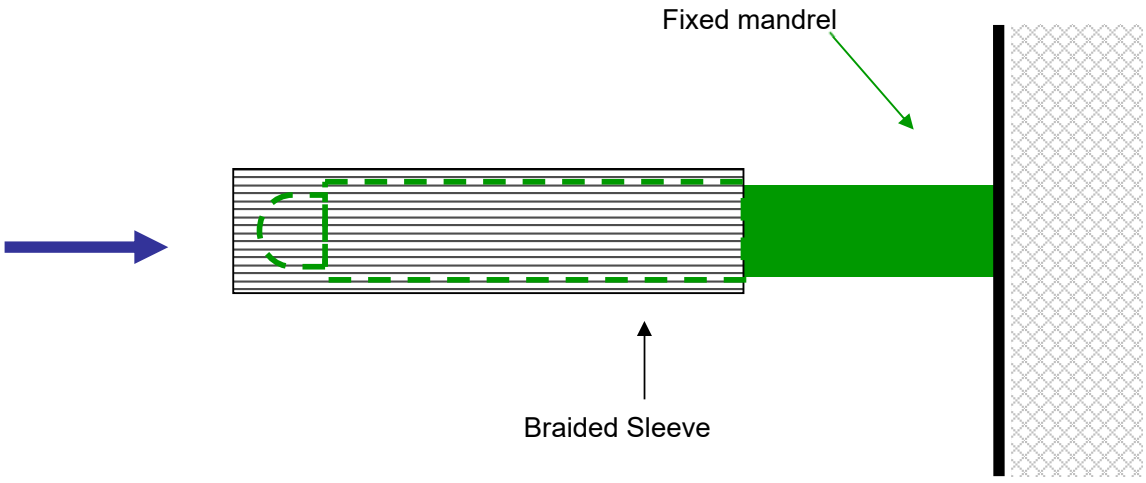


The cone at the end of the PA tube makes the installation easier

Installation Method 2

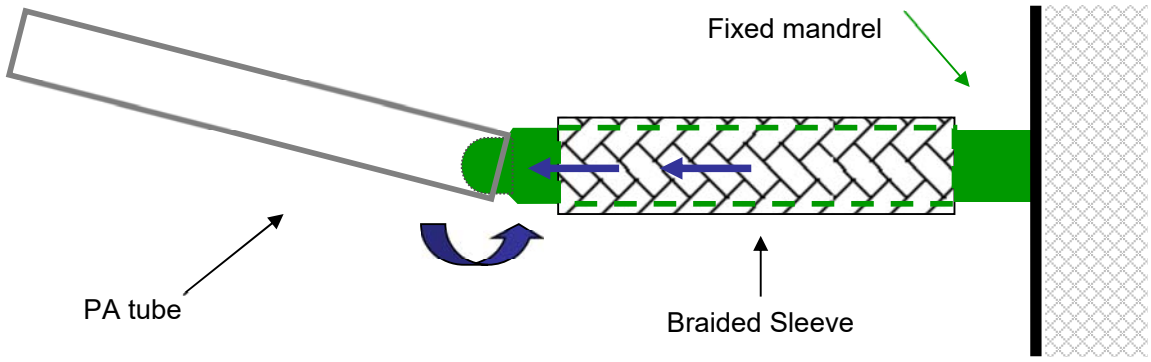
Fixed mandrel use

A. Install the sleeve on the mandrel

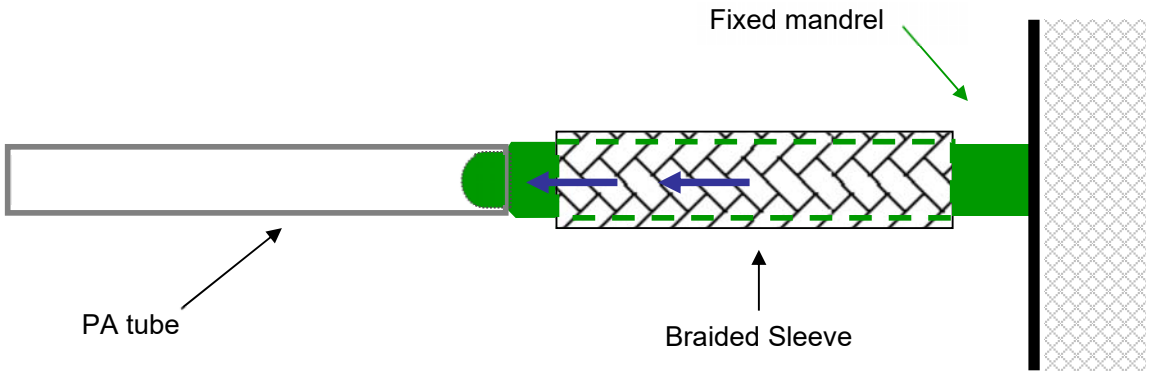


The diameter and length of the mandrel is determined by the application.

B. Click the PA tube on the mandrel



C. Install the braided sleeve on the PA tube by pulling it



D. Your PA Tube is now protected with the braided Sleeve

Standard component validation and process steps

Length definition

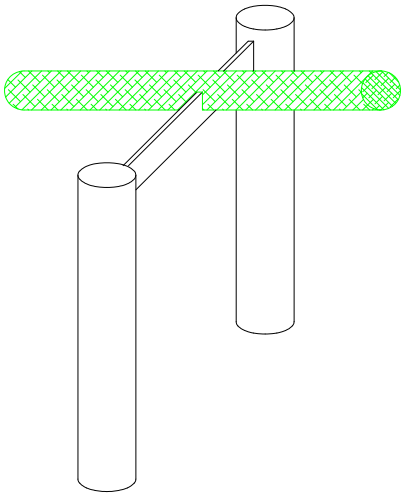
Due to longitudinal shrinkage and expansion associated with braided constructions, it is recommended to validate the sleeve installation on each application. The typical effect of using a braid above its nominal diameter is the increase in length necessary to cover the good application length versus the product length as delivered.

Customers need to pay specific attention to the sleeve working temperature and the maximum shrinkage associated and validated for each sleeve design.

For specific sensitive polymers like PEEK based raw material present in FlexGuard 2135 and FlexFit 2134, it is recommended to add 10% to the length initially defined to make sure that due to the shrinkage associated with PEEK and temperature exposure, the good application length will be always protected.

Cutting

Our products comply with the most stringent smoke and toxicity requirements, nevertheless, to avoid unpleasant smells released by plastic through the hot cutting operation, we recommend our customers to directly source cut pieces to the desired lengths. Cut pieces will allow installation of a reliable length with guaranteed tolerances and provide globally faster installation features.



Should there be a need for the material to be sourced in spools, a hot cutting device (hot wire or hot knife) will be preferable to limit end fray during installation.

Fixing

FlexFit®, FlexGuard® and QuietSleeve® can be held in position:

1. By themselves when the sleeve size and the wire harness diameter allow a good fit or between 2 branches or 2 connectors
2. By an adhesive
3. By a plastic cable tie
4. By a heat-shrinkable sleeve or boot (hot melt or plastic)