

INSTALLATION GUIDE: CONVOLUTED TUBING

Includes:

Cotflex, Korflex, Polyflex
AHW, Polyflex C, Polyflex NP,
Polygreen NP, Polyflex UFW,
Sinoflex, Soflex, Sofford,
Syflex, USCOT

INDEX	DATE	LIST OF MODIFICATIONS	DESIGNED	APPROVED
A	/	CREATION	/	/
B	/	Re-formatting and addition of §5 "unrolling"	/	/
C	/	"Cut" and "unrolling" specifications grouping	/	/
D	/	Add in § 5.5, specification for PA	/	/
E	/	Add §10	/	/
F	/	Add in §4.4	/	/
G	JUN/04/15	Deleted SOFANO in Sec.5.2, addition of packaging info and other changes. On Sec. 8, changed the word strips to blade.	RPI	IBL
H	APR/01/19	Update in English/French	YBA	APE
I	AUG/09/21	Update form + Storage conditions, remove French language.	EJO	CBR
J	FEB/10/22	Adding Schlemmer profiles Update Storage conditions, Installation process & Cutting sections.	EJO	CBR
K	MAR/16/22	Update §5 Cutting	EJO	CBR
L	FEB/21/23	Update §5 Cutting	EJO	CBR
M	MAR/07/23	Add top of rib cutting (§5 Cutting)	EJO	CBR
N	JAN/19/24	Add preheat process for N6FR in 5.1 section	RLA	YBA
O	JUL/05/24	Delete old TDS links	JTO	CCA
P	SEPT/10/24	Add Polygreen NP	JTO	ACH

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1. Product presentation

1.1. Product description

CONVOLUTED TUBING are plastic tubing that can be slit or non-slit and proposed in various material grades depending on the profile shape.

CONVOLUTED TUBING are designed to provide mechanical protection and compression resistance for wiring harnesses. Temperature of use will depend on the chosen material grade.

1.2. Availability

1.2.1. Color

- Standard color is black.
- Several products are also proposed in orange.
- Other colors upon request.

1.2.2. Size

- CONVOLUTED TUBING have a wide range of sizes: for each product, please refer to the relevant Technical Datasheet.

1.3. Marking and identification

Color stripe or marking depending on the material grade.

2. Logistic conditions

2.1. Delivery

CONVOLUTED TUBING can be delivered in containers, half-containers, coils or in cut lengths from 15 to 2,000 mm (other lengths upon request only).

Delivery option according to the specifications agreed between the customer and Delfingen at program starting stage

2.2. Packaging

CONVOLUTED TUBING is delivered in carton packaging, fully recyclable. Cartons for cut lengths vary in dimensions depending on the length and size of the tubing. (*)

Packaging design according to the specifications agreed between the customer and Delfingen at the program starting stage.

() For specific packaging requirements, please ask your Delfingen Sales Representative.*

2.3. Storage

2.3.1. Containers (CTN)

The containers shall be stored in a dry place in order to avoid any degradation of cardboard due to moisture. They can be stacked onto two at maximum. Stacking is preferably to be done with containers containing identical Ø.

2.3.2. Half Containers (½ CTN)

Half-containers shall be stored in a dry place in order to avoid any degradation of cardboard due to moisture. They can be stacked onto five at maximum. Stacking is preferably to be done with containers containing identical Ø.

2.3.3. Shelf-life

DELFINGEN products have to be stored according to the below recommendations from delivery date in an undamaged packaging.

Tubing shall not be exposed during storage to:

- Direct sunlight
- High temperature
- Humidity

We recommend storing the product under 23°C / 50% RH. Under these conditions the tubing can be stored for up to two years.

Storage at higher temperature and up to 50°C and/or under extremely humid environments can promote:

- Leaching out of white substances (oligomers, plasticizers)
- Swelling of the tubing
- Softening of the tubing

Under these conditions the tubing can be stored for up to four months.

DELFINGEN won't be responsible for any damage or performance loss on the product if the storage time is equal or superior to four months and/or temperature higher than recommended.

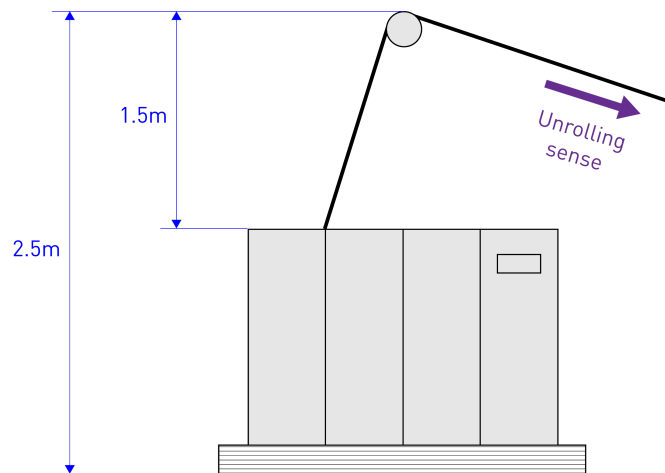
3. Unwinding

3.1. Slit tubing

The mode of unwinding of the tube issued from a container or 1/2 container shall be the same as the mode of winding during the manufacturing phase.

Indeed **it is mandatory to unwind the product in the vertical axis and at a height** of minimum 2.5 m above the ground or 1.5 m above the container. This will enable an optimal uncoiling and reduce the distortion risk:

- Twisting
- Formation of knots
- Slit overlapped



3.2. Unslit tubing

For the unwinding of non-slitted tubing, a turntable is recommended to unwind the product before cutting. The direction of the turntable has to be the opposite of the coiling/rolling direction of the product inside the box.

4. Installation and fastening process

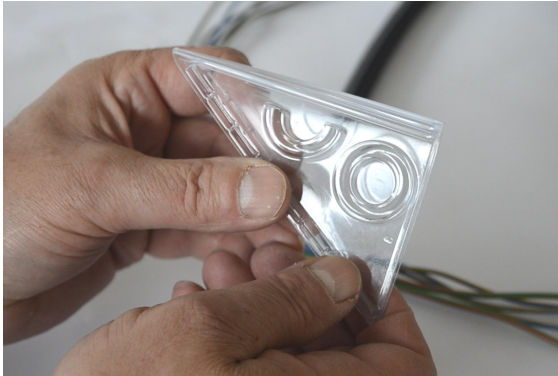
Before starting the installation of CONVOLUTED TUBING over the component, ensure you have chosen the size suitable to your application.

Depending on the diameter and the material, if the CONVOLUTED TUBING is slitted, the tube might be delivered slightly overlapped (2mm max). During the wire assembly process, the tube will be reopened and the overlap will be removed.

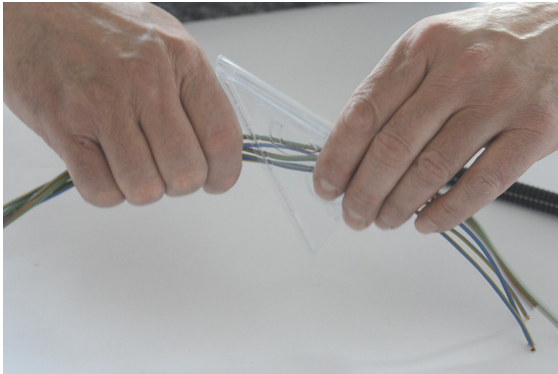
Choose the adapted mounting tool depending on the tubing diameter. DELFINGEN recommends the usage of DELFINGEN Mounting Tools to install the product (slit only). The usage of mounting tools from an alternate supplier is the responsibility of the harness maker.

Installation of slitted convoluted tubing

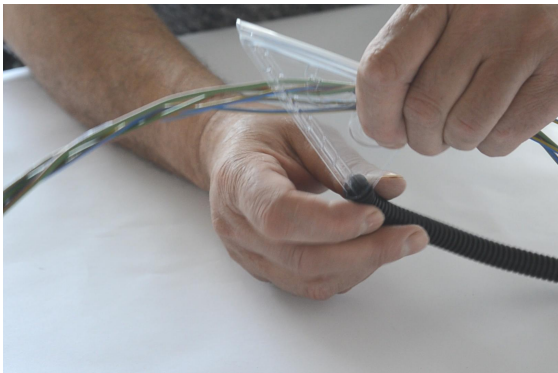
A. Fold the mounting tool as shown on the picture below.



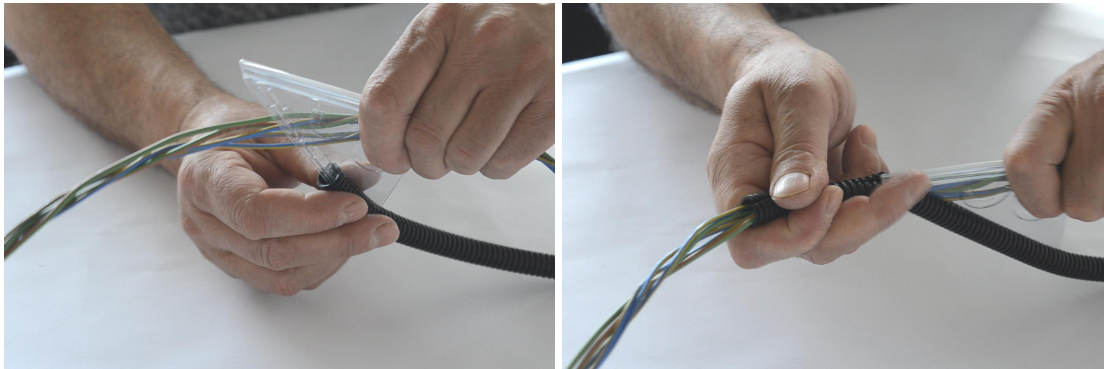
B. Insert the cables in the mounting tool.



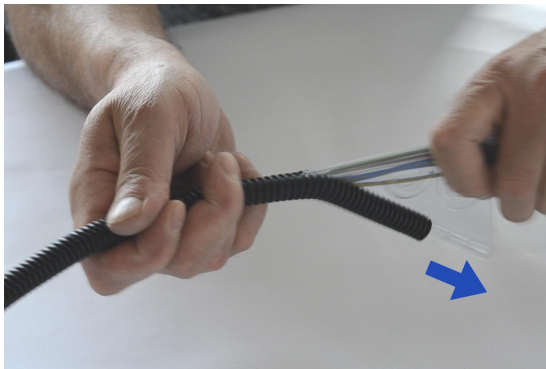
C. Insert the tool into the CONVOLUTED TUBING slit.



- D. Carefully slide the tool along the slit (or slide the convoluted tubing on the wires through the tool, if the wires are installed on a wiring harness assembly board). The cables will be automatically inserted during this phase.



- E. When the tool reaches the end of the tubing, remove the tool.



Filling ratio

The acceptable maximum filling rate must be inferior or equal to 80% of the inner tubing volume.

Bending radius

The minimum bending radius is three times the outer tubing Ø.

Fastening process

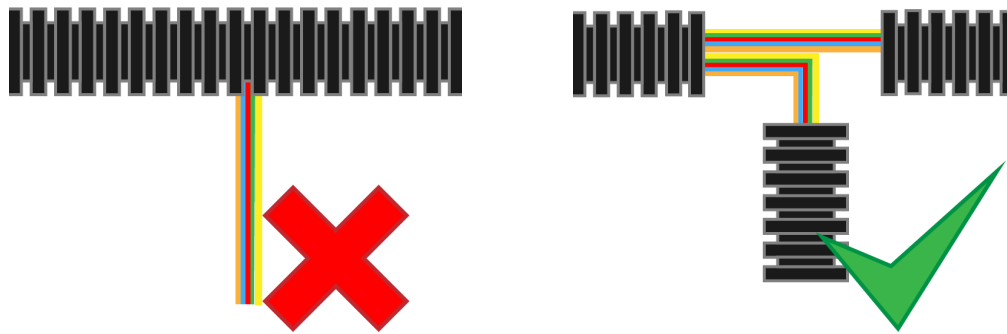
CONVOLUTED TUBING has to be held in position after installation:

- A. By using DELFINGEN accessories depending on the application.
- B. By using an adhesive tape, a plastic cable tie, a lacing tape, or a clip to fix at least one end of CONVOLUTED TUBING on the component.

Wiring branching with slit convoluted tubing

For any branching needed on the wiring harness, the convoluted tubing has to be cut at each branch before crossing the derivation. Wires shall not pass through the slit to avoid any damage to them.

Connection has to be then secured with the use of an adhesive tape or with a DELFINGEN accessory.



5. Cutting

5.1. Machine

Use a rotary type cutting machine (rotating blade) for standard cutting.
For top rib cutting, use a cutting machine with a top of rib detection system.
For N6FR material: (hard product) a preheat process is necessary before cutting to avoid breaking issues during cutting process

5.2. Guide bush

Before each cutting operation, assemble the guide bush referring to the Ø of the tube in order to avoid any crushing of the tube.

5.3. Blades

Use hardened steel blades. Do not use a worn blade.

5.4. Troubleshooting: breaking issue

In case of cutting issues (breakage, splinters...), the Convoluted Tubing can be heated beforehand for a short duration (max. temperature < 100°C) to improve the cutting efficiency.

Cutting tolerances are given on the Delfingen drawing.

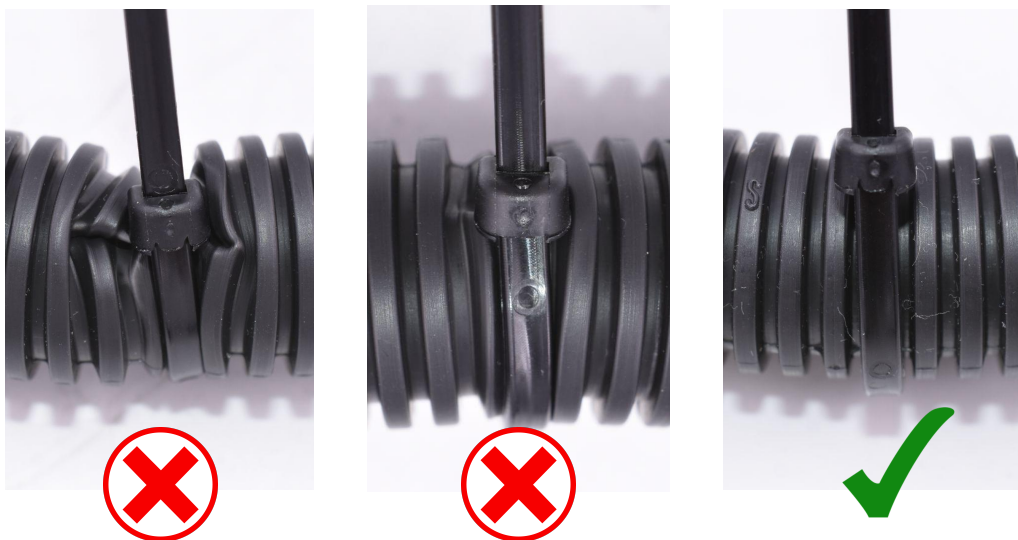
6. Other information

CONVOLUTED TUBING are registered in the IMDS database (International Material Data System)

CONVOLUTED TUBING are conform to the REACH regulation (Registration, Evaluation, Authorisation and restriction of CHemicals)

CONVOLUTED TUBING are conform to the RoHS 3.0 EU Directive 2015/863 (Restriction of the use of certain Hazardous Substances)

If clamps are used, the tube corrugations must not be deformed. Delfingen declines all responsibility for defects or other anomalies in products that have been over-tightened using a hose clamp.



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