Installation instructions

HEAT SHRINKABLE STRAIGHT JOINT

for single core polymeric insulated cable with wire screen

Highest Voltage 72,5 kV

ELCOhiTERM GLS - 72/EW

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Drawing N°	Code MP21608	Drawn	Updated	Approved
911/EW	Date	11/12/2018	28/07/2021	
	Signature	C.I.	G.DA.	G.DS.

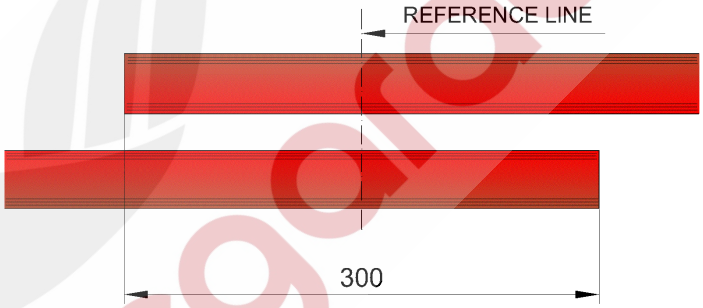
IMPORTANT PRELIMINARY INFORMATION

- **THIS PRODUCT MUST BE INSTALLED BY COMPETENT PERSONAL WITH ELECTRICAL EQUIPMENT AND IN SAFETY CONDICTION.**
- **READ CAREFULLY ALL THE INSTRUCTIONS BEFORE STARTING CABLE PREPARATION.**
- **CHECK THAT ALL COMPONENTS LISTED ON THE *BILL OF MATERIAL* ARE AVAILABLE.**
- **APPLY THE TUBES ACCORDING TO THE SEQUENCE INDICATED ON THE BILL OF MATERIAL.**
- **HEAT SHRINK THE TUBES FOLLOWING THESE *GOLDEN RULES*:**
- **USE ONLY BUTAN OR PROPANE GAS TORCH.**
- **FLAME MUST BE SOFT.**
- **HEAT THE TUBES UNIFORMELY.**
- **MOVE THE FLAME ALL AROUND THE CIRCUMFERENCE OF TUBES.**
- **START FROM THE CENTER OF TUBE, AND MOVE SLOWLY TOWARD THE END OR UNLESS OTHERWISE STATED.**
- **DO NOT INSIST ON THE SAME PART.**
- **STOP WHEN COMPLETELY SHRUNK.**

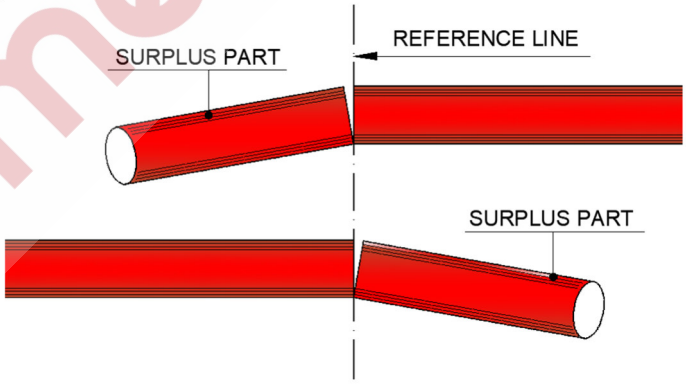
1. CABLE PREPARATION

1.1 Overlap the cables ends for **300 mm** at least so they are in the right position for the connection.

Put a MARK as a **reference line** at the middle of the overlap.



1.2 Cut the cables in such a way as to remove the surplus parts in correspondence of the **reference line**.

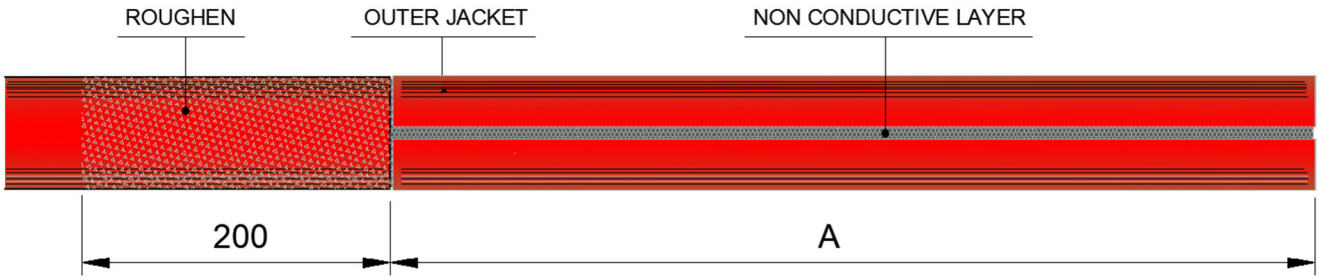


--- OPERATIONS FOR BOTH CABLE ENDS ---

1.3 Cut and remove the outer jacket for a **" length of dimension A "** as indicate in the enclosed *BILL OF MATERIAL* from the top of the cable.

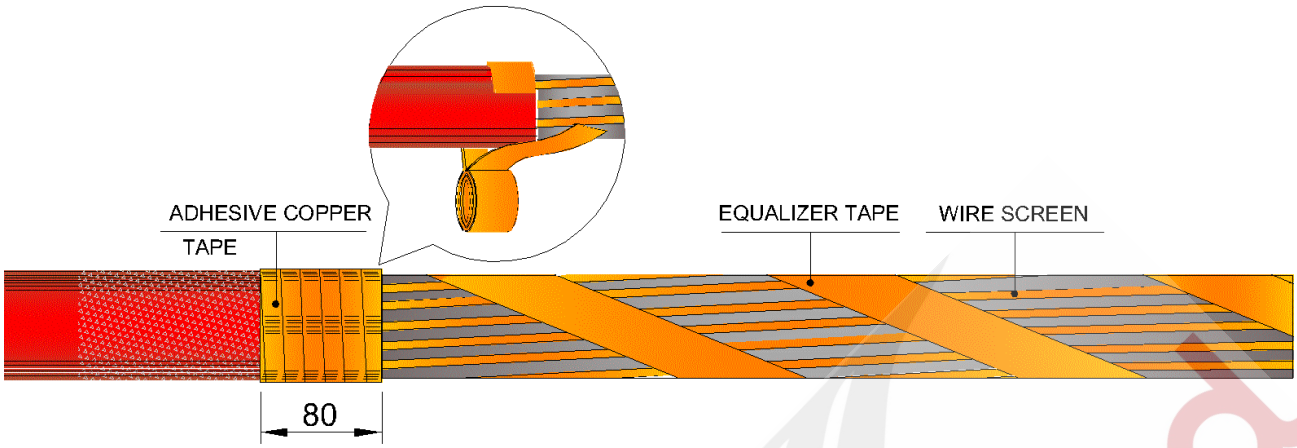
1.4 Clean up the outer jacket with a suitable solvent up to a length of **1,5 m** at least, to avoid dirty is transferred to the internal surface of the heat-shrinkable tube.

1.5 Roughen the outer jacket for **200 mm** from the edge (cut).

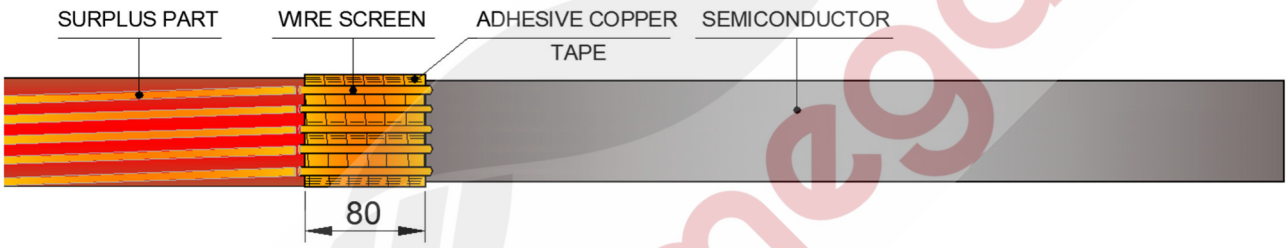


1.6 Cut and remove the exposed **non conductive layer**.

1.7 Apply on the outer jacket one layer of a**dhesive copper tape** for **80 mm** starting from the cut.

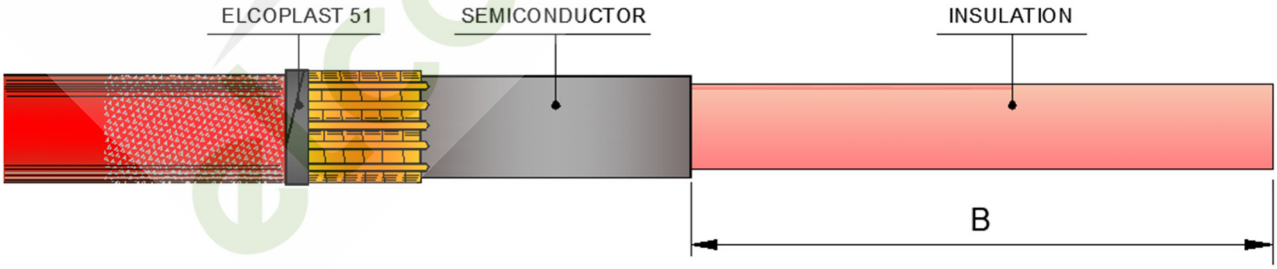


1.8 Remove the equalizer tape. Turn the screen wires backwards on the outer jacket, distribute them evenly around the adhesive copper tape previously applied on the outer jacket, cut and remove the wires to a length of **80 mm** from the outer jacket cut or anyway for a length equal to the length of applied adhesive copper tape.



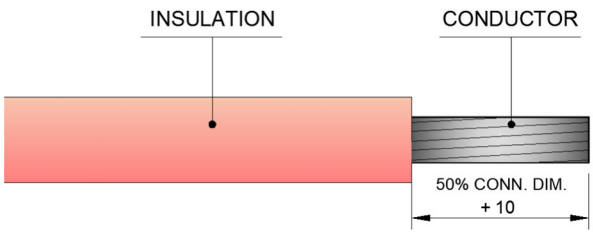
1.9 Apply on the wire screen points an layer of **ELCOPLAST 51 PVC tape**.

1.10 Remove the cable semiconductor, with an appropriate tool, for a **" length of dimension B "** as indicate in the enclosed *BILL OF MATERIAL* from the top of the cable.



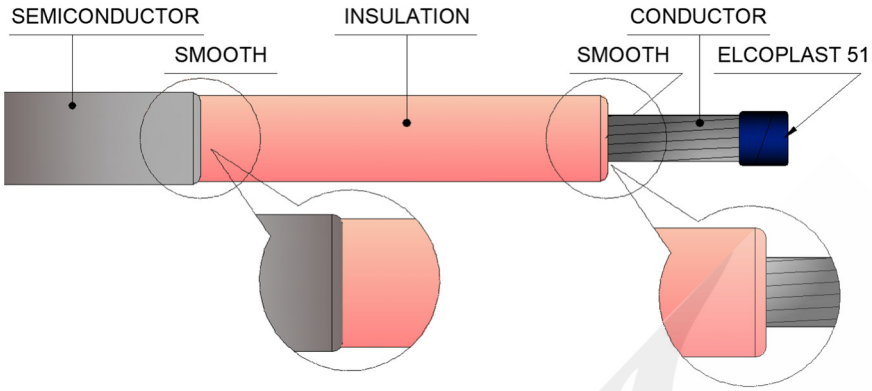
1.11 Remove the primary insulation from the top of the cable **TO A LENGTH OF "50% OF CONNECTOR DIMENSION + 10 mm"**.
Beware not to nick the conductor!!!

1.12 Smooth the insulation surface. Be sure to remove all semiconducting traces, using the supplied abrasive cloth. Beware not to touch semiconductive layer!!!



1.13 Smooth with abrasive cloth firstly the insulating cutting edges; then the semiconductor layer edges. Do not dirty the insulation parts with semiconductor particles!!!

1.14 Clean up the exposed conductor and apply some laps of **ELCOPLAST 51 PVC tape** on its edge.



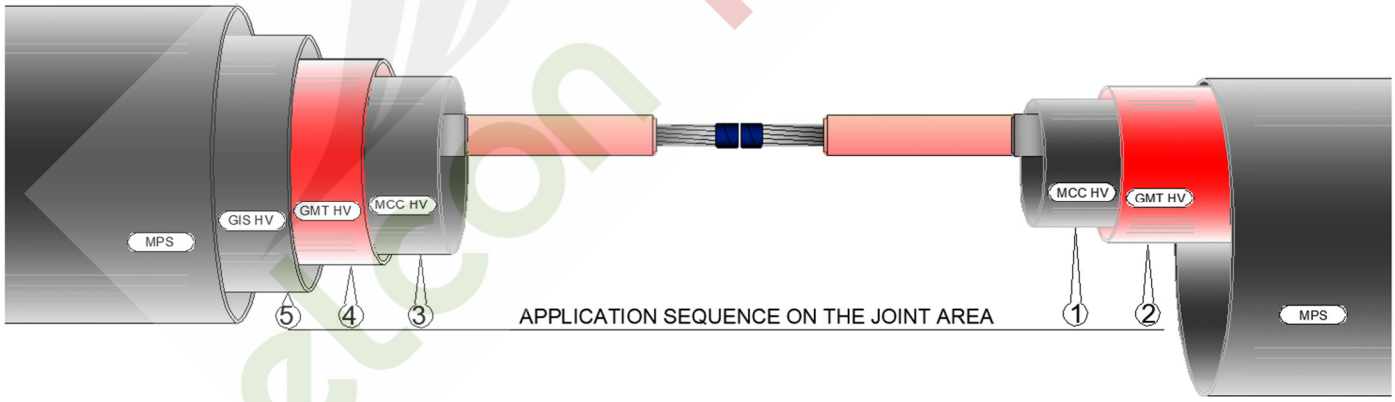
2. CONDUCTORS CONNECTION, STRESS RELIEF APPLICATION INSULATION BUILD UP

2.1 *PREPARING TUBES FOR OPERATIONS*

Slip on the outer jacket of Cables the following heat-shrinkable tubes:

- ***N.1 sealing MPS*** *tube (black colour)* **tube application Nº 7**
- ***N.1 sealing MPS*** *tube (black colour)* **tube application Nº 6**
- ***N.1 insulating-semiconductive GIS HV*** *tube (red / black colour)* **tube application Nº 5**
- ***N.1 insulating GMT HV*** *tubes (red colour)* **tube application Nº 4**
- ***N.1 stress control MCC HV*** *tubes. (black colour)* **tube application Nº 3**
- ***N.1 insulating GMT HV*** *tubes (red colour)* **tube application Nº 2**
- ***N.1 stress control MCC HV*** *tubes. (black colour)* **tube application Nº 1**

Position the tubes on the outer jackets according at the available space and in a telescopic disposition as shown in figure.
For the tubes size, refer to the application sequence in the joint area, see the BILL OF MATERIAL.
If possible, place the both sealing tube MPS on one outer jacket only.

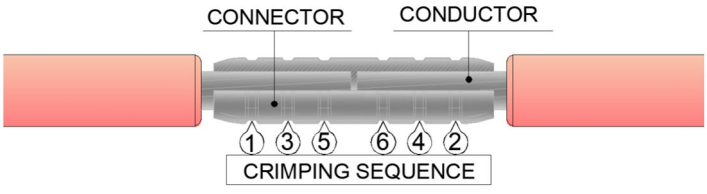


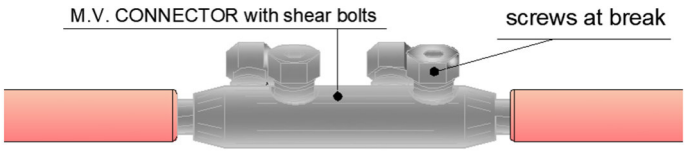
OPERATIONS STEPS

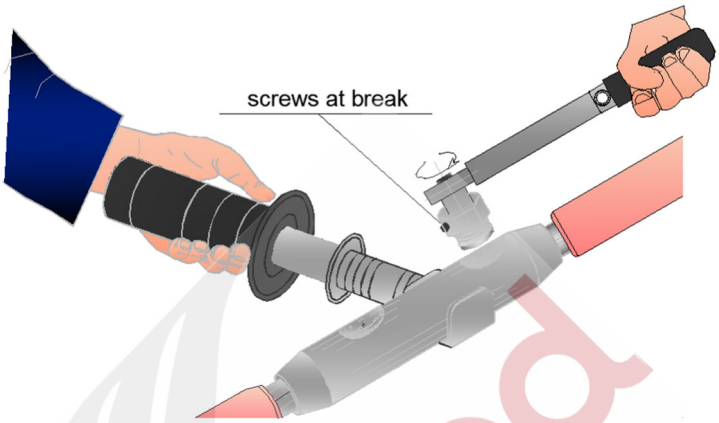
2.2 Remove the PVC tape applied on the conductors.

2.3 Insert the connector onto the appropriate mating cores, ensuring that the connector is within the size range specified on the enclosed **BILL OF MATERIAL** and is also correctly **Voltage Rated**.

2.4 **For Crimping connector:**
Crimp the connector respecting the indicated crimping sequence.



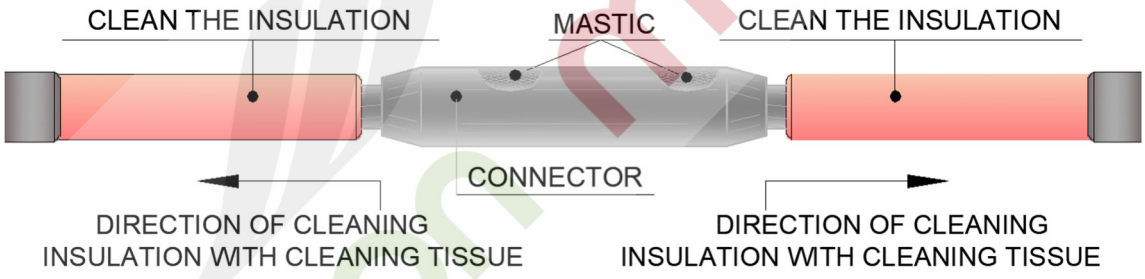




2.4a For Mechanical connector:
Shear the bolts as per the connector manufacturer's instructions.

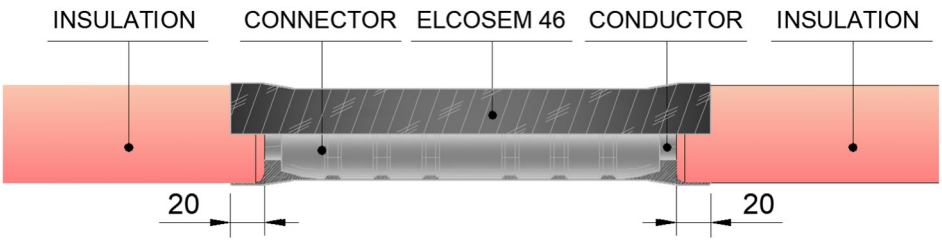
IMPORTANT

- ***Remove any anti-oxidant paste that migrates out of the connector;***
- ***Remove any traces present on the connector using the abrasive cloth;***
- ***Clean the insulation of the cable through the supplied with cleaning tissue, proceeding from the connector to the semiconductor to avoid dragging semi-conductive particles on the insulation primary, if necessary, clean the semiconductor being careful not to touch the insulation clean before;***
- ***Properly fill with Mastic all surface irregularities on the connector, coming from the crimp voids, or the breakage of the screws.***



-- **Directions for application of ELCOSEM 46 TAPE: it must be applied by stretching it, up to reduce its original width approximately to the half!!!**

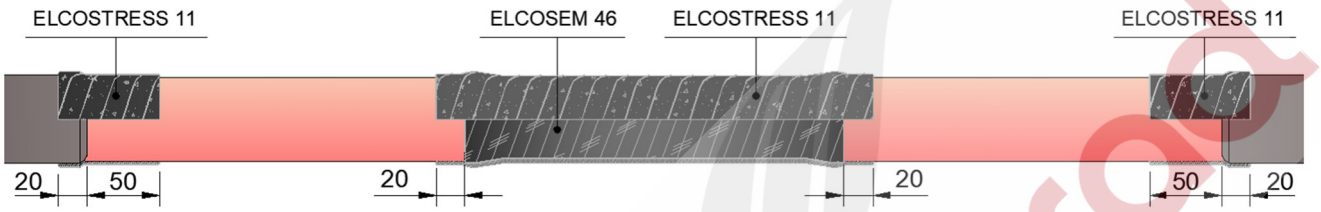
2.5 Apply **one** half-lapped layer of **ELCOSEM 46** (semiconductive tape) on the connector as well as on conductor exposed parts, so as to fill the space between the insulation cutting edge and connector edge. Continue to tape, up to overlap the insulation for **20 mm**.



-- **Directions for application of ELCOSTRESS 11 TAPE: it must be applied by stretching it, up to reduce its original width approximately to the half !!!**

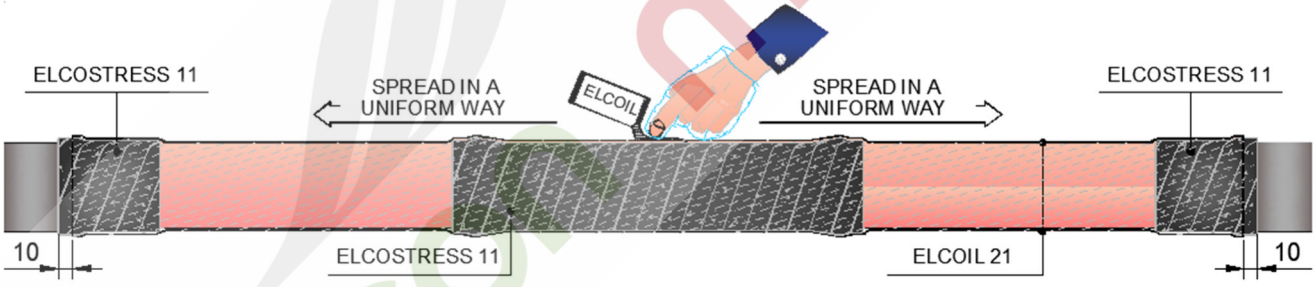
2.6 Apply **at least six** half-lapped layers of **ELCOSTRESS 11** on the connector area homogeneously filling the space between connector ends and primary insulation, which has to be overlapped up to a length of about **20 mm** further than the ELCOSEM 46 TAPE edge. In any case, after taping, final round diameter in connector area should be slightly greater than cable insulation diameter.

2.7 Apply **two** half-lapped layers of **ELCOSTRESS 11** on the cable semiconductor edges overlapping it for **20 mm** and the insulation for **50 mm**.



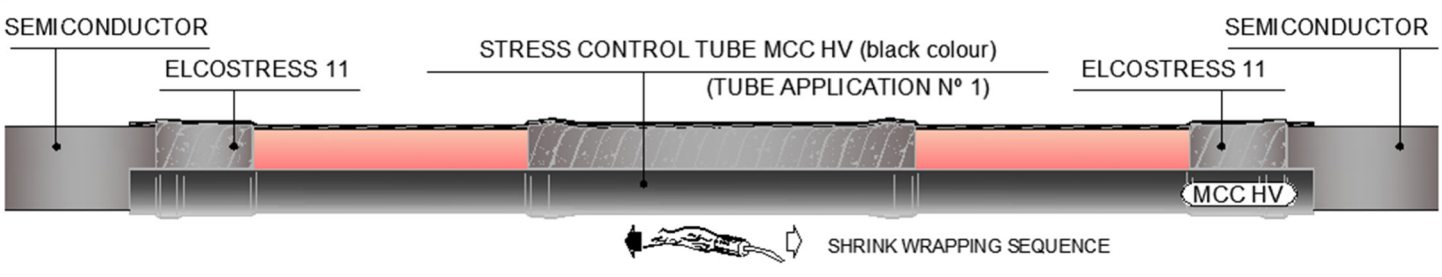
2.8 After wearing the supplied gloves, apply a layer of **ELCOIL 21** on the ELCOSTRESS 11 layer, and on the exposed insulation.

DO NOT apply the ELCOIL 21 on the FINAL part of 10mm of ELCOSTRESS 11 TAPE LAYER wrapped on the semiconductor layers!!!
Do NOT apply all the ELCOIL 21, it is also necessary for another application!!!

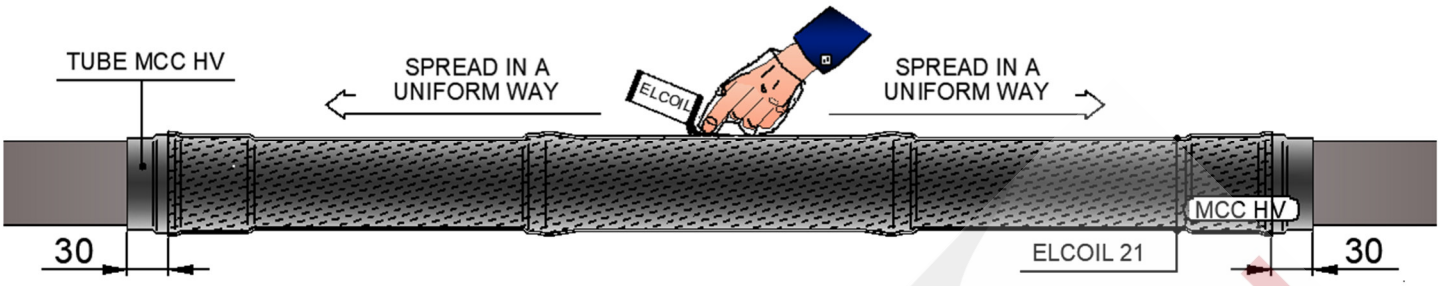


2.9 Slide back the first **stress control tube MCC HV (black colour, tube application Nº 1 see the bill of material)**, on the joint in such a way as to evenly overlap the cable semiconductor layers on both sides.
Heat-shrink the tube, as for the GOLDEN RULES, starting from the center and moving towards the ends.

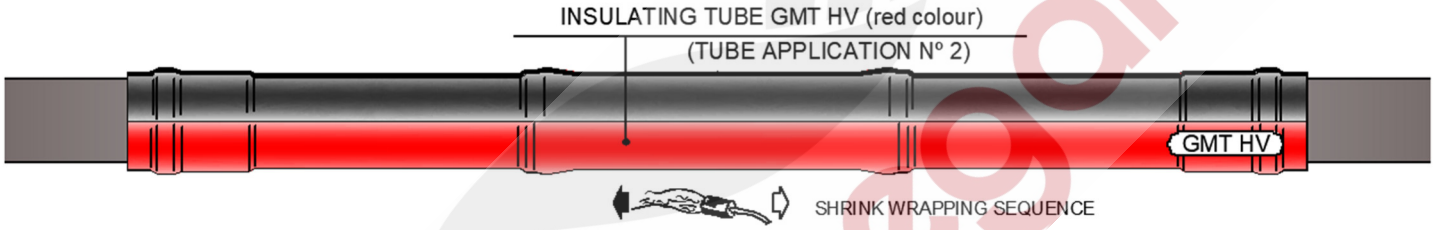
*The **stress control tube MCC HV** and the **insulating tubes GMT HV** have to be cleaned after the heat shrinking.*



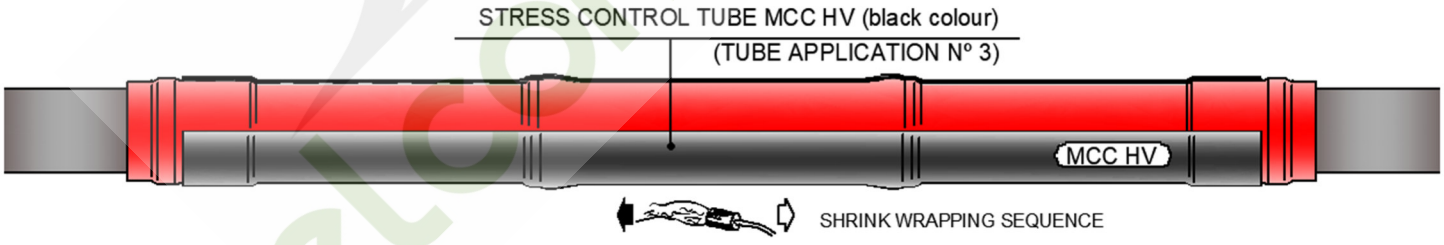
2.10 Apply an uniform layer of **ELCOIL 21** on shrunk MCC tube. **DO NOT apply ELCOIL 21 on the tube edges for 30 mm.**



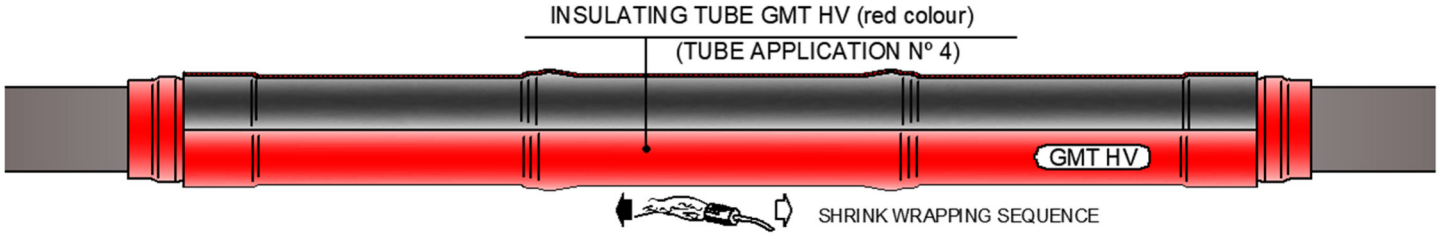
2.11 **Slide and Center** the **insulating tube GMT HV (red colour, tube application Nº 2 see the bill of material)** over the previously applied MCC HV tube. Heat-shrink it properly.



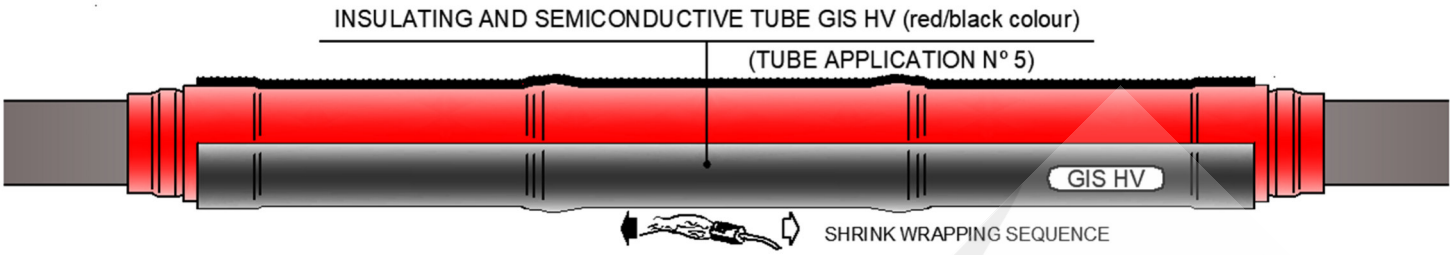
2.12 **Slide and Center** over the previously applied GMT HV tube the **second stress control tube MCC HV (black colour, tube application Nº 3 see the bill of material)**. Heat-shrink it properly.



2.13 **Slide and Center** over the previously applied MCC HV tube the **insulating tubes GMT HV (red colour, tube application Nº 4 see the bill of material).** Heat-shrink it properly.

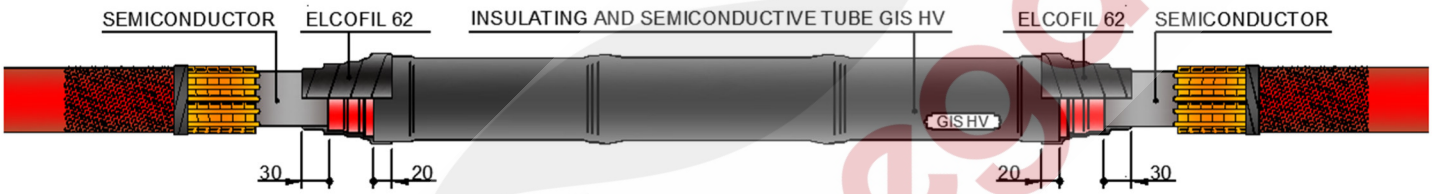


2.14 **Slide and Center** over the previously applied GMT tube the **insulating-semiconductive tube GIS HV (red/black colour, tube application Nº 5 see the bill of material).** Heat-shrink it properly.



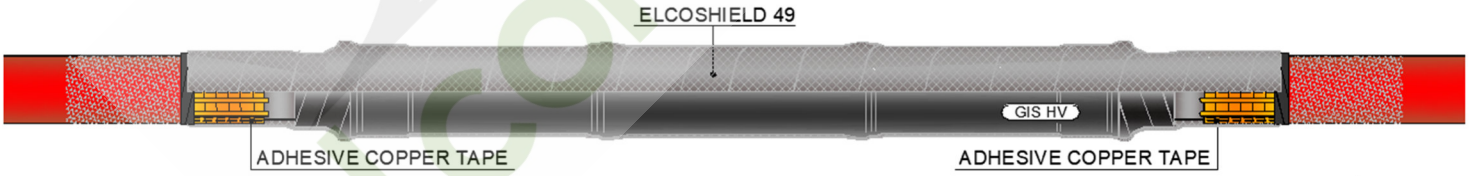
-- **Directions for application of ELCOFIL 62 MASTIC: it must be applied by sligtly stretched and with 50 % overlapped!!!**

2.15 Apply, on both sides of the joint two layers of sealing mastic **ELCOFIL 62**. Start to tape covering **30 mm** of the semiconductor layer and continue on the tube GIS HV for about **20 mm.**



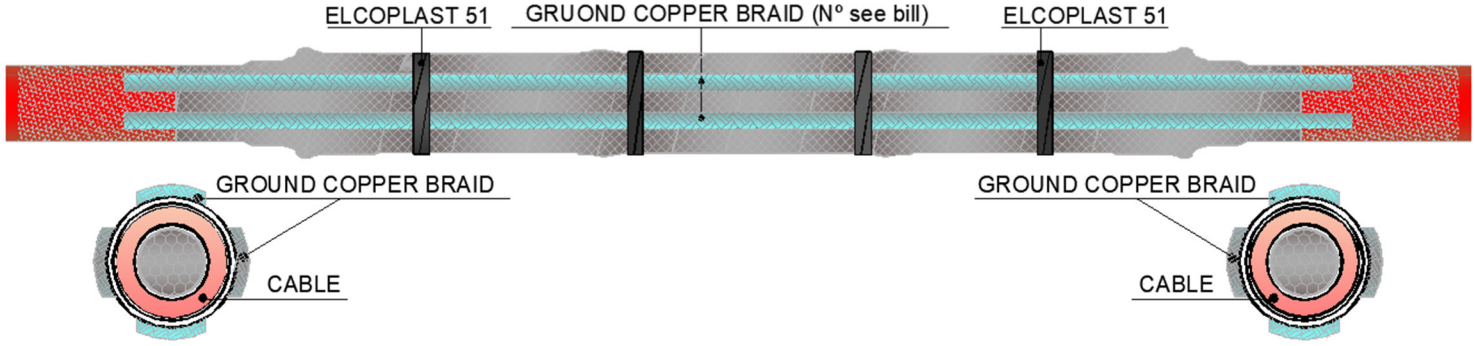
3. SHIELDING OPERATION.

3.1 Wrap the **ELCOSHIELD 49** tinned copper tape over the joint, with an **overlap rate of 20 %**, up to overlap the adhesive copper tape (and wires screen) applied on the outer jacket **on both sides**. Fix the ELCOSHIELD 49 at the end of the taping, by a knot obtained by the same tape.



3.2 Position the ground copper braids contained in the kit (**Nº see the bill of material)** on the joint. **See detail of the figure**.

3.3 Fix the braids in some point with PVC tape **ELCOPLAST 51.**



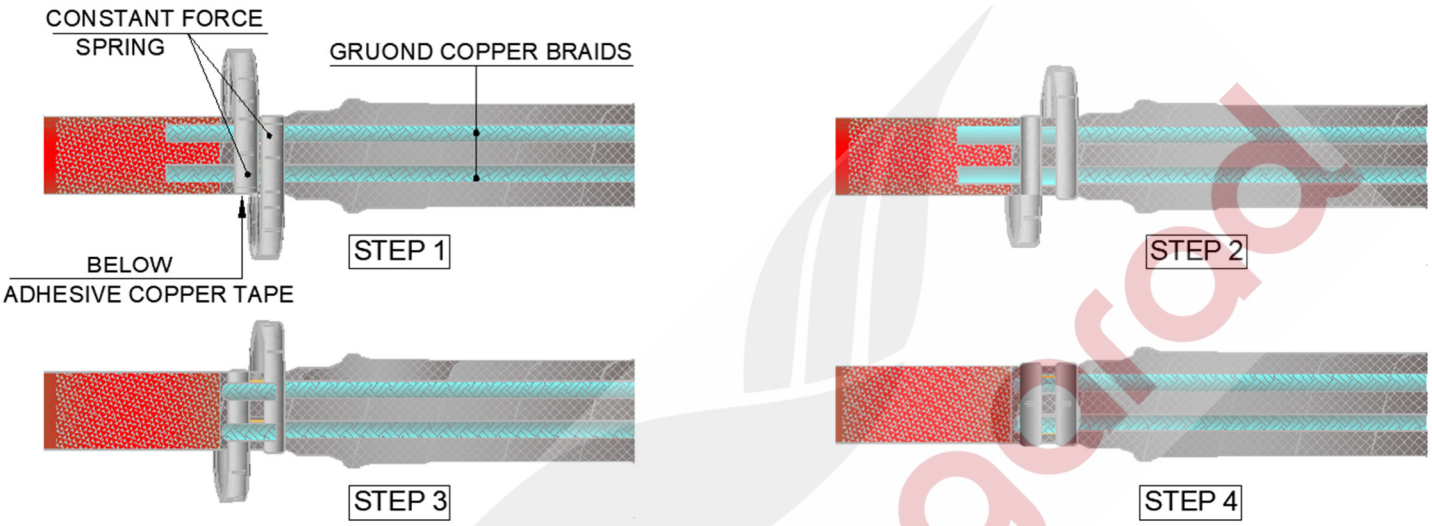
--- OPERATIONS FOR BOTH CABLE ---

3.4 **STEP 1** Position the two **constant force springs** edge on the ground copper braid in correspondence of the adhesive copper tape (and wires screen) below of the ELCOSHIELD 49.

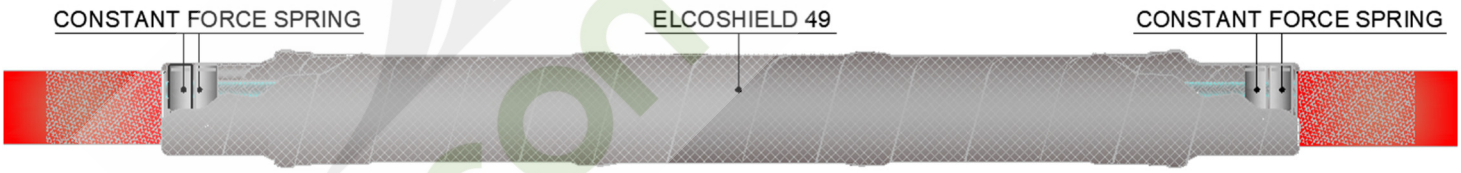
STEP 2 Fix all the ground copper braids by two laps of constant force springs.

STEP 3 Refold on the constant force springs the eventual length of braids that go beyond the constant force spring edge.

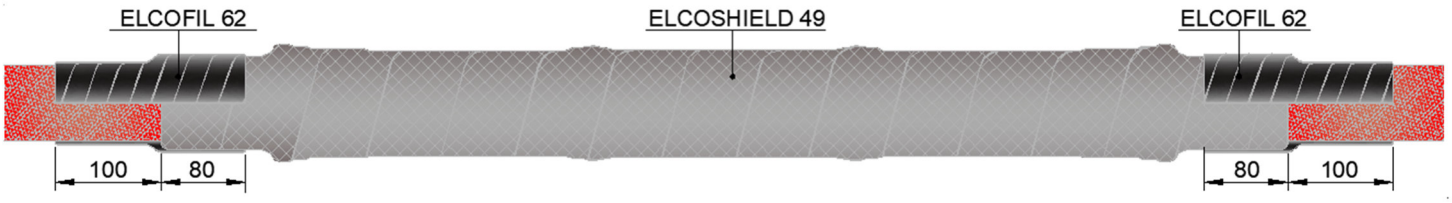
STEP 4 Wrap the rest of the constant force springs.



3.5 Wrap the other layer of **ELCOSHIELD 49** tinned copper tape over the joint, with an overlap rate of 20 %, up to overlap the constant force springs on both sides. Fix the ELCOSHIELD 49 at the end of the taping, by a knot obtained by the same tape.



3.6 Apply one layer of sealing mastic **ELCOFIL 62** on the outer jacket (roughen zone) for a length of **100 mm**, continue the taping on the ELCOSHIELD 49 for a length of **80 mm**.

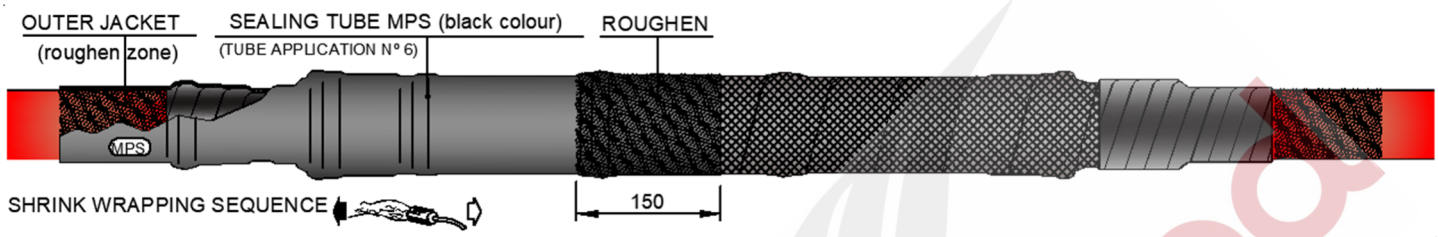


4. OUTER JACKET BUILD UP OPERATION.

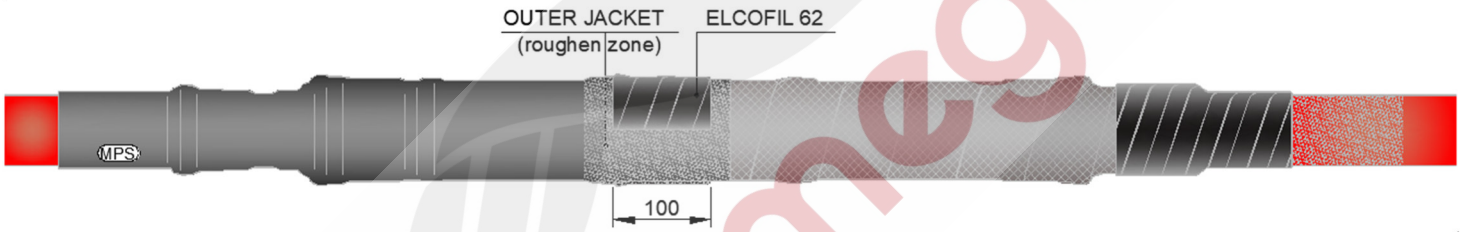
4.1 Slide one of the **sealing tube MPS (black colour, tube application Nº 6 see the bill of material)** units onto the joint ensuring that it overlaps the roughened cable outer jacket whilst reaching the middle of the joint overall.
*****Ensure you remove any of the protective packaging from the tubes prior to shrinking****

4.2 Heat shrink the tube from the center to the extremities on both sides until the tube is uniformly shrunk. Adhesive may exit from both ends of the tube.

4.3 Allow to cool and roughen the tube edge (sealing tube MPS) that has just been shrunk for a distance of **150 mm** from the tube end in the middle of the joint using the abrasive cloth.

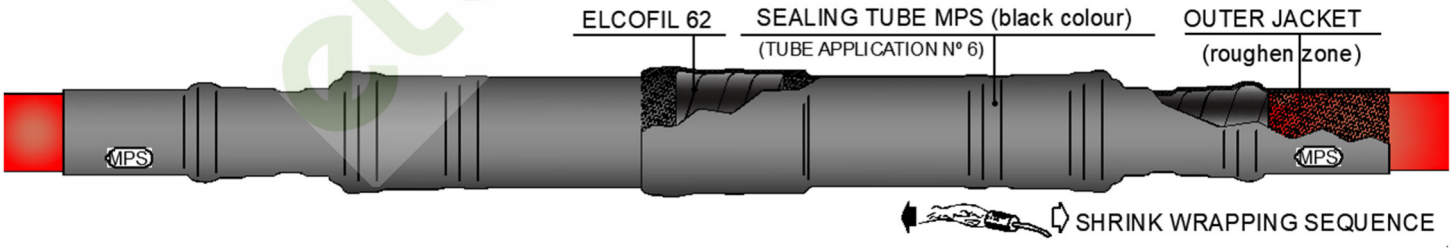


4.4 Wrap one layer of **ELCOFIL 62** for **100 mm** within the roughened area.



4.5 Slide on the second **sealing tube MPS (black colour, tube application Nº 7 see the bill of material)** ensuring that it overlaps the roughened cable outer jacket whilst reaching the middle of the joint overall.
The previously applied **ELCOFIL 62** should be completely covered by the tube.
*****Ensure you remove any of the protective packaging from the tubes prior to shrinking****

4.6 Heat shrink the tube from the center to the extremities on both sides until the tube is uniformly shrunk. Adhesive may exit from both ends of the tube.



4.7 Allow the joint to cool. Then it is ready to energize.

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