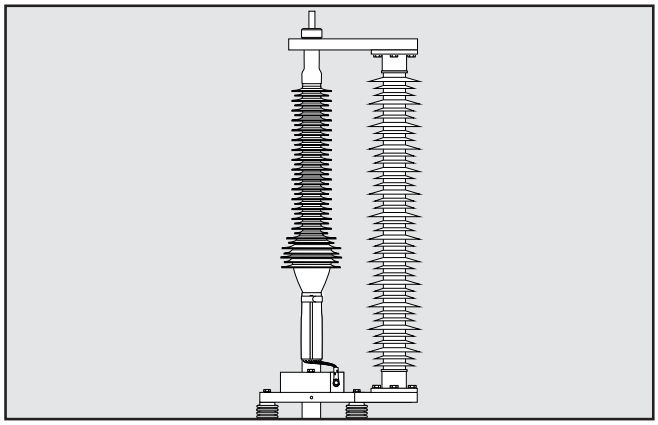
INSTALLATION INSTRUCTIONS

EPP-3402-5/21

OHVT-FS

Dry Type Flexible Termination with Self-Supporting Insulator for Polymeric Insulated Cables with Wire Shield up to 145 kV



TE's Raychem Cable Accessories

Please dispose of all waste according to environmental regulations.

For more information: te.com/energy

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General Instructions

Before Starting

- Check the kit label and the title of the installation instructions to prove that the cable accessory you are going to use matches the cable.
- Make sure the cable is properly sealed.
- Make sure the cable is in the final installation position.
- Make sure the cable is straight at the jointing position.
- Check the position of the cables to be in alignment to the final position of the accessories.
- Make sure the joint bay/installation area provides adequate space for the cable components to be parked on either cable for later use during the installation.
- The joint bay/Installation area must be kept clean and dry during installation. For outdoor installation use tent or other appropriate shelter.
- Carefully read and follow the steps in the installation instructions. Components or working steps may have been changed/improved since you last installed this product.
- All tools, PPE and apparatus used must be kept clean during the installation.
- Obey relevant and local security and safety rules during the installation.

Shrinking Heat-Shrink Tubing

- Use a propane (preferred) or butane gas torch.
- Ensure the torch is always used in a well-ventilated environment.
- Adjust the torch to obtain a soft blue flame with a yellow tip. Pencil-like blue flames should be avoided.
- Keep the torch aimed in the shrink direction to preheat the material.
- Keep the flame moving continuously to avoid scorching the material.
- Clean and degrease all parts that will come into contact with adhesives.
- If a solvent is used follow the manufacturer’s handling instructions.
- Start shrinking the tubing at the position recommended in the instructions.
- Ensure that the tubing is shrunk smoothly all around before continuing along the cable.
- Tubing should be smooth and wrinkle free with inner components clearly defined.

Stripping the Cable

Use appropriate stripping tools for smooth and even insulation diameter.
Adjust the stripping tool to the thickness of the semi-conductive layer. Avoid removing too much of the insulation. Polish the stripped surface by hand using the supplied abrasive paper beginning with the lowest grid size, or by an appropriate sanding machine and abrasive paper and grades. The surface of the insulation must be even and free of all traces of conductive material.

Cables with Segmented Conductors

All cut back dimensions and information given in this instructions document refer to cables with non-segmented conductors only. In case of cables with segmented conductors, all insulation or conductive materials have to be removed from the conductor. If the removal of these materials require a longer cut back of the cable insulation, this length needs to be added to the cable cut back dimensions mentioned in the instructions.

NOTE

Special instructions for segmented conductors are available on request.

Straightening and Heating of the Cable

Before starting the cable preparation, train the cable end in the straight installation position and fix it.

The cable needs to be heated and straighted for the length of complete Installation.

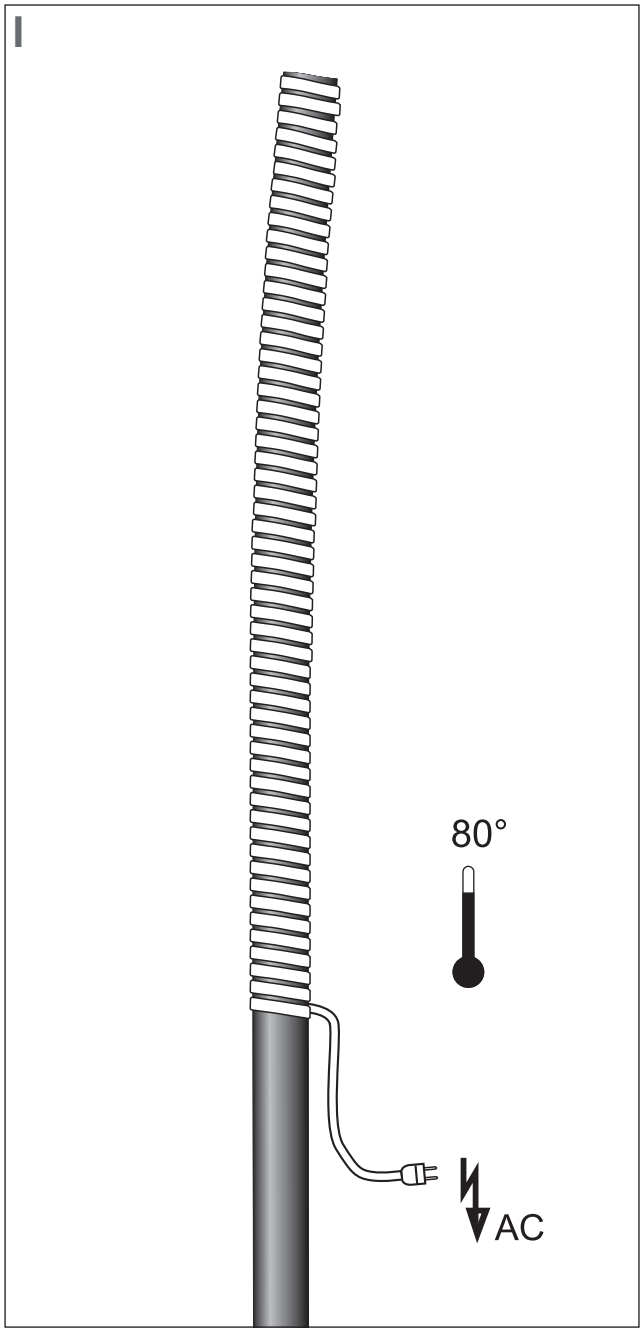
In case of graphite coating cover the cable with one layer of crepe paper.

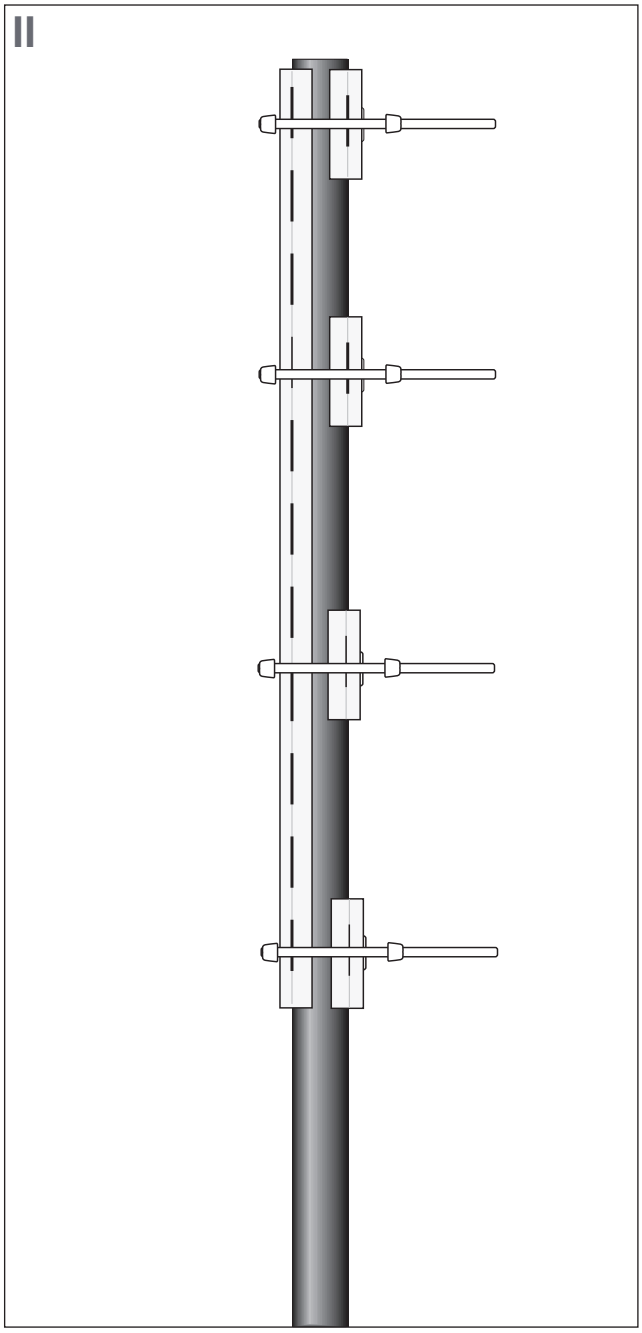
Degrease and clean the oversheath.

Heat the cable by applying a heating device to the oversheath as shown in the TABLE BELOW.

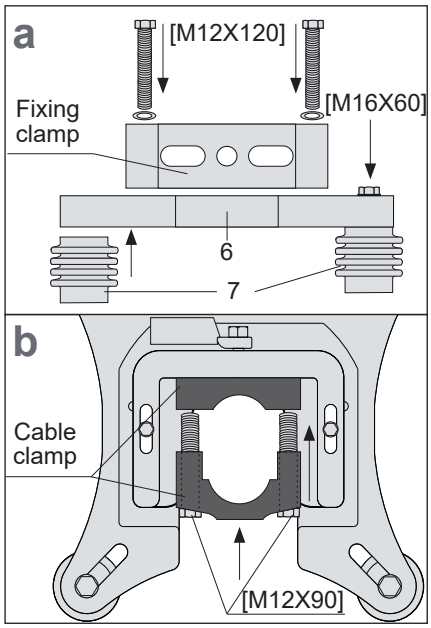
Before stripping to the required dimensions, the cable needs to be cooled down to ambient temperature using slide rails.

Cable Cross Section	Heating Time/ Temperature
up to 400 mm^2	4 h / 80 °C
up to 1200 mm^2	5 h / 80 °C





Marking Reference Lines



Position the support insulators and base plate on the support rack.

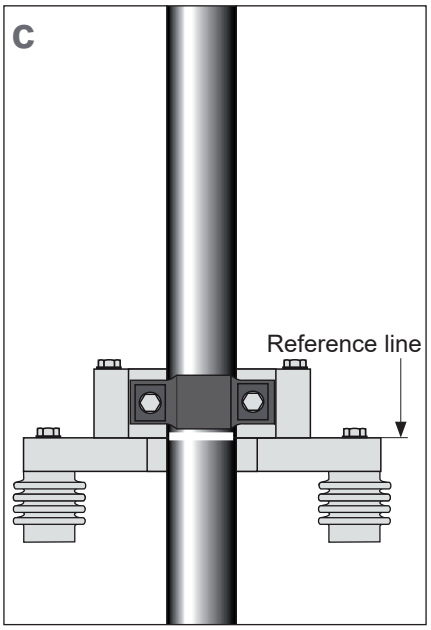
Temporarily fix the support insulators (**7**) to the base plate (**6**) with the provided screws.

NOTE

If necessary, check and adjust the bores on the support rack: The support insulators have to be installed in a plane. If there is a gap between the support rack and any of the support insulators, use the inserting noncorrosive metal spacers to adjust it.

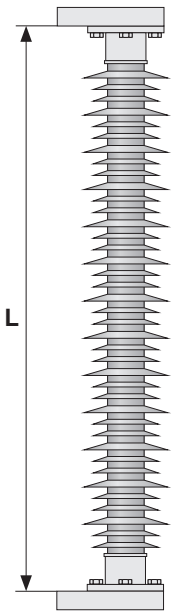
Firmly fix the support insulators to the support rack.

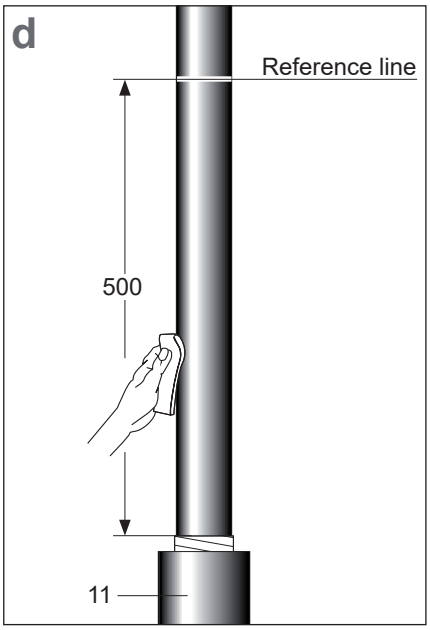
Place fixing clamp and cable clamp into the base plate. Make sure it fits properly (see **drawings a & b**).



Mark the cable as shown from the uppermost edge of the base plate using a marking pen or PVC tape as shown. Make sure that the remaining cable length above the reference line is greater than **L**.

Measure the length L of the insulator (5) as shown.





Remove the cable clamp and base plate to have sufficient installation space.

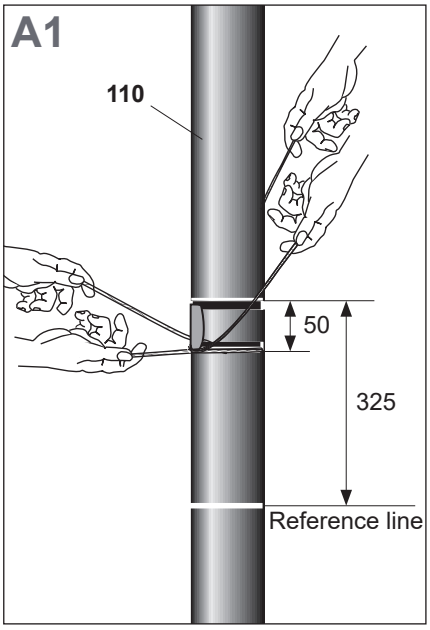
Remove the graphite coating or any seminconductive layer, if any, up to 500 mm below and above the reference line and clean the cable.

Cover the cable with crepe paper below the cleaned surface for protecting the long tube.

Slide the long tube (**11**) over the covered cable surface.

Cable Preparation

A. Cables with Wire Shield and Laminated Foil



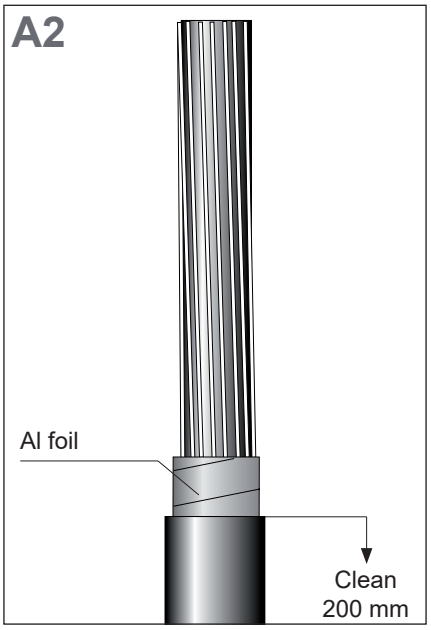
325 mm above the reference line, cut through the outer jacket (**110**) with the supplied yellow string.

Remove the outer jacket from the AL foil (**106**) by slicing segments away with the string as shown.

Clean the metal foil from oversheath traces.

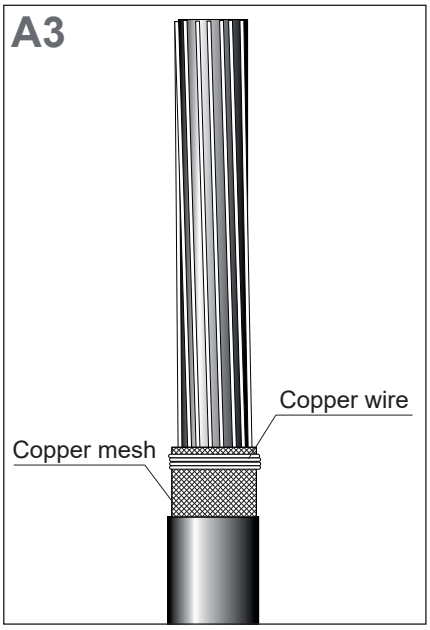
Protect the metal foil with a PVC tape. Remove the oversheath, foil and bedding.

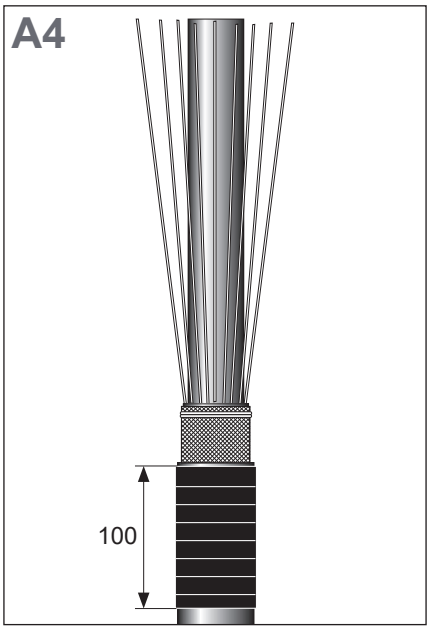
Clean the end of the oversheath for up to 200 mm.



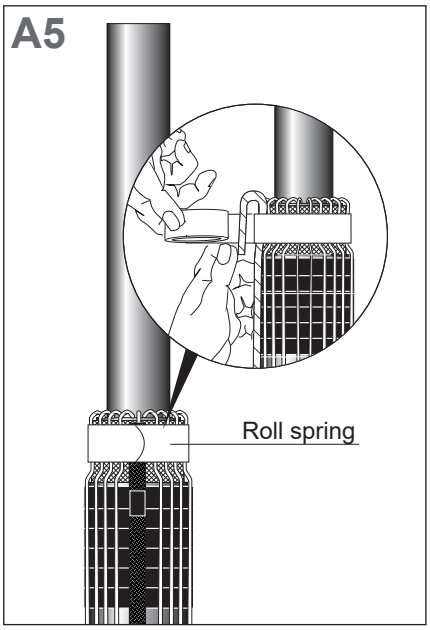
Break the edge of Al foil with a rough file.
Remove the PVC tape. Smooth the surfaces of the Al foil with a very fine grinding cloth.

Wrap 3 layers of copper mesh over the Al foil. Fix the copper mesh in place with a copper wire.





Apply black mastic on 100 mm of the oversheath.



Bend back the screen wires.

Install the roll spring around the screen wires and fix the copper braid as shown in the detail. Tighten the roll spring with a twisting action.

Protect the roll spring with PVC tape.

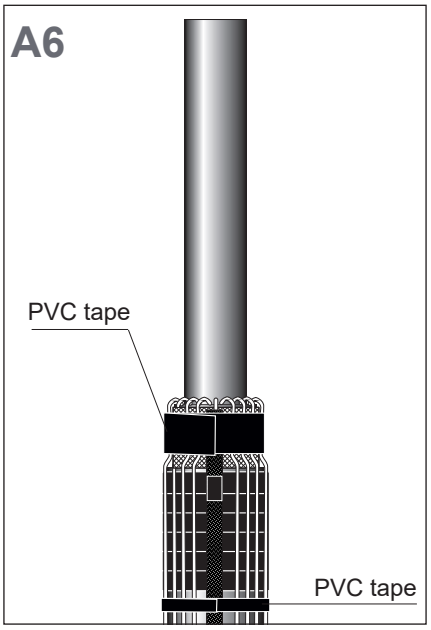
NOTE

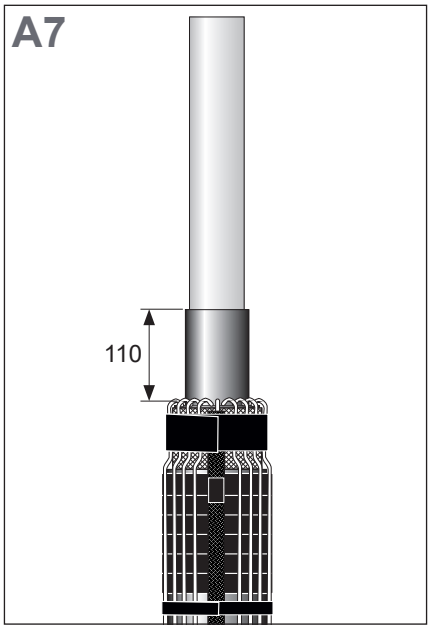
When stripping the core screen, make sure the cutting depth of the stripping tool is adjusted accurately so it removes the outer semicon layer entirely but does not cut into the insulation.

Thoroughly remove the core screen to within 110 mm of the laminated foil cut. The surface of the insulation should be free from all traces of conductive material.

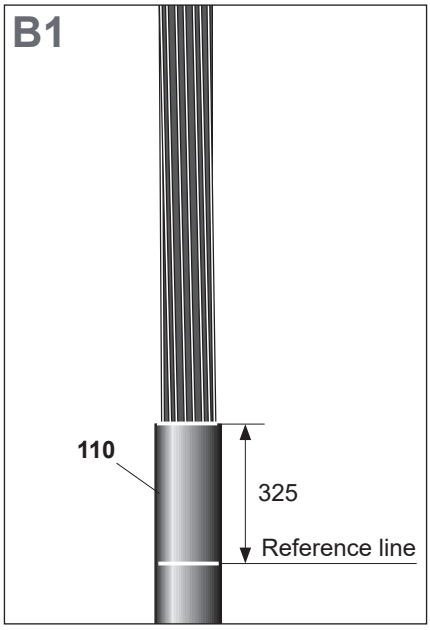
Continue with step 8.

Fix the wires and copper braid to the oversheath just below the mastic temporarily by using PVC tape.





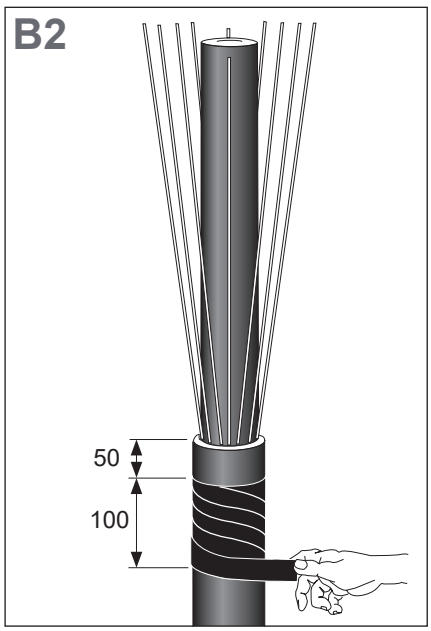
B. Cables with Wire Shield



Starting 325 mm above the reference line, remove the outer jacket (**110**) of the cable as shown.

Starting from 50 mm below the oversheath cut, apply mastic (black) over 100 mm of the oversheath.

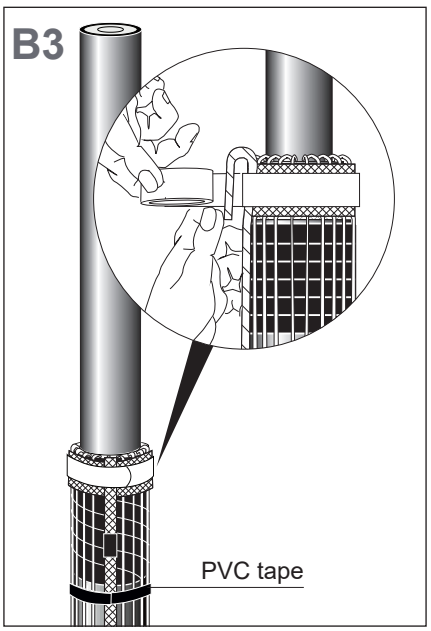
Bend back the screen wires.



Apply one layer of copper mesh around the oversheath cut covering the screen wires.

Fix the screen wires and copper braid to the copper mesh with the roll spring. Tighten the roll spring with a twisting action. Protect the roll spring with PVC tape.

Fix the wires and copper braid to the oversheath just below the mastic temporarily by using PVC tape.

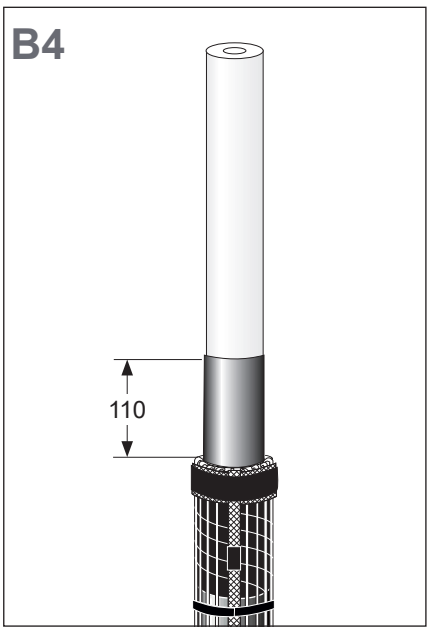


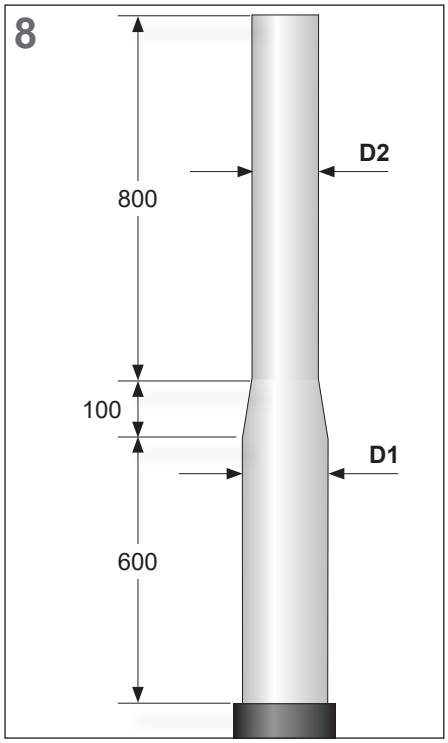
Thoroughly remove the core screen to within 110 mm of the oversheath cut. The surface of the insulation should be free from all traces of conductive material.

NOTE

When stripping the core screen, make sure the cutting depth of the stripping tool is adjusted accurately so it removes the outer semicon layer entirely but does not cut into the insulation.

Continue with step 8.





First half of the cable end needs to be prepared to have a diameter **Ø D1 for a length of 600 mm**.
A transition is done for 100 mm and the remaining cable length must be within the range of **Ø D2**.

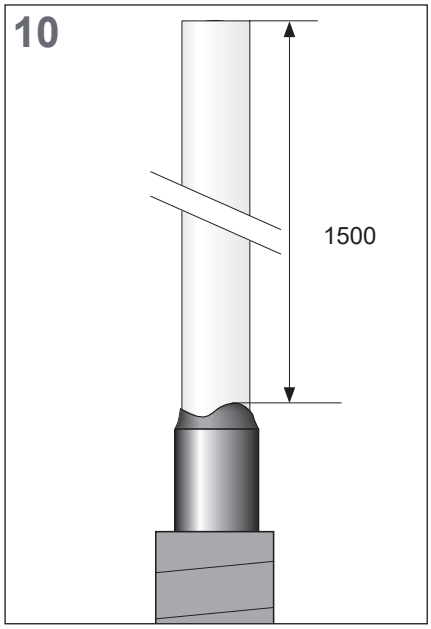
NOTE

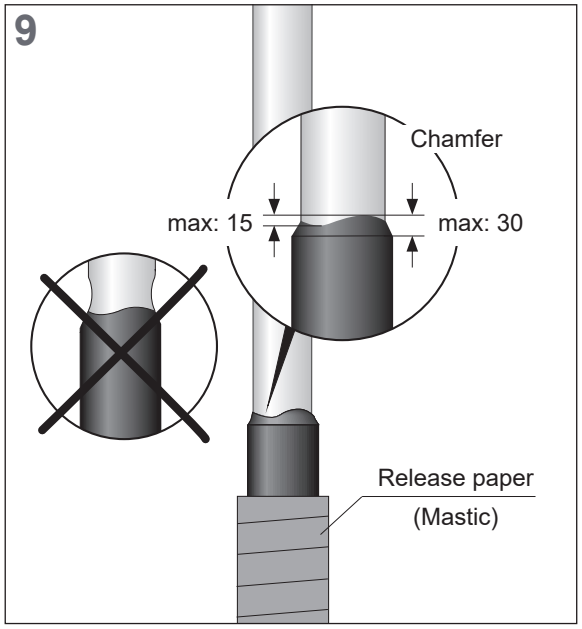
See **Table 1** for the diameter values as well as the drawing for the length dimensions.

Table 1

Insulation diameter D1 (mm)	Treated Insulation diameter D2 (mm)	Stress Cone inner diameter (mm)	Silicone Body
46.0 - 50.0.0	47±0.5	41.5	DFBODY-46/50
49.5 - 57.0	51.5±0.5	45	DFBODY-49.5/57
56.6 - 63.5	58.6±0.5	51	DFBODY-56/63
63.5 - 71.3	65.5±0.5	58	DFBODY-63/71
71.0 - 78.7	73±0.5	64	DFBODY-71/78

Measure the inner length of the silicone body and verify if it is around 1500 mm. Cut the cable according to dimension as shown.





Protect the black mastic below the oversheath cut from contamination using the release paper.
Chamfer the outer semicon layer on the cut between 20 - 30 mm as shown.
Polish the whole length of insulation.

NOTE

Make sure that the transition from the outer semicon layer to the insulation corresponds in terms of shape and max. heigth with wave form in detail.

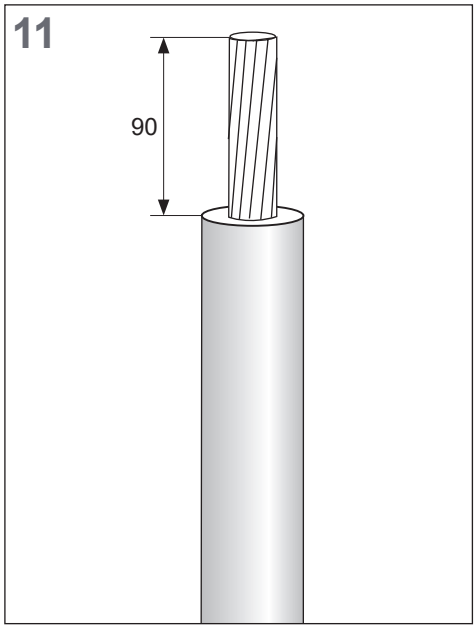
Do not damage the insulation.

Completion of the Termination

Cut back the insulation according to **90 mm** as shown.

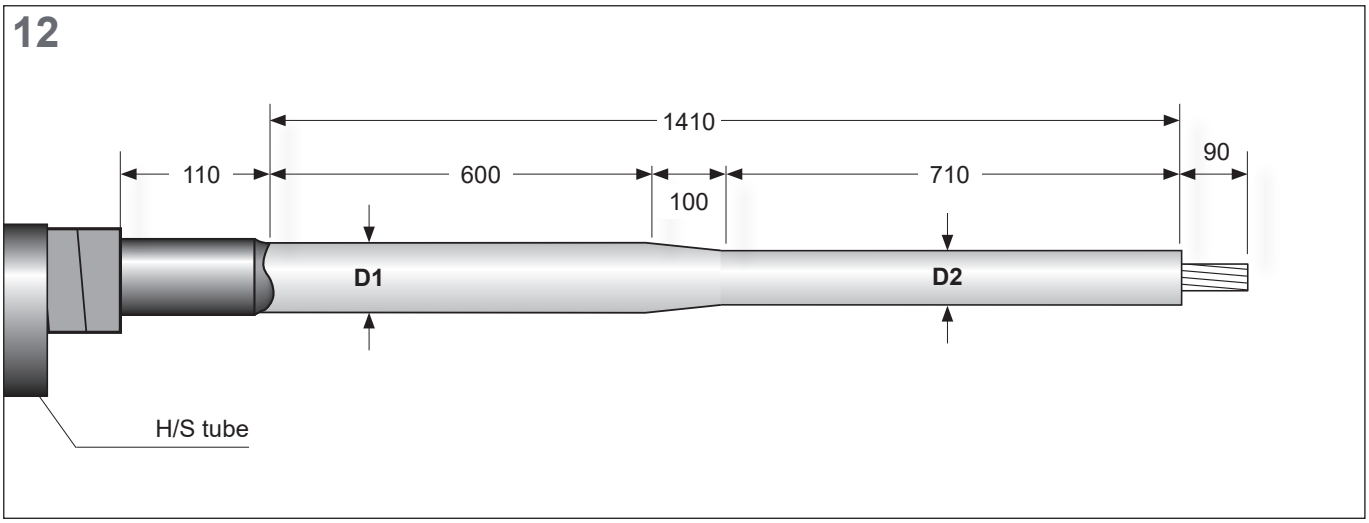
NOTE

Removal of waterblocking materials must be carried out. Check if the diameter over cable conductor is within the application range of cable lug according to packaging label.



Slide the heat shrink tube over the outer sheath.

Measure the diameter **D1** and **D2** over the prepared insulation and verify if the measured values lie within the application range for the silicone body, see **Table 1**.



Wrap some layer of textile tape onto the conductor to hold the adapter straight on the conductor.

Place the adapter on the cable conductor.

Protect the conductor with PVC tape.

From the highest wave of the semi-con cut mark 70 mm as shown.

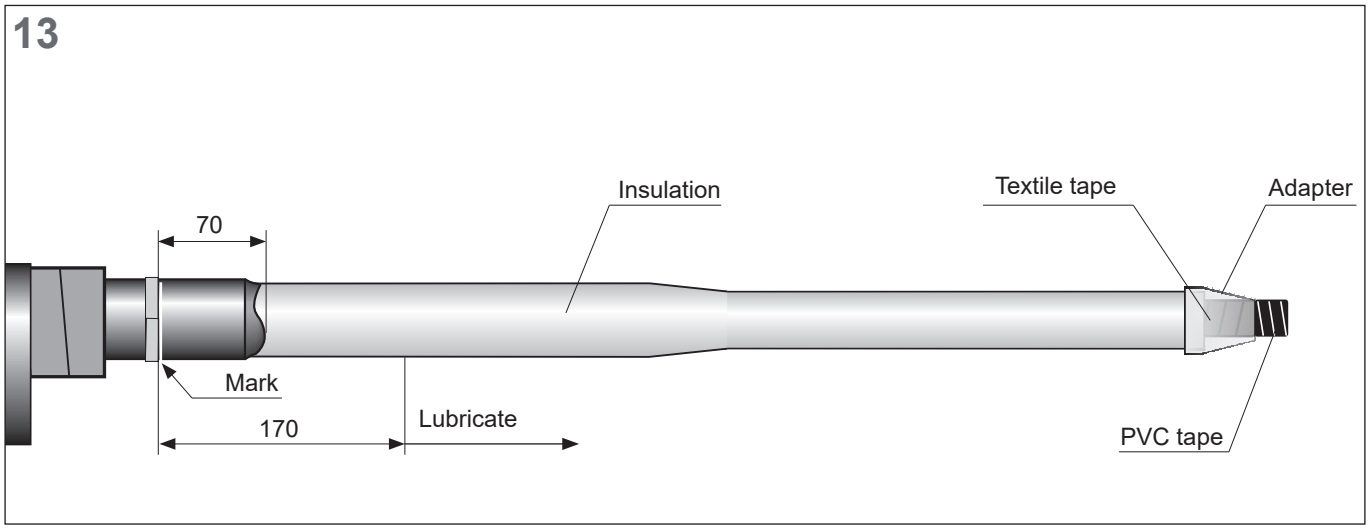
NOTE

Wash and clean your hands.

Wrap a stopper of red PVC tape behind the mark of 70 mm as shown. Thickness of stopper tape must be 15 mm.

Clean the cable insulation.

Thoroughly lubricate the cable insulation from 170 mm above the mark. Lubricate the inner part of the silicone body with the silicone grease supplied using the PVC stick. Check the inside of the body and make sure that the silicone grease covers the inner surface evenly.



Ensure that the silicone body is straight by using the supporting structure materials and packaging.
Push the silicone body by using the push-on tool onto the cable core until its collar reaches the marking.

NOTE

Be careful when pushing the silicone body close to the mark. It must NOT be moved beyond the 70 mm mark.

Make sure to only push the body and not pull! The length of the silicone body should not be extended during installation.

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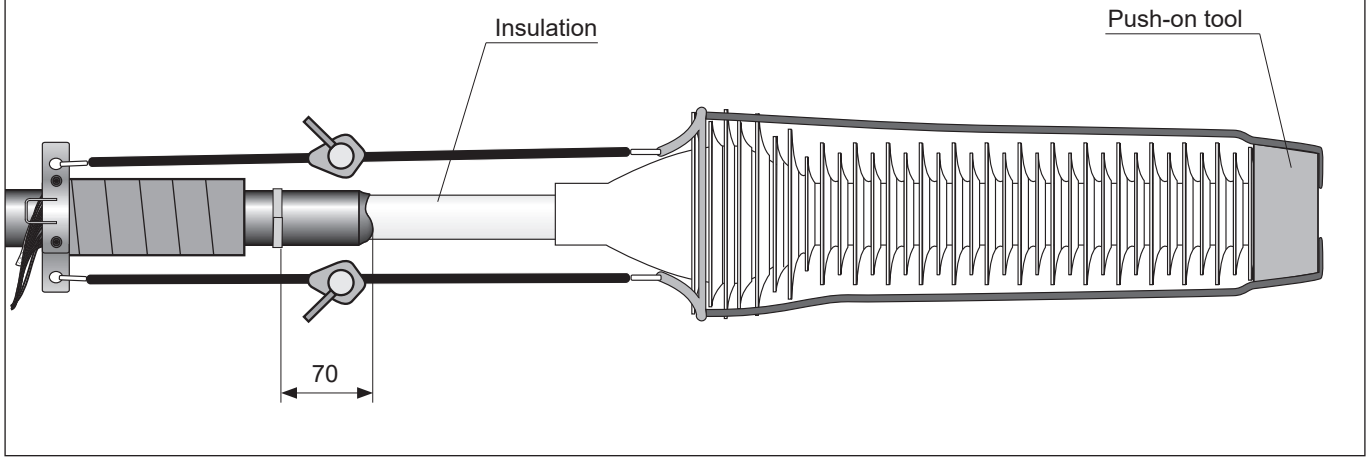

Slightly twist the sheds at the top till the top of body is level with the cable insulation cut.
Remove PVC tape, textile tape and cone from the conductor.

Dismantle the pushing tool.

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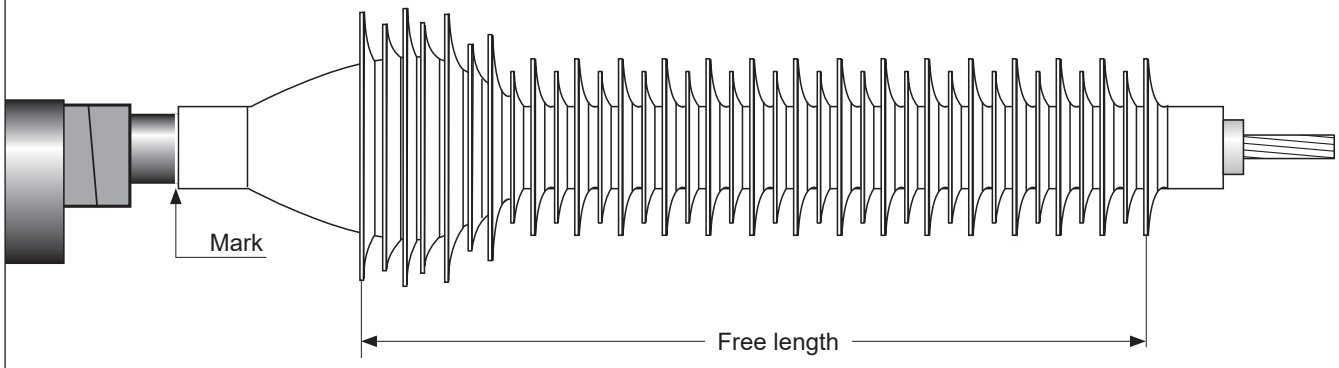
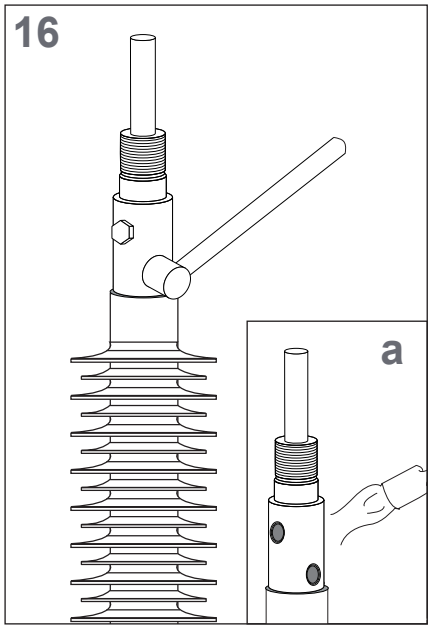


In order to check the elongation of the body after pushing, free length of the body is measured and this should be in the range of **1110 mm - 1140 mm**.

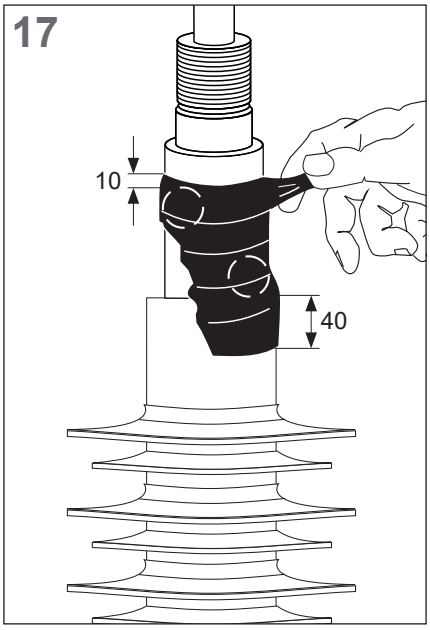


Tighten the bolts of the lug.

Shear off the bolts starting with the lower one. Use a common box spanner or spanner.

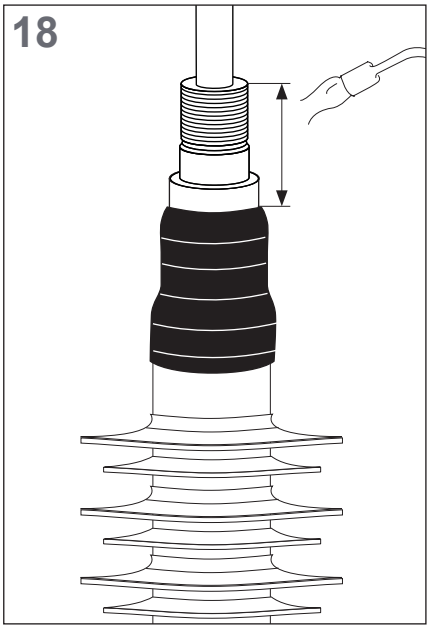
Degrease and clean the lug (**1**) and the cable insulation (**103**).

Heat the lug.



Apply 1 - 2 layers of black mastic on the cable lug and build a smooth transition between the silicone body and the lug.

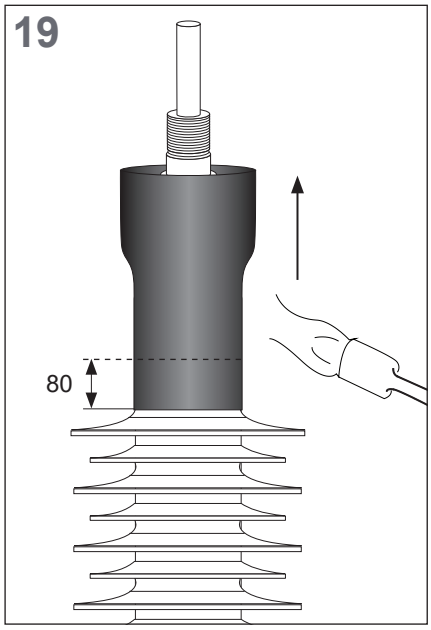
Start 10 mm above the upper bolt & stop 40 mm below the lug on the silicone body.



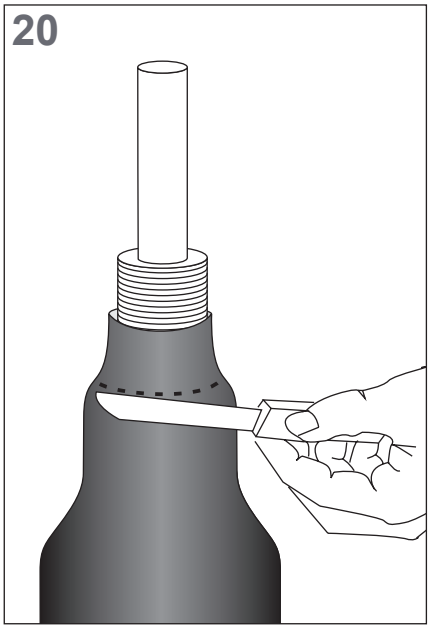
Heat the exposed metal part of the lug.

Position the sealing sleeve so that it covers the connector barrel and overlaps the silicone body by 80 mm.

Shrink it into place, starting at the bottom.



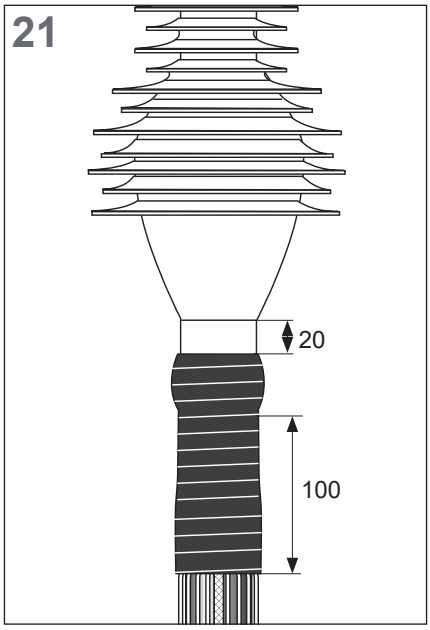
In case the tube is longer, cut it at the edge on the cable lug above screw area.

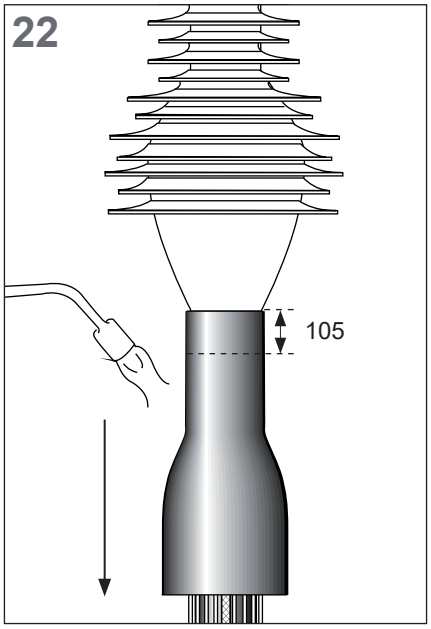


Remove the release paper.

Starting 20 mm below the conical part of the silicone body, apply black mastic with slight tension and slight overlap (see drawing).

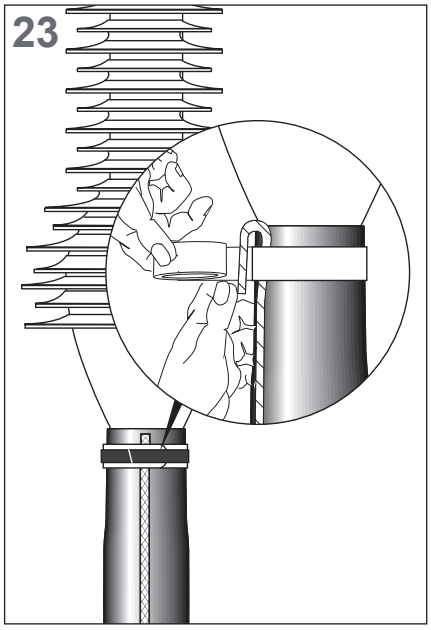
Wrap down up to 100 mm below the oversheath cut.





Position the heat shrink tube on the silicone body at the collar or approx. 105 mm above the end of silicone body.

Shrink into place. Start shrinking at the top, then move downwards.

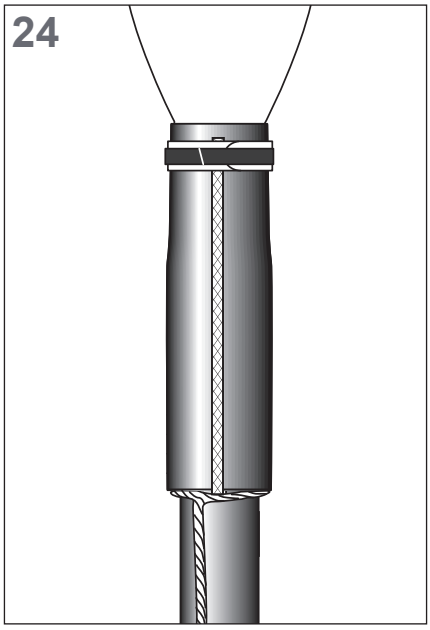


Wrap the roll spring twice over the heat shrink tube.

Bend the copper braid back over the heat shrink tube, position the end onto the roll spring, and cut it accordingly (see detail).

Tighten the roll spring with a twisting action.

Protect the roll spring with an adhesive bundle tape. Use a cable tie to fix/hold the roll spring tight.



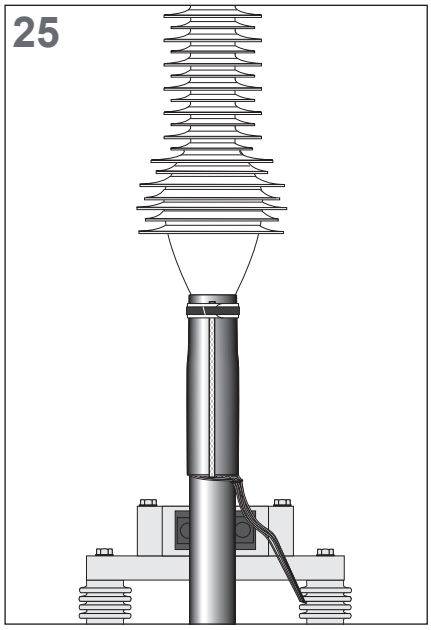
Form the earthing lead by twisting the strands together.

Completion of Self-Supporting Kit

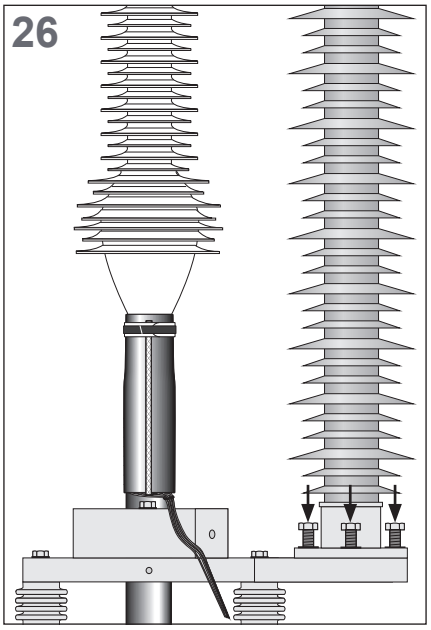
Bring the base plate arrangement onto the support rack and align the cable.

NOTE

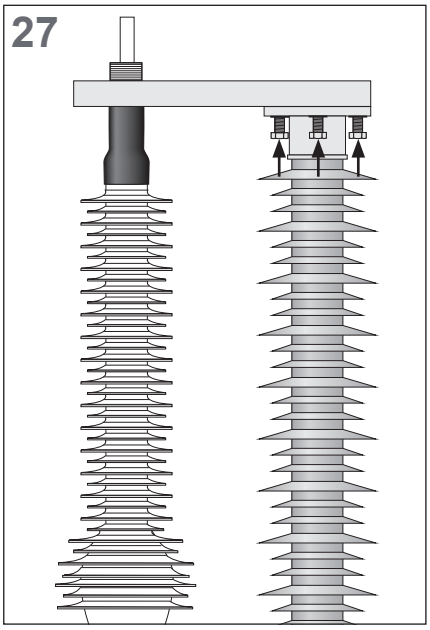
Do not fix the cable clamp.

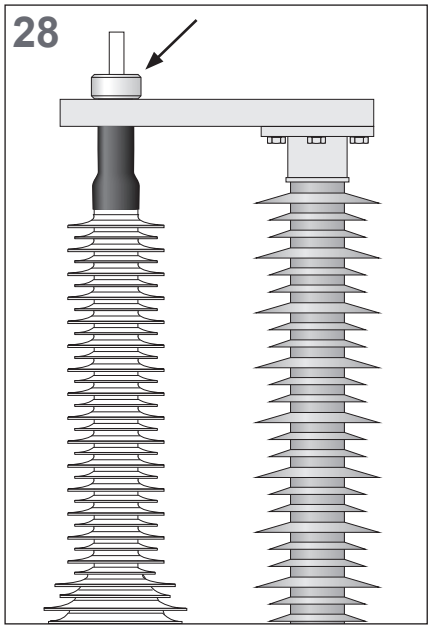


Install the self-supporting insulator onto the base plate with screws provided (50 Nm).

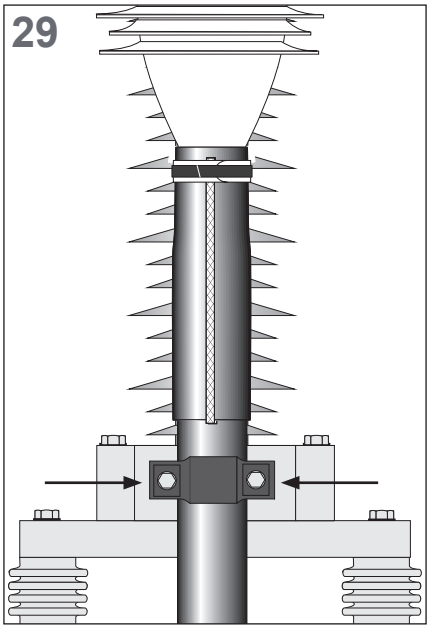


Align the pin of the termination with the top plate and install the plate onto the self-supporting insulator (50 Nm).

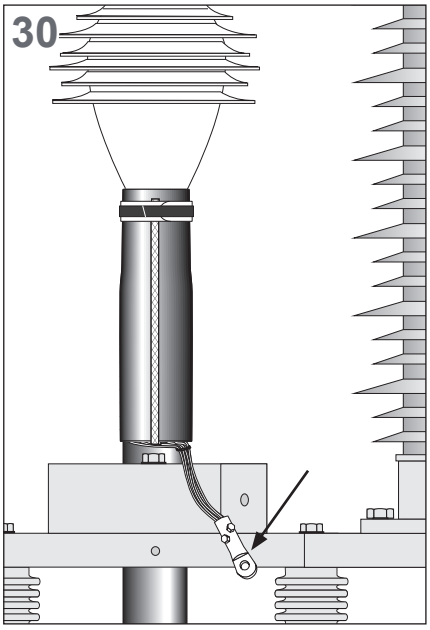




Fix the support nut onto the termination top plate firmly.

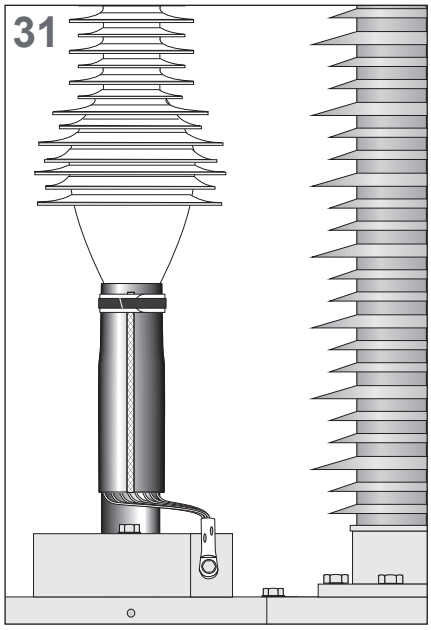


Fix the cable with the cable clamp.



Bundle the earth braid and install the mechanical cable lug on the earth wires.

Connect the earthing point on the fixing clamp.



Termination completed.