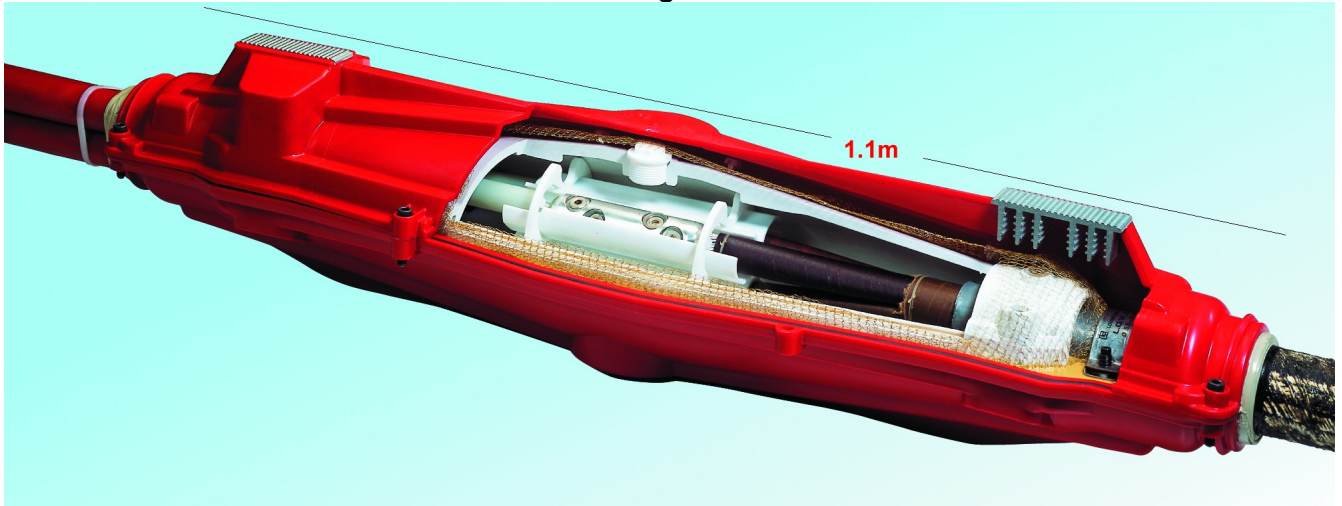


**LoviSil® Medium Voltage Cable Joints, 12-36kV, Solve Moisture Ingress Problems.**

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Fig.1.

**Cutaway View of LoviSil® “K” series Straight Water-Resistant Medium Voltage Underground Joint.**

Underground cable joints in electricity distribution networks must remain moisture free to prevent arc failure of any joint. Because the joints are created “on-site”, the quality of the jointing technique is critical. Lovink Enertech of Holland, where the water table is often only centimetres below the land surface, have been producing underground cable joint accessories since 1919.

Their latest range of Cable Joint, called LoviSil®, is suitable for all common cable joints, for polymeric XLPE and EPR, and paper-insulated PILC and PICAS cable types, and connector transitions between all of these cable types are available.

For 12 & 24kV joints, 1-core, 3-core and 3 x 1-core straight through and end joint types, and 3-core and 3 x 1-core branch and loop joint models are standard, and a special “repair joint” is made for 12kV.

For 36kV joints, 1-core and 3-core straight through joints are made.

The elegant design provides a faster, more reliable and robust joint, which provides perfect joints from all trained jointing staff, even those with limited experience.

For 12 and 24kV joints, the LoviSil® Cable Joint is supplied as:

- A] a polymeric PTFE tube set to provide primary electrical insulation and correct cable positioning, (in the 36kV type, the tube set is replaced by joiner(s) of conductive and insulating silicone),
- B] cast metal conducting tubes to make the electrical cable connection with “snap-off” bolt heads to ensure that perfect “compression torque” is applied,
- C] a pair of white glass-fibre-reinforced-polyester (GRP) mating shell moulds which completely enclose and seal the joint, forming the inner shell, and
- D] a container of LoviSil® liquid silicone, which is poured into the polyester mould, completely encasing the cable joint in Lovink’s liquid silicone.

This usage of liquid silicone is its greatest advantage over other jointing techniques, as the liquid silicone surrounds the joint. LoviSil® has three very important electrical characteristics:

- 1] it remains liquid, minimising the risk of discharge and dried out paper insulation, as it provides the same insulating function as the grease in paper insulated cables, and does not support stable air bubbles.
- 2] its dielectric constant is practically identical to that of polymeric cable insulation, whether in liquid form, or its soft “rubber” form.
- 3] it is actively hydrophobic, but in the event of water ingress past the seals of the joint, or migration of moisture along the inside of the insulating cable sheath towards the electrical connection, the liquid silicone “cures” in the presence of water to a soft and perfectly insulating rubber, which seals against any further water ingress.

In the accompanying photo of a set of nine joints being made by contractor Siemens Westinghouse (see Fig. 2., Page 2.) during an electrical upgrade at the Shell Bukom Refinery in Singapore in 2006, the third

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from right connector is having its white, “inner shell mould” filled with LoviSil® liquid silicone. Note the temporarily placed funnel, mounted in the white inner shell, towards the foreground, which ensures the correct level of the silicone “fill” and zero air entrapment, and the support frame holding the LoviSil container, as the filling is carried out. The LoviSil® liquid silicone container has two outlets, and the flow rate into the white, inner shell, is controlled by the gentle release of the seal on the second, (red) cap. As soon as the LoviSil® pour is completed, the entry holes into this white mould are sealed. The earth shield open stocking, copper netting, provided as part of the LoviSil® kit, and which has been pre-located over the cable prior to the inner connection(s) being made, is clamped to the earth screen of the two incoming cable ends, and an appropriately sized earth strap is clamped to each of the cable ends, laying just external to the white, inner shell, thereby ensuring earth continuity and fault integrity. The second, larger, outer shell is then assembled, with the prior location (around the cable entries) of the prefabricated compressible closed-cell-foam seals, which locate and seal the cable entry(ies) to the outer shell. The whole process is “cold”, ideal for hazardous zoned areas.

The coloured outer shell pair has one side pre-fitted with a protruding neoprene gasket, set in a channel, which ensures an air-tight seal to each other when screwed together. This outer, protective shell is then filled with a liquid two-pack polyurethane resin. This is supplied as part of the kit in the form of a jointed plastic bag which keeps the two components separate until the separator sleeve is removed. This makes a very clean and reliable two-pack mix, as the mixing can be carried out whilst the contents are still in the sealed bag, with perfect proportions and zero mess.

As soon as the polyurethane mix has been added, the aluminium entry seals can be closed, and the connector safely tested electrically. On successful completion of the tests, the joint may be buried. The two-pack polyurethane will harden, bonding the two shells into a single entity, and in conjunction with the robust outer coloured shell, provides an immensely strong outer mechanical protection for the inner shell.

The kit provision ensures that no step is omitted, and allows for fast, high quality workmanship to become “standard”. The outer shells are colour coded, bright red for 12kV, dark red for 24kV, and orange for 36kV.

Fig. 2.



Contractor Siemens Westinghouse installing 9 x LoviSil® joints at the Shell Bukom refinery medium voltage upgrade, in Singapore, 2006. Note that the impression of the joints being located over an “arch” structure, is only a visual illusion, an artefact of the widened work trench in the location of the joint construction work, and in fact, the blocked work base area is flat, although elevated above the incoming cable runs.