Innovative branch off low voltage joint with insulation piercing connectors for house connection

BACKGROUND

The main functionality of the joint is to connect houses or EV charging stations or other types of installations to the main low voltage cable in the street. The joint is a cable connector and associated casing that can be used on underground low voltage PVC cables. At this stage Alliander focusses on a joint primarily for PVC cables, if feasible the scope can be expanded to PILC cables (Dutch GPLK) as well. These low-voltage cables distribute electricity to consumers and supply public lighting (230/400V). The low voltage cables have four main cores and four auxiliary cores. These cables and associated garnishes are placed underground, at a depth of 60 to 80 cm. The new joint should be assembled at least 50% faster than the assembly of the current joint which takes in average 60 minutes (excluded digging trench).

An (time) indication of the current joint assembly process:

1. Preparing the PVC cable (V-VMvKhsas) (±10-15 min)
2. Attaching the insulation piercing connectors (±10 min)
3. Wrapping and filling (±35 min)

Total of 60 minutes (average) in the current assembly process.

SUMMARY OF TECHNICAL REQUIREMENTS

- The current rating of the completely assembled joint (connector + joint materials) must at least be equal to the current rating of the cable's conductor diameter, being 4 x 10mm2 or less.
- The joint must be able to withstand an overpressure of a 10m water column.
- The joint must be suitable for and secure mounting on live cables, in accordance with VWI (Safe Working Instructions) and BEI-BLS (Operations of Electrical Installations, Low Voltage Industry).
- The material of the joint must not be hygroscopic (water-attractive) and must remain its function in humid conditions.
- Under normal use (storage, assembly, disposal) parts and materials from the joint do not pose a danger to people and the environment.
- The joint has a technical life of at least 50 years.

The product must be suitable for installation under the following conditions:

- A cable temperature of 5 to 40 degrees Celsius.
- An outside temperature of 5 to 40 degrees Celsius.

Materials and substances that are released during assembly and that have to be treated as waste shall not be regarded as hazardous waste, as described in the European Regulation waste list (Eural).

If new connection technology is adopted, Liander is obliged to comply with a number of standards and directives. The joint shall meet the following standards and directives.

The product shall comply with the following standards:

- NEN-EN 50393
- NEN-HD 631.1 Part 1
- NEN-EN-IEC 60455-3-8 Part 3 Sheet 8
- IEC 60287
- NEN-ISO 11014-1
- NEN-EN-ISO 9001
- NEN-EN-ISO 14001
- Safe Work Instructions in accordance with BEI-BLS (see http://netwerkbedrijven.dearbocatalogus.nl)

The product shall be successfully tested and certified in accordance with:

- NEN-EN 50393 for the joint as a whole, tested as type 2 and 3, test series A1/B1
- NEN-HD 631.1 or NEN-EN-IEC 60455-3-8 with aging test in water at 90^{o}C if resin is used as filler
- NEN-EN-IEC 61238-1-2 for the branch connector(s), electrical tests in accordance with test series class A, mechanical tests in accordance with test series class 1 or better
- Product certification must be done by an ISO 17025 certified test institute