Electric Utility – Medium-Voltage Power Cable Jacket Integrity Testing

The primary functions of jackets in a Medium-Voltage (MV) Concentric Neutral (CN) cable are to provide protection and minimize mechanical damage to the cable core and underlying components during transportation and installation, inhibit copper CN corrosion, as well as impede moisture ingress into the cable core. MV cable jacket can be susceptible to mechanical damage during transportation, handling and installation. There has always been a desire to verify if excessive mechanical damage has occurred before, during, or after installation with a simple test. Attempts have been made to perform dc testing on MV cables with non-conducting jackets in the field to locate mechanical damage, although without a known ground plane this can result in great variability and misdiagnosis.

General Cable now offers EmPowl® Link CL Edge™, a MV CN cable with a semiconducting polyethylene (SCPE) coating on the outer surface of the non-conducting jacket to create a known ground plane. This allows installers to reliably determine if jacket mechanical damage has occurred between the CN and SCPE coating.

Step 1: Prepare Cable and Area for Testing
- The SCPE coating is a very thin layer. Using sandpaper or a skiving tool remove SCPE coating approximately six (6) inches from the end (See diagram below).
- Validate isolation between the SCPE and CN electrodes using an ohmmeter.
- The underlying non-conducting jacket must remain intact.

Step 2: Connect dc Test Set
- Connections and area between electrodes must be clean and dry.
- Connect the test set voltage source “Hot End” to the phase conductor / CN electrode of the test cable.
- Connect the test set return “Ground End” to the SCPE electrode of the test cable.
- The additional test set ground connection (bleeder wire) shall be connected to an earth ground rod.
- Additional phase and CN conductors, on cables not under test, shall be grounded.
- If testing on a metal reel, also ground the reel.
**Step 3: Perform dc Withstand Test**

- Apply voltage and gradually ramp up to the desired dc withstand voltage level.
- Once the desired dc withstand voltage has been reached, hold for 1 minute and verify the leakage current reaches steady state.

![Image of dc test setup]

**Step 4: Interpret Results**

- If mechanical damage is present, the leakage current will likely keep increasing and the test set won’t be able to maintain the dc voltage at the desired withstand level.
- If desired, leakage current can be recorded for information purposes.
- The mechanical damage site can be located following the dc test set instructions.

**Step 5: Repair if Suitable**

- Please refer to General Cable Technical Bulletin UTB-022 Medium Voltage Power Cable Jacket Repair to determine if identified mechanical damage is suitable for repair. Following repair, repeat steps 1 to 4.