



RECOMMENDATIONS FOR MAINTENANCE TESTS ON POLYMERIC MEDIUM VOLTAGE CABLES

SCOPE

Different types of maintenance tests performed periodically (annually or bi-annually) on the de-energised cables. This technical informative applies to XLPE insulated cables with voltage ratings from 1.9/3.3 kV to 19/33 kV.

SAFETY REQUIREMENTS

As the voltages used in these tests are potentially lethal, appropriate safety measures must be employed to ensure that the safety of all people involved in the testing process is not compromised.

Cable ends to be isolated shall be disconnected from the supply and protected from contact to supply, or ground, or accidental contact.

Safety measures shall include, and shall not necessarily be limited to, earthing of cable under test prior to and after test voltages are applied, erection of safety barriers with warning signs, and an open communication channel between testing personnel.

The testing guidelines outlined in this document are Olex New Zealand Limited's recommendations only, and Olex New Zealand Limited can not be held responsible for ensuring the safe implementation of these recommendations.

SHEATH INTEGRITY TEST

A sheath integrity test (e.g. 1000 V minimum insulation resistance tester) applied between the outer-most metallic layer and earth can identify after commissioning damage to the non-metallic outer sheath. Values obtained should be compared with the values obtained during commissioning.

The measured value should be read after application of the voltage for 1 minute. Ideally the measured value should be corrected for temperature to a standard value at 20°C if correction factors are available. A rough guide is that the insulation resistance decreases to one half of the value for a 10°C rise in temperature. The cable temperature should be recorded along with the measured values.

Measured values of Insulation Resistance for the sheath should be greater than calculated values. Calculated values for new cable range from 1.5 MΩ/km to 4.0 MΩ/km @ 20°C for PVC sheaths and from 120 MΩ/km to 300 MΩ/km @ 20°C for PE sheaths. Values are highest for small cables & thick sheaths and lowest for large cables & thin sheaths. (Factory tests show that measured values are up to an order of magnitude greater than the calculated values.)



Earth the screens after an Insulation Resistance Test on a sheath for at least 5 minutes before handling or performing other tests.

POLARISATION INDEX TEST (On Primary Insulation)

DC voltages up to 5 kV, used when performing Polarisation Index Tests on Primary Insulation, are not considered to be a "High Voltage DC Test".

The Polarisation Index Test should be carried out using a low level High Voltage DC supply. Suggested maximum DC Test Voltage values are:- 2.5 kV DC for 1.9/3.3 kV cables and 5 kV DC for above 1.9/3.3 kV to 19/33 kV cables.

The current readings are taken at 1 minute and 10 minutes after the application of voltage.

The Polarisation Index is the ratio of the current after 1 minute to the current after 10 minutes. For good cable this will be greater than 4.0, and for cable that is OK between 4.0 and 2.0. A value less than 1.0 should be considered as a failure, while values between 2.0 and 1.0 should be considered as only a marginal pass.

Short the conductors to the screens after a Polarisation Index Test for at least 15 minutes before handling or performing other tests.

The above test can be carried out automatically with a "Megger", BM 25 Insulation Tester.

The Polarisation Index Test should be carried out in the "Guarded Mode", and guarding should be applied at both ends with a spare core used for the connection lead to the guard at the far end. Any conductor or cable core used as a guard lead must have a resistance to ground of greater than 10 k Ω .

DOCUMENTATION

The values obtained in the above tests should be recorded in the cable log book containing the original commissioning test values.