

Field Testing for Cables Rated 2 kV or Less, Non-Shielded Insulation Resistance Testing

BACKGROUND

It may be necessary to verify that the conductor insulation integrity has not been compromised, either due to handling and installation or use. For cables rated 2 kV or less without an insulation shield, an insulation resistance test (better known as a “Megger” test) is used. This test, when performed properly, will not cause any undue electrical stress on the conductor insulation. This type of a test is a “GO” or “NO GO” type of test.

INSULATION RESISTANCE TEST VALUES

Below is a table of the minimum and maximum test voltages for each cable voltage rating, along with the minimum insulation resistance value that is to be measured for each.

| Conductor Voltage Rating | Test Voltage | | Minimum Insulation Resistance Value |
|--------------------------|--------------|----------|-------------------------------------|
| | Minimum | Maximum | |
| 600 V | 500 VDC | 600 VDC | 100 MΩ |
| 1 kV | 1 kVDC | 1 kVDC | 100 MΩ |
| 2 kV | 1 kVDC | 2.5 kVDC | 100 MΩ |

Without any correction factors for conductor insulation temperature or length applied, the absolute minimum measured insulation resistance value is 2 MΩ. Values lower than those shown in the table above indicate that further investigation is required, not necessarily a conductor insulation issue.

It is important to note the following:

- 1) The test duration should be at least 60 seconds, with the measured insulation resistance stabilizing within this time frame.
- 2) The minimum insulation resistance values are based on 1,000 ft of cable, with a conductor insulation temperature of 60 F (15.6 deg C). Longer lengths will result in a lower measured insulation resistance. Higher conductor insulation temperature will result in a lower measured insulation resistance.
- 3) Other factors that affect the measured insulation resistance include (but are not limited to): insulation type (thermoset versus thermoplastic), humidity (moisture), test voltage applied, color of conductor insulation, and the age of the cable.

APPLICABLE WIRE AND CABLE

Insulation resistance testing may be used on any wire or cable rated 600 V to 2 kV, with a non-shielded insulation system.

REFERENCES:

NETA ATS-2017 “Standard for Acceptance Testing Specifications”
NETA MTS-2019 “Standard for Maintenance Testing Specifications”

