

Field tests can be broadly grouped into three categories: acceptance, maintenance and fault location testing. Conducted on wire or cable after an installation but before placing it into service, an acceptance test detects installation or shipping damage that might affect cable performance. After the cable has been placed in service, maintenance tests detect in-service deterioration. On the other hand, fault location tests pinpoint the exact failure site in a cable. Knowing exactly where the cable has failed permits the cable to be repaired or replaced as necessary. A few of the most common test methods are described below.

### MEGGER® TESTING

A Megger test uses a megohm meter to test the insulation properties of such things as electrical wiring, motor windings and high-power antenna mounts. Normally conducted on 600-volt power cable for either acceptance or maintenance purposes, a megohm meter typically applies 600 to 2,500 V DC for several minutes to the cable. The megohm meter measures the current “leaking” through the insulation and displays the results in units of resistance (i.e., megohms or millions of ohms). A reading less than 100 megohms indicates a possible cable problem. Even though Megger is a registered trademark of Megger Limited Group, the term is widely used for all similar tests regardless of manufacturer.

### HIPOT TESTING

The hipot (high potential) test is an acceptance or maintenance test and is normally used on cables rated 5 through 35 kV and higher. Like the Megger test, this device applies DC voltage to a cable and measures current leakage through the insulation. Unlike the Megger test, the applied voltage is considerably higher (up to 65 kV for a 15 kV cable, for example) and the results are displayed in units of microamps ( $\mu\text{A}$ ). With the hipot test, a high reading (for example greater than 100  $\mu\text{A}$ ) indicates a possible problem. Because of the potentially lethal high voltages involved, this test must be performed only by qualified personnel.

### CONTINUITY TESTING

The continuity test, which can be used on virtually every type of wire and cable except optical fiber, is probably the easiest and least expensive field test available. A handheld multimeter conducts the test by using a resistance setting to check the wire or cable for accidental

contact between copper conductors due to damaged or defective insulation. A multimeter can also be used to check for conductors that have been broken somewhere along the cable’s length. The continuity test can be used for acceptance, maintenance or fault location testing.

### THUMPER TESTING

A thumper is a fault location device that applies a high-voltage pulse to a cable to determine the exact location of a cable failure. It works by applying a brief (millisecond) high-energy pulse to the cable. At the point of the cable failure, the injected energy is released with a loud bang similar to that of a firecracker. When the test is performed on cable buried several feet underground, a muffled thump is usually heard above ground. The cable is usually thumped several times a minute until someone walking the length of the cable run can locate the point of failure.



### OTHER TEST METHODS

- LAN cable testers (measure attenuation, crosstalk, and impedance)
- Time domain reflectometers
- Optical time domain reflectometers
- Resistance-based fault location equipment
- Capacitance-based fault location equipment
- Arc-pulse fault location equipment
- Very low frequency AC test
- Online/offline partial discharge
- Series resonant AC test set



Additional information on field tests can be found on pages 122-127 of Anixter’s Wire and Cable Technical Information Handbook. To order your copy, visit [anixter.com/literature/wchandbook](http://anixter.com/literature/wchandbook).

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