**Course Name:** Grounding & Protection of Communication Sites

**Course Overview:**
As communication site location expand and increase in number, there is a strong need for getting technicians up to speed on grounding and protection training. This course is dedicated to grounding, bonding, and safety concepts for communications sites. All session topics are tailored specifically to the distinct requirements of the communications industry. Sections include Basics of Grounding, the Grounding Electrode System, Site Grounding, Equipment and Enclosure grounding, DC Grounding Practices, Grounding of Signal Carrying Cables and an introduction to Surge Protective Devices.

This course may be attended in one of the following ways:

1. One-day on-site course. TESSCO Item# 352385
2. One-day course held at an independent location. TESSCO Item # 341500
3. Two-day on-site course: This course follows our one-day curriculum with a Site Inspection Training on the second day. TESSCO Item # 375993

The optional second day of Site Inspection Training instructed at client facilities. A Prerequisite for attendance is a basic knowledge of electrical theory including Ohm's Law.

Accredited for 0.8 CEUs and BICSI Certified

**Course Length:** 1 or 2 days

**Who should attend?**

- Field Service Technicians
- Field Engineers
- Managers/ Field Supervisors
- Design Engineers
- Electricians
- Managers or Supervisors

**You will learn:**

- Review of DC and AC electrical characteristics
- Grounding and bonding procedures
- Battery and generator maintenance
- Lighting precautions
- Electrical safety issues and practices

**Prerequisites:** None

**Customizable Course:** Yes

**Course Content:**

**Day One**
**Section 1: Basics of Grounding**

- Purpose of Grounding
- Basic Grounding of AC and DC circuits
- Resistance and Impedance of Grounding Conductors
- Allowable Ground Current
- Purpose of Bonding
- Ground Loops

**Section 2: Grounding Electrode System**

- Earth Grounding
- Conductivity of Earth
- The Grounding Electrode
- The Ground Ring
- Ground Radials
- Concrete-Encased- Electrode
- Grounding Electrode System
- Sizing the Grounding Electrode Conductor
- Bending and Bonding of Grounding Electrode Conductor
- Compression and Exothermic Bonding
- Earth Ground Resistivity
- Earth Ground Resistivity Nomograph
- Earth Ground Resistance Testing
- Ground Continuity Measurement

**Section 3: Site Grounding**

- AC Service Grounding
- Telephone Service Grounding
- Tower Grounding
- Tower Guy Wires Grounding
- Transmission System Grounding and Bonding
- Ice Bridge/Cable Tray System Grounding and Bonding
- Equipment Grounding
- Fence Grounding
- Emergency Back Up System Grounding
- Grounding of Surge Protection Devices
- Grounding of Lightning Protection System
- Shelter and Building Grounding
- Grounding of Rooftop Mounted Structures
- Cellular Site Grounding

**Section 4: Equipment and Enclosure Grounding**

- Equipment Ground Conductor for AC Circuits
- Equipment Ground Conductor for DC Circuits
- Isolated Ground Systems
- Equipment Ground Conductor Bending
- Ancillary Equipment Grounding and Bonding
- Equipment Required to be Bonded
- Equipment Rack Grounding and Bonding
- Cable Tray System Grounding and Bonding
- Battery Racks Grounding and Bonding
- ESD Grounding
- Halo Ground
- Transmission Lines Protection and Grounding at Entry Points
- Grounding of Surge Protection Devices

**Section 5: DC Grounding Practices**

- Single Point Grounding Techniques of DC Equipment.
- Master Ground Bar (MGB)
- Frame/Logic Ground Bar
- Equipment Ground Bar
- Isolated Ground Bar
- Ancillary Ground Bar
- DC System Grounding
- Bonding to the MGB
- Location of the MGB
- Grounding of the MGB
- Typical Grounding of a Telecommunication Site

**Section 6: Grounding of Signal Carrying Cables**

- Low Frequency Shield Grounding for Multipair Data Cables
- Multiple Grounding of Shielded Multipair Cables
- High Frequency Shield Grounding for Multipair Data Cables
- RS 232 Pin Assignment Table
- Grounding for RS 232 Cables
- Low Frequency Shield Grounding for Coax Cables
- High Frequency Shield Grounding for Coax Cables
- Cable Grounding for Multiple Buildings
- Optical Fiber Cable Shield Grounding

**Section 7: Surge Protection Devices (SPD)**

- Sources of Transient Overvoltages
- Gas Tube Technology
- Metal Oxide Varistor Technology
- Silicon Avalanche Diode Technology
- Normal Mode Protection
- Common Mode Protection
- Primary Protection Methods
- Secondary Protection Methods
- AC Service SPD
- Telephone Service SPD
- Data Line SPD
- Transmission Lines SPD
- Tower Lighting SPD
- Typical SPD Protection for a Telecommunication Site

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**Optional Day Two Site Inspection Training**

Attendees will observe on their own selected communication site how to:

- ✓ Verify proper electrical distribution wiring for the main entrance panel and subpanels feeding critical equipment.
- ✓ Survey the grounding scheme for code compliance.
- ✓ Check systems and equipment for compliance with accepted installation practices and manufacturers' specifications.
- ✓ Measure selected voltages and currents and verify proper load balance.
- ✓ View voltage waveshapes with an oscilloscope and verify significant amounts of harmonic distortion.
- ✓ Survey electrical distribution and lightning protection schemes.