



## SMART GROUND TESTING SERVICE

### Advanced Ground Impedance and Resistance Testing

#### Comprehensive

Complete and accurate results with no need for additional analysis

#### Reliable

Quantified confidence levels, automatic error correction, and in-field calibration

#### Intelligent

Easily identifies and removes background noise, EMI, and stray currents from test results

#### Informative

Assesses grounding system for compliance with IEEE and/or IEC safety standards

#### Convenient

Ideal for energized systems, sites with limited real estate, and other unique situations

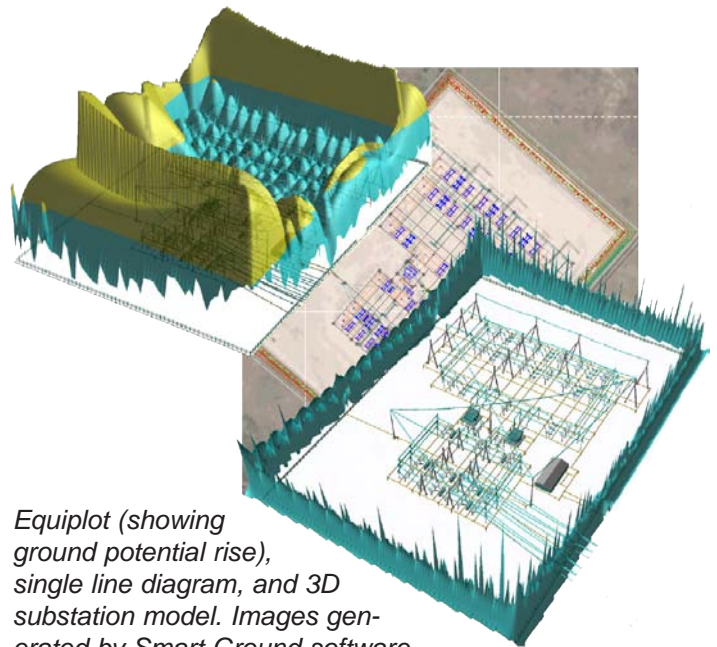
### The Smart Ground Advantage

Utilities and industrial facilities have struggled for years with unreliable grounding measurements produced by the Fall-of-Potential (FOP) method and its inherent limitations.

Unlike the outdated FOP test, Smart Ground analyzes the real-world grounding environment and compares actual measurements to an ideal computer model of the system being tested. The results are highly-accurate measurements and practical recommendations to help you make informed decisions.

#### What to Expect

The Smart Ground test is performed on-site by our expert technicians in cooperation with your staff. Our experience ensures testing is completed safely, quickly, and with minimal impact to operations.



*Equiplot (showing ground potential rise), single line diagram, and 3D substation model. Images generated by Smart Ground software.*

### The Report

The Smart Ground report covers all aspects of testing including:

1. Results from all test areas, with multi-layer soil resistivity, ground impedance, and point-to-point measurements.
2. Safety assessments of worst-case step, touch, and transfer voltages according to IEEE standard 80 and/or IEC standard 479-1.
3. Visual representations of the facility detailing locations of measurements, observations, and recommendations.
4. Expert recommendations tailored for your site, based on test findings, safety standards, and your specific needs.
5. A general bill of materials and an optional lightning safety assessment.



## Smart Ground Testing Service

An advanced system combining a versatile multimeter, sophisticated software, and professional analysis.

### Comprehensive Analysis

Smart Ground makes a 3D model of the site's physical and electrical layout, which is compared with measurements to identify corrosion and weakness. Uses frequency ranges up to 1000 Hz to analyze impedance.

### Broad Applications

Smart Ground returns accurate results on energized and connected ground grids, using sophisticated software to filter out electrical noise.

### Confident Results

Smart Ground collects thousands of data samples to calculate measurements and verify results with stated confidence levels.

### Practical & Convenient

Smart Ground is accurate even when the distance to the current probe is only 2 times the diagonal distance of the grid. The shorter distance saves work without compromising accuracy.

## Risks of Inefficient Grounding

When properly designed and maintained, a grounding system establishes electrical connections with the earth, provides a common ground reference, and minimizes ground potential rise. This reduction in ground potential rise prevents many electrical anomalies which can affect:

- General personnel safety
- Lightning and surge protection systems
- Clearing ground faults quickly
- Protecting critical electronic systems

Yet many facilities never make needed repairs because buried grounding systems are difficult to inspect and test. The Smart Ground service simplifies testing and provides practical recommendations so you can finally have confidence in your grounding system.

Call us today at **+1 (303) 447-2828** to learn how our grounding experts can help maximize your operation's potential.

## Fall-of-Potential (FOP)

An old method intended for small, isolated facilities.

### Limited Capabilities

For each measurement, FOP testers are capable of only one reading at a single frequency, with no validation of the results. All analysis must be performed manually, increasing risk for error.

### Narrow Applications

FOP can't distinguish background noise from test current, thus making it inappropriate for energized systems.

### Questionable Results

No error checking or confidence levels. Not sensitive enough to accurately measure low-resistance grounds like those at large plants or substations.

### Difficult to Deploy

Excessive lead length makes FOP impractical in urban or developed areas. Distance to the current probe must be at least 5 times the diagonal distance of the grid.



*The Smart Ground  
multimeter.*