ANALOG SURFACE RESISTANCE TEST KIT

Operation and Maintenance

staticWorx®
GroundSafe® ESD Flooring

DESCRIPTION

StaticWorx Analog Surface Resistance Test Kit is a portable battery-powered instrument designed to measure resistance point-to-point (RTT) and surface to ground (RTG). The meter is equipped with an automatic test voltage selector. The test voltage will switch from 10V to 100V should the measured resistance exceed 1 x 10^5 ohms.

ESD protected area products should be tested:

A. Prior to installation to qualify for listing in user's ESD control plan. Approved ESD materials (see product qualification table at ANSI/ESD S20.20 Table 3 EPA ESD control items)
B. During initial installation
C. For periodic checks of installed products as part of ANSI/ESD S20.20 Compliance Verification testing per ESD TR53.

Figure 1: Analog Surface Resistance Test Kit

COMPLIANCE VERIFICATION PLAN

"A Compliance Verification Plan shall be established to ensure the Organization's fulfillment of the technical requirements of the ESD Control Program Plan. Process monitoring (measurements) shall be conducted in accordance with a Compliance Verification Plan that identifies the technical requirements to be verified, the measurement limits and the frequency at which those verifications shall occur. The Compliance Verification Plan shall document the test methods and equipment used for process monitoring and measurements. If the test methods used by the Organization differ from any of the standards referenced in the document, then there must be a tailoring statement that is documented as part of the ESD Control Program Plan. Compliance verification records shall be established and maintained to provide evidence of conformity to the technical requirements.

The test equipment selected shall be capable of making the measurements defined in the Compliance Verification Plan." (ANSI/ESD S20.20 section 7.3)

Packaging Analog Surface Resistance Test Kit
1 Analog Surface Resistance Test Meter
1 9V Alkaline Battery
2 Shielded Test Leads
2 Five Pound Electrodes
1 Plastic Carrying Case
1 Certificate of Calibration

StaticWorx®
P.O. Box 1556,
Williston, VT 05495

617-923-2000
fax: 617-467-5871

staticworx.com

MADE IN THE UNITED STATES OF AMERICA

We Keep You Grounded

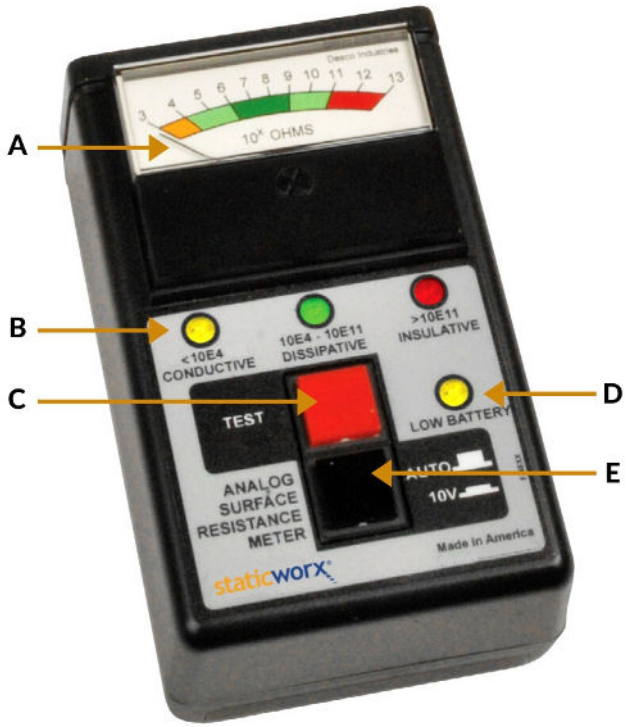

Figure 2: Analog Surface Resistance Meter features and components

FEATURES AND COMPONENTS

A. Analog Display: Displays surface resistance measurements from 1 x 10^3 - 1 x 10^{13} ohms.

B. Resistance Property LEDs: Color-coded LEDs that provide quick-check resistance indicators.

C. Test Button: Hold this button down to operate the Analog Surface Resistance meter.

D. Low Battery LED: Illuminates when the battery power drops to 4.0V (±0.1V).

E. Test Voltage Button: Test voltage will automatically switch from 10V to 100V when set to AUTO. Test voltage will stay at 10V HOLD when set to 10V.

OPERATION

Compliance Verification Test Procedure Guideline

The ESD Association lists test procedures and troubleshooting tips in Compliance Verification ESD TR53.

NOTE: The test kit can be used to measure RTG and RTT of shelves, garments, floor and cart worksurfaces using test procedures similar to worksurfaces and foot grounders.

MEASURE WORKSURFACE RESISTANCE TO GROUND (RTG)

1. Do not clean the surface.
2. Remove all ESD sensitive items from the surface and items that might interfere with the test.
3. Connect one lead banana plug to ground.
4. Use one 5 pound electrode on the other test lead and place it at the center of the surface.
5. Set the Test Voltage Button to AUTO. Press and hold the the TEST button until the measurement is displayed (see Figure 3).
6. Perform additional measurements by placing the electrode on the most commonly used or worn areas.

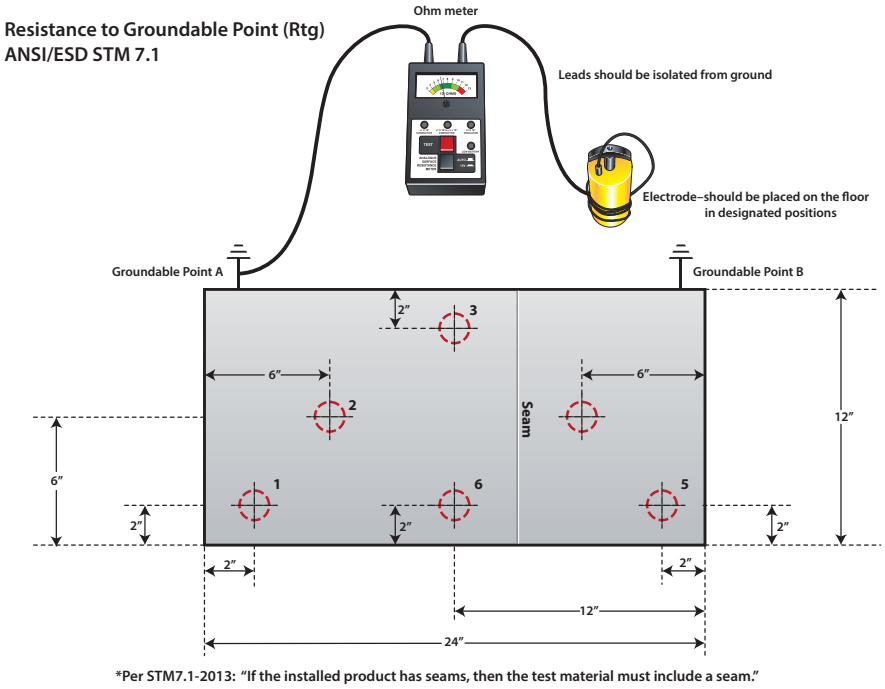

Figure 3: Using the test leads and one 5 pound electrode to measure RTG

CAUTION: If there is a current limiting resistor in the worksurface and the worksurface resistance is lower, the measurement will primarily be the resistance of the resistor. It is recommended to measure RTT particularly if the material color is black.

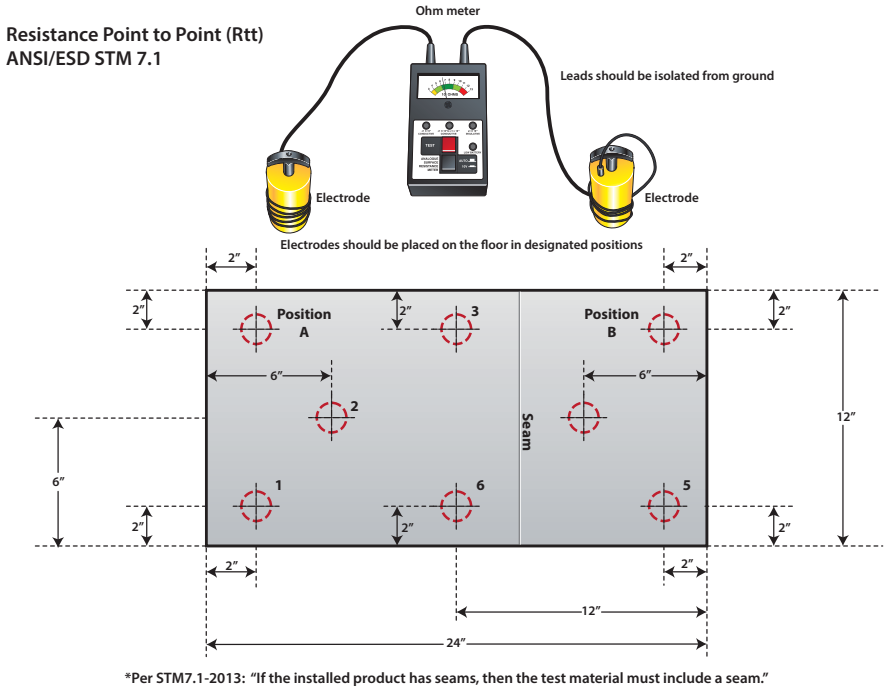

Figure 4: Using the test leads and two 5 pound electrodes to measure RTT

MEASURE WORKSURFACE RESISTANCE POINT-TO-POINT ON THE SURFACE (RTT)

1. Do not clean the surface.
2. Remove all ESD sensitive items from the surface and items that might interfere with the test.
3. Use two 5 pound electrodes and place them 10" apart on the most frequently used area of the surface (2" from any edge, 3" from any groundable point).
4. 4. If the most used area of the surface is not obvious, use two points near the center of the surface.
5. Set the Test Voltage Button to AUTO. Press and hold the TEST button until the measurement is displayed (see Figure 4).

If the measurement is outside acceptable limits, clean the surface and re-test to determine if the cause of failure is an insulative dirt layer or the ESD worksurface material. NOTE: Use an ESD cleaner containing no insulative silicone.

RECOMMENDED FREQUENCY OF PERIODIC COMPLIANCE VERIFICATION OF INSTALLED PRODUCTS

The ESD Association lists test procedures and troubleshooting tips in Compliance Verification ESD TR53.

NOTE: "The frequency of periodic testing is normally specified in corporate operating procedures. … The frequency of testing is driven by the amount of risk exposure that can occur between tests. For example, what is the quantity of product handled between test periods?" (See ESD Handbook ESD TR20.20)

A GUIDE FOR PERIODIC TESTING

TR20.20 section 5.3.1.13 Periodic Tests)

- Worksurface, Carts, Shelves - at least quarterly (see ESDTR20.20 section 5.3.1.13 Periodic Tests)
- Footwear - "Incoming inspection on a lot sampling basis should be performed for all static control footwear." (see ESD TR20.20 section 5.3.3.4 Testing)
- Floor - "In some cases, a simple electrical resistance test with a megohmmeter may suffice. In others, a static charge generation test may be required. The frequency of testing is also a consideration. Some materials, such as floor finishes, may require more frequent testing because of their lack of permanency." (see ESD TR20.20 section 5.3.4.15.1.4)
- Seating - "The recommended electrical resistance range for seating is less than 10E9 ohms as tested in accordance with ANSI/ESD STM 12.1. This value should be during acceptance testing, installation and periodically thereafter." (see ESD TR20.20 section 5.3.5.3 Testing
- Garments - "ESD TR53 describes periodic verification test methods and trouble shooting for garments. The sleeve to sleeve resistance test should be made to ensure proper resistance range through the entire garment. Alternately, the garment while worn can be tested using a wrist strap tester." (ESD Handbook ESD TR20.20-2008 section 5.3.13.3.1.7 Periodic Verification Testing)

MAINTENANCE

The area surrounding the cable jacks at the top end of the meter should be wiped with a clean cloth moistened with alcohol to remove skin oils that will accumulate and affect the accuracy at high resistances. The frequency of cleaning will depend on usage; once a month would be a good starting point.

Per ANSI/ESD S4.1 "Clean the electrodes with a minimum 70% isopropanol-water solution." Make sure conductive pads are dry prior to use.

The Analog Surface Resistance Meter requires little maintenance, and there are no user serviceable parts. If your unit requires service beyond cleaning the electrodes or replacing the batteries, please contact Staticworx Customer Service on 617-923-2000.

SPECIFICATIONS

Resistance Ranges	1 x 10^3 to 1 x 10^{13} ohms @ 10 Volts, complies with ANSI/ESD S4.1 1 x 10^6 to 1 x 10^9 ohms @ 100 Volts, complies with ANSI/ESD S4.1
Accuracy	±1/2 decade
Power supply	9V alkaline battery
Operating Temperature	41˚F to 85°F (5˚C to 30°C)
Environment Requirements	Indoor use only at altitudes less than 6500 ft. (2km) Maximum relative humidity of 80% up to 85°F (30°C
Meter Dimensions	4.5" x 2.8" x 2.1" (11 cm x 7 cm x 5 cm)
Meter Weight	0.5 lbs (0.2 kg)
Carrying Case Kit Dimensions	9.5" x 12.0" x 3.5" (24 cm x 30 cm x 9 cm)
Carrying Case Kit Weight	12.0 lbs (5.4 kg)
External Electrode	5 lbs (±2 oz), 2.5" in diameter complies with ANSI/ESD S4.1