

# Periodic Verification of Soldering and Desoldering Equipment

## Provided by the ESD Association

### Q:

Are there some simple methods that don't require a lot of expensive equipment that I can use to periodically confirm that I am not causing damage to ESD sensitive product with my Soldering and Desoldering Equipment?

### A:

Electrical overstress (EOS) and electrostatic discharge (ESD) from soldering and desoldering activities can cause damage to some electronic components and assemblies. The same characteristics essential to the initial selection of soldering and desoldering equipment must be periodically verified during their use. These characteristics are resistance between the tip of the tool and the ground reference, tip current leakage, and tip voltage. ANSI ESD STM 13.1-2000 outlines several methods to qualify, verify compliance, and test repairs on AC powered Soldering/Desoldering Hand Tools. In addition, be sure to consult the equipment manufacturer's procedures, and or contractual requirements for specifics on frequency of checks and certification. The level of use of the equipment will also impact how often soldering and desoldering equipment performance should be checked.

This article will outline in brief two convenient test methods from ANSI ESD STM 13.1-2000. These methods are not intended for equipment qualification.

### Soldering Iron Tip-to-Ground Resistance (de-energized "cold" iron)

#### Test Equipment

1. DC Ohmmeter capable of measuring a DC resistance of 0.1 ohms through 1.0 megohm with an accuracy of +/- 10% of the measured value.
2. Calibration resistor; ½ watt 2 ohm +/- 1%

#### Test Procedure

1. Check for proper function of the ohmmeter by using the calibration resistor. Confirm that the DC Ohmmeter reads between 1.8 and 2.2 ohms.
2. Thoroughly clean and tin the soldering iron tip.
3. Unplug the iron from the electrical outlet and allow it to cool to room temperature.
4. Check for proper tip or element installation into the handle.
5. Attach one of the DC Ohmmeter test leads by means of an alligator clip to the third wire (ground prong) of the iron's AC power cord. Press the other test lead firmly against the tinned end of the iron's tip.
6. Record the reading.
7. Reverse the ohmmeter test leads and repeat the test.

Both resistance readings must be less than 2 ohms



### Soldering Iron Tip Voltage – Hot Iron

**Precautions** – The following steps involve working with items having very hot surfaces (test electrodes and soldering iron tips).

#### Test Equipment

1. Ground Fault Interrupter (GFI), 15 or 20 amp unit with a trip point current of less than 10 milliamps (4-6 mA nominal)
2. Test Electrode – a ½” wide (1.27cm), 2” long (5 cm), 1/16” thick (2.44mm) piece of copper with a stranded copper wire bonded to one end and ½” square tinned area at the other end.

#### Test Procedure

Excessive tip voltage is an indication of equipment current leakage.

1. Connect the copper wire from the Test Electrode to a known ground within reach of the unit being tested.
2. After confirming that the tip resistance is less than 2 ohms (as outlined above), plug the equipment into a qualified GFI unit and turn-on the power.
3. Allow the equipment to reach operating temperature.

4. Assuming that the tip is still clean from the resistance test above, bring the tip of the soldering equipment in contact with the tinned end of the Test Electrode.
5. The soldering equipment should not trip the GFI unit.

Providing equipment power through a GFI will result in a real time monitoring of fault current to less than the trip point of the GFI (less than 10mA) regardless of the number of leakage paths. This will be the case as long as the tip resistance to ground is periodically checked and is less than 2 ohms. Periodic performance of the above steps will assure a current leakage level below that which will damage ESD sensitive circuits. Use of a GFI will also reduce the possibility of personal hazard due to an electrode fault.

Working Group 13 Hand Tools was reactivated in 2007 to begin the review process of ANSI/ESD STM13.1-2000. A new revision to this document should be released during the later half of 2008 or early 2009. Once ANSI/ESD STM13.1 is re-released, Working Group 13 is planning to review the potential industry need for other standards in the Hand Tools arena. Working Group 13 welcomes guests and new members to their committee meetings in February, June, and September.

Visit the ESD Association web site at [www.esda.org](http://www.esda.org) for meeting dates and locations.

#### References

ANSI/ESD STM13.1-2000 Standard Test Method for Measuring Electrical Potential from – Electrical Soldering/Desoldering Hand Tools. Authors Harry Joliff, Melissa Jollif, Ben Baumgartner, Julius Brodbeck, Larry Burich, Cheryl Checketts, Mike Fowler, Charles Gerdel, Vaughn Gross, Jim Mann.

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#### About the ESD Association

Founded in 1982, the ESD Association is a not for profit, professional organization directed by volunteers dedicated to furthering the technology and understanding of electrostatic discharge. The Association sponsors educational programs, develops ESD Standards, holds an annual technical symposium, and fosters the exchange of technical information among its members and others. Additional information may be obtained by contacting the ESD Association, 7900 Turin Rd., Bldg. 3 Rome, NY 13440-2069 USA, Phone 315-339-6937, Fax 315-339-6793. Email [info@esda.org](mailto:info@esda.org).  
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