

Lead Free Product Testing

Trace Laboratories – Central’s lead-free testing program examines products that are expected to be in compliance to the European RoHS (Restriction of the Use of Certain Hazardous Substances) directive. This directive calls for the elimination of lead (Pb) in all electronic components in European product supply chains by July 1, 2006. Other countries, including the US, are expected to quickly follow suit.

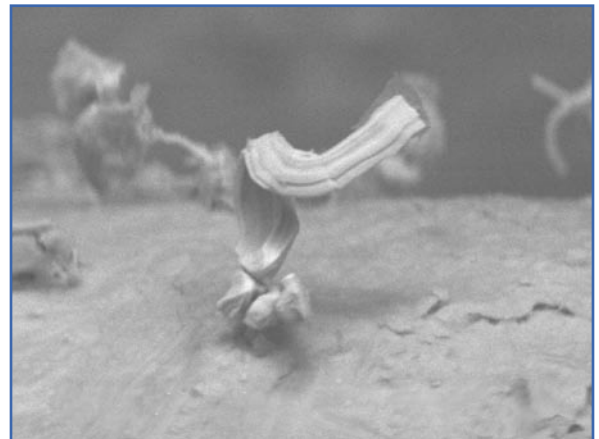
Trace’s lead-free testing program incorporates the iNEMI (International Electronics Manufacturing Initiative) specification for the testing of lead-free components. This testing helps to determine the extent of certain problems associated with lead-free products, including one of the major concerns, tin whisker growth.

Tin Whiskers

With the use of tin (Sn) as a major component of lead-free solder, tin whiskers can develop. Tin whiskers are needle-like growths that develop out of tin surfaces. The growths can cause short circuits or functional damage to the product.

It is generally accepted that:

1. Whiskers grow at room ambient conditions (~25°C, 50 to 80% RH).
2. Whiskers will not grow at temperatures exceeding 90°C.
3. “Bright” tin creates more whiskers faster than “matte” tin.



Tin Whisker Testing

- Initially examine each of the pads /leads/joints for tin whiskers
- Acquire digital photos under magnification
- Provide an electric bias (which studies have shown promotes the propensity of tin-whisker growth)
- High temperature/humidity aging test for 4000 hours
- A storage test at ambient conditions for 4000 hours
- A rapid thermal cycling test for 1000 cycles



Lead-Free Product Testing

Trace Labs is capable of meeting all lead-free applications as specified by iNEMI.

Trace Laboratories' program will inspect using certified optical equipment. Complete written reports are available as part of the certified tin whisker testing program. Failure analysis is available through our Trace Laboratories East facility.

Testing for Presence of Lead

This series of tests confirm that materials are truly lead-free. The test is conducted on the solder before product assembly. The metal is digested in acid and tested with Atomic Absorption Spectroscopy (AAS) or Inductively Coupled Plasma (ICP).

Mechanical Strength

This test examines the integrity of lead-free solder joints.

- Lead pull strength
- Lead shear strength
- Cross sectioning the joints
- Energy dispersive X-Ray spectroscopy (EDS)

Other Common Lead-free Product Defects

- Poorly optimized lead-free wave soldering
- Non-wetting
- Insufficient solder
- De-wetting
- Icicling
- Cold solder joints
- Blow holes
- Solder balls/capillary balls
- Fillet lifting
- Skips
- Grainy joints

Independent, Internationally Accredited Testing Services

- ✓ Acceleration
- ✓ Climatic Testing, Shock/Vibration, Material Characterization
- ✓ Contour Flight Fatigue Life (Thermal Shock and Cycling)
- ✓ EMC Testing
- ✓ Environmental Stress Screening (ESS)
- ✓ Explosion Proofing
- ✓ Failure Analysis
- ✓ HALT/HASS
- ✓ High Altitude Outgassing
- ✓ Solder Joint Reliability



Testing is performed in strict accordance with the standards and customer-specific requests. The lab is also available on a per-day basis for preliminary testing and troubleshooting.

Trace is an A2LA Accredited Laboratory.

For more information, or for a quote on specific test requirements, contact:

Trace Laboratories - Central
1150 West Euclid Avenue
Palatine, IL 60067
Phone: 847-934-5300
Fax: 847-934-4600

Trace Laboratories - East
5 North Park Drive
Hunt Valley, MD 21030
Phone: 410-584-9099
Fax: 410-584-9117

Email: info@tracelabs.com

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www.tracelabs.com