

Lead Free Product Testing/Tin Whisker 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 NEMI (National 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 more major concerns being 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 growths that develop out of tin surfaces. The growths can cause short circuits or functional damage to another part of the product. Tin Whiskers are caused in the following conditions:

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

Testing

- * Initially examine each of the pads /leads/joints for tin whiskers
- * Perform scanning electron microscopy
- * Photograph at approximately 3000x
- * Tin whisker accelerated test project
- * Isothermal tests
- * Thermal cycling test
- * Assembly, pre-conditioning, and providing of an electrical bias representing actual use conditions
- * 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

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

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 done 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)
- * SEM

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

For more information on Lead Free Product Testing or Tin Whisker Testing, please request a quote or contact us.