

COMPLIANT LEAD FREE (RoHS)

Surtek is an industry leader in Pb-free soldering operations. From participating in international standards organizations to conducting company-wide studies of Pb-free soldering (i.e., selection of solder alloy, evaluation of solder paste, wave solder flux, equipment and components, optimization of processes, designing rules, reliability, quality and costs of manufacturing), we believe that Surtek electronics has developed lead free soldering services that is second to none. Our lead free services cover:

- Printed Circuit Boards
- Rework
- Assembly (SMT or THA)
- Wave Soldering
- Materials Analysis

We comply with all PCB lead free and RoHS assembly standards. All of Surtek's lead free services use special procedures to verify compliance. To assist our customers better, we assist their transitions to PCBs that are RoHS compliant.

1.0 THE SOURCING OF LEAD FREE COMPONENTS

As part of our Turnkey, lead free prototype assembly services, we assist our customers in sourcing lead free PCBs, materials and components for their Bill of Materials (BOM). Please contact Sale/Quality for more information on lead free parts sourcing.

2.0 ROHS PCB ASSEMBLY

The RoHS Directive lists the hazardous materials that are not to be used in the RoHS PCB assembly process including printed circuit boards, discrete components, or solder joints. Since blank PCBs used in leaded processes are usually coated with a lead tin finish, the board will need to be altered in order to ensure compliance with RoHS standards.

3.0 LEAD FREE PROTOTYPING PROCESS

PCBs used in lead free prototyping are manufactured at temperatures that are usually 30 to 50 degrees greater than with leaded processes. As a result of the higher processing temperatures, the PCB's substrate and related components must be capable of withstanding higher reflow oven temperatures. Moreover, the level of IC moisture sensitivity must be about two classes higher for lead free PCBs. Lead free PCBs may also have a shorter shelf life than leaded PCBs.

4.0 REFLOW TEMPERATURE PROFILES

Surtek recommends at least 1 additional lead free PCB as well as an extra set of temperature sensitive parts (e.g., ball grid arrays, heat-slug parts, etc.) to ensure the correct oven reflow temperature profiling. Now, these parts can be true parts, non-functional true parts, or thermally compatible substitute components (dummy-parts). It has been Surtek's experience that most quality parts vendors can provide non-functioning, mechanical samples or thermally similar parts.

5.0 VISUAL APPEARANCE OF LEAD FREE SOLDER JOINTS

It is worth noting that the appearance of a lead free solder joint is quite different than that of a leaded joint due to the metallic composition of the lead free solder. On first look, a lead free solder joint appears similar to be a "cold" solder joint; it requires a trained eye to determine the quality of a lead free solder joint. Surtek employees an inspection staff trained to the IPC-610 standards. They are very capable to determining the solidity and quality of lead free solder joints.

6.0 VERIFICATION OF THE LEAD FREE BOM

All customers are responsible for verifying that their lead free Bill of Material (BOM) is correct and the PCB with associated components meet lead free requirements. If you need our assistance, Surtek's Sale /QA department is more than happy to provide you with assistance. For instances where PCBs and/or components arrive at Surtek's production facilities in moisture packages that have been invalidated, we will advise you that baking will be required prior to PCB assembly commencing.

7.0 PCB STENCIL AND SOLDER PASTE APPLICATION

Applying the stencil to the lead free compatible PCB is the first step of the manufacturing process. This is accomplished by using a lead free compatible solder past alloy called SAC305, which is commonly used in Surface Mount, Wave Solder and Wire (Hand) soldering. After soldering is completed, the PCB is inspected visually. This inspection verifies solder coverage and the acceptability for manufacturing.

8.0 AUTOMATED COMPONENT PLACEMENT

Using automated pick-and-place SMT equipment, parts are placed on the PCB per the customer's BOM with each component having an assigned part number. The pick-and-place equipment is programmed so it "picks" the part based upon the unique part number and places it on the PCB. All components must be lead free compatible and must be capable of handling the higher soldering and process temperatures that are characteristic of lead free PCB assembly processes.

9.0 THROUGH HOLE AND HAND/WIRE SOLDERING

In addition to automated parts placement, Surtek is capable of lead free Through Hole and Hand/Wire soldering operations. These operations are performed in board regions where no leaded parts are placed. For these manual operations, we apply lead free solder and use lead free soldering tools.

10.0 PROCESSING THE PCB IN THE REFLOW OVEN

The final step of the lead free PCB manufacturing is processing the PCB in the reflow oven to melt the solder paste to form a metallic bond between the component and the trace of the PCB. As stated previously, both lead free components and PCBs that are compliant with the RoHS standards are required to be processed at higher temperatures in the oven. Since the temperature margin or “window” of processing is narrower than with leaded processes, the reflow temperature profile is critical since it is used to control the reflow soldering processes and tracking thermal profiles. For correct temperature profiles, the following parameters are needed: thickness, finish, and size of the board, as well as the layer count.

11.0 FINAL TESTING

After soldering we conduct a visual inspection in order to determine if any manufacturing defects exist. Our inspection staff uses the IPC-A- 610 Rev F Class 2 soldering acceptability standard for this testing.

12.0 PACKAGING OF THE LEAD FREE PCBs

Once the lead free PCBs are completely assembled and tested, the boards will be individually packed in electrostatic discharge (ESD) bags for shipping.