

## **T4: Lead-Free Rework: Its Implementation and Lessons Learned**

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### **Course Description**

July 1, 2006 witnessed initial implementation of the European Union RoHS directive. As of that date, the majority of electronic products shipped into the EU had to be lead-free. Pending is the China RoHS directive that will restrict use similar hazardous materials in many products shipped into China. Rework of these products required adoption of both lead-free materials and processes. How have electronic assemblers responded in both their product design and in their rework/repair operations in satisfying these requirements?

This workshop addresses the advantages/disadvantages of lead-free alternatives for PCB and component termination finishes. It discusses the need for new visual inspection criteria in absence of the smooth, shiny finishes and low wetting angles to which we are accustomed. It describes the degraded wetting properties of lead-frees, the extended soldering cycles of lead-frees, and potential damage caused by these. It also focuses on the advantages/disadvantages of candidate lead-free alloys for component leads, terminations and board finishes, their impact on rework, and new profiling requirements required by these.

### **Topics Covered**

- Lead-free alloys and their properties
- Component and lead surface finishes
- PCB land and pad finishes
- Managing the changeover to lead-free
- Hand soldering of through-hole and SMT lead-free components
- Rework of lead-free assemblies
- Flux effectiveness with lead-free solders
- Thermal profiling requirements
- Moisture sensitive devices (MSDs) in lead-free soldering
- Lead-free visual inspection guidelines
- X-ray of lead free interconnects
- Assembler experiences in adapting to lead-free rework/repair

### **Who Should Attend**

Managers, designers, manufacturing, process, quality and operations personnel involved in the decision-making, implementation, and application of lead-free technology will benefit from this course. Some familiarity with SMT is required.