

# **SMT Process Fundamentals for Tin-Lead and Lead Free Assembly One-Day Tutorial**

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## **Course Description:**

This course will provide a thorough, introductory but comprehensive understanding of the surface mount and mixed technology assembly processes for lead based and lead free electronics packaging. Topics include an in-depth coverage of PCBs, assembly types, component types, assembly process, assembly materials, identification of defects, troubleshooting and process control. Critical design tips for ease of manufacture and assembly will be discussed throughout the lecture. Tradeoff decisions between different materials and equipment types will also be highlighted. A good comparison of lead based and lead free process will be provided, including implementation issues.

## **Who should attend?**

- ◆ People with very little or no background in SMT
- ◆ Process, Design, Test and Quality Engineers
- ◆ Process and Quality Technicians
- ◆ Operators
- ◆ Marketing, Sales and Purchasing Staff
- ◆ Managers

## **After completing this course, you will be able to:**

1. Identify various SMT components, their terminology and nomenclature
2. Understand what a PCB is and also the need for effective thermal management
3. Identify types of mixed technology PCB assemblies and their assembly sequence
4. Understand the influence of design on the ease of manufacturing and assembly
5. Understand thoroughly the entire assembly process and the various parameters that influence it.
6. Understand the influence of various materials such as solder paste, adhesives, flux, etc.
7. Detect assembly process defects and troubleshoot them.
8. Evaluate equipment required for setting up assembly lines
9. Understand Lead Free Implementation and Issues.

## **Topical Outline**

1. Electronics Packaging & Levels
  - Functions of Packaging
  - Thermal management issues
  - PCB Packaging
  - Assembly Types
  - Assembly Process Sequence
2. PCB Types, Materials and Manufacturing
3. Overview of Through Hole Technology
  - Component Types & Process Steps
4. Overview of Surface Mount Technology
  - Passive Component Types
  - Active Component Specifications
  - Active Component Types (ICs)
  - Common SMT assembly process
5. Stencil Printing
  - Solder Paste-Characterization, Types, Handling & Safety
  - No-Lead Solder and its Impact
  - Stencils and Squeegees-Materials, Types & Manufacturing
  - Print Parameters
  - Process requirements for Lead Free
  - Print Characteristics, Defects and Corrective Action
6. Adhesive Dispense
  - Adhesive Types, Selection & Dispensing Techniques
  - Inspection
  - Reflow Curing
7. Component Placement
  - Factors Influencing the use of Automated Placement Equipment
  - Machine Configurations & Types
  - Component Packaging for Automated placement
8. Soldering
  - Reflow Soldering
    - Typical Reflow Profile
    - Profiling & its importance-How to?
    - Factors affecting good reflow
    - Lead Free Solder and Profiling Changes
  - Wave Soldering
    - Changes needed for Lead Free Solder
    - Process Sequence & Defects
9. Cleaning Materials, Process, & Testing for cleanliness
10. Inspection Techniques, Assembly Defect Identification and Corrective Action
11. Testing of PCB Assemblies
12. Rework and Repair