

Wave Solder Process Training & Troubleshooting On-Site Workshop Agenda

- ▶ Our most popular course.
- ▶ This is down-to-earth, no nonsense training that will help your entire staff right away.
- ▶ It includes direct remedy of your own specific board and wave machine issues.
- ▶ Covers your wave solder process, wave machines, chemistry, materials, lead free and, uniquely, how to use your Optimizer successfully for immediate improvements.
- ▶ All participants will use the celebrated ***Wave Solder Survival Guide***.
- ▶ The course's content and depth are designed for your company's immediate and long-term improvements in wave solder quality.

DAY 1 - At wave machine and in classroom

A New Perspective On Your Process

- A. Introduction to the Solder Bond – Solder Joint Formation, Wetting
- B. Materials – Solder, Flux, Boards, Components
- C. Instrumentation – Fluxer, Air Knife, Conveyor, Preheaters, Solder Pot, Nozzle
- D. Board-Wave Interaction – Parallelism, Dwell Time and Immersion Depth, presentation includes copyrighted drawings
- E. The Relationship Between Your Wave Machine Settings and Board-Wave Interaction – Review of wave machine settings as compared to board-wave, fluxer and temp data
- F. How to Ensure that Your Boards are Parallel to Your Wave -
“The Secret Technique of Marking Your Fingers”, demonstration of procedures

The Simple Chemistry Factors That Make A Good Solder Joint

- A. Solder Bond Formation I – How your solder bond is formed at first contact with your wave, in your wave and exiting your wave
- B. Solder Bond Formation II – How your molten solder penetrates the base metal
- C. Flux – Roles of flux, acidity and pH level, types of fluxes, in-depth analysis of your activation points and breakdown temperature, verifying thorough and even flux distribution, measuring and controlling your weight of flux applied
- D. Wetting Force – Angle of wetting, solder fill
- E. Solder Temp – Relationship of tin to lead as your solder temperature changes

continued

DAY 2 - At wave machine and in classroom

How to REALLY Achieve World Class Wave Solder Results

- A. Measuring the 12 Key Data Points of Wave Soldering and Identifying the Exact Variables of the Wave Solder Process
- B. Recent Studies on Wave Solder Process Control – Review of published experiments, methodology and results

Your PCBs Experience In The Wave Machine

- A. How to Integrate Your Variables – What happens when your boards pass through the wave machine at each phase of its functioning
- B. Why Temperature Control is So Easy – Preheat temp, preheat slope, maximum temp, delta T, top-side and bottom-side, solder wave temperature, the broad and forgiving temperature windows, daily temperature verification

Lead Free: Basic Principles and Critical Issues

- A. Alloys
- B. Temperature Ranges
- C. Machine Issues
- D. Process Update
- E. Lead Free Defects – How to cure them; how to prevent them.

Hands-On Experiments For Superior Board Quality

- A. The Flow of the Solder Wave I – Solder wave flows, pulsations and variations
- B. The Flow of the Solder Wave II – How your solder is pumped through the nozzle with its three characteristics: malleability, elasticity and hardness
- C. The Flow of the Solder Wave III – The qualities of flow, viscosity and velocity
- D. Parallelism – Full Implementation of “The Secret Technique of Marking Your Fingers”; roles of conveyor, solder pot, nozzle, dross deceptions, backplate
- E. Immersion Depth – Relationship to contact length, relationship to dwell time, how to determine and achieve repeatability
- F. Dwell Time – Definition, relationship to contact length, relationship to immersion depth, relationship to wave shape, optimization by board type
- G. Optimizing Your Wave Solder Process to Measure and Control Repeatability and to Identify and Maintain Optimal Parameters For Each Board Type – Provocation of defects, performance of fast responses to wave solder process measurements

continued

DAY 3 - *At your wave machine and in classroom*

Wave Solder Process Knowledge Assessment and Learning Test

- A. Comprehensive, Interactive Review of Key Workshop Highlights, including the key data points and supporting parameters for process optimization
- B. Detailed Analysis of High Impact Daily Procedures
- C. Helpful Breakdown of Unique Methods to Eliminate Board Defects
- D. Thorough Review of Special Techniques to Quickly Lower Production Costs
- E. Further Illustrations - using your own boards running through your wave machines

DAYS 4 and 5 - *With Individual Staff Members at Wave Machines and in Conference*

Single-Minded Focus on Solving Your Specific Board Defects and Wave Machine Issues

- Active, expert, on-site troubleshooting to solve your specific wave solder challenges that were not remedied during group instruction.
- Working directly with individual managers and engineers designated by you, on a one-on-one basis, to punch through your current barriers, cure your defects, and show you how to keep it that way.
- All factors will be considered: Process, equipment, chemistry, materials and design.
- We will communicate with you in advance, to set priorities for this very special day of your workshop. This includes identifying which board types and wave machines are at issue and characterizing the nature of your current concerns.
- Once your issues have been addressed, you will be provided with clear procedures to prevent their recurrence.

Your program will employ the copyrighted **Wave Solder Process Survival Guide** as a teaching tool, workbook and reference source, and the patented Wave Optimizer to obtain and respond to data on your boards' experiences in your wave machines and your wave machines' performance.