

Course Title:

Lead-Free Soldering - Metallurgical Fundamentals, Failure Modes, and Optimal Processes (a full day course)

Instructor: Dr. Ning-Cheng Lee, Indium Corporation of America

This course emphasizes on the technical knowledge required for implementing lead-free soldering. It covers the background, solders, surface finishes, components, substrates, assembly processes, rework, and reliability of lead-free soldering. Furthermore, it discusses the failure modes, challenges, and solutions for addressing those issues.

Topics:

1. Lead-free legislation and implementation status
2. Lead-free alloys
3. Lead-free surface finishes
4. Lead-free components and substrates
5. Reflow processes of lead-free soldering
6. Lead-free wave soldering
7. Lead-free rework
8. Lead-free soldering inspection
9. Lead identification
10. Transition stages of lead-free soldering
11. Soldering area array packages
12. Fragility of SAC solder joints
13. Underfilling lead-free BGAs and CSPs
14. Tin whisker formation mechanism and solutions
15. Voiding mechanisms and control at lead-free reflow soldering
16. Failure modes of lead-free solder joints
17. Additional challenges of lead-free soldering

Who Should Attend:

This course is intended for engineers, supervisors, managers, scientists, technologists, and technicians who are constantly plagued by the varieties of problems encountered in lead-free soldering of SMT industries.

Biography of Ning-Cheng Lee:

Ning-Cheng Lee is the Vice President of Technology of Indium Corporation of America. He has been with Indium since 1986. Prior to joining Indium, he was with Wright Patterson Air Force Base Materials Laboratory (1981-1982), Morton Chemical (1982-1984), and SCM (1984-1986). He has more than 20 years of experience in the development of fluxes and solder pastes for SMT industries. In addition, he also has very extensive experience in the development of underfills and adhesives. His current research interests cover advanced materials for interconnects and packaging for electronics and optoelectronics applications, with emphasis on both high performance and low

cost of ownership.

He received his Ph.D. in polymer science on structure-property relationships from University of Akron in 1981. Prior to Akron period, he has studied organic chemistry at Rutgers University in 1976. He received a BS in chemistry from National Taiwan University in 1973.

Ning-Cheng is the author of "Reflow Soldering Processes and Troubleshooting: SMT, BGA, CSP, and Flip Chip Technologies" by Newnes, and co-author of "Electronics Manufacturing with Lead-Free, Halogen-Free, and Conductive-Adhesive Materials" by McGraw-Hill. He is also the author of book chapters for several lead-free soldering books. He received two awards from SMTA and one from SMT Magazine for best proceedings papers of international conferences. He is honored as 2002 SMTA Member of Distinction, and received 2003 Lead-Free Co-Operation Award from Soldertec, and 2006 Exceptional Technical Achievement Award from IEEE CPMT. He serves on the board of director for SMTA. Among other editorial responsibilities, he also serves as one of the editorial advisory boards of Soldering & Surface Mount Technology, and Global SMT & Packaging. He has numerous publications and frequently gives presentations, invited seminars, keynote speeches, and short courses worldwide on those subjects at many international conferences or symposiums.