



TJ GREEN ASSOCIATES, LLC

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Wire Bonding Certification

3 DAYS

This three day course is a combination of classroom and “hands-on” exercises conducted at the wire bonder designed to teach the basics of manual gold ball and wedge wirebonding. The goal is to teach the process of wirebonding, which includes the wire, tool, machine settings and operation, work stage and operator skill. Especially important is how to troubleshoot a wire bond problem and get the process back on track. The instructor shares his numerous years of experience and provides insightful tips that help build confidence. Students develop a functional understanding of the wire bond process along with important quality and reliability considerations for hi rel military and medical products. In addition to bonding, the students also learn the important visual inspection criteria and how to properly perform wire pull/ball shear testing.

This course is intended for new wire bonders, but many experienced bonders and process/quality engineers have taken the course and learned a great deal. The classroom training is open to anyone, but the “hands on” activities are limited to 3 or 4 students at a time due to logistical reasons.

Course Outline

Day 1 - Classroom Activities (AM Session 0830-1200 hrs)

The Wire Bond Process

- Thermosonic gold ball bonding
- Wedge bonding
- Ribbon bonding
- Thermocompression bonding
- Deep access wire bonding
- Heavy gage wirebond processes
- Material properties of the bonding wire
- Wire bonding tools
 - Selecting the proper tool
- Factors that affect the wirebond process
- Review of Mil spec visual criteria
 - Source requirements

Afternoon Session in Lab with Operators and Inspectors (see below)

Day 2 - Classroom Activities (AM Session 0830-1200 hrs)

Review and Discussion from Previous Day

Review of Wirebond Defect Photos (wirebonds ... good vs. bad)

Wire bond defects and related materials and process parameters



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- Die bonding processes and what to look for at wirebonding
- Common cleaning process used prior to wirebonding
- Wire bond pull testing
 - Destruct pull test and Mil spec limits
 - Non-destruct pull testing
- Ball shear testing per the ASTM test method

Afternoon Session in Lab with Operators and Inspectors (see below)

Day 3 - Morning Session in Lab with Operators

Classroom Activities (PM Session 1400-1630 hrs)

- Review from Previous Day
- Wire Bond Pull Testing
- Ball Shear Testing
- Wirebond Yield and Reliability Problems
- Establishing a bond window using Design of Experiments (DOE)

Lab Exercises “Hands-on” skill development, set-up and trouble shooting

- Bonder Equipment Set Up and Review
- Wire Bond Demonstrations... How to Make Good Bonds
- Setting the Stage Height
- Clamping and Hold Down of the Product
- Student Wire Bond Exercises...Exploring the Effects of Power, Time and Force
- Pull Testing/Ball Shear Testing
- Visual Inspection and Instructor Feedback
- Changing Tool and Wire

- Student Wire Bond Proficiency Demonstration
- Wire Bond Skills Check Off Sheet

- Establishing a Bond Window
- Design of Experiments to Establish a Process Window (optional)
 - Wirebond process controls

- Visual Inspection Exercises
 - Stereo zoom (60X)
 - High power bond inspection

- Course Summary
- Student Examination Test and Review
- Student Feedback and Course Critique