eurofins | EAG Laboratories



Solderability Testing at Eurofins EAG: Ensure Long-term Performance and Reliability

As electronic assemblies become more complex, ensuring high quality solder joints is critical for long term performance and reliability. Poor solderability can lead to defects such as weak bonds, voids, or non-wetting, resulting in assembly and premature field failures. At EAG Laboratories, our solderability testing provides quantitative, data driven assessments of component and PCB surface solderability in compliance with MIL-STD, J-STD-002, and IPC standards. Our testing helps manufacturers and customers to validate materials, optimize processes, and reduce risk in high reliability applications.

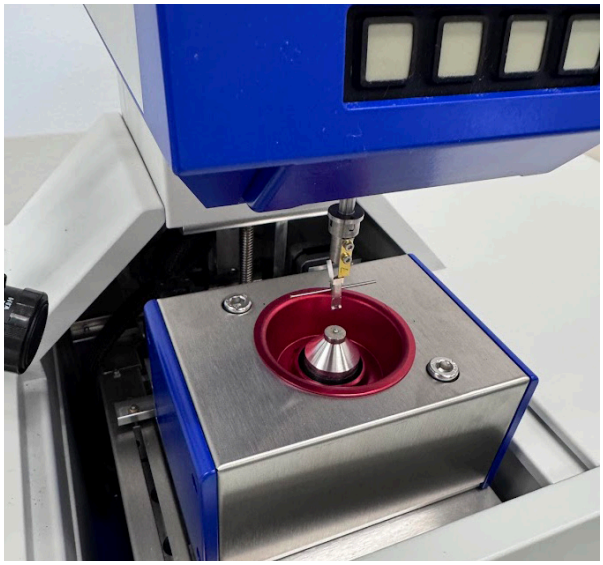

Figure 1: Wetting balance tester setup.

Advantage

EAG solderability testing, centered around the wetting balance analysis, delivers precise, repeatable measurements of solderability performance, supporting and validating the subjective visual inspections often found in more common testing procedures.

Wetting force (mN) is measured to show the strength of solder adhesion. Time to wetting identifies slow or incomplete wetting issues, while meniscus curve analysis evaluates solder interaction with surfaces over time. This repeatable testing allows for increased valuable data that can be used for root cause analysis on solder joint defects. This data can also be utilized for process optimization, by validating flux activity, surface finishes and storage conditions. Additionally with high sensitivity to marginal defects, EAG is able to help detect early-stage oxidation, contamination, or poor surface finishes before assembly failures occur. Measuring wetting speed helps identify slow wetting issues, which go unnoticed in standard visual checks.

Preconditioning through Steam aging and reflow/ oven aging allows moisture induced failures and solderability degradation to be tested. Simply put, EAG transforms solderability testing from pass/fail inspection to predictive quality assurance and fault analysis.

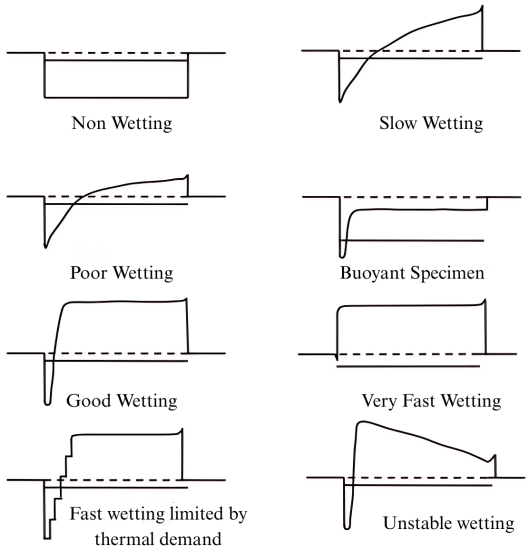

Figure 2: Wetting curves - Characteristic wetting balance signatures and curves provide quantitative insight into the solderability of the sample, such as flux performance, solder alloy behavior, and surface finish quality.

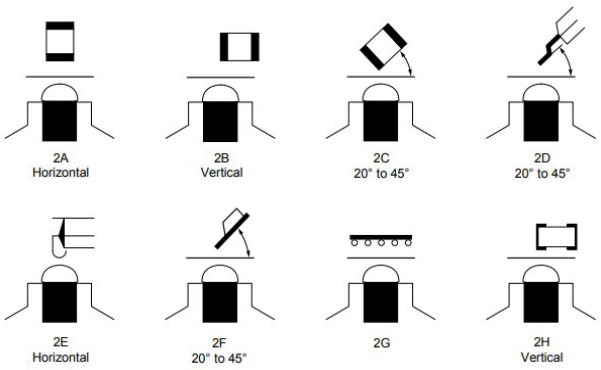

Figure 3: Dip angles - Fixturing and immersion angles are configured per applicable industry standards to ensure test integrity and reproducibility.

Capabilities

- Compliance with MIL STD, J-STD, IPC, IEC Standards
- Wetting Balance Analysis (Force vs. time)
- Evaluation of leads, terminations, PCBs, and surface finishes
- Detection of non-wetting, dewetting, and oxidation effects
- Pre-conditioning simulations
    - Steam Aging
    - Reflow Simulation (Max Temp)
    - Oven Aging

Applications

- Design of Manufacturing
- Quality Control
- Component Qualification (DPA)
- Process Validation (reflow profiles, flux performance)
- Failure Analysis (poor wetting, aging effects)
- PCB pad/coating evaluation

Samples

- Through-hole components
- Surface Mount devices (QFP, SOP, TSOP)
- Wire
- Chip Resistors/Capacitors
- Lead (Pb) and Pb-free solder

Testing Methods & Standards

- ANSI J-STD-002 & J-STD-003
- MIL-STD-883, Method 2003.10
- ISO 9455-16 & ISO 12224-3
- IPC-TM-650, Method 2.4.12

Contact EAG

At EAG, we help clients achieve high quality, reliable products through comprehensive failure analysis services. With a global network of labs and an unmatched range of engineering capabilities, we serve as a single source for both full root cause investigations and targeted analytical techniques. Our proven methodology is both effective and flexible, allowing us to adapt to the specific needs of your project or operation. Backed by decades of experience and technical expertise, our team provides clear, insightful interpretations to help you understand the cause of failure and prevent future issues. We are committed to delivering the answers you need to move forward. Contact EAG.