

Metcal Introduces a Revolutionary Way to Further Mitigate Risks in Hand Soldering

Unsuccessful solder joints continue to be the primary reason printed circuit boards (PCB) fail. Currently, solder joint reliability is determined by visual inspection, operator ability and experience, and the skill to control the aspects influencing the hand soldering process.

Soldering—the bonding of metallic surfaces via an intermetallic compound (IMC) involves several calculated risks prior to application:

- Choice of tip geometry
- Selection of tip temperature
- Collection and analysis of process data

As well as risks associated with the operator who:

- Determines solder geometry
- Detects the transition of solder from solid to liquid
- Calculates the (IMC) formation without adversely impacting throughput or repeatability

To reduce elements of risk prior to hand soldering, they can be identified and steps taken to help minimize poor outcomes. Engineers examine the variables that can impact the hand soldering application, such as tip temperature, solder chemistry, maximum component temperature and board makeup.

The soldering activity is then put into the operator's hands. At this point, the worker's skill and experience determines whether each solder joint is successful or not and is then confirmed by a visual inspection. Operator skill and visual inspection however cannot confirm the correct formation of the IMC.

Introducing another layer of assurance – Metcal's CV-5200 Connection Validation Soldering Station

The role of IMC is critical to the successful formation of a solder joint. With too little IMC formation, the solder joint is cold or dry, hindering electrical connection. Too much IMC and solder joint embrittlement becomes an issue. Validation of the IMC formation during the soldering process mitigates the risk.

Metcal's new CV-5200 Connection Validation Soldering Station verifies solder joint reliability and complements visual inspections. The sophisticated system introduces much-desired technology that changes hand soldering forever. Operators will see real-time, closed-loop feedback of an intermetallic compound formation (IMC)—a critical component of a successful solder joint. Working in tandem, the hardware and software calculate the IMC and if the joint is good, an LED light embedded in the handpiece turns green indicating a quality solder joint has been achieved. The overarching benefits are numerous.

Mitigates Risk and Improves Quality - decreases solder joint defects by validating the intermetallic compound (IMC) formation in a soldered joint

Heightens Process Control - LED light ring on the handpiece lets the operator know if they've produced a successful solder joint

Enhances Visual Inspection - adds repeatability and a measurable standard to the soldering process

Reduces Non-Compliance Risks – tip temperature is precisely calculated by Chip-in-Cartridge technology; advances audit compliance

Adds Traceability/Data Access - communication port provides access to process traceability data; enables easy firmware upgrades

Each factor involved with the formation of the solder joint is an element of risk and can affect throughput and repeatability. The industry has previously relied heavily on control of input variables and operator training to minimize risk with varying degrees of success. With Metcal's CV-5200 Validation Connection Soldering Station the variables and risks associated with operator skill and individual assessment are substantially reduced.

Contact Hisco for more information about the [Metcal CV-5200 Connection Validation Soldering System](#).