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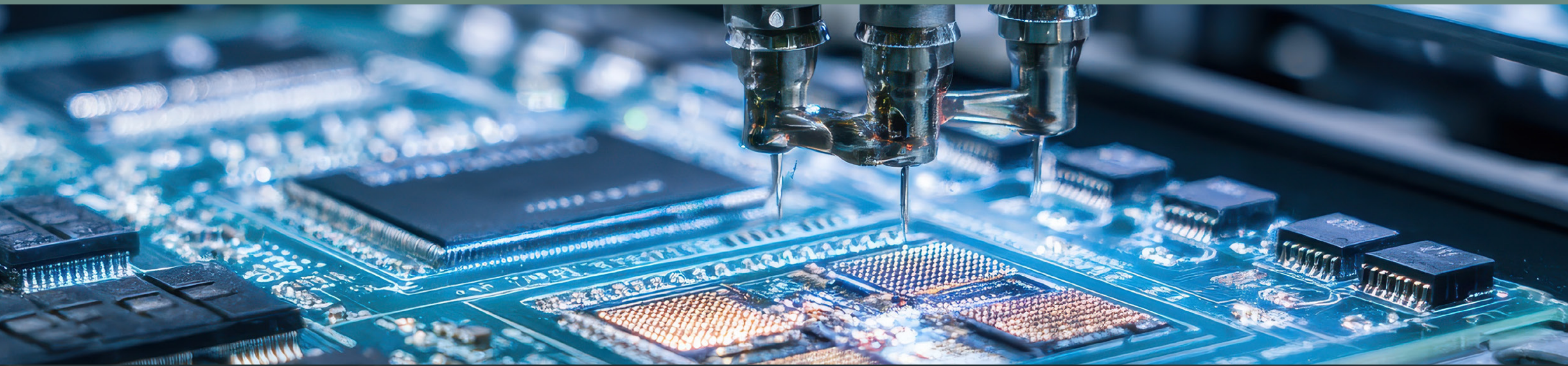
SMT Vacuum Reflow Soldering

Void-free joints for mission-critical electronics

As electronics move toward higher power density, smaller packaging, and harsher operating environments, traditional SMT reflow processes are hitting their limits. Vacuum reflow soldering replaces passive degassing with active gas expulsion under controlled vacuum, delivering a fundamental improvement in solder joint quality.

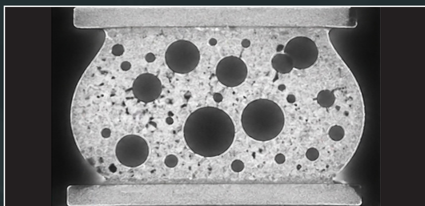


THE PROBLEM WITH TRADITIONAL REFLOW

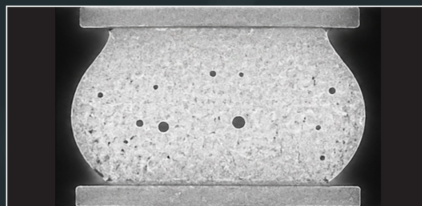
Conventional reflow relies on passive gas release during soldering. This method results in void rates of 10-25% (rising above 30% for complex packages), reduced thermal conductivity, weakened mechanical integrity, and long-term reliability risks. For OEMs targeting automotive, medical, or aerospace markets, these limitations become barriers to entry.

PERFORMANCE COMPARISON

- **VOID RATE:** < 1-5% vs 10-25% traditional (90% reduction)
- **MECHANICAL STRENGTH:** +30-40% vs standard level (superior vibration and drop resistance)
- **THERMAL RESISTANCE:** -35-50% vs traditional (lower chip operating temperatures, longer component life)
- **SERVICE LIFE:** 2-3x vs standard lifespan (proven under temperature cycling, high humidity, and vibration)
- **VOID RATE EXAMPLES:**



Standard reflow: 10 - 25%



Partial vacuum (~100 mbar): 5 - 10%

True high vacuum (~3 mbar): < 1 - 2%

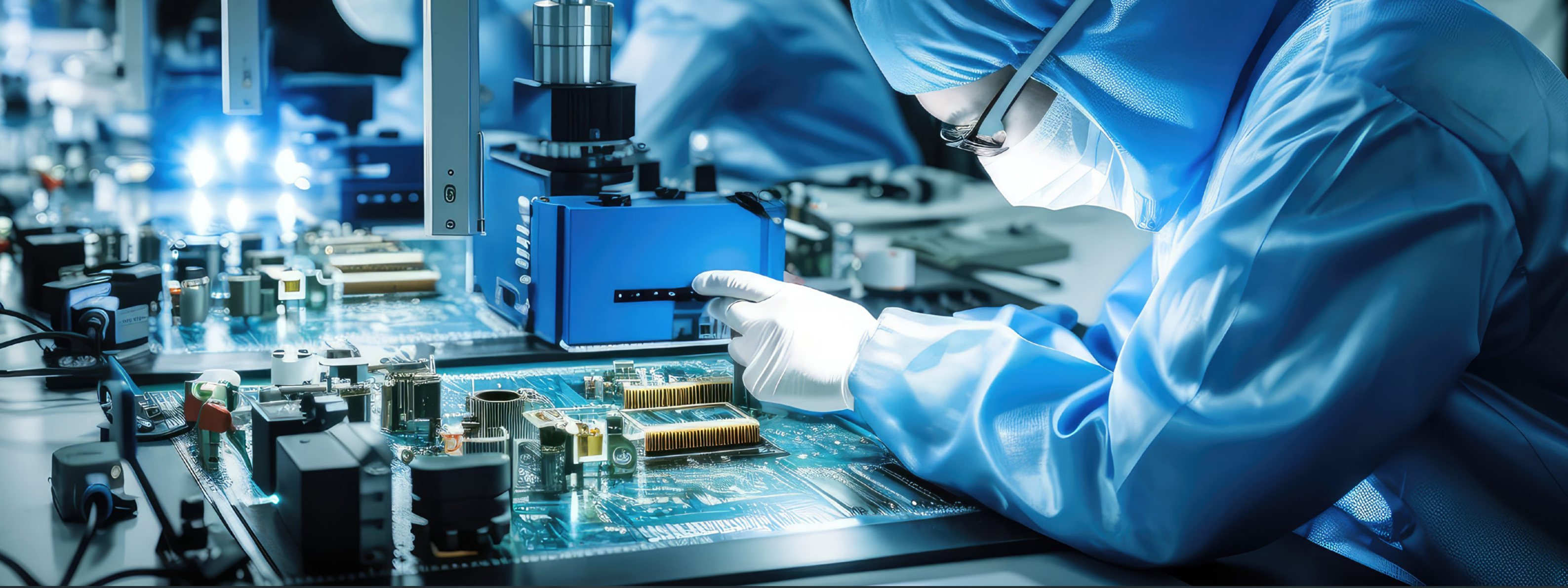
HOW VACUUM REFLOW WORKS

01 PREHEAT
Flux activates under atmospheric pressure, removing oxides and preventing re-oxidation.

02 MELT
Temperature rises above the solder melting point. Alloy powder fully liquefies.

03 VACUUM DEGAS
Pressure drops to 5-50 mbar while solder is liquid. Bubbles expand sharply under the pressure differential and are actively extracted by vacuum pump.

04 FILL + COOL
Atmospheric pressure restores. Liquid solder fills pads densely under pressure, then rapid cooling forms void-free joints.



EQUIPMENT HIGHLIGHTS

VACUUM PRESSURE: Down to 3 mbar minimum

CHAMBER: Integral aluminium alloy construction with reliable air tightness

HEATING: Medium-wave auxiliary heating for uniform thermal control

ATMOSPHERE: Full nitrogen-assisted production throughout

MONITORING: Oxygen analyser with real-time data logging

TRACEABILITY: Full process data saving and recall

PROVEN MANUFACTURING IMPACT

REWORK RATE: 0.3% (down from 8.7% -- a 96.5% reduction)

SOLDERING YIELD: 99.8% (up from 92.1%)

These improvements translate directly into lower rework costs per PCB, reduced scrap rates, fewer warranty claims, and significant annual savings on quality-related expenditure.

INDUSTRY STANDARDS COMPLIANCE

Automotive: AEC-Q100 Grade 0

Access to Tier 1 automotive supplier systems. High-reliability soldering support for IGBT, BMS, and ADAS components.

Medical: ISO 13485

Full compliance with medical device quality management. Safety and regulatory compliance for diagnostic and implantable electronics.

Aerospace: MIL-STD-883

Military-grade manufacturing standards for electronics under extreme temperature, vibration, and shock.

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WHY PARTNER WITH US

Your products deserve solder joints that perform under pressure, not just pass inspection. With vacuum reflow soldering, you get void rates below 5%, yields above 99.8%, and compliance with the standards your target markets demand. Whether you are qualifying for automotive Tier 1 programmes, meeting medical device regulations, or pursuing aerospace contracts, this capability removes the manufacturing risk from your most critical assemblies.

One process. Fewer defects. Faster route to market.

For more information and to contact us visit **lisconn.com**