

MAGNALYTIX[®] SIR Testing

Surface Insulation Resistance Testing

SIR TESTING SERVICES

SIR Testing is a STRESS Test Method used to test for ...

- Flux Residue Corrosiveness to the Functionality of Electronic Components
- Surface Mount Electrochemical Reliability
- Secondary Soldering Process Steps Electrochemical Reliability
- Cleaning Agent, Machine, and Process Electrochemical Reliability
- Climatic Reliability of the Finished Product

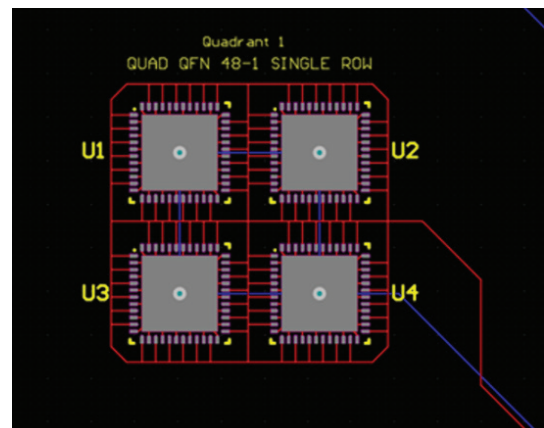
Flux and process residues from each assembly step are collected on the active circuit traces, pad-to-pad, via-to-pad, and hole-to-hole spacing. Electrochemical failures (parasitic leakage and dendrite formation) are typically component or process-specific. The root cause of these failures is **IONIC** contamination left under component terminations.

A critical step in building reliable assemblies is the selection of soldering materials, cleaning materials, and process conditions over the discrete steps used to complete the assembly process. Highly dense designs using miniaturized components must consider these component types as potential risk factors. SIR (surface insulation resistance) measures the random surface effects of process materials and residues to qualify and control the process. Making these invisible process residues visible enables the assembler to make system corrections when necessary. Understanding system random effects and preventing those factors improves quality.

SIR Test Method per IPC TM-650 2.6.3.7

SIR detects the effects of Ionic contamination that can cause intermittent and total failure of the product in the field. SIR testing uses an industry-standard pattern of positive and negative traces (called a comb) to test

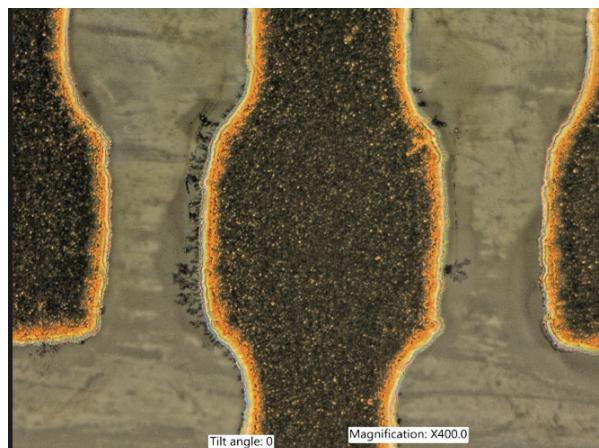
- The conductivity of process residues by inducing environmental moisture
- Temperature
- Relative Humidity
- Bias voltage
- In a test chamber monitoring electrical resistance over 7 days



Climatic (Environmental) Effects of Products in the Field

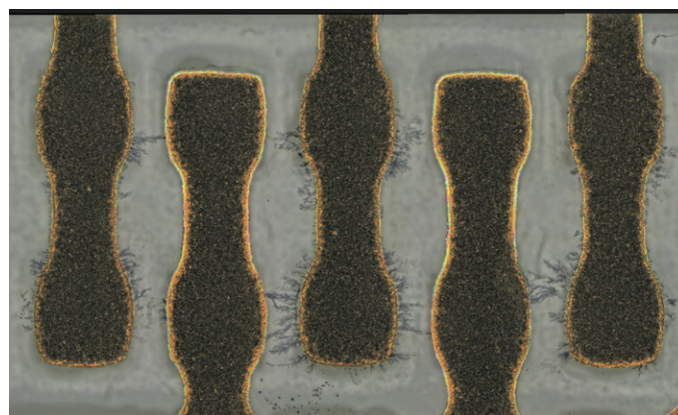
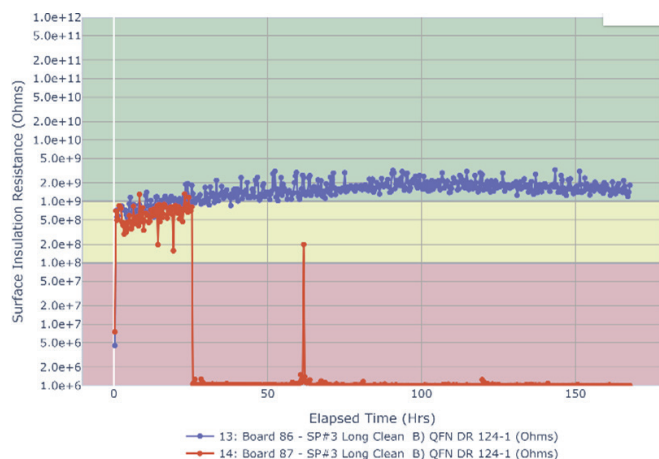
Temperature and humidity directly impact an electronic device's functioning, lifetime, and overall reliability.

- An increase in relative humidity (RH) is known to increase the corrosion rates of metals.
- Active and ionic residues on the PCB surface and under component terminations, hydrogen bond with water to form leakage currents when the circuit assembly is exposed to high humidity.
- Small dendrites growing from the cathode toward the anode cause a sudden or gradual drop in surface insulation resistance.



Field Failures

- Leakage currents are involuntary currents that flow across conductors of opposite polarity.
- As resistance drops to the ground, metal oxides are aligned.
- Metal oxides form dendritic growth patterns that can lead to no found faults.



Magnalytix SIR Testing Services Offers the Most Advanced Instrumentation and Comprehensive Testing. We help clients to improve their processes and develop their Objective Evidence Package.