

Approved Testing Methods



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The leading manufacturer of cleaning and cleanliness testing products.

Approved Cleanliness Testing Methods

Many batch-format aqueous cleaning systems are equipped with a built-in resistivity controller that allows an operator to preset a resistivity level.

Rinse water draining from the boards is measured for electrical resistance. This process allows the cleaning system to automatically adjust its cycle time to accommodate varying load sizes and chemical concentrations. By utilizing a cleaning system equipped with a resistivity controller, one need not be concerned with making minor adjustments in cycle times as the cycles will adjust automatically.

A popular misconception is that a user may use the resistivity tester in the cleaning system as an approved method of ionic contamination testing. This concept is false.

There are several approved methods of performing ionic contamination tests to determine cleanliness. These testing methods are described and identified as IPC standards. The recognized IPC ionic contamination testing standards are listed below:

Resistivity of Solvent Extract (ROSE) Test Method IPC-TM-650 2.3.25

The ROSE test method is used as a process control tool to detect the presence of bulk ionics. The IPC upper limit is set at 10.0 mg/NaCl/in². This test is performed using a Zero-Ion or similar style ionic testing unit that detects total ionic contamination, but does not identify specific ions present. This process draws the ions present on the PCB into the solvent solution. The results are reported as bulk ions present on the PCB per square inch.

Modified Resistivity of Solvent Extract (Modified ROSE)

The modified ROSE test method involves a thermal extraction. The PCB is exposed in a solvent solution at an elevated temperature for a specified time period. This process draws the ions present on the PCB into the solvent solution. The solution is tested using an Ionograph-style test unit. The results are reported as bulk ions present on the PCB per square inch.

Ion Chromatography IPC-TM-650 2.3.28

This test method involves a thermal extraction similar to the modified ROSE test. After thermal extraction, the solution is tested using various standards in an ion chromatograph test unit. The results indicate the individual ionic species present and the level of each ion species per square inch.

The resistivity tests performed by a batch-format aqueous cleaning system utilizes water as its extraction media. The maximum resistivity obtainable by water is 18.3 M-Ohm.

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Ionic contamination testers utilize a solvent mixture consisting of DI water and isopropyl Alcohol. Depending on the brand of tester, the extraction media's resistivity is up to 150 M-Ohms. It is imperative that the machine used to validate a cleaning process be capable of extracting ionic contamination in excess of the cleaner's ability. By using the cleaning system to evaluate itself, it would be impossible to verify false positive cleanliness results.

No military, telecommunications, medical, or commercial cleanliness specification recognizes an ionic contamination test utilizing just water. Even if, in theory, the cleaning system was designed to spray the same solvent mixture used in ionic contamination testers, the specifications require the test board to be immersed in the test solution. The majority of batch format cleaning systems utilize spray-in-air technology, not immersion.

The Zero-Ion conforms to many published cleanliness testing standards including:
IPC-TM-650 2.3.25 - MIL-C-28809 - MIL-P-55110 - MIL-STD-2000 - WS6536