

## 1. Area of Application for the ZESTRON® Resin Test

With electronic assemblies being more frequently exposed to diverse climatic conditions, the reliability of conformal coatings becomes increasingly important. Remaining flux residues are mainly responsible for adverse effects on the climatic and long-term reliability. Particularly, the resin-based components of such residues promote poor adhesion, which in turn leads to delamination and/or cracks of the conformal coating. As a result, all resin-based residues must be identified during the manufacturing process and completely removed through an integrated cleaning step.

Due to an increased resin content in the new lead-free solder pastes, it has become even more important to detect resin-based residues early on in the process. This not only ensures a reliable and consistent removal of such contamination, but allows full compliance with J-Standard 001, which limits the resin-based contamination to  $40 \mu\text{g}/\text{cm}^2$  [ $258 \mu\text{g}/\text{in}^2$ ].

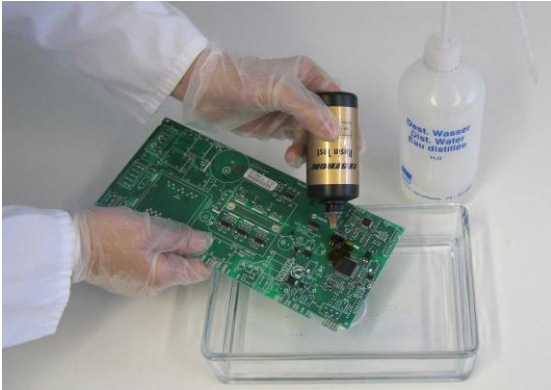
Other organizations, such as the GfKORR (a society tasked to limit corrosion effects), have confirmed these contamination thresholds and subsequently issued specific guidelines for the conformal coating of electronic assemblies. As part of the latest publication, leading experts highly recommend the examination of electronic assemblies for flux residues to ensure the best surface conditions before coating applications.

The ZESTRON® Resin Test was developed to provide an easy-to-use and fast test method that facilitates an improved visual assessment of surface cleanliness levels.

The ZESTRON® Resin Test visually identifies the distribution of resin-based residues via temporary color reaction. By revealing critical resin residues, this test complements analytical methods such as the Ionic Contamination Measurement and the ZESTRON® Flux Test.

## 2. Conducting the Test

### 1. Application on the electronic assembly



- Wear protective gloves and goggles and laboratory coat (to protect hands and clothes from brown coloring by the ZESTRON® Resin Test).
- Apply the ZESTRON® Resin Test indicator on critical areas or, if necessary, over the entire surface of the electronic assembly or soldered joints.
- Allow the indicator to react for at least 5 minutes. Should the surface of your electronic assembly be very sensitive, reduce the reaction time to 3 minutes to avoid a permanent discoloration of the assembly.

### 2. Rinsing



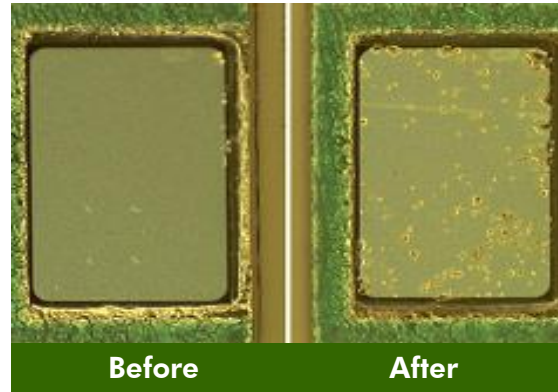
- Rinse thoroughly with distilled or DI-water. It is recommended to conduct the test over a laboratory bench or sink.

### 3. Drying



- Allow the electronic assembly to dry. Drying time can be reduced by using compressed air (use only dry and oil free air).

### 4. Interpretation



- Now, the test results can be interpreted (see chapter 3).

See the application  
video on our website



## 3. Evaluation of Test Results

### Result: No discoloration

- There are no resin-based residues, which could have compromised the quality of subsequent handling and processing steps.

### Result: Discoloration

- Resin based residues are stained yellow-brownish and show a positive result for the ZESTRON® Resin Test. The residues are visible to the naked eye or can be identified under a microscope when they appear as thin films. The intensity of the discoloration is an indication of the quantity of the resin residues present. The previously described adverse effects become more prominent, the higher the level of contamination. Yellow should be classified as a light contamination while dark brown represents an intense contamination. For further interpretation please, see chapter "Interpretation of Test Results."

In case of discoloration due to resin residues, delamination and poor adhesion of the coating may occur on the surface of the electronic assembly. Should the assembly be exposed to extreme climatic stressors, insufficient coating may cause a failure of the assembly.

In the event that tests/inspections have already confirmed the climatic resistance of the given electronic assemblies, even the brownish stained residual contamination can be classified as non-critical. This also applies to wire bonding processes.

If environmental and climatic tests have not yet been conducted, the user would be well advised to have the reliability and climatic resistance of electronic assemblies assessed by ZESTRON or any other qualified laboratory. Such testing can reveal whether existing contamination might lead to insufficient adhesion of the coating and is therefore a threat to the climatic resistance of electronic assemblies. We are happy to provide qualified expertise within our service range.

## 4. Special Remarks / Disposal

- The ZESTRON® Resin Test will not affect electronic assemblies. Discoloration will fade over time. However, the test rarely leads to permanent discoloration of the alloy (e.g. Ag, Cu).
- When correctly applied, the ZESTRON® Resin Test together with distilled or fully DI-water can be disposed of through the regular sewage system.
- When stored in a refrigerator, the indicator has a shelf life of 5 years.