

Analytical Services

- » Failure Analysis
- » Protective Coating
- » Risk Analysis



Failure Analysis



Ion Chromatography (IC)

- Qualitative and quantitative analysis of anions and cations (in particular activators)
- Detection limit: 0.01 μg/cm²
- Compliance with standards requirements
- Assessment of contamination impact on the cause of failure





Visual Inspection

- Non-destructive, visually presented, photo-optical analysis
- Magnification between 5 1000x, with optical filters and relief mode
- Assessment of surfaces and coatings to determine cause of failure





Particle measurement / Technical cleanliness

Fourier Transform Infrared Spectroscopy (FTIR)

- Method for qualitative and (semi-)quantitative analysis of organic residues on surfaces
- Analysis of areas $\geq 5 \times 5 \mu m$
- Identification of chemical structures of contaminants, residues, films, particles etc.





Flux Test / Resin Test

- Assessment of wire bonding and coating properties and/or detection of resin/activator residues to identify adhesion problems or creeping current paths

The solution

- » Protective coating
- » Adhesion

Scanning electron microscope / Energy-dispersive X-ray spectroscopy (SEM / EDX)

- Non-destructive, visually presented analysis
- Resolution down to the nanometre level
- Investigates material composition of surfaces using element contrast
- EDX analysis to determine cause of failure
- Qualitative and quantitative measurement of particles according to type and size distribution
- Compliance with requirements of the ZVEI guideline on component cleanliness
- Assessment of influence on cause of failure
- Basis for risk assessment of particles using SIR
- Imaging procedure to detect resin and activator residues, even in smallest quantities

Protective Coating



- » Surface cleanliness
- » Choice of system

- » Reliability assessment
- » Cost reduction

Analytical Services

Coating Layer Test

- Imaging procedure for detecting coating defects such as pore channels, cracks or poor edge covering
- Estimation of a failure-free protective coating
- Can also be used to check the component wetting ability prior to soldering







Ionic contamination measurement (ROSE Test)

- Extractive, quantitative determination of total ionic contamination in the range of 0.01 - $30 \,\mu g/cm^2$
- According to IPC-TM650 2.3.25
- Comparison of cleanliness level and/or production monitoring to supplement technical cleanliness





Contact angle measurement

- Assessment of adhesion of wire bonding and protective coating

Differential thermal analysis

- Calorimetric and gravimetric measurement of reaction properties and mass change of solvent-based coatings
- Determination of ventilation and drying behaviour
- Conclusions for process management of coating and determination of the degree of cross-linking/brittleness of coating





Coating Reliability (CoRe) Test

- drying
- 100 % condensation at RT or 80°C over a period of 15 - 30 min with circuit in (standby) operation Quality control of a coating process

The solution

» Processing time reduction

Flux Test / Resin Test

- Imaging procedure to detect resin and activator residues, even in smallest quantities
- Assessment of wire bonding and coating
 - properties and/or detection of resin/activator
 - residues to identify adhesion problems or creeping current paths
- Investigation of thin organic or oxidic films by comparison
- Dynamic or static measurement of surface wettability with angular resolution of $\pm 5^{\circ}$

• Stress test for electrochemical migration and creeping currents to detect defects, delamination or insufficient

Risk Analysis

For assistance with

- » Technical cleanliness
- » Ionic contamination

- » Residues in narrow gaps
- » Filmic contamination

Analytical Services

Particle measurement / Technical cleanliness

- Qualitative and quantitative measurement of particles according to type and size distribution
- Compliance with requirements of the ZVEI guideline on component cleanliness
- Assessment of influence on cause of failure
- Basis for risk assessment of particles using SIR





Surface Insulation Resistance Measurement (SIR)

- Measurement of surface resistance on a comb structure
- 3 V < U < 24 V, temperature and humidity according to requirements
- Risk assessment of contaminants and selection of materials and processes for humidity robustness





Flux Test

Fourier Transform Infrared Spectroscopy (FTIR)

- Method for qualitative and (semi-)quantitative analysis of organic residues on surfaces
- Analysis of areas $\geq 5 \times 5 \mu m$
- Identification of chemical structures of contaminants, residues, films, particles etc.





- Qualitative and quantitative analysis of anions and cations (in particular activators) Detection limit: 0.01 μg/cm² Compliance with standards requirements
- of failure

The solution

» Creeping current / signal integrity

Ionic contamination measurement (ROSE Test)

- Extractive, quantitative determination of total ionic contamination in the range of 0.01 - $30 \,\mu g/cm^2$ According to IPC-TM650 2.3.25
- Comparison of cleanliness level and/or production monitoring to supplement technical cleanliness

- Imaging procedure to detect activator residues, even in smallest quantities
- Assessment of wire bonding and coating properties and/or detection of activator residues to identify creeping current paths

Ion Chromatography (IC)

Assessment of contamination impact on the cause



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