Fraunhofer EMFT

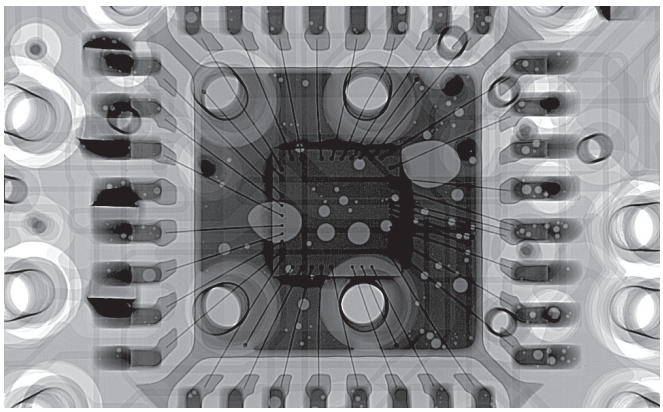
Services for reliability and failure analysis of electronic components and systems

Reliability test with monitoring of electronic assemblies. ©Fraunhofer EMFT/Bernd Müller

Our laboratories at Fraunhofer EMFT offer a wide range of qualification tests, failure analyses and reliability tests for electronic components and systems. In addition, we can support the quality assurance for optimize the manufacturing processes with vulnerability assessments. Our clients include a broad spectrum of industries such as aerospace (ESA), automotive and suppliers, medical technology to simple industrial electronics. A wide range of requirements consisting of delivery specifications, acceptance criteria and international standards is covered by Fraunhofer EMFT.

Our services in the field of analytics and material testing

- Analytics
  - Stereo microscopy
  - High resolution X-ray inspection incl. µCT
  - Metallography microsection preparation incl. visual inspection
  - Scanning electron microscope REM with EDX analysis
- Evaluation according to IPC, ESA or DIN
- Qualification- and reliability tests for printed boards, electronic components and Resources
- Solder join inspection according to IPC and ESA (ESA-accepted qualification lab)
- Risk management and process optimization as well as development or test methods and devices
- Failure analyses



X-ray inspection QFN (Quad Flat No Leads Package).
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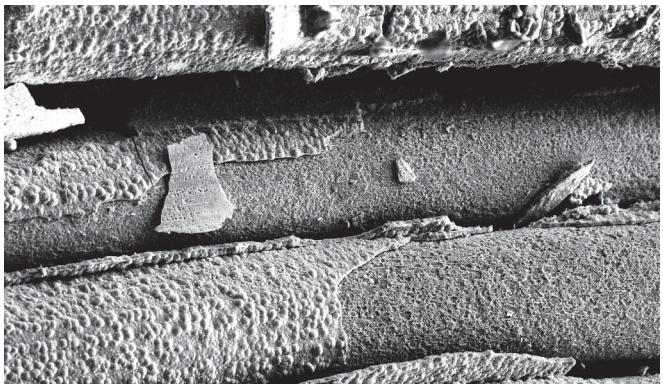
Qualification and Reliability Tests

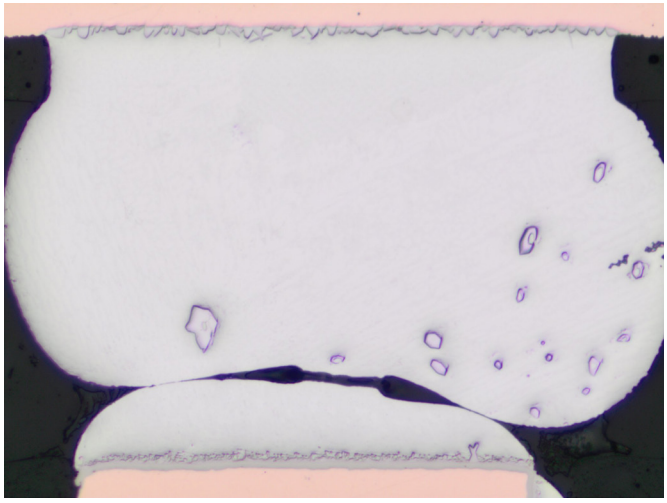
- Inspection of electronic assemblies according to IPC-J-STD-001 and IPC-A-610
- Solder Joint inspection according to IPC-J-STD-001 und IPC-A-610
- Printed circuit board inspection according to IPC-6012 (Rigid), IPC-6013 (Flex); IPC-6015 (MCM-L) and IPC-A-600
- Solderability tests for electronic assemblies and PCB according to DIN EN or IPC
- Contamination Tests on PCB and electronic assemblies
- Qualifikationen für lötfreie Verbindungstechniken wie Crimpverbindungen; Einpresstechnik; Steckverbinder
- Qualifications for electrical connectors (crimp connections, pressfit technology, plug connectors)
- Crimp inspection (Voltage Drop; Tensile testing; Durability)
- Structural analysis and materials characterization
- Surface Characterization: Roughness measurement, topography, Coating thickness
- Corrosion analysis
- Thermal imaging
- Vibration and Shock Environmental Test
- Tensile, compression and flexure tests with climatic chamber and video analyses
- Environmental simulation and reliability tests
  - Cyclic temperature-humidity test to +95°C und 98 % r.F
  - Temperature cycling test to +200°C and 10 k/min
  - Rapid temperature change tests to -80°C and 220°C
  - Heat Storage to +300°C
- Active power load tests
- HAST (highly accelerated stress test)
- Condensation tests with isolation resistance measurement
- Combination of electrical/mechanical inspection and measurement tools



Bursted electrical wire after cyclic power load test.
©Fraunhofer EMFT/Bernd Müller

Technologies and Equipment

- Climate chambers:
  - Temperature -humidity
  - Rapid temperature change
  - Cyclic temperature change
  - Heat Storage
- Materials Testing Machine with climate chamber video analyses
- Vibration test systems with 3 axial mounting
- Stereo and reflected light microscopes with various contrast and exposure options (BF, DF, PO, DIC, fluorescence)
- Confocal 3D laser scanning microscope
- Profilometer
- High-resolution scanning electron microscope with EDX analysis
- Focused Ion Beam (FIB)
- X-ray inspection system with high performance µCT scan
- Thermal camera
- Laboratory power supply up to 1000 A
- Contaminometer
- Solder Baths
- Modern fully equipped electronics laboratories



Head-in-pillow BGA Defect. ©Fraunhofer EMFT/Bernd Müller

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