

## Hermeticity Testing, RGA and the New TM 1014 Spec Limits

Hermeticity of electronic packages including hybrids, RF microwave modules, microcircuits, semiconductor devices and MEMS continues to be of critical importance to the military and aerospace community as evidenced by the recent tightening of the spec limits in MIL-STD-883 Test Method 1014. This seminar examines each of the major hermeticity test methods described in TM 1014. The basic science and applicability of HMS (Helium Mass Spectroscopy), Radioisotope Kr-85 and OLT (Optical Leak Test) methods are examined in detailed. Each method is compared/contrasted in light of the new specification limits.

The gas content inside a sealed electronic package is measured using RGA (Residual Gas Analysis). The basic scientific principles of the RGA test are described and reviewed along with the basis for the 5,000 PPM moisture spec level. RGA data and how it relates to hermeticity and as a process monitor is also discussed along with plenty of time for questions.

Students will come away with a better understanding of the latest hermeticity test methods and new spec limits along with an understanding of RGA testing and how the two are related.

### Course Outline:

What is Hermeticity?

Moisture problems in microelectronics

- Review of classic moisture related failure mechanisms

- Failures caused by other gases such as H<sub>2</sub>, NH<sub>3</sub> and condensable organics

Seal Test Method MIL-STD-883 TM 1014

- Theory and technical basis of hermeticity testing

  - Air leak vs. measured helium leak rate

- Helium based methods including CHLD and Condition A5

- Radioisotope Kr-85 method

- Optical Leak Testing (OLT)

Theory and technical basis for RGA testing (TM 1018)

- How to read and interpret and RGA report

- How to back calculate leak rate from RGA data

- RGA as a process monitor

Summary plus Q&A