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HERMETICITY TESTING, RGA AND “NEAR HERMETIC” PACKAGING CONCEPTS 1 DAY

Course Description

Hermeticity of electronics packages and hermeticity test techniques continue to be of critical importance to the microelectronics packaging community. Specifically, in the area of MEMS/MOEMS packaging, OLEDs, wafer scale packaging, optoelectronic devices and packaging for Military and Space. In addition, there are a host of medical implants, bio medical devices and emerging nanotechnology applications that all require hermetic packages and valid techniques to measure the leak rate. In contrast to a hermetic cavity style package “near hermetic” packages are being developed that rely on polymeric materials, such as LCP, to make a package that provides just enough moisture protection to survive in the intended end user environment.

This one-day course begins with an overview of hermetic sealing processes. The class will then examine the accepted leak test techniques as prescribed in Mil Standard 883 Test Method 1014. This misunderstood test method is often a source of frustration. The basic science behind helium fine leak testing (both the fixed and flexible methods) will be presented. Difficulties and limitations in fine leak testing of small volume packages is a major industry concern, especially among the Space community. Issues with bomb times and pressures, measured leak rate vs. air leak rates, “one way leakers”, virtual leakers will be addressed, along with gross leak testing; bubble, weight gain etc. In each case the focus will be on practical issues facing the industry.

The latest techniques for measuring both gross and fine leak testing is Optical Leak Test (OLT). In this method a laser interferometer measures out of plane deflection on a lid surface in response to a changing pressure and relates these measurements to an equivalent helium leak rate. For some packages (e.g. MEMS and Opto devices) OLT is the only available viable technique.

The ultimate goal is to seal the sensitive microelectronic component in a dry, inert atmosphere to allow reliable functioning of the device over its intended lifetime. The gas ambient inside the package is measured using Residual Gas Analysis. What is RGA (Residual Gas Analysis)? How does it relate to hermeticity testing? Is the current 5,000 PPM level valid for next generation MEMS/MOEMS and Nanotechnology. Besides moisture what other gases are of concern?

Packages made from polymeric materials as opposed to traditional hermetic seals (i.e. metal, ceramic etc) require a different approach from a testing standpoint. The problem is now one of moisture diffusion through the barrier and package interfaces. A brief review of the techniques and methods to evaluate a “non-hermetic” approach is presented.

In addition to a comprehensive set of course notes each student receives a copy of “Hermeticity of Electronic Packages” by Hal Greenhouse (Noyce Publications 2000) and a “Practical Guide to TM 1014,” authored by the instructor.

Who should attend

This PDC is intended as an introductory to intermediate level course for process engineers, designers, quality engineers, and managers responsible for sealing, leak testing, and RGA results and for those responsible for evaluating new cavity style packages.

Course Fee: \$795