May 21, 2007

JEDEC Meeting in Myrtle Beach

SUMMARY: Neff Presentation on the MIL-STD-1071.8 Seal Test discrepancies.

1. Problem: It has been established based on experimentation, that we need to tighten the leak rate requirements for all devices.
2. The actual leak rates to which we have been testing are 1 x 10-6 atm cc/sec (air) for packages > 0.4 cc; and 1 x 10-7 atm cc/sec (air) for smaller packages.
3. That is not the reading we see on the HMS. (R1). The R1 value is the equivalent He "reading" that is the result of the bombing of the part .
4. Almost everyone is using the R1 values in the "Fixed" table in the specs. They think the callout is for the R1 value.
5. If you read the "Failure Criteria" in 10.2.2, you see the callout maximum leak rates . Those leak rate values are not tight enough to catch a large percentage of the leaks we are finding.
6. Most of the leak rates of the present day devices, (built with today's technologies of construction and sealing, are leaking in the 10-7 and 10-8 ranges. Those values are not readable on the common production HMS.
7. The common production HMS has a normal 'working background' of 3-5 x 10-9 atm cc/s (He)
8. The specifications are flawed in that they have dropped the detailed explanations that show the "L" values as the 'Failure-Criteria' and the R1 as the 'Readout' on the HMS.
9. We have therefore been doing an extended "Gross-Leak" test at best.
10. To perform the test using the new "L" values in the spec we will need to read values on the HMS in the 10-10 and 10-11 range, (which they are not capable to do.
11. To put enough helium into your part to read the 5 x 10-9 limit of the HMS, we would have to bomb for 100s to 1,000s of hours at the pressure limits of the devices.
12. We have been testing devices in the 10- 8 & 10-9 range with Kr85 leak detectors for decades. It is possible because it only requires short bomb times, and the detectability of the Kr85 within a part is hundreds of millions higher detectability than the Helium required for the same leak.
13. Recent studies are showing conclusively that the Kr85 detected leakers in the 10-7 – 10-8 (He) equivalent range, are not detectable on the production HMS. These leak rates are being confirmed in RGA testing, and include the detection of helium in parts.
14. The detection of helium has been assumed to mean the part had a "One-Way" leak. That is a misinterpretation. There was not enough helium in the part to be seen on the HMS.
15. It is now left to the decision of how much can we tighten the spec, (not whether we should), and let industry develop better test methods, or use the two methods presently available: "The radioisotope method"; or the "Cumulative helium method". The radioisotope method has been used for forty years for the testing of high volume production for both gross and fine leaks. The cumulative method is new, capable, but possibly limited in the high volume production throughput requirements.