ENGINEERING PRACTICE STUDY

TITLE: MIL-STD-883, Method 1014 Survey of Industry to Determine Which Test Conditions are Being Used

October 20, 2014

STUDY PROJECT 5962-2014-011

FINAL REPORT

Study Conducted by DLA Land and Maritime - VAS

Prepared by:

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I. OBJECTIVE: The purpose of this Engineering Practice (EP) Study was to obtain input from the military services, microcircuit manufacturers, testing, and user community concerning which Test Conditions in MIL-STD-883, method 1014 are being used for hermeticity testing of microcircuit and hybrid devices.

II. BACKGROUND: There is an array of Test Conditions MIL-STD-883, method 1014 that can be used to determine the hermeticity of microcircuit and hybrid devices. These Test Conditions and their individual procedures make method 1014, in its entirety, complex and difficult to read. At the request of NASA, this survey was conducted to see if all Test Conditions are being used and if the complexity of the method may be reduced.

The Survey questions in Attachment 1 to this EP Study are based on the final copy of MIL-STD-883 revision J w/Change 4, dated 3 July 2014.

The EP Study was conducted and surveys were received during the period of 20 August 2014 through 15 October 2014.

III. RESULTS: All completed surveys for this study were submitted to DLA Land and Maritime and the survey response information has been compiled as shown in Attachment 2 (Table I.). There were 32 responses received to this survey. It is estimated that these responses represent approximately 25% to 30% of the industry using MIL-STD-883, method 1014 for devices which are manufactured to the MIL-PRF-38534 or the MIL-PRF-38535 requirements.

The survey results show that 13 of the 16 different Test Conditions in method 1014 are being used. There is a degree of certainty that the 3 Test Conditions that show no usage from the survey results are in fact being used, but survey responses were just not received providing this information. (One example of proof is that it has been stated at previous JEDEC meetings and on a NEPAG telecon that the “Weight Gain Gross Leak” Test Condition is used, but no survey responses were received providing this information for this EP Study.)

IV. CONCLUSIONS: It is determined that most, if not all, of the Test Conditions existing in MIL-STD-883, method 1014 are being used. Additionally, method 1014 may not be simplified by moving any unused Test Conditions to an appendix in the method at this time. The final results for this EP Study will be published and will be reported on at the next Joint JC-13/G-12 meeting in January 2015.

V. RECOMMENDATION: DLA Land and Maritime recommends that no changes be made to MIL-STD-883, method 1014, based on the results of the survey responses to this EP Study.

ATTACHMENT 1

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Survey to determine which Test Conditions of MIL-STD-883, method 1014 are used.

Please answer the following questions:

1. Name: _____

2. Company: _____

3. Mark an "X" next to the description that best identifies your company:

   ____ Microcircuit or Hybrid device manufacturer
   ____ Original Equipment Manufacturer (OEM)
   ____ Military or Government organization (e.g.: Air Force, Army, Navy, NASA)
   ____ Laboratory or Test House
   ____ Other (please describe) _____

4. Mark an "X" next to the Test Condition(s) from MIL-STD-883, method 1014 that you use:

   Trace Gas (He)
   ____ A1 Fixed Fine Leak
   ____ A2 Flexible Fine Leak
   ____ A4 Fine Leak, applicable to the unsealed package

   Radioisotope (Kr85)
   ____ B1 Fine Leak
   ____ B2 Gross Leak
   ____ B3 Wet Gross Leak

   Perfluorocarbon Gross Leak
   ____ C1 Fixed Method that uses a liquid bath
   ____ C2 has been replaced by C1
   ____ C3 Fixed Method that uses a vapor detection system instead of an indicator bath

   Optical
   ____ C4 Gross Leak
   ____ C5 Fine Leak

   ____ Penetrant Dye Gross Leak

   ____ Weight Gain Gross Leak

   Radioisotope (Kr85)
   ____ G1 Thermal Leak Test for the evaluation of package hermetic integrity at elevated temperature

   Cumulative Helium Leak Detection (CHLD)
   ____ CH1 Fixed Leak Detection for both Fine and Gross leak using the CHLD System
   ____ CH2 Flexible Leak Detection for both Fine and Gross leak using the CHLD System
   ____ Z He Gross Leak Detection combined with one of several other tracer gases for Fine Leak Detection using the CHLD System

Please email this completed survey to: Charles.Saffle@dla.mil

Thank you.

ATTACHMENT 2

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Table I. MIL-STD-883, Method 1014 Test Conditions Survey Results.

	Microcircuit or Hybrid Device Manufacturer	**Original Equipment Manufacturer**	**Military or Government Organization**	**Laboratory or Test House**	**Other**
Test Conditions:					
Trace Gas (He)					
A1 Fixed Fine Leak	6	1		3	
A2 Flexible Fine Leak	19	1		3	
A4 Fine Leak (unsealed pkg)	4			2	1
Radioisotope (Kr85)					
B1 Fine Leak	5		1	3	
B2 Gross Leak	2		1	2	
B3 Wet Gross Leak			1	2	
Perflourocarbon Gross Leak					
C1 Fixed method (liquid bath)	20	2	1	4	
C3 Fixed method (vapor)	3				
Optical					
C4 Gross Leak	2				
C5 Fine Leak	2				
Penetrant Dye Gross Leak	1	1		2	
Weight Gain Gross Leak					
Radioisotope (Kr85)					
G1 Thermal Leak (temperature)				1	
Cumulative Helium (CHLD)					
CH1 Fixed Leak Detection (both Fine and Gross)					
CH2 Flexible Leak Detection (both Fine and Gross)	1	1	2		
Z He Gross Leak detection with tracer gases for Fine Leak					