

ENGINEERING PRACTICE STUDY

TITLE: Determining the Potential Improvements to MIL-STD-883-5 Test Method 5011, Evaluation and Acceptance Procedures of Polymeric Materials.

November 27, 2024

EP Study Project Number: 5962-2024-008

Final Report

**Study Conducted by DLA Land and Maritime
Document Standardization Division (VA)
Microelectronics Branch (VAS)**

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EP study of Determining the potential improvements to MIL-STD-883-5 test method 5011.

- I. **OBJECTIVE:** The purpose of this Engineering Practice (EP) Study is to obtain input/feedback from the military services, manufacturers, users, and other stakeholders concerning the current usage and potential improvements to MIL-STD-883-5 test method 5011, Evaluation and Acceptance Procedures for Polymeric Materials, to provide better or more consistent internal gas analysis results in the completed device.
- II. **BACKGROUND:** Defense Logistics Agency (DLA) Land and Maritime published MIL-STD-883-5 test method 5011, on 29 March 1987 and have made minimal changes to the method to date. The intention is to ensure that this test method is keeping up with the current requirements of the other test methods in MIL-STD-883.

Proposals:

The current requirements in MIL-PRF-38534 are as follows:

C.3.10 Polymeric material evaluation. The polymeric materials used in device applications will be subjected to and pass the evaluation procedures detailed in method 5011 of MIL-STD-883.

The current requirements in MIL-PRF-38535 are as follows:

A.3.5.1.1 Polymeric materials. All polymeric materials of microcircuits shall meet the requirements of TM 5011 of MIL-STD-883. Polymeric materials shall be approved by the acquiring or preparing activity.

Questions:

1. Are you currently evaluating your polymeric material on each lot of polymeric materials in accordance with test method 5011?
2. Can test method 5011 of MIL-STD-883-5 be improved to better specify product requirements or testing?

MIL-PRF-38535 manufacturers only:

3. Are your polymeric materials being approved by the acquiring or preparing activity as required by A.3.5.1.1?

- III. **RESULTS:** The EP Study project was opened, and an initial draft was posted on the web and distributed on September 5, 2024 for review and comments. Inputs were solicited from all interested parties, including the military services, microcircuit manufacturers, original equipment manufacturers, and user communities concerning the test method.
- IV. **CONCLUSIONS:** Manufacturers would like more clarity in the requirements. Clarifying what materials 5011 should be applied to also allows manufacturers to better understand what they will be audited to, and when and how 5011 should be used.
Users would like more stringent testing and reporting. For outgassed materials, the testing request primarily revolves around the 5(1) sampling criteria. Some recommendations would be at least 3(0); some commenters recommended 5(0). Rationale: This test is only testing the outgassing of an organic material. Any failures need to be adjudicated before the material lot can be accepted. This would go a long way to instill confidence in the test method.
Another concern of users is focused on the certificate of compliance and ensuring that the certificate is supplied to the component manufacture and the user.
- V. **RECOMMENDATIONS:** DLA Land and Maritime-VA will work to revise MIL-STD-883-5 Test Method 5011 to incorporate the conclusions from the inputs received from interested parties to this EP Study. A draft revision of MIL-STD-883-5 Test Method 5011 will be prepared and formally coordinated as required. Thanks to all who provided inputs/comments regarding this study.