NASA-STD-8739.11 Tutorial
F2 Filters

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Acronyms [*modify as needed*]

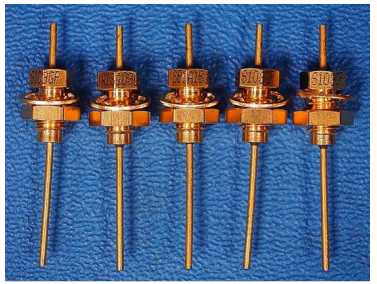
AEC	Automotive Electronics Council
COTS	Commercial-Off-The-Shelf
Cpk	Process Capability Index
DLA	Defense Logistics Agency
DoD	Department of Defense
DPPM	Defective Parts Per Million
EEEE	Electrical, Electronic, Electromechanical, Electro-Optical
EMI	Electro-Magnetic Interference
EOL	End-Of-Line
ETW	Electronics Technology Workshop
FIT	Failure-In-Time
FMEA	Failure Mode and Effects Analysis
GSFC	Goddard Space Flight Center
IL	In-Line
ILPM	Industry Leading Parts Manufacturer
JEDEC	Joint Electron Device Engineering Council

LAT	Lot Acceptance Test
MIL-SPEC	Military Specification
NASA	National Aeronautics and Space Administration
NEPP	NASA Electronic Parts & Packaging (Program)
NESC	NASA Engineering & Safety Center
NSC	NASA Safety Center
PPAP	Production Part Approval Process
PSW	Part Submission Warrant
QML	Qualified Manufacturers List
QPL	Qualified Product List
RHA	Radiation Hardness Assurance
SMA	Safety and Mission Assurance
SMD	Standard Microcircuit Drawing
SME	Subject Matter Expert
SPC	Statistical Process Control

Covered Part Type Description

- As in EEE-INST-002, the filter section addresses an electrical device which transmits or impedes electrical noise signals in one or more frequency intervals. The construction type is “feed-through filters”, which are generally mounted on and passing a signal through a bulkhead.
  - This section does not address EMI filters where the construction type is of either hybrid or lumped element/connectorized style filters.
    - Hybrid styles should be selected and evaluated in accordance with Sections M2 or M3, as applicable.





Key Considerations

- New in 8739.11, Key Considerations have been added for certain sections. This information is intended to provide technical guidance in part selection and applications, beyond the traditional tables provided for screening and lot acceptance.
  - Exercise special care during the part installation, as filters may contain internal soldered connections that can reflow during installation.
  - b. Do not exceed the maximum recommended torque per the specification. Excessive torque can crack the filter outer case and/or its internal components. Cracked discoidal capacitors can go undetected through post installation checkout but lead to filter malfunction post-integration.
  - c. Due to the inherent reliability risks associated with the use of small feed-through filters, a larger size (greater than Size 4) feed-through filter shall be selected for space flight applications.
  - d. Currently no manufacturers are qualified for Class S product assurance level. Therefore, for missions with Level 1 parts assurance requirements, Class B requires re-screening with additional voltage conditioning.
  - e. While lot acceptance testing is not required for parts assurance Level 3 parts, a life test is still recommended for lots used in critical circuit applications.

Major Changes from EEE-INST-002

- DPA is a requirement for all filter procurement categories, for all quality levels.
  - DPA requirement was not present in EEE-INST-002 but was imposed through the parts control plan/parts control board for Level 1 and Level 2 projects.
- 8739.11 specifically prohibits the use of MIL-PRF-15733 filters in space flight applications (Levels 1-3)
  - EEE-INST-002 prohibited their use in Level 1 only.
- For level 1 applications, post-procurement screening is required for QPL-28861 filters.
  - Additional voltage conditioning, beyond the B-level 160 hours, is required.
  - Hot IR after torquing into mounting plate is not part of MIL-PRF-28861 Group A testing.
    - EEE-INST-002 defined QPL-28861 filters (Class S and B) as Use-As-Is for Level 1 and Level 2.
    - EEE-INST-002 allowed Class B filters in Level 1 applications when no Class S filters were available.

Major Changes from EEE-INST-002

- LAT testing, subgroup 1, sample size increased to 5(0) for level 1; 5(1) for level 2. Inspections remain the same as EEE-INST-002.
  - EEE-INST-002 sample was 4(0) for both level 1 and 2.
- LAT testing, subgroup 2, removes High Frequency Vibration and DPA, and increases sample sizes to 10(0) for Level 1, and 5(0) or 10(1) for Level 2.
  - EEE-INST-002 sample was 5(0) for Level 1.
- LAT testing, subgroup 3, adds specific pre- and post- life test parametric criteria, and allows a failure for level 2 (10(1)).
  - EEE-INST-002 only specified MIL-PRF-28861 test criteria.
  - EEE-INST-002 sample size for Level 2 was 10(0).

Major Changes from EEE-INST-002

- Derating factor for current changed to 70% of rated operating current.
  - EEE-INST-002 derating factor for rated operating current was 50%.

Send email to address below for questions

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Backup

EMI Filters Types Not Addressed by F2

