

Guidelines for Applying AQEC Integrated Circuits and Semiconductors

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1. Scope. The Aerospace Qualified Electronic Component (AQEC) standard, GEIA-STD-0002-1, was developed with the collaboration of integrated circuit and semiconductor device manufacturers and users of these devices to provide a mechanism to more effectively apply commercial parts in aerospace and other systems that require specified reliability. As stated in GEIA-STD-0002-1, the intention of AQEC is to

- “a. Provide AQEC users access to information from the AQEC manufacturers necessary to use commercial-off-the-shelf (COTS) products.
- b. Better enable AQEC users to assess that these parts are capable of operating reliably in their applications.
- c. Minimize deviations from the AQEC manufacturers’ COTS products.
- d. Have minimal impact on the AQEC manufacturers’ standard operating or business procedures.
- e. Promote communication between the AQEC manufacturers and users.”

2. Applicable Documents

GEIA-STD-0002-1, Aerospace Qualified Electronic Component (AQEC) Requirements, Volume 1 - Integrated Circuits and Semiconductors.

IEC TS 62239, Process management for avionics, Preparation of an electronic components management plan-First Edition

AIAA R-100A, Recommended Practice for Parts Management

GEIA: Government Electronics and Information Technology Association

IEC: International Electrotechnical Commission

AIAA: American Institute of Aeronautics and Astronautics

3. Definitions. See applicable documents for definitions.

4. General Guidelines

4.1 AQEC standard requirements. The AQEC standard provides a means to share data on part performance. The AQEC standard does not specify a uniform performance requirement or any minimum part performance capability.

4.2 User responsibility. The user’s responsibility in applying an AQEC part is the same as for any commercial device, but it should be easier to get the information to properly

apply the part. An AQEC part may still require additional testing by the user to verify capability for any particular application. An AQEC part may be appropriate for one application and not for another.

5. Detail Guidelines

5.1 Part application assessment. Any AQEC standard part requires the parts application and management guidelines specified in IEC 62239 and AIAA R-100 to justify use in any application. These guidelines include application assessments that consider the following factors:

- Materials (e.g., compatibility with assembly processes, pure tin effects analysis, etc.)
- Derating (see SD-18, <http://www.crane.navy.mil/sd18/default.htm>)
- Circuit tolerance analysis, parameter variation effects on system performance
- Reliability for life cycle environments and operation (see SD-18, <http://www.crane.navy.mil/sd18/LibraryDodRptsLifeCycleEnv.htm>)
- Procurement availability, and technology/upgrade roadmap
- Quality (assess for need of additional screens, receiving inspection)

5.2 Part procurement. Users should only procure AQEC standard parts through distribution channels approved by the device manufacturer.

6. Notes

6.1 Information. For more information contact US Army Aviation and Missile RDEC, 256-842-0163