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Process management for avionics - Aerospace qualified electronic components (AQEC) -
Part 1: Integrated circuits and discrete semiconductors

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Process management for avionics - Aerospace qualified electronic components (AQEC) - Part 1: Integrated circuits and discrete semiconductors

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC TS 62564-1:2016. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC TS 62564-1, which is a technical specification, has been prepared by IEC technical committee 107: Process management for avionics. It is a Technical Specification.

This fourth edition cancels and replaces the third edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) addition of optional ADHP PPAP;

b) revision to Annex B; addition of Annex C and Annex D;

c) removal of STACK;

d) general update to referenced standards throughout.

GEIA-STD-0002-001 (June 2006), *Aerospace Qualified Electronic Component (AQEC) Requirements, Volume 1 - Integrated Circuits and Semiconductors*, has served as a basis for the elaboration of the first edition (2009) of this technical specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
107/442/DTS	107/443/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62564 series, under the general title *Process management for avionics - Aerospace qualified electronic components (AQEC)*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

INTRODUCTION

Aerospace qualified electronic components (AQEC) plans are developed by manufacturers in order to document compliance with AQEC requirements for aerospace, defence and high performance (ADHP) users. For AQEC designated components, the intention is to

a) provide AQEC users access to information and data from the AQEC manufacturers that is necessary for using commercial-off-the-shelf (COTS) products, particularly in the context of aerospace certification process where complex electronic components are involved;

b) better enable AQEC users to assess whether these parts are capable of operating reliably in their applications;

c) minimize deviations from the AQEC manufacturers' COTS ~~products~~ electronic components;

d) have minimal impact on the AQEC manufacturers' standard operating or business procedures;

e) promote communication between the AQEC manufacturers and users.

This document only addresses integrated circuits and discrete semiconductors manufactured using silicon based technology and excludes silicon carbide and gallium nitride technologies.

1 Scope

This part of IEC 62564, which is a Technical Specification, defines the minimum requirements for integrated circuits and semiconductors which are designated as an "aerospace qualified electronic component (AQEC)". It applies to integrated circuits and semiconductors exhibiting the following attributes:

a) a minimum set of responses to requirements, ~~or~~ information and data including physical hardware data, provided by the part manufacturer, which will allow a standard COTS electronic component to be designated AQEC by the manufacturer;

b) as a minimum, each COTS electronic component (designated AQEC) will have been designed, fabricated, assembled, and tested in accordance with the component manufacturer's requirements for standard data book components with additional enhancements as considered appropriate;

c) qualification of, and quality systems for, the COTS electronic components to be designated as AQEC ~~should~~ will include the manufacturer's standards, operating procedures, and technical specifications. This information ~~should~~ will be available when requested;

d) electronic components manufactured before the manufacturer has addressed AQEC requirements, but utilizing the same processes, are also considered AQEC compliant, providing sufficient data is made available;

e) additional desired attributes of a device designated AQEC (that will support AQEC users) are found in Annex B of this document.

This document contributes by the above attributes to the aerospace certification process which include particularly complex COTS electronic components.

NOTE 1 Parts qualified to military specifications such as JAN, JANTX, JANTXV transistors and diodes, MIL-PRF-38535 or MIL-PRF-5962-XX microcircuits, CECC (CENELEC Electronics Component Committee) specified components, etc. (except those identified as being for "logistic support" purposes only) are considered AQEC; the remainder of this document only addresses non-military specification parts.

NOTE 2 Adding a TX to JAN prefix means that the part was not only made to MIL-PRF-19500 but it was also tested to Mil spec. Adding a V to the TX means that the part was verified during testing before the package was completed.

NOTE 3 Electronic components classified by original component manufacturers (OCMs) as being 'enhanced' components only become AQEC components when they meet the requirements of this document.

~~Parts qualified to AEC-Q100, grade 0 through to grade 3 are considered AQEC. For those applications where a 0 °C to +70 °C temperature range is appropriate, grade 4 is also considered to be AQEC.~~ Parts qualified to AEC-Q100, grade 0, AEC-Q100 grade 1, and AEC-Q100 grade 2 according to the standard qualification test plan according to Table 2 of AEC-Q100:2023 are considered candidates for AQEC providing they meet the requirements of this document. Parts qualified to AEC-Q100 for a specific mission profile require analysis to determine suitability for AQEC selection. The users should document that the grade category used is compatible with the application in accordance with their IEC ~~TS~~ 62239-1 electronic components management plan (ECMP).

Although developed for the avionics industry, this document can be applied by other industrial sectors at their discretion.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC ~~TS~~ 62239-1, *Process management for avionics - Management plan - Part 1: Preparation and maintenance of an electronic components management plan*

~~IEC 62396-1, *Process management for avionics – Atmospheric radiation effects – Part 1: Accommodation of atmospheric radiation effects via single event effects within avionics electronic equipment*~~

~~IEC TS 62668-1, *Process management for avionics – Counterfeit prevention – Part 1: Avoiding the use of counterfeit, fraudulent and recycled electronic components*~~

~~ISO 9001, *Quality management systems – Requirements*~~

J-STD-048, *Notification Standard for Product Discontinuance*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

3.1 Terms and definitions

3.1.1
AQEC specification
document prepared by or for the manufacturer to describe an AQEC product

Note 1 to entry: It includes a data sheet and ~~may~~ can include other documents, such as material descriptions, environmental test procedures, quality monitoring processes, etc. It ~~may~~ can be a stand-alone document or a clearly denoted item within a larger documentation system. There ~~may~~ can be additional data associated with specific applications which ~~may~~ can be requested separately.

3.1.2
AQEC plan
instrument prepared by the plan owner (see 3.1.13) that clearly, concisely, and unambiguously documents the processes used by the plan owner to satisfy the requirements of this document

Note 1 to entry: The plan contains auditable content.

3.1.3
assessment
evaluation of a plan owner's AQEC plan to determine if it is compliant with this document

Note 1 to entry: It ~~may~~ can be conducted by IECQ, the customer, the customer's designee, or by a third party designated by the customer community.

3.1.4
microcircuit
integrated circuit
microcircuit (device with a high circuit-element density) in which all or some of the circuit elements are inseparably associated and electrically interconnected (on one or more substrates, in a unique indivisible package) so that the microcircuit is considered to be indivisible for the purpose of construction and commerce