

TECHNICAL SPECIFICATION

**Process management for avionics – Electronic components for aerospace,
defence and high performance (ADHP) applications –
Part 2: General requirements for passive components**





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Part 2: General requirements for passive components**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PROCESS MANAGEMENT FOR AVIONICS – ELECTRONIC
COMPONENTS FOR AEROSPACE, DEFENCE AND
HIGH PERFORMANCE (ADHP) APPLICATIONS –****Part 2: General requirements for passive components**

FOREWORD

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62686-2 which is a technical specification, has been prepared by IEC technical committee 107: Process management for avionics.

This first edition cancels and replaces the first edition of IEC PAS 62686-2 published in 2016. This edition constitutes a technical revision.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
107/302/DTS	107/343/RVDTS

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 62686 series, published under the general title *Process management for avionics – Electronic components for aerospace, defence and high performance (ADHP) applications*, 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

This part IEC 62686 includes all the requirements of the obsolete STACK Specification S/0003 issue 2 related to passive components and contains revisions for alternative qualification test methods and additional test information for the aerospace, defence and high performance (ADHP) industries. This document is typically used in conjunction with IEC TS 62239-1.

NOTE With the addition of alternative methods, it is possible for manufacturers to be audited by IECQ under the new IECQ automotive scheme or IECQ approved component scheme.

PROCESS MANAGEMENT FOR AVIONICS – ELECTRONIC COMPONENTS FOR AEROSPACE, DEFENCE AND HIGH PERFORMANCE (ADHP) APPLICATIONS –

Part 2: General requirements for passive components

1 Scope

This part of IEC 62686 defines the minimum requirements for general purpose "off-the-shelf" COTS (commercial off-the-shelf) passive components for aerospace, defence and high performance (ADHP) applications.

This document applies to all passive components that can be operated in ADHP applications within the manufacturers' publicly available data sheet limits in conjunction with IEC TS 62239-1. This document can be used by other high performance and high reliability industries, at their discretion.

ADHP application requirements are not necessarily fulfilled by this document alone. ADHP original equipment manufacturers (OEMs) could consider redesigning their products or conducting further testing to verify suitability in ADHP applications using their procedures for satisfying their electronic component management plan (ECMP) (see IEC TS 62239-1).

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.

JESD48, *Product discontinuance*

J-STD-609B, *Marking, symbols, and labels of leaded and lead-free terminal finished materials used in electronic assembly*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>.

3.1.1

calendar days, pl.

continuous days, including weekends and holidays

**3.1.2
container**

outer shipping container consisting of one or more inner containers

**3.1.3
data sheet**

document prepared by the manufacturer that describes the electrical, mechanical, and environmental characteristics of the component

**3.1.4
deviation**

user agreement to allow the delivery of a shipping lot which does not fully meet the requirements of this document

Note 1 to entry: This is considered equivalent to concession for the purposes of this document.

**3.1.5
device specification**

document written by a user and agreed by the supplier

**3.1.6
form**

shape, size, dimensions, and other physically measurable parameters that uniquely characterize a product

[SOURCE: IEC TS 62239-2:2017, 3.1.23]

**3.1.7
fit**

ability to physically interface or connect with

**3.1.8
function**

action or actions that a product is designed to perform

[SOURCE: IEC TS 62239-2:2017, 3.1.25]

**3.1.9
incoming lot**

one or more shipments of a device, grouped together for the purpose of incoming inspection

**3.1.10
inner container**

box or bag containing devices, either in magazines or bulk packaged

**3.1.11
magazine**

shipping container that feeds into automatic placement machines

EXAMPLE: Sticks, tubes, matrix trays, tape/reel, etc.

**3.1.12
component
device**

electrical or electronic device that is not subject to disassembly without destruction or impairment of design use and is a small circuit having a high equivalent circuit element density

Note 1 to entry: It is considered as a single part composed of interconnected elements on or within a single substrate to perform an electronic circuit function.

Note 2 to entry: This excludes printed wiring boards/printed circuit boards, circuit card assemblies and modules composed exclusively of discrete electronic components.

3.1.13

manufacturing lot

definite quantity of devices tracked at each manufacturing operation

Note 1 to entry: A manufacturing lot is associated with a travel log and constitutes a group homogeneously processed through all manufacturing operations under uniform manufacturing conditions.

3.1.14

moisture sensitivity level

MSL

rating indicating a component's susceptibility to damage due to absorbed moisture when subjected to reflow soldering

3.1.15

original component manufacturer

OCM

company specifying and manufacturing the electronic component

[SOURCE: IEC TS 62668-1:2016, 3.1.13]

3.1.16

OEM

original equipment manufacturer

manufacturer which defines the electronic subassembly that includes the electronic components or defines the components used in an assembly and/or test specification

[SOURCE: IEC TS 62668-1:2016, 3.1.14]

3.1.17

passive component

component that does not require electrical power to operate (for example not capable of power gain)

Note 1 to entry: For the purposes of this document, the term 'passive' is restricted to capacitors and resistors.

3.1.18

room temperature

temperature identified at $25\text{ °C} \pm 5\text{ °C}$ in a room

3.1.19

shipping lot

single lot of one or more containers received by a user

3.1.20

supplier

company which provides to another an electronic component which is identified by the logo or name marked on the device

Note 1 to entry: A supplier can be the OCM, a franchised distributor or agent, a non-franchised distributor, broker, reseller, OEM, CEM and EMS etc.

[SOURCE: IEC TS 62686-1:2015, 3.1.19]

3.1.21 termination

element of a component that connects it electrically and mechanically to the next level of assembly

3.2 Abbreviated terms

AC	alternating current
ADHP	aerospace, defence and high performance
AEC	Automotive Electronics Council
AOQ	average out-going quality
AQEC	aerospace qualified electronic component
AQL	acceptable quality level
CB	certification body
CECC	CENELEC electronic components committee
CFC	chlorofluorocarbon
COTS	commercial off-the-shelf
DC	direct current
DFMEA	design failure modes and effect analysis
DLA	Defense Logistics Agency (see http://www.dsccl.dla.mil/)
DPM	defects per million
DVP&R	design verification plan and report
ECMP	electronic component management plan
EHS	environmental health and safety
EMAS	Eco-Management and Audit Scheme (established by the European Union)
ESD	electrostatic discharge
FFF	form, fit and function
FIT	failures in time
GR&R	gage repeatability and reproducibility analysis
h	hour
HAST	highly accelerated stress test
HBM	human body model
HTOL	high temperature operating life
IATF	International Automotive Task Force
IECQ	International Electrotechnical Commission Quality Assessment System for Electronic Components
I/O	input and output
IR	infra-red
LTB	last time buy
LTPD	lot tolerance percent defective
min	minute
MSA	measurements system analysis
MSL	moisture sensitivity level
OCM	original component manufacturer
OEM	original equipment manufacturer
PC	preconditioning

PCB	printed circuit board
PCN	product or process change notification
PFMEA	process failure modes and effects analysis
Pkg	package
PPAP	part production approval process
QA	quality assurance
QPL	qualified parts list
REACH	registration, evaluation, authorization and restriction of substances
RoHS	restriction of hazardous substances
SMD	surface mount device
SPC	statistical process control
T_{amb}	ambient temperature
TC	test code
T_{opmin}	minimum operating temperature
T_{opmax}	maximum operating temperature
UCT	upper category temperature

4 Technical requirements

4.1 General

4.1.1 Overview

The supplier, preferably the franchised distributor or original component manufacturer (OCM), as defined in 3.1.20 and 3.1.15, shall have an appropriate quality management system and shall provide the following minimum technical requirements. Other proposed equivalent test methods, rationale and supporting data shall be reviewed and shall achieve the same end objectives as specified herein (see 4.4.4). The supplier or OCM shall provide a high-level statement summarising how compliance to the specification is achieved including the use of equivalent test methods (see 4.1.2), when they are used.

NOTE 1 ISO 9001 or AS/EN/JISQ 9100 can assist with compliance to this clause.

NOTE 2 In case the COTS passive components cannot be procured directly from the OCM (for example if too small a quantity), the franchised distribution network is usually privileged with regard to potential risks (for example lack of traceability and counterfeiting).

Informative annexes are provided at the end of this document and their contents are subject to change. Users of this document are encouraged to review the latest data available whenever referencing the content of these annexes:

- Informative Annex A: Test code (TC) information;
- Informative Annex B: Typical IECQ-CECC approved passive components;
- Informative Annex C: Typical USA military specified passive components;
- Informative Annex D: Typical automotive component;
- Informative Annex E: Typical IEC specified passive components;
- Informative Annex F: Verification requirements matrix for IEC TS 62686-2.