



BSI Standards Publication

## Process management for avionics - Management plan

---

Part 1: Preparation and maintenance of an electronic components management plan

## National foreword

This British Standard is the UK implementation of EN IEC 62239-1:2018. It is identical to IEC 62239-1:2018. It supersedes PD IEC/TS 62239-1:2015, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/107, Process management for avionics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2018  
Published by BSI Standards Limited 2018

ISBN 978 0 580 51201 8

ICS 49.060; 03.100.50; 31.020

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2018.

### Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

---

EUROPEAN STANDARD

**EN IEC 62239-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2018

ICS 03.100.50; 31.020; 49.060

English Version

Process management for avionics - Management plan - Part 1:  
Preparation and maintenance of an electronic components  
management plan  
(IEC 62239-1:2018)

Gestion des processus pour l'avionique - Plan de gestion -  
Partie 1: Préparation et maintenance d'un plan de gestion  
des composants électroniques  
(IEC 62239-1:2018)

Luftfahrtelektronik-Prozessmanagement - Managementplan  
- Teil 1: Erarbeitung und Instandhaltung eines  
Managementplanes für elektronische Bauelemente  
(IEC 62239-1:2018)

This European Standard was approved by CENELEC on 2018-10-29. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**European foreword**

The text of document 107/320/CDV, future edition 1 of IEC 62239-1, prepared by IEC/TC 107 "Process management for avionics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62239-1:2018.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-07-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2021-10-29

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

**Endorsement notice**

The text of the International Standard IEC 62239-1:2018 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60068-2-58	NOTE	Harmonized as EN 60068-2-58
IEC 60695-11-5	NOTE	Harmonized as EN 60695-11-5
IEC 61193-2	NOTE	Harmonized as EN 61193-2
IEC 61340-5-1	NOTE	Harmonized as EN 61340-5-1
IEC/TR 61340-5-2	NOTE	Harmonized as CLC/TR 61340-5-2
IEC 61760-4	NOTE	Harmonized as EN 61760-4
IEC 61967 (series)	NOTE	Harmonized as EN 61967 (series)
IEC 61967-1	NOTE	Harmonized as EN 61967-1
IEC 62435-1	NOTE	Harmonized as EN 62435-1
IEC 62132 (series)	NOTE	Harmonized as EN 62132 (series)
IEC 62402	NOTE	Harmonized as EN 62402
IEC 62435-1	NOTE	Harmonized as EN 62435-1
ISO 9000	NOTE	Harmonized as EN ISO 9000
ISO 9001	NOTE	Harmonized as EN ISO 9001
ISO 9004	NOTE	Harmonized as EN ISO 9004

**Annex ZA**  
(normative)

**Normative references to international publications  
with their corresponding European publications**

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62396	series	Process management for avionics - Atmospheric radiation effects	-	-
IEC 62396-1	2016	Process management for avionics - Atmospheric radiation effects - Part 1: Accommodation of atmospheric radiation effects via single event effects within avionics electronic equipment	-	-
IEC/TS 62647-1	-	Process management for avionics - Aerospace and defence electronic systems containing lead-free solder - Part 1: Preparation for a lead-free control plan	-	-
GEIA-STD-0005-1	-	Performance Standard for Aerospace and High Performance Electronic Systems Containing Lead-Free Solder	-	-
IPC/JEDEC J-STD-20	-	Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices	-	-

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms, definitions and abbreviated terms .....	8
3.1 Terms and definitions.....	8
3.2 Abbreviated terms.....	12
4 Technical requirements .....	14
4.1 General.....	14
4.2 Component selection .....	14
4.2.1 General.....	14
4.2.2 Application conditions for use .....	15
4.2.3 Availability and durability .....	15
4.2.4 Additional performance .....	15
4.2.5 Component identification .....	15
4.3 Component application .....	16
4.3.1 General.....	16
4.3.2 Electromagnetic compatibility (EMC).....	16
4.3.3 Derating and stress analysis .....	16
4.3.4 Thermal analysis.....	18
4.3.5 Mechanical analysis.....	18
4.3.6 Testing, testability, and maintainability.....	19
4.3.7 Avionics radiation environment .....	19
4.3.8 Management of lead-free termination finish and soldering.....	19
4.3.9 Counterfeited, fraudulent and recycled component avoidance .....	20
4.3.10 Moisture and corrosion .....	20
4.3.11 Additional customer related application requirements .....	20
4.4 Component qualification.....	20
4.4.1 General.....	20
4.4.2 Minimum component qualification requirements .....	21
4.4.3 Original component manufacturer quality management .....	21
4.4.4 Original component manufacturer process management approval .....	21
4.4.5 Demonstration of component qualification.....	22
4.4.6 Qualification of components from a supplier that is not qualified .....	23
4.4.7 Distributor process management approval .....	24
4.4.8 Subcontractor assembly facility quality and process management approval .....	24
4.5 Continuous component quality assurance .....	25
4.5.1 General quality assurance requirements .....	25
4.5.2 Ongoing component quality assurance.....	25
4.5.3 Plan owner in-house continuous monitoring .....	25
4.5.4 Component design and manufacturing process change monitoring .....	26
4.6 Component dependability.....	26
4.6.1 General.....	26
4.6.2 Component availability and associated risk assessment .....	26
4.6.3 Component obsolescence .....	27
4.6.4 Proactive measures .....	27

4.6.5	Component obsolescence awareness .....	27
4.6.6	Reporting.....	27
4.6.7	Semiconductor reliability, wear out and lifetime.....	28
4.6.8	Reliability assessment .....	28
4.7	Component compatibility with the equipment manufacturing process .....	28
4.8	Component data .....	29
4.8.1	General.....	29
4.8.2	Minimum component data requirements.....	30
4.9	Configuration control.....	30
4.9.1	General.....	30
4.9.2	Alternative components.....	30
4.9.3	Alternative sources .....	30
4.9.4	Equipment change documentation .....	31
4.9.5	Customer notifications and approvals .....	31
4.9.6	Focal organization .....	31
5	Plan administration requirements.....	31
5.1	Plan organization.....	31
5.2	Plan terms and definitions.....	31
5.3	Plan focal point.....	31
5.3.1	Primary interface .....	31
5.3.2	Plan focal point responsibilities .....	32
5.4	Plan references.....	32
5.5	Plan applicability.....	32
5.6	Plan implementation .....	32
5.6.1	ECMP compliance.....	32
5.6.2	Plan objectives .....	32
5.6.3	Plan owner's subcontracted activities.....	33
5.7	Plan acceptance .....	33
5.8	Plan maintenance .....	33
	Annex A (informative) Requirement matrix for IEC 62239-1 .....	34
	Annex B (informative) Typical qualification requirements and typical component minimum qualification requirements .....	50
	Annex C (informative) IEC 62239-1 cross-references to SAE EIA-STD-4899 for guidance.....	53
	Annex D (informative) Guidelines for environmental protection techniques and for comparison of components specifications .....	56
	Bibliography.....	70
	Figure 1 – Suspect components perimeter .....	20
	Table A.1 – Requirements matrix .....	34
	Table B.1 – Typical qualification requirements and typical component minimum qualification requirements .....	50
	Table C.1 – Cross-reference overview between IEC 62239-1 and SAE EIA-STD-4899, for guidance.....	53
	Table D.1 – Environmental protection techniques to be considered during the avionics design process .....	56
	Table D.2 – Guidelines for the comparison of internationally available component specifications – Microcircuits <sup>a</sup> .....	61

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

**PROCESS MANAGEMENT FOR AVIONICS –  
MANAGEMENT PLAN –****Part 1: Preparation and maintenance of  
an electronic components management plan**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62239-1 has been prepared by IEC technical committee 107: Process management for avionics.

IEC 62239-1 cancels and replaces IEC TS 62239-1 published in 2015.

This first edition cancels and replaces the first edition of IEC TS 62239-1 published in 2015. This edition constitutes a technical revision.

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

- a) added references to SAE EIA-STD-4899, IECQ OD 3702, IECQ OD 3407-1, IEC TR 62240-2, IECQ component schemes, SAE AS6081, SAE AS6171, GEIA-STD-0005-1 GEIA STD 0008;



- b) replaced Annex C (which was transferred into IEC TR 62240-2) with a cross-reference table to SAE EIASTD4899 rev C clauses/subclauses for guidance purposes only;
- c) added the analysis of component technical erratum in 4.8.2;
- d) updated Bibliography and reference documents.

The text of this international standard is based on the following documents:

CDV	Report on voting
107/320/CDV	107/333/RVC

Full information on the voting for the approval of this International Standard 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 62239 series under the general title *Process management for avionics – Management plan*, 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.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

## INTRODUCTION

This document provides the structure for avionics equipment manufacturers, subcontractors, maintenance facilities, and other aerospace component users to develop their own electronic component management plan (ECMP), hereinafter also referred to as 'plan'. This document states objectives to be accomplished. The plan does not describe specific requirements and those who prepare plans in compliance with this document will document processes that are the most effective and efficient for them in accomplishing the objectives of this document. In order to allow flexibility in implementing and updating the documented processes, plan owners are encouraged to refer to their own internal process documents instead of including detailed process documentation within their plans.

NOTE The equipment manufacturer, often called in the industry the original equipment manufacturer (OEM) is in general considered as the plan owner.

This component management document is intended for aerospace users of electronic components. This document is not intended for use by the manufacturers of electronic components. Components selected and managed according to the requirements of a plan compliant with this document may be approved by the concerned parties for the proposed application, and for other applications with equal or less severe requirements.

Organizations that prepare such plans may prepare a single plan and use it for all relevant products supplied by the organization or may prepare a separate plan for each relevant product or customer.

## **PROCESS MANAGEMENT FOR AVIONICS – MANAGEMENT PLAN –**

### **Part 1: Preparation and maintenance of an electronic components management plan**

#### **1 Scope**

This part of IEC 62239 defines the requirements for developing an electronic components management plan (ECMP) to guarantee to customers that all of the electronic components in the equipment of the plan owner are selected and applied in controlled processes compatible with the end application and that the technical requirements detailed in Clause 4 are accomplished.

In general, the plan owner of a complete electronic components management plan (ECMP) is the avionics original equipment manufacturer (OEM).

NOTE SAE EIA-STD-4899 can be used to comply with the requirements of IEC 62239-1 where applicable (see Annex C), to enable the plan owner to harmonise its plan for both documents.

This document provides an aid in the aerospace certification process.

Although developed for the avionics industry, this process can be applied by other industrial sectors.

#### **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 62396 (all parts), *Process management for avionics – Atmospheric radiation effects*

IEC 62396-1:2016, *Process management for avionics – Atmospheric radiation effects – Part 1: Accommodation of atmospheric radiation effects via single event effects within avionics electronic equipment*

IEC TS 62647-1, *Process management for avionics – Aerospace and defence electronic systems containing lead-free solder – Part 1: Preparation for a lead-free control plan*

GEIA-STD-0005-1, *Performance Standard for Aerospace and High Performance Electronic Systems Containing Lead-Free Solder*

IPC/JEDEC J-STD-20, *Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices*