

Space product assurance - Electrical, electronic and electromechanical (EEE) components

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16602-60:2023 sisaldab Euroopa standardi EN 16602-60:2023 ingliskeelset teksti.	This Estonian standard EVS-EN 16602-60:2023 consists of the English text of the European standard EN 16602-60:2023.
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English version

Space product assurance - Electrical, electronic and electromechanical (EEE) components

Assurance produit des projets spatiaux - Composants électriques, électroniques et électromécaniques (EEE)

Raumfahrtproduktsicherung - Elektrische, elektronische und elektromechanische (EEE) Bauteile

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Table of contents

European Foreword	7
Introduction	7
1 Scope	9
2 Normative references	10
3 Terms, definitions and abbreviated terms	12
3.1 Terms from other standards	12
3.2 Terms specific to the present standard	12
3.3 Abbreviated terms	13
3.4 Conventions	15
3.5 Nomenclature	16
4 Requirements for Class 1 components	17
4.1 Component programme management	17
4.1.1 General	17
4.1.2 Components control programme	17
4.1.3 Parts control board	17
4.1.4 Declared components list	18
4.1.5 Electrical and mechanical GSE	19
4.1.6 EQM components	19
4.2 Component selection, evaluation and approval	20
4.2.1 General	20
4.2.2 Manufacturer and component selection	20
4.2.3 Component evaluation	24
4.2.4 Parts approval	26
4.3 Component procurement	27
4.3.1 General	27
4.3.2 Procurement specification	27
4.3.3 Screening requirements	28
4.3.4 Initial customer source inspection (precap)	28
4.3.5 Lot acceptance	29

4.3.6	Final customer source inspection (buy-off)	30
4.3.7	Incoming inspections	30
4.3.8	Radiation verification testing	31
4.3.9	Destructive physical analysis	31
4.3.10	Relifing	32
4.3.11	Manufacturer's data documentation deliveries	32
4.4	Handling and storage	33
4.5	Component quality assurance	33
4.5.1	General	33
4.5.2	Nonconformances or failures	33
4.5.3	Alerts	34
4.5.4	Traceability	34
4.5.5	Lot homogeneity for sampling test	35
4.6	Specific components	35
4.6.1	General	35
4.6.2	ASICs	35
4.6.3	Hybrids	35
4.6.4	One time programmable devices	35
4.6.5	Microwave monolithic integrated circuits	36
4.6.6	Connectors	36
4.7	Documentation	36
5	Requirements for Class 2 components	38
5.1	Component programme management	38
5.1.1	General	38
5.1.2	Components control programme	38
5.1.3	Parts Control Board	38
5.1.4	Declared Components List	39
5.1.5	Electrical and mechanical GSE	40
5.1.6	EQM components	40
5.2	Component selection, evaluation and approval	40
5.2.1	General	40
5.2.2	Manufacturer and component selection	41
5.2.3	Component evaluation	44
5.2.4	Parts approval	46
5.3	Component procurement	46
5.3.1	General	46
5.3.2	Procurement specification	47

5.3.3	Screening requirements	47
5.3.4	Initial Customer Source Inspection (precap).....	48
5.3.5	Lot acceptance.....	48
5.3.6	Final customer source inspection (buy-off).....	49
5.3.7	Incoming inspections.....	49
5.3.8	Radiation verification testing	50
5.3.9	Destructive physical analysis	50
5.3.10	Relifing.....	51
5.3.11	Manufacturer's data documentation deliveries	51
5.4	Handling and storage.....	52
5.5	Component quality assurance	52
5.5.1	General	52
5.5.2	Nonconformances or failures	52
5.5.3	Alerts.....	53
5.5.4	Traceability	53
5.5.5	Lot homogeneity for sampling test.....	53
5.6	Specific components.....	53
5.6.1	General	53
5.6.2	ASICs.....	53
5.6.3	Hybrids.....	54
5.6.4	One time programmable devices.....	54
5.6.5	Microwave monolithic integrated circuits	55
5.6.6	Connectors	55
5.7	Documentation	55
6	Requirements for Class 3 components	57
6.1	Component programme management	57
6.1.1	General	57
6.1.2	Components control programme	57
6.1.3	Parts control board.....	57
6.1.4	Declared components list.....	57
6.1.5	Electrical and mechanical GSE	58
6.1.6	EQM components	58
6.2	Component selection, evaluation and approval.....	58
6.2.1	General	58
6.2.2	Manufacturer and component selection.....	59
6.2.3	Component evaluation	62
6.2.4	Parts approval.....	64

6.3	Component procurement	65
6.3.1	General	65
6.3.2	Procurement specification	65
6.3.3	Screening requirements	65
6.3.4	Initial customer source inspection (precap)	66
6.3.5	Lot acceptance.....	66
6.3.6	Final customer source inspection (buy-off).....	66
6.3.7	Incoming inspections.....	67
6.3.8	Radiation verification testing	67
6.3.9	Destructive physical analysis	67
6.3.10	Relifing.....	68
6.3.11	Manufacturer's data documentation deliveries	69
6.4	Handling and storage.....	69
6.5	Component quality assurance	69
6.5.1	General	69
6.5.2	Nonconformances or failures	70
6.5.3	Alerts.....	70
6.5.4	Traceability	70
6.5.5	Lot homogeneity for sampling test.....	71
6.6	Specific components.....	71
6.6.1	Overview	71
6.6.2	ASICs.....	71
6.6.3	Hybrids.....	71
6.6.4	One time programmable devices.....	71
6.6.5	Microwave monolithic integrated circuits	72
6.6.6	Connectors	72
6.7	Documentation	72
7	Quality levels	74
8	Evaluation and lot acceptance for retinned parts.....	88
9	Pure tin lead finish – risk analysis	89
9.1	Overview	89
9.2	Requirements	89
Annex A (normative)	Component control plan (CCP) - DRD	91
A.1.1	Requirement identification and source document.....	91
A.1.2	Purpose and objective.....	91
A.2.1	Scope and content	91

A.2.2	Special remarks	92
Annex B (normative)	Declared component list (DCL) - DRD	93
B.1.1	Requirement identification and source document.....	93
B.1.2	Purpose and objective.....	93
B.2.1	Scope and content	93
B.2.2	Special remarks	94
Annex C (normative)	Procurement specification - DRD.....	95
C.1.1	Requirement identification and source document.....	95
C.1.2	Purpose and objective.....	95
C.2.1	Scope and content	95
C.2.2	Special remarks	96
Annex D (normative)	Part approval document (PAD) - DRD.....	97
D.1.1	Requirement identification and source document.....	97
D.1.2	Purpose and objective.....	97
Annex E (informative)	EEE documents delivery per review	100
Bibliography.....		103
Tables		
Table 4-1:	Document requirements list for Class 1 components	36
Table 5-1:	Document requirements list for Class 2 components	55
Table 6-1:	Document requirements list for Class 3 components	72
Table 7-1:	Quality levels for Class 1 components	74
Table 7-2:	Quality levels for Class 2 components	78
Table 7-3:	Quality levels for Class 3 components	83
Table D-1 :	PAD sheet.....	98
Table E-1 :	EEE delivery documents	101

European Foreword

This document (EN 16602-60:2023) has been prepared by Technical Committee CEN-CENELEC/JTC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-60:2023) originates from ECSS-Q-ST-60C Rev. 3.

This document will supersede EN 16602-60:2015.

The main changes with respect to EN 16602-60:2015 are listed below:

- Implementation of Change Requests
- Topic "EQM components" added for all three classes
- Topic "Pure tin lead finish – risk analysis" moved from ECSS-Q-ST-60-13 to ECSS-Q-ST-60 as clause 9. Definition of "traceability information (trace code)" updated"

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any EN covering the same scope but with a wider domain of applicability (e.g. : aerospace).

Introduction

The objective of the EEE component selection, control, procurement and use requirements is to ensure that EEE components used in a space project enables the project to meet its mission requirements.

Important elements of EEE component requirements include:

- a. component programme management,
- b. component selection, evaluation and approval,
- c. procurement,
- d. handling and storage,
- e. component quality assurance,
- f. specific components, and
- g. documentation.

The main tools which can be used to reach the objective are:

- a. concurrent engineering,
- b. standardization of component types,
- c. characterization of components,
- d. assessment of component manufacturers including declared competencies and processes,
- e. testing, screening, lot acceptance and periodic testing,
- f. procurement specifications,
- g. control and inspection,
- h. control of nonconforming materials,
- i. assessment and use of existing component data,
- j. application of specific control to mitigate risk for components with limited data or confidence, and
- k. information management.

The basic approach is as follows:

- The customer of a given space project defines the EEE component requirements within the boundaries of this standard. They appear in the appropriate clauses of the project requirements as defined in ECSS-M-ST-10.
- The supplier defines a component control plan to implement those requirements into a system which enables, for instance, to control the selection, approval, procurement, handling in a schedule compatible with his requirements, and in a cost-efficient way.
- The supplier ensures that the applicable parts requirements are passed down to lower level suppliers and ensure that they are compliant to these parts requirements.

1

Scope

This standard defines the requirements for selection, control, procurement and usage of EEE components for space projects.

This standard differentiates between three classes of components through three different sets of standardization requirements (clauses) to be met.

The three classes provide for three levels of trade-off between assurance and risk. The highest assurance and lowest risk is provided by class 1 and the lowest assurance and highest risk by class 3. Procurement costs are typically highest for class 1 and lowest for class 3. Mitigation and other engineering measures may decrease the total cost of ownership differences between the three classes. The project objectives, definition and constraints determine which class or classes of components are appropriate to be utilised within the system and subsystems.

- a. Class 1 components are described in Clause 4.
- b. Class 2 components are described in Clause 5
- c. Class 3 components are described in Clause 6.

The requirements of this document apply to all parties involved at all levels in the integration of EEE components into space segment hardware and launchers.

This standard may be tailored for the specific characteristics and constraints of a space project in conformance with ECSS-S-ST-00.

Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this ECSS Standard. For dated references, subsequent amendments to, or revision of any of these publications do not apply. However, parties to agreements based on this ECSS Standard are encouraged to investigate the possibility of applying the more recent editions of the normative documents indicated below. For undated references, the latest edition of the publication referred to applies.

EN reference	Reference in text	Title
EN 16601-00-01	ECSS-S-ST-00-01	ECSS system — Glossary of terms
EN 16601-10	ECSS-M-ST-10	Space project management — Project planning and implementation
EN 16602-10-09	ECSS-Q-ST-10-09	Space product assurance — Nonconformance control system
EN 16602-20	ECSS-Q-ST-20	Space product assurance — Quality assurance
EN 16602-30-11	ECSS-Q-ST-30-11	Space product assurance — Derating — EEE components
EN 16602-60-02	ECSS-Q-ST-60-02	Space product assurance — ASIC and FPGA development
EN 16602-60-05	ECSS-Q-ST-60-05	Space product assurance — Generic procurement requirements for hybrids
EN 16602-60-12	ECSS-Q-ST-60-12	Space product assurance — Design, selection, procurement and use of die form monolithic microwave integrated circuits (MMICs)
EN 16602-60-13	ECSS-Q-ST-60-13	Space product assurance — Commercial electrical, electronic and electromechanical (EEE) components
EN 16602-60-14	ECSS-Q-ST-60-14	Space product assurance — Relifing procedure — EEE components
EN 16602-60-15	ECSS-Q-ST-60-15	Radiation hardness assurance — EEE components
EN 16602-70	ECSS-Q-ST-70	Space product assurance — Materials, mechanical parts and processes
	ESCC 20200	ESCC Basic Specification: Component Manufacturer Evaluation
	ESCC 21004	ESCC Basic Specification: Guidelines for incoming inspection of EEE components
	ESCC 22500	ESCC Basic Specification: Guidelines for displacement damage irradiation testing

	ESCC 22800	ESCC Basic Specification: ESA/SCC Non conformance Control System
	ESCC 22900	ESCC Basic Specification: Total Dose Steady-State Irradiation Test Method
	ESCC 24900	ESCC Basic Specification: Minimum requirements for controlling environmental contamination of components
	ESCC 25500	ESCC Basic Specification: Methodology for the detection of pure tin in the external surface finish of case and leads of EEE components
	ESCC QPL	ESCC qualified part list (https://escies.org)
	ESCC EPPL	ESCC European preferred parts list (https://escies.org)
	ESCC QML	ESCC qualified manufacturers list (https://escies.org)
	GEIA-STD-0005-2	Standard for Mitigating the Effects of Tin Whiskers in Aerospace and High Performance Electronic Systems.
	MIL QPLs	MIL qualified parts lists
	MIL QMLs	MIL qualified manufacturers lists
	NPSL	NASA Parts Selection List
	JAXA QPL	JAXA qualified parts list
	ESCC, MIL & JAXA specifications and standards called in the document	