

# Space product assurance

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## European preferred parts list (EPPL) and its management

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## Foreword

This Standard is one of the series of ECSS Standards intended to be applied together for the management, engineering and product assurance in space projects and applications. ECSS is a cooperative effort of the European Space Agency, national space agencies and European industry associations for the purpose of developing and maintaining common standards.

Requirements in this Standard are defined in terms of what shall be accomplished, rather than in terms of how to organize and perform the necessary work. This allows existing organizational structures and methods to be applied where they are effective, and for the structures and methods to evolve as necessary without re-writing the standards.

The formulation of this Standard takes into account the existing ISO 9000 family of standards.

This Standard has been prepared by the ECSS Working Group Q-60-01, endorsed by the SCSB, reviewed by the ECSS Technical Panel and approved by the ECSS Steering Board. The list of European preferred parts is established and maintained under the authority of the Space Components Steering Board (SCSB) in partnership with the European Space Agency (ESA), national space agencies (NSAs) and European space industry.

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# Scope

## 1.1 General

This Standard contains the European preferred parts list (EPPL) and provides the rules for establishing the list of preferred and suitable components to be used by European manufacturers of spacecraft hardware and associated equipment.

The operating rules for management, administration and maintenance of the EPPL are defined in annex A of this Standard.

## 1.2 Applicability

This Standard applies to all parties involved at all levels in the realization of space segment hardware and its interfaces.

## 1.3 Objective

The objective is to direct the user towards a limited number of component types, covering all design applications. The aim is to avoid duplication and achieve cost reduction and procurement effectiveness.

The EPPL is made up of two parts:

- Part I components:  
components which are fully qualified or evaluated to recognized space standards giving full confidence for space usage.
- Part II components:  
components which have potential capability to satisfy space application requirements, but have not yet reached the level of full confidence.

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## 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 revisions 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 most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

ECSS-P-001	Glossary of terms
ECSS-Q-60	Space product assurance - Electrical, electronic and electromechanical (EEE) components

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## Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

The terms and definitions given in ECSS-P-001 are applicable.

### 3.2 Abbreviated terms

The following abbreviated terms are defined and used within this Standard:

<b>CECC</b>	CENELEC Electronic Components Committee
<b>CTB</b>	Component Technology Board (of the SCSB)
<b>EAF</b>	entry application form
<b>ECSS</b>	European Cooperation for Space Standardization
<b>EPPL</b>	European preferred parts list
<b>ER</b>	established reliability
<b>ESA</b>	European Space Agency
<b>ESA/SCC</b>	European component procurement specification system
<b>HTML</b>	hyper text markup language
<b>MIL (spec)</b>	specification of the U.S. Department of Defense
<b>NASA</b>	National Aeronautics and Space Administration
<b>NASDA</b>	National Space Development Agency of Japan
<b>NPSL</b>	NASA parts selection list
<b>PPL</b>	preferred parts list
<b>QML</b>	qualified manufacturer listing
<b>QPL</b>	qualified parts list
<b>RAF</b>	removal application form
<b>SCSB</b>	Space Components Steering Board
<b>SEE</b>	single event effect
<b>SEF</b>	summary evaluation form
<b>SEU</b>	single event upset

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## Rules for selection and removal

### 4.1 General

The inclusion of components in the EPPL indicates that they:

- are capable of satisfying a wide range of design applications;
- are known in their technology and show potential for use in flight-standard hardware;
- have a significant chance of being utilized for current and future programmes;
- are available from sources for which there is evidence that they are capable of providing products of the required quality.

Preference is given to those components that are available:

- in both packaged and surface mount versions;
- for both engineering model and flight hardware.

For each part type the relevant manufacturer is listed, together with the applicable procurement specification and relevant characteristics. Preference is given to European suppliers. In the case that an European component is not available, the non-European component is listed.

Preference is given to components for which a second source is available. Components selected for inclusion in the EPPL have been subjected to standardization and, for example, reduction of type variants, values, packages, sizes, application range. Components selected for inclusion in the EPPL are from suppliers whose product lines have been certified by the executive of the Space Components Steering Board (SCSB) or by an accredited third party authority.

### 4.2 Part I components

Components included in Part I of the EPPL can be used without any special provision, on the condition they meet the application requirements.

Provided that the selection criteria in subclause 4.1 are met, the Part I components shall be selected from:

- a. components included in recognized QPLs issued by:
  - ESA
  - U.S. Defense Supply Center, Columbus - MIL (class S, ER level R)
  - NASDA (class S, ER level R)
- b. components belonging to QML, class V;

- c. components included in NASA NPSL, level 1;
- d. components that have been evaluated successfully according to ESA/SCC, ECSS-Q-60 or equivalent requirements for which a recognized procurement specification is available.

### 4.3 Part II components

Part II components complement Part I components and ensure improved coverage of future programme requirements. In general, additional effort is necessary to satisfy specific programme requirements. The selection of components is based on available data resulting from evaluation demonstrating capability to satisfy space application requirements.

Provided that the selection criteria in subclause 4.1 are met, the Part II components shall be selected from:

- a. components included in recognized QPLs issued by:
  - U.S. Defense Supply Center, Columbus - MIL (level B, JANTXV, ER level P)
  - CECC Register of Approvals
  - NASDA (level B, ER level P)
- b. components belonging to QML, class Q;
- c. components included in NASA NPSL, levels 2 and 3;
- d. components that have been evaluated in a space project or in other applications, where at least minimum data are available, e.g.:
  - constructional analysis
  - electrical characterization
  - life test results
  - mechanical data (for electromechanical components, only)
  - radiation test data (for sensitive components only)
- e. components where manufacturer's data are available, e.g.:
  - qualification data
  - process (SPC) data, life test/reliability/field data and line certification.

### 4.4 Removal

A component type may be removed from the EPPL for any of the following reasons:

- the component has become obsolete;
- sources are no longer available;
- the type has been replaced by a functionally similar but improved component;
- inherent reliability/quality problems have been experienced and not resolved.

The reason for deletion is indicated in the "What's new" section of the EPPL.

## **User responsibility**

Components in the EPPL met the appropriate criteria of clause 4 at the time of inclusion. However, it is the responsibility of each user, who is considering using components selected from the EPPL, to satisfy himself of the suitability of the component, in all respects, for the application intended.

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## **EPPL content**

For each component, the following information shall be provided:

- type;
- package;
- description, including preferred variants, temperature range, range of values for passives, remark on radiation sensitivity, if available;
- detail specification (whenever possible, the specification proposed is from the ESA/SCC system);
- generic specification (when necessary);
- manufacturer;
- remarks if any (such as restrictions, relevant or specific information).

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## European preferred parts list

The European preferred parts list is available on the World Wide Web.  
To obtain the current release of the EPPL, please refer to the following website:

**<http://www.estec.esa.nl/qcswww/eppl/>**

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## Annex A (normative)

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# Administration and maintenance of the EPPL

## A.1 General

This annex defines the operating rules and the information flow to perform the administration and maintenance of the EPPL.

The chart for administration and maintenance of the EPPL is given in Figure 1.

The EPPL shall be updated twice a year, as a minimum.

## A.2 Establishment of the EPPL

### A.2.1 Parties involved

The parties involved in the EPPL life cycle are as follows:

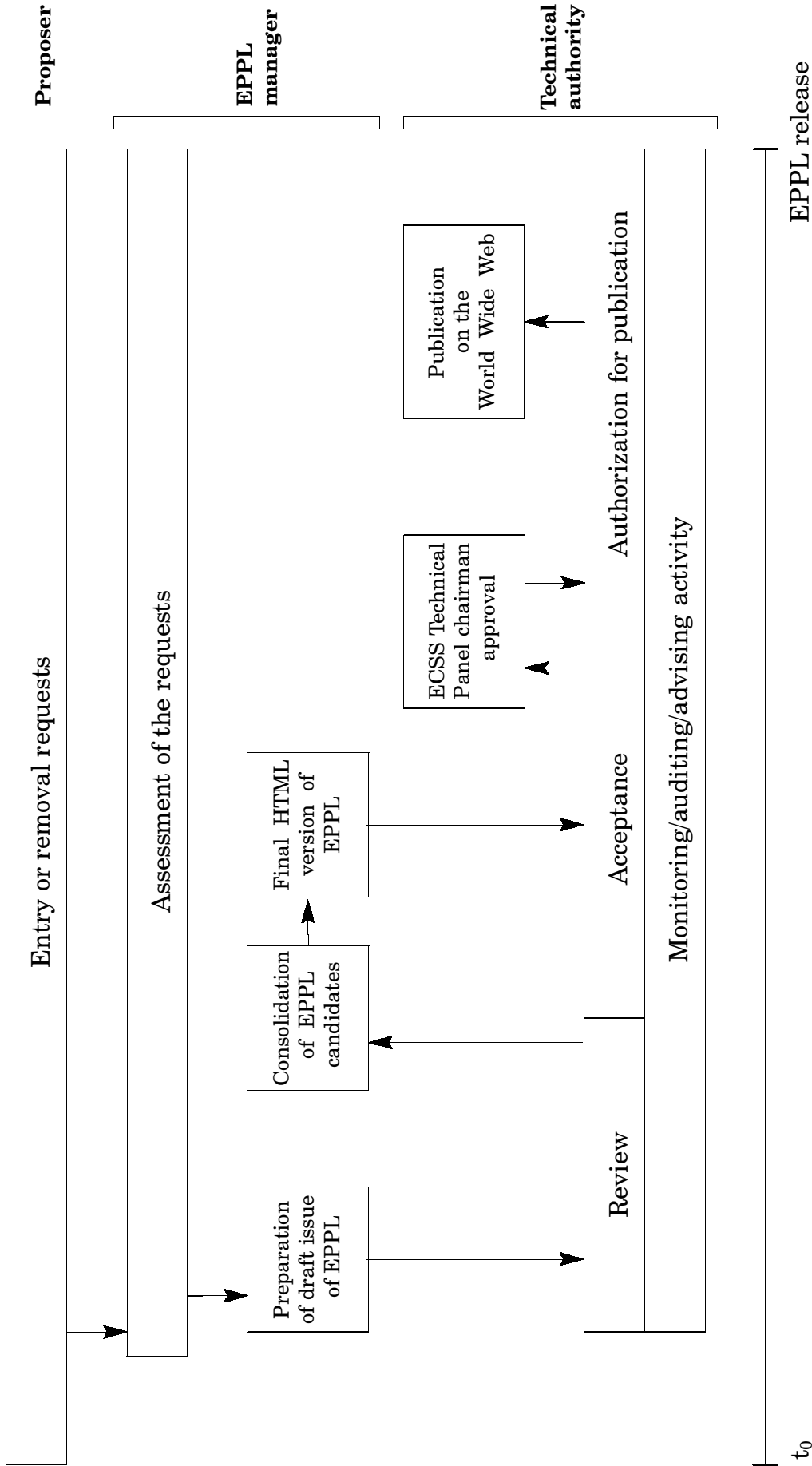
- The proposer, as the person submitting proposal for selection or removal of components in the EPPL, acting as technical contact point with the EPPL manager.
- EPPL technical authority, nominated by the SCSB for monitoring, advising, technical review functions.
- EPPL manager is in charge of the process of any selection or removal of components in the EPPL and for providing the list in a suitable form for inclusion on the website.

### A.2.2 Management of the document

The EPPL is released on the World Wide Web after formal authorization given by the technical authority and approval by the chairman of the ECSS Technical Panel.

Proposals for selection or removal of components may be made by any person and addressed directly to the EPPL manager as indicated on the list.

Any change to the list proposed by the EPPL manager shall be authorized by the technical authority, subsequently approved by the chairman of the ECSS Technical Panel.



**Figure 1: EPPL flow chart**

### A.2.3 Responsibilities

- a. The person submitting a proposal, the proposer, for selection or removal of components in the EPPL, shall act as the technical interface with the EPPL manager.
- b. The technical authority is responsible for the content of the EPPL, and, on behalf of the SCSB, also for the formal authorization to release the EPPL, after approval by the chairman of the ECSS Technical Panel.
- c. The technical authority shall monitor and may audit, on behalf of the SCSB, the EPPL activity performed by the EPPL manager, and shall advise the SCSB and the EPPL manager on request.
- d. The EPPL manager is responsible for the preparation of the EPPL, and for providing it in a suitable form for subsequent authorization, approval and inclusion on the website.

## A.3 Description of the information flow

- a. Proposals for selection or removal in the EPPL shall be made using an Entry Application Form (EAF) or a Removal Application Form (RAF) as described in subclauses A.5 and A.6.
- b. The submission of a proposal for selection or removal may be made at any time.
- c. Proposed selection or removal shall be processed by the assigned EPPL manager.
- d. The EPPL manager shall review the EAFs or the RAFs, applying the selection or removal criteria, as defined in clause 4, and performing any standardization and type reduction necessary.
- e. For each component type which is not qualified to a recognized system, the EPPL manager shall obtain sufficient supporting documentation (e.g. test data) to properly evaluate the acceptability of the component.
- f. All new component types proposed, which are not qualified, shall be selected in line with the technological programme and general policy established by the CTB.
- g. The EPPL manager, using a suitable Summary Evaluation Form (SEF), shall generate a preliminary list of candidates and changes to the EPPL. This preliminary list shall be distributed to the technical authority members for review and approval.
- h. The technical authority shall be responsible for authorizing the publication of the EPPL on the website after approval by the chairman of the ECSS Technical Panel.
- i. The technical authority shall be responsible for reviewing the activities of the EPPL manager and for advising the EPPL manager and the SCSB.
- j. The EPPL manager shall be responsible for the accuracy, schedule and availability of the list.
- k. Information should be exchanged between the parties by electronic means, preferably by Internet.
- l. All records, including correspondence, complete questionnaires, draft documents and minutes of meeting generated and received in the course of the contract, are designated as the property of SCSB and shall be stored by the EPPL manager in a way that prevents degradation and facilitates ready retrieval. They shall be delivered as directed by the SCSB, at no charge.
- m. The chart for the EPPL preparation and releases is included in Figure 1.

## A.4 Entry application form (EAF)

Proposals for parts selection in the EPPL are made using the entry application form (EAF) as described hereafter.

### 1. User

Company name: name of the relevant user  
Company address: address of the relevant user  
Proposer: who is submitting the proposal  
Authorized by: responsible authority in the organization of the proposer.  
Signature: the form shall be signed by the proposer

### 2. Component

Type: commercial designation of the component  
Group: code (see EPPL)  
Subgroup: code (see EPPL)  
Description: description of the component function  
Package: standard designation of the package

### 3. Design and application assessment

Application: a detailed description of the application by the user  
Expected volume: expected quantity of components planned to be used in the identified application

### 4. Manufacturer

Manufacturer: supplier of the EPPL candidate  
Processing: front end manufacturing plant(s)  
Assembly: assembly plant  
Screening: plant where the component is screened  
Component manufactured since: date when production started  
Present availability: indication of availability for the chosen assurance level  
Engineering model availability: indication of the availability of the engineering model equivalent component  
Future availability: future availability of the required assurance level  
Export license: any limitation for exportation and any license required shall be indicated in this field

### 5. Technology section

Process: detail description of the baseline process  
Available packages: all available packages shall be indicated in this field  
Available lead finishing: all the available lead finishing shall be indicated in this field  
Die size (if applicable): dimension of the die



Metallization (if applicable):	type of metallization
Die-attach method (if applicable):	identification of the die-attach method
Bonding method (if applicable):	identification of the bonding method
Bond wires (if applicable):	material and relevant dimension of the bond wires
Other information:	any other information related to the technology of the part shall be indicated in this field

### 6. Qualification status

QPL/PPL listing:	indication of inclusion in the recognized QPLs/PPLs
Line qualification:	indication of any available manufacturer or user line qualification related to the EPPL candidate
Device qualification:	indication of any available manufacturer or user device qualification
Similarity:	indication of any part qualification reached by similarity with equivalent device
Evaluation/qualification testing	
In progress:	indication of start date and due date for completion
Planned:	indication of any planned evaluation or qualification testing and the relevant schedule
Maximum assurance level available	
Present:	maximum screening level available at the time of the request
Future:	maximum screening level that may be available in the future
Previous space usage:	identification of the space programmes on which the EPPL candidate has been previously used

### 7. Quality and reliability data

Maximum rated temperature	
During operation:	maximum operating temperature
For environmental testing:	maximum temperature(s) to be used during tests
Test data availability:	This field, and related table, shall contain all report references relevant to electrical tests, mechanical tests, environmental tests, life test, constructional analysis

### 8. Radiation data

Radiation test data availability:	This field, and related table, shall contain report references relevant to total dose and SEU tests
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### **9. Existing procurement specification**

General specification: generic specification identified for the EPPL candidate

Detail specification: detail specification identified for the EPPL candidate

Others: any other specification (e.g. manufacturer specification) shall be identified in this field

### **10. Second source**

In the case that a second source is available, the required information shall be provided as per the baseline manufacturer.

### **11. Additional data and remark**

Any additional information, recognized by the users as useful for the aim of EPPL selection assessment, shall be included in this section.



<b>EPPL Entry Application Form</b>	Page: 2 of 3 Date: Issue:																																				
<p><b>6. Qualification status</b></p> QPL/PPL listing: Line qualification: Device qualification: Similarity: Evaluation/qualification testing In progress: Planned: Maximum quality level available Present: Future: Previous space usage:																																					
<p><b>7. Quality and reliability data</b></p> Maximum rated temperature During operation: <span style="float: right;">For environmental testing:</span>  Test data availability																																					
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	Yes	No	Origin	Reference no.	Date																																
Total dose																																					
SEU																																					
Latch-up																																					
<p><b>9. Existing procurement specification</b></p> General specification: Detail specification: Others:																																					

## EPPL Entry Application Form

Page: 3 of 3

Date:

Issue:

### 10. Second source

Second source available

 yes    no

Manufacturer:

Wafer processing:

Assembly:

Screening:

Component type reference:

Maximum quality level available

Present:

Future:

Previous space usage:

### 11. Additional data and remarks (including reliability and radiation data)

## A.5 Removal application form (RAF)

Proposals for parts removal from the EPPL are made using the removal application form (RAF) as described hereafter.

### 1. User

Company name: name of the relevant user  
Company address: address of the relevant user  
Proposer: who is submitting the proposal  
Authorized by: responsible authority in the organization of the proposer.  
Signature: the form shall be signed by the proposer

### 2. Component

Type: commercial designation of the component  
Manufacturer: supplier of the EPPL component to be removed  
Group: code (see EPPL)  
Subgroup: code (see EPPL)  
Description: description of the component function or characteristics  
Package: standard designation of the package  
Detail specification: detail specification identified in the EPPL

### 3. Reason for deletion

Tick a box as appropriate and fill in detail description.

### 4. Additional remarks

Any addition remarks, recognized by the users as useful for the aim of EPPL deletion assessment, shall be included in this section.

<b>EPPL Removal Application Form</b>		Page: 1 of 1 Date: Issue:
<b>1. User</b> Company name: Company address: Proposer:		
		Signature: Authorized by:
<b>2. Component</b> Type: Group: Description: Detail specification: Equivalent to a component already in the EPPL <input type="checkbox"/> yes <input type="checkbox"/> no If yes, justify the interest for the new one:		
<b>3. Reason for deletion</b> <input type="checkbox"/> Obsolete <input type="checkbox"/> No longer used <input type="checkbox"/> No longer available from supplier <input type="checkbox"/> Replaced by similar one <input type="checkbox"/> Inherent reliability/quality problems <input type="checkbox"/> Other <input type="checkbox"/> Detail description		
<b>4. Addition remarks</b>		

## **A.6 Summary evaluation form (SEF)**

The assigned EPPL manager shall generate the preliminary list of changes to the EPPL, to be submitted to the technical authority acceptance, using the summary evaluation form (SEF).





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