



**RECOMMENDATIONS ON THE USE OF THE ESCC
SPECIFICATION SYSTEM FOR THE EVALUATION
AND PROCUREMENT OF UNQUALIFIED
COMPONENTS**

ESCC Basic Specification No. 23100

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1 **PURPOSE**

This specification provides the ESCC recommendations in respect of procurement, for flight or ground segment space application of unqualified EEE components and for associated evaluation activities.

(The recommendations are promulgated under the auspices of the Space Components Steering Board representing European international and national space agencies, user industry and component manufacturers.)

2 **SCOPE**

The purpose of the ESCC recommendations is to achieve maximum standardisation of the approval procedures applied to the procurement of unqualified components. The scope of the recommendations is such that:

- (a) The assessment and evaluation of components during procurement contributes to an increasing body of information which can serve, where appropriate, as a basis for selection for entry into the ESCC EPPL and for the ESCC qualification of components.
- (b) Work performed in the frame of a particular project or programme is not repeated unnecessarily when the same component is procured by a subsequent project.

3 **RELATED DOCUMENTS**

3.1 **APPLICABLE DOCUMENTS**

| | |
|-------------|---|
| ESCC 20100 | Requirements for Qualification of Standard Electronic Components for Space Application |
| ESCC 20200 | Component Manufacturer Evaluation |
| ESCC 20800 | New ESCC Specifications and Change Requests |
| ESCC 21700 | General Requirements for the Marking of ESCC Components |
| ESCC 22600 | Requirements for the Evaluation of Standard Electronic Components for Space Application |
| ESCC 22900 | Total Dose Steady-State Irradiation Test Method |
| ESCC 24600 | Minimum Quality System Requirements |
| ESCC 25100 | Single Event Effects Test Method and Guidelines |
| ESCC REP001 | List of Published ESCC Documents and Specifications |

3.2 **REFERENCE DOCUMENTS**

| | |
|--------------|---|
| ESCC 10400 | Organisation and Basic Rules of the Components Technology Board |
| ESCC 12300 | The European Preferred Parts List (EPPL) and its Management |
| ECSS-Q-ST-60 | Electrical, Electronic and Electromechanical (EEE) Components |
| ISO 9001 | Quality management systems -- Requirements |

4 TERMS AND DEFINITIONS

4.1 DEFINITIONS

Unqualified Component A (EEE) component which is not listed in the ESCC QML or QPL, or other international or national space component qualification system.

4.2 ABBREVIATIONS

| | |
|--------|---|
| AQP | Annual Qualification Programme |
| CTB | Component Technology Board |
| DPA | Destructive Physical Analysis |
| ECSS | European Cooperation for Space Standardisation |
| EEE | Electrical, Electronic and Electro-mechanical |
| EPPL | European Preferred Parts List |
| ESCIES | European Space Components Information Exchange System (https://escies.org) |
| QML | Qualified Manufacturers List |
| QPL | Qualified Parts List |
| SCSB | Space Components Steering Board |
| TA | Technical Authority (for the EPPL) |

5 RECOMMENDATIONS

The ESCC's recommendations for unqualified components are provided below.

5.1 GENERAL

The procurement for space application should be carried out, by the companies and project teams concerned, based on a set of established requirements to mitigate the risk of utilising unsuitable components, leading to their premature failure in flight or ground segment use. Typically such requirements should form part of an overall product assurance plan for the space project.

5.2 ECSS SYSTEM

The procurement for space application should be carried out in accordance with the requirements of the ECSS System and in particular by the application of ECSS-Q-ST-60.

5.3 UTILISATION OF ESCC SPECIFICATIONS

Where a suitable ESCC Detail Specification exists it should be utilised in conjunction with its associated Generic and applicable referenced Basic Specifications to procure the component.

Where a suitable ESCC Detail Specification does not exist, a procurement specification should be prepared in the ESCC format, thus utilising the availability of the applicable Generic and Basic specifications. Further, this Detail specification, once agreed with the manufacturer, shall be submitted to the ESCC Executive for harmonisation and issue within the ESCC System.

(Noting that this should be the case where future repeat usage of the component is considered to be likely and the manufacturer is willing to supply against the requirements of the ESCC System. Submission may be either by the user or the manufacturer and be made to the ESCC Executive Secretariat. Refer to ESCC Basic Specification No. [20800](#) for further details.)

5.4 COMPONENT IDENTIFICATION AND MARKING

Where a component is procured using applicable formally issued ESCC specifications and is deemed fully compliant with all the procurement requirements specified within the specifications, the component should be identified by the ESCC component number. Component marking should be in accordance with the provisions of ESCC Basic Specification No. [21700](#).

(Noting that ESCC Specifications are under the custody of ESA and are formally issued on behalf of the SCSB by the ESCC Executive Secretariat. Current, valid issues are listed in the ESCC [REP001](#) and are available from ESCIES.)

5.5 DETAILED EVALUATION

Where the suitability of the component to be procured and/or the associated manufacturer is not fully established and visible for space application, the component should be subjected to a Detailed Evaluation based on the ESCC methodology outlined in ESCC Basic Specification No. [20100](#) comprising an evaluation of the Manufacturer and an evaluation of the component.

5.5.1 Manufacturer Evaluation

The procurement for space application should be from a component manufacturer with a demonstrable quality management system typically based on ISO 9001 and preferably with a valid existing third party certification. Further, the manufacturing process for the space lot should be subject to the controls of the quality management system and this should be aligned to the extent necessary with the minimum quality system requirements given in ESCC Basic Specification No. [24600](#).

Where a procurement is planned from a manufacturer for whom an assessment is deemed necessary, an audit should be performed based on the ESCC methodology outlined in ESCC Basic Specification No. [20200](#).

5.5.2 Component Evaluation

Where the suitability of the:

- design margins,
- constituent materials,
- construction,
- performance, including radiation resistance, or
- intrinsic reliability

of the component is not fully established and visible for space application, an evaluation programme should be undertaken. Further, the evaluation test programme should be in accordance with, or based on, the ESCC requirements given in ESCC Basic Specification No. [22600](#) and, where it exists, the applicable ancillary Basic Specification. For radiation assessment, work should be conducted in accordance with the requirements of ESCC Basic Specifications Nos. [22900](#) and [25100](#).

5.6 LOT VALIDATION

5.6.1 General

A component lot procured for flight use should be subjected to a sample testing plan over and above the specified lot screening tests so as to validate the lot's suitability for use.

The following should be taken into consideration in establishing the lot validation:

- the availability of existing pertinent test data where the suitability of such data is assessed, at a minimum, in accordance with the criteria given in ECSS-Q-ST-60.
- the performance of the validation testing should be either by the manufacturer, the user, a third party assessment service or an appropriate combination thereof.
- where ESCC specifications are used the validation testing should comprise one or more of the tests or test sequences defined in the applicable Generic (noting any deviations in the applicable Detail specification) for Lot Validation Testing or Lot Acceptance Testing. (The use of the former term is in those Generics employing periodic testing for qualified manufacturers.)
- the performance of a DPA on a suitable sample from the lot, in a manner so as to conform, at a minimum, to the requirements stipulated for DPA in ECSS-Q-ST-60.

Where ESCC specifications are used, the contract or purchase order conditions should specify that the manufacturer shall not knowingly deliver components which are not capable of passing all the tests specified for lot validation or lot acceptance testing, as applicable, irrespective of whether the tests are to be performed.

5.6.2 Radiation

A component lot procured for flight use should be subjected to an assessment of radiation sensitivity and, where the technology is assessed as being at risk in the project application, a radiation lot verification test programme conducted. For total dose effects the work should be performed in accordance with ESCC Basic Specification No. [22900](#). For semiconductor components, per the applicable Generic specification, this is associated with wafer lot acceptance testing which forms part of the lot screening requirements. For single event effects the work should be performed in accordance with ESCC Basic Specification No. [25100](#).

5.7 HARMONISATION

Members and Observers of ESCC encourage the constituents they represent to contribute successful results from the procurement activities of unqualified components to the harmonisation task. Namely that suitable components and the data to hand are proposed to the EPPL TA or to the CTB for inclusion respectively in the EPPL or future AQPs, leading to subsequent inclusion in the ESCC QML or QPL. Further, that problems encountered are shared by those members who participate in the ESA Alert System.

In the overall interests of standardisation and future evolution, the results from procurement, particularly of unqualified components, are brought to the attention of the CTB and its working groups dealing with the strategic dossiers. By this means the dossiers can be enhanced as more knowledge is gained from the early use of emerging technologies.

5.7.1 European Preferred Parts List

Submission of component proposals for inclusion in the EPPL should be in accordance with ESCC Procedure No. [12300](#).

5.7.2 CTB

Bringing information into the realm of the CTB for consideration in the frame of strategic dossiers or within the frame of an AQP should be in accordance with ESCC Procedure No. [10400](#).

5.7.3 ESCIES

Data arising in the course of procurement activities is shared within the ESCC community by preparing the data in a form fit for web dissemination and by contributing it to ESCIES. Inter alia, such data would include DPA reports, radiation test reports, part approval documents and evaluation test reports.