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Relifing procedure – EEE components

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This document is provided as support material to the published version of ECSS-Q-ST-60-14C (1 August 2019)

This version contains the marked-up changes with respect to the previous version. It does not contain the PUID numbers for added requirements.

**Foreword**

This Standard is one of the series of ECSS Standards intended to be applied together for the management, engineering, product assurance and sustainability 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 rewriting the standards.

This Standard has been prepared by the , reviewed and approved by the ECSS Technical Authority.

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Change log

|  |  |
| --- | --- |
| ECSS-Q-ST-60-14A | Never issued |
| ECSS-Q-ST-60-14B | Never issued |
| ECSS-Q-ST-60-14C  15 November 2008 | First issue |
| ECSS-Q-ST-60-14C Rev.1  1 August 2019 | First issue Revision 1  The major changes between ECSS-Q-ST-60-14C (15 November 2008) and this version are:   * Creation of two relifing flows: one covering Class 1 and Class 2 components and the other covering Class 3 components * Harmonization with the latest version ECSS-Q-ST-60 * Introduction of the applicability of the relifing requirements to commercial components * Change of timing requirements for relifing (from 7+3 to 7+4+4 years) increasing the maximum elapsed time between date code and time of mounting from 10 to 15 years * Transformation of normative Annex A "Relifing report - DRD" by into informative Annex C "Guidelines for a Relifing report" * Deletion of informative Annex B "ESD"   Detailed Change Record:  Deleted requirements:  5a and b (merged and recreated as new 5f); 6.1.2a to j (moved, modified and recreated in clause 6.1.1); 6.2d; A.2.1a to d; Figure A-1.  Added requirements:  4.2.3b; 5c to h; 6.1.1e to o (moved, modified and recreated from former clause 6.1.2 requirements); 6.1.1p and q; 6.1.4d; 6.5d; 7.1.1a to h, Table 7-1; 7.1.2a; 7.1.3a to d; 7.2a to e; 7.3a to c; 7.4 a; 7.5a to d;  Modified requirements:  4.1.3a; 4.1.5a Note deleted; 4.1.6a; 4.2.3a; 4.2.4a and b (term “package” replaced by “container”); Table 5-1; 6.1.1c; Table 6-1; 6.1.3a; 6.1.4a; 6.1.5a (text of Note separated from text of requirement); 6.2c; 6.2e; 6.2f (brackets removed); 6.4a; 6.5b;  Editorial changes:   * Scope updated * Normative References and Terms and definitions updated * Heading of clause 4 updated * Heading of clause 4.2.4 changed from “Package” by “Container” * Heading of clause 5, 6 and 6.1.1 updated |

Table of contents

[Change log 3](#_Toc15034433)

[1 Scope 7](#_Toc15034434)

[2 Normative references 8](#_Toc15034435)

[3 Terms, definitions and abbreviated terms 9](#_Toc15034436)

[3.1 Terms from other standards 9](#_Toc15034437)

[3.2 Terms specific to the present standard 9](#_Toc15034438)

[3.3 Abbreviated terms 12](#_Toc15034439)

[3.4 Symbols 13](#_Toc15034440)

[4 Environmental parameters for handling and storage for Class 1 to Class 3 programmes 14](#_Toc15034441)

[4.1 General rules and requirements 14](#_Toc15034442)

[4.1.1 <<deleted> 14](#_Toc15034443)

[4.1.2 Procedures 14](#_Toc15034446)

[4.1.3 Storage area and storage zone 14](#_Toc15034447)

[4.1.4 Cleanliness 14](#_Toc15034448)

[4.1.5 ESD protection 15](#_Toc15034449)

[4.1.6 Packing – Packaging – Handling 15](#_Toc15034451)

[4.1.7 Quality assurance requirements for storage areas 15](#_Toc15034453)

[4.2 Storage conditions 15](#_Toc15034454)

[4.2.1 Air 15](#_Toc15034455)

[4.2.2 Temperature 16](#_Toc15034456)

[4.2.3 Relative humidity (RH) 16](#_Toc15034457)

[4.2.4 Container 16](#_Toc15034458)

[5 Timing parameters for Class 1 to Class 3 programmes 17](#_Toc15034459)

[6 Control parameter for Class 1 and Class 2 programmes 19](#_Toc15034460)

[6.1 Test requirements 19](#_Toc15034461)

[6.1.1 Requirements per EEE parts family: 19](#_Toc15034462)

[6.1.2 <<deleted>> 24](#_Toc15034463)

[6.1.3 Electrical testing 24](#_Toc15034465)

[6.1.4 External visual inspection 24](#_Toc15034466)

[6.1.5 Seal test 25](#_Toc15034467)

[6.2 Nonconformance 25](#_Toc15034468)

[6.3 Relifing datecode 26](#_Toc15034469)

[6.4 Relifing report 26](#_Toc15034470)

[6.5 Certificate of Conformity 26](#_Toc15034471)

[7 Control parameters for Class 3 programmes 27](#_Toc15034472)

[7.1 Test requirements 27](#_Toc15034473)

[7.1.1 Requirements per EEE parts family 27](#_Toc15034474)

[7.1.2 Electrical testing 29](#_Toc15034475)

[7.1.3 External visual inspection 29](#_Toc15034476)

[7.2 Nonconformance 29](#_Toc15034477)

[7.3 Relifing datecode 29](#_Toc15034478)

[7.4 Relifing report 30](#_Toc15034479)

[7.5 Certificate of Conformity 30](#_Toc15034480)

[Annex A (normative) <<deleted and recreated as informative Annex C>> 31](#_Toc15034481)

[Annex B (informative) <<deleted> 32](#_Toc15034580)

[Annex C (informative) Guidelines for a Relifing report 33](#_Toc15034651)

[Bibliography 35](#_Toc15034652)

**Figures**

[Figure C-1 : Example of a relifing traveller sheet 34](#_Toc15034653)

**Tables**

[Table 5‑1: Timing parameters 18](#_Toc15034654)

[Table 6‑1: Control parameters and detailed application of categories 21](#_Toc15034655)

[Table 7‑1: Control parameters and detailed application of categories for Class 3 programmes 28](#_Toc15034656)

# Scope

This standard specifies the requirements, also known as “relifing requirements”, for the planned, intentional storage, control, and removal from storage of electronic, electrical and electromechanical parts which are intended to be used for space applications.

This standard covers the relifing of all components as defined by ECSS-Q-ST-60 and ECSS-Q-ST-60-13.

The relifing process is a lot quality control activity. The inspections and tests defined do not constitute an up-screening or up-grading of components to a higher level of quality than procured to.

In line with ECSS-Q-ST-60, this standard differentiates between classes of components through different sets of standardization requirements.

The classes provide 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 can 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.

* Class 1 components are described in Clause 4, 5 and 6
* Class 2 components are described in Clause 4, 5 and 6
* Class 3 components are described in Clause 4, 5 and 7

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 is applicable to all EEE parts covered by ECSS-Q-ST-60 and used in space programmes.

This standard is not applicable to dice.

This standard may be tailored for the specific characteristic and constrains 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.

|  |  |
| --- | --- |
| ECSS-S-ST-00-01 | ECSS system – Glossary of terms |
| ECSS-Q-ST-10-09 | Space product assurance – Nonconformance control system |
| ECSS-Q-ST-60 | Space product assurance – Electrical, electronic and electromechanical (EEE) components |
| ECSS-Q-ST-60-13 | Space product assurance – Commercial electrical, electronic and electromechanical (EEE) components |
| ECSS-Q-ST-70-01 | Space product assurance – Cleanliness and contamination control |
| ESCC 24900 | Minimum Requirements for Controlling Environmental Contamination of Components |
| IPC/JEDEC J-STD-033D April 2018 | Standard for Handling, Packing, Shipping and Use of Moisture/ re-flow Sensitive Surface Mount Devices |
| ESCC 20600 | Preservation, Packaging and dispatch of ESCC Electronic Components |
| ANSI ASQ Z1.4-2003 Revision 2008 | Sampling procedures and tables for inspection by attributes |

# Terms, definitions and abbreviated terms

## Terms from other standards

1. For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 apply, in particular for the following terms:
   1. clean area
   2. cleanliness
   3. cleanroom
   4. component
   5. conformance
   6. contamination
   7. dependability
   8. environment
   9. inspection
   10. performance
   11. relifing
   12. traceability

## Terms specific to the present standard

1. antistatic material

material that minimizes the generation of static charges

1. 1 This term refers to the reduction of triboelectric charge generation.
2. 2 This property is not dependent upon material resistivity.
3. conductive material

<CONTEXT: ESD protection> material with the following characteristics:

* surface conductive type: materials with a surface resistivity less than 105 Ω/🞎.
* volume conductive type: materials with a volume resistivity less than 104 Ω-cm.

1. container

receptacle which holds, restrains or encloses an item for the purpose of storage or transportation

1. (original) date code

code used by the EEE part manufacturer at assembly step that indicates the production date

1. 1 Generally four-figure codes; two for the year and two for the week.
2. 2 Special lot number can also identify the date code.
3. (relifing) date code:

code indicating the date an item is submitted to the last step of the relifing sequence

1. Four-figure code, two for the year and two for the week.
2. dissipative material

<CONTEXT: ESD protection> material with the following characteristics:

* surface conductive type: materials with a surface resistivity equal to or greater than 105 Ω/🞎 but less than 1012 Ω/🞎.
* volume conductive type: materials with a volume resistivity equal to or greater than 104 Ω-cm but less than 1011 Ω-cm.

1. electrostatic charge

negative or positive electrical charge present on the material or item surface, at rest

1. electrostatic discharge (ESD)

transfer of electrostatic charge between objects at different potentials caused by direct contact or induced by an electrostatic field

1. electrostatic discharge sensitive (ESDS)

tendency of the performance of EEE parts to be affected or damaged by an ESD event

1. ESD protected area

area which is constructed and equipped with the necessary ESD protective materials, equipment, and procedures, to limit ESD voltages below the sensitivity level of ESDS items handled therein

1. ESD protective material

material with one or more of the following properties: limits the generation of electrostatic charge, dissipates electrostatic charge, and provides shielding from electric fields

1. ESD protective packaging

packaging with ESD protective materials to prevent ESD damage to ESDS items

1. electrostatic shield

barrier or enclosure that prevents or attenuates the penetration of an electric field

1. handled or handling

actions during which items are hand manipulated or machine processed

1. identification

application of appropriate markings to ensure that the identity of an item is unfailingly indicated after preservation and each stage of packing

1. isolating material

<CONTEXT: ESD protection> material not defined as conductive or dissipative are considered to be isolating

1. package

support used for enveloping, protecting or containing materials

1. Different types of packages are normally used: Primary, intermediate and final packages
2. (primary) package

container, envelope or wrap holding an individual item

1. (intermediate) package

container holding two or more primary packages

1. (final) package

container holding one or more intermediate packages, used for transportation of supplies to the orderer

1. packaging

operations consisting in the preparation of supplies for transit and delivery.

1. The term includes preservation, identification and packing
2. packing

operation by which supplies are placed in container or wrapped and placed in containers

1. particle

unit of matter with observable length, width and thickness

1. A particle can be object of solid or liquid composition, or both, and generally between 0,001 μm and 1000 μm in size
2. preservation

cleaning of an item and the application of a suitable temporary protective, where necessary, to maintain the item in prime condition

1. relifing procedures

set of tests performed on an item previously stored to verify that its initial quality and reliability have not been affected by time

1. storage area

area in the storage site where EEE parts are stored and which contains one or more storage zones.

1. storage long duration

storage for which duration exceeds 3 years

1. storage site

geographical location where EEE parts are stored for a short, medium or long term period

1. For this site the requirements given in this standard apply: EEE parts manufacturer’s premises, procurement Agency, EEE part user.
2. storage zone

defined space in which EEE parts are stored and which is equipped for the monitoring and the control of storage conditions.

1. triboelectric effect

generation of electrostatic charge on an object by rubbing or other type of contact.

## Abbreviated terms

For the purpose of this Standard, the abbreviated terms from ECSS-S-ST-00-01 and the following apply:

| Abbreviation | Meaning |
| --- | --- |
| ASIC | application specific integrated circuit |
| CCD | charge coupled device |
| CDM | charge device model |
| DPA | destructive physical analysis |
| DSP | digital signal processor |
| EEE | electronic, electrical and electromechanical |
| ESCC | European space components coordination |
| ESD | electrostatic discharge |
| FPGA | field programmable gate arrays |
| HBM | human body model |
| JEDEC | joint electronic devices engineering council |
| MM | machine model |
| MMIC | microwave monolithic integrated circuit |
| NA | not applicable |
| NCR | nonconformance report |
| NSA | national space agency |
| RH | relative humidity |
| SCSB | space components steering board |
| VLSI | very large scale integration |

## Symbols

|  |  |
| --- | --- |
| **Ω** | ohm |
| **Ω/**🞎 | ohm per square |
| **Ω-cm** | ohm centimetre |
| **μm** | micrometer |
| **V** | volt |

# Environmental parameters for handling and storage for Class 1 to Class 3 programmes

## General rules and requirements

### <<deleted>>

### Procedures

ECSS-Q-ST-60-14\_0470002

The following domains shall be covered and documented by procedures sent to the customer for information, on request:

Storage area and storage zone

Cleanliness

ESD protection

Packing and Packaging

Handling

Quality assurance.

### Storage area and storage zone

ECSS-Q-ST-60-14\_0470003

It shall be demonstrated that storage areas and storage zones provide such protection against vibration, electromagnetic fields, radiation fields and against light so that possible degradation of organic packaging material is prevented.

### Cleanliness

ECSS-Q-ST-60-14\_0470004

Rules for cleanliness efficiency shall be implemented.

ECSS-Q-ST-60-14\_0470005

The working areas and the contained equipment shall be maintained as visually clean with no loose material.

ECSS-Q-ST-60-14\_0470006

Access rules shall apply for personnel, materials and equipment.

ECSS-Q-ST-60-14\_0470007

Storage areas shall conform to a cleanliness level as defined in ECSS-Q-ST-70-01 clause 5.3.1.4.

1. This cleanliness level is often called and known as “grey zone”.

### ESD protection

ECSS-Q-ST-60-14\_0470008

The efficiency of ESD protection measures in storage, handling and testing areas shall be demonstrated.

### Packing – Packaging – Handling

ECSS-Q-ST-60-14\_0470009

EEE parts manufacturers requirements or, by default, ESCC 20600 or IPC/JEDEC J-STD-033D (April 2018) shall apply for packing, packaging and handling.

### Quality assurance requirements for storage areas

ECSS-Q-ST-60-14\_0470010

The storage responsible entity shall establish and document the following:

Prohibited materials

Personnel access rules

Prohibited personnel actions

Measures and facilities to segregate and protect components during receiving, inspection, storage and delivery

Control measures to ensure that electrostatic discharge susceptible components are identified and handled only by trained personnel using anti static packaging and tools.

## Storage conditions

### Air

Normal air is used.

### Temperature

ECSS-Q-ST-60-14\_0470011

Temperature in the immediate vicinity of stored components shall at all times be maintained between a minimum temperature of 17 °C and a maximum temperature of 27 °C.

1. This is to avoid chemical reactions catalysis when it is too high or electronic reactions on certain technologies when it is too low.

### Relative humidity (RH)

ECSS-Q-ST-60-14\_0470012

RH in store cupboards shall be kept in the range 20 % to 65 % of RH.

1. This is to avoid, when combined with temperature, corrosion phenomena. The lower is the Relative Humidity the greater is the probability for ESD damage.

EEE parts with MSL > 1 shall be stored, before and after relifing test sequence, in one of the following conditions:

Nitrogen,

Dry and ionised air in a range up to 20 % RH maximum,

Dry packs as specified in IPC/JEDEC J-STD-033D (April 2018).

### Container

ECSS-Q-ST-60-14\_0470013

The containers used during storage shall ensure protection against ESD as defined in clause 4.1.6 and against any form of corrosion or contamination.

ECSS-Q-ST-60-14\_0470014

Parts shall be stored in containers such that it can be demonstrated that they offer protection against ESD, corrosion and contamination including the contamination induced by the package itself.

1. Their primary containers can be used as long as they meet this requirement.

ECSS-Q-ST-60-14\_0470015

CCDs and opto-electronic sensors shall be stored in dry air or in neutral ambience, to prevent risks of cover glass pollution and moisture ingress.

# Timing parameters for Class 1 to Class 3 programmes

ECSS-Q-ST-60-14\_0470016

<<deleted, modified and moved to 5f>>

ECSS-Q-ST-60-14\_0470057

<<deleted, modified and moved to 5f>>

The maximum lifetime requirements of the ECSS parts manufacturers shall be taken into account.

In absence of EEE manufacturer's lifetime limitation and when required, relifing shall be performed between T1 and T2 according to the timing parameters given in Table 5‑1.

Relife can be anticipated before T1, provided dT remains applicable.

For parts not planned to be mounted and to be kept in stock, relifing is not mandatory.

In case of parts procured through an external procurement entity, the customer should require the supplier to state the minimum period of validity of parts (w.r.t. T1 or T2) after delivery.

In case of parts procured through an external procurement entity, the customer should require the supplier to state the minimum period of validity of parts, w.r.t. T1 or T2, after delivery.

When started, all relifing tests as described in Table 6 1 and Table 7 1 shall be completed in a maximum period of six weeks.

First of all, the maximum lifetime requirements of the EEE parts manufacturers shall be taken into account.

ECSS-Q-ST-60-14\_0470055

Table ‑: Timing parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| T1 | | T2 | | dT | | |
| 7 years | | 15 years | | 4 years | | |
| T0 Original date code  T1 Maximum allowed storage period from T0 with no relifing control  T2 Maximum duration between the original date code of part and its mounting  dT Maximum allowed storage period after a relifing control which can be repeated once | | | | | | |

# Control parameters for Class 1 and Class 2 programmes

## Test requirements

### Requirements per EEE parts family:

ECSS-Q-ST-60-14\_0470018

For relifing, the following tests, as specified in Table 6‑1 shall be performed:

External Visual Inspection

Electrical measurements

Seal test

Specific test

ECSS-Q-ST-60-14\_0470019

Component families not covered in Table 6‑1 shall be subject to special procedures to be defined by the program.

1. The relifing procedure can be applied on a sub-lot containing only the quantity of components immediately needed for production. In this case, the relifing date-code is applicable only to parts actually tested. The time limits specified in Table 5‑1 remain applicable for the residual sub-lot.

ECSS-Q-ST-60-14\_0470020

When sampling is specified in Table 6‑1, it shall be performed in accordance with AQL 0,65 % level II according to ANSI ASQ Z1.4-2003 Revision 2008.

ECSS-Q-ST-60-14\_0470021

The specifications and methods to be used during relifing shall be those that were in effect for the initial procurement or, if demonstrated that they are not applicable, the most recent updated issues.

ECSS-Q-ST-60-14\_0470022

Seal test shall be performed on components made with a hermetic cavity package in conformance with the applicable procurement specification.

ECSS-Q-ST-60-14\_0470023

For ceramic chip or moulded capacitors, electrical measurement shall be done after 4 hours of stabilisation at 125 °C for Type II ceramic.

ECSS-Q-ST-60-14\_0470024

Multi-chips (stacked) capacitors shall be submitted to 100% visual inspection and electrical testing.

ECSS-Q-ST-60-14\_0470025

For all type of solid tantalum capacitors, the following specific tests shall be performed before the parametrical measurement:

Apply 9 discharges and 8 charges with a cycle time of 2 seconds and under nominal voltage and monitor the current during both charge and discharge tests to detect short circuit,

Perform a burn-in test for a duration or 96 hours at rated voltage at 85 °C

For all type of non-solid tantalum capacitors, the following specific test shall be performed before the parametrical measurement:

Perform a burn-in test for a duration or 96 hours at rated voltage at 85 °C.

ECSS-Q-ST-60-14\_0470026

For film capacitors using the polycarbonate technology, a DPA test shall be performed on three pieces, including:

external visual inspection,

sealing test after insulate sleeve removal,

microsection on two pieces, and

decaping on third part.

ECSS-Q-ST-60-14\_0470027

For programmed parts, the total duration, including storage and mission, shall not exceed data retention duration given by the manufacturer.

ECSS-Q-ST-60-14\_0470058

For VLSI, hybrids and CCD, when electrical test is not practicable because of test program or product complexity, the validation may be transferred to use step such as functional tests or programming stages.

1. For example, VLSI can be ASIC, FPGA, MMIC, DSP, microprocessors, microcontrollers.

ECSS-Q-ST-60-14\_0470029

For electromagnetic relays of latching and non-latching type, 10 switching shall be run before electrical measurements.

ECSS-Q-ST-60-14\_0470030

For low frequency and radio-frequency wires and cables, the following shall be done:

inspect at least 0,5 m, and

remove 0,2 m of the insulating material.

ECSS-Q-ST-60-14\_0470031

Electrical test shall be optional for cavity hermetically sealed qualified parts when the qualification level is in line with the quality level defined by the applicable Tables 7-1, Table 7-2 or Table 7-3 of ECSS-Q-ST-60.

For cable assemblies, electrical test shall be limited to insulation resistance test.

When relifed, commercial components shall be tested as defined in Table 6‑1 providing in addition, the following:

the availability of endurance test results on the flight lot,

the availability of humidity test results on the flight lot as per ECSS-Q-ST-60-13, in case of non-hermetic package sensitive to humidity,

the availability of a report of DPA performed on 3 pieces for each lot of commercial components in the frame of the relifing procedure.

ECSS-Q-ST-60-14\_0470056

Table ‑: Control parameters and detailed application of categories

|  | External Visual Inspection | ELECTRICAL (6.1.1o) | SEAL (6.1.1e) | SPECIFIC  TESTS |
| --- | --- | --- | --- | --- |
| **capacitors, chip, ceramic** | sampling | sampling  (6.1.1f) | no | no |
| **capacitors, moulded, ceramic** | sampling  (6.1.1g) | sampling  (6.1.1f, 6.1.1g) | no | no |
| **capacitors, glass (CYR, …)** | 100 % | 100 % | no | no |
| **capacitors, mica (HTxx, …)** | 100 % | 100 % | no | no |
| **capacitors, chip, solid tantalum**  **(TAJ, T495, CWR11, …)** | sampling | 100 % | no | yes  (6.1.1h) |
| **capacitors, leaded, solid tantalum**  **(CSR, …)** | sampling | 100 % | no | yes  (6.1.1h) |
| **capacitors, leaded,**  **non solid (tantalum,(CLR79, …)** | 100 % | 100 % | no | yes  (6.1.1i) |
| **capacitors, film**  **(CRH, CHS, PMxx, MKTS, …)** | sampling | 100 % | no | yes  (6.1.1j) |
| **capacitors, variable** | sampling | no | no | no |
| **connectors, non filtered, rectangular** | 100 % | no | 100 % | no |
| **connectors, filtered, rectangular** | 100 % | 100 % | 100 % | no |
| **connectors, non filtered, circular** | 100 % | no | 100 % | no |
| **connectors, filtered, circular** | 100 % | 100 % | 100 % | no |
| **contacts, savers & accessories** | no | no | no | no |
| **crystals** | 100 % | 100 % | 100 % | no |
| **diodes** | 100 % | sampling | 100 % | no |
| **diodes, microwave** | 100 % | sampling | 100 % | no |
| **Filters** | 100 % | 100 % | 100 % | no |
| **fuses, "cermet"** | sampling | sampling | no | no |
| **fuses, wire link** | sampling | sampling | no | no |
| **heaters, flexible** | 100 % | 100 % | no | no |
| **inductors, coils, moulded** | sampling | sampling | no | no |
| **inductors, coils, non moulded** | sampling | sampling | no | no |
| **integrated circuits** | 100 % | sampling  (6.1.1k, 6.1.1l) | 100 % | no |
| **integrated circuits, microwave** | 100 % | sampling  (6.1.1l) | 100 % | no |
| **µwave passive parts (isolators, circulators)** | 100 % | sampling | no | no |
| **µwave passive parts**  **(power dividers, couplers)** | 100 % | sampling | no | no |
| **µwave passive parts (attenuators, loads)** | 100 % | sampling | no | no |
| **oscillators (hybrids)** | 100 % | 100 % | 100 % | no |
| **relays, electromagnetic,**  **latching and non-latching** | 100 % | 100 %  (6.1.1m) | 100 % | no |
| **resistors, fixed, film**  **(RNC, MBx xxxx, ...) (except RNC90)** | sampling | 100 % | no | no |
| **resistors, high precision,**  **fixed, metal foil (RNC90, ...)** | sampling | 100 % | no | no |
| **resistors, network, thick and thin film** | sampling | 100 % | no | no |
| **resistors, current sensing (RLV, ...)** | sampling | 100 % | no | no |
| **resistors, power, fixed, wirewound**  **(RWR, ...)** | sampling | sampling | no | no |
| **resistors, power, fixed, wirewound, chassis mounted (RER, ...)** | sampling | sampling | no | no |
| **resistors, precision, fixed,**  **wirewound (RBR, ...)** | sampling | 100 % | no | no |
| **resistors, fixed, film, high voltage**  **(RHV, ...)** | sampling | sampling | no | no |
| **resistors, fixed, thick and thin film, chip** | sampling | 100 % | no | no |
| **switches, electromechanical** | 100 % | 100 % | 100 % | no |
| **switches, thermostatic** | 100 % | 100 % | 100 % | no |
| **thermistors** | 100 % | 100 % | no | no |
| **transformers** | sampling | 100 % | no | no |
| **transistors** | 100 % | sampling | 100 % | no |
| **transistors, microwave** | 100 % | sampling | 100 % | no |
| **wires and cables, low frequency** | sampling  (6.1.1n) | no | no | no |
| **cables, coaxial, radio frequency** | sampling  (6.1.1n) | no | no | no |
| **hybrids** | 100 % | 100 %  (6.1.1l) | 100 % | no |
| **surface acoustic waves** | 100 % | 100 % | 100 % | no |
| **charge coupled devices** | 100 % | 100 %  (6.1.1l) | 100 % | no |
| **opto discrete devices**  **(photodiodes, LED, phototransistors, optocouplers, …)** | 100 % | 100 % | 100 % | no |
| **HV cable assembly** | 100 % | 100 % | no | no |
| **cable assembly** | 100 % | 100 %  (6.1.1p) | no | no |

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### Electrical testing

ECSS-Q-ST-60-14\_0470032

A subset of DC parameters as given in the table of room temperature electrical measurements of the relevant procurement specification, ESCC or equivalent, shall be selected, submitted for customer approval on request and then measured.

1. 1 It is important to pay attention to the test and set up procedures which can have changed since the initial date code.
2. 2 Additional burn-in and drift calculation to be performed only when specified in Table 6‑1.

### External visual inspection

ECSS-Q-ST-60-14\_0470033

In case of doubt or anomaly regarding any surface of the leads, one part shall be sampled in order to make a solderability test according to the applicable test method.

ECSS-Q-ST-60-14\_0470034

The solderability test results shall be recorded in the relifing report.

ECSS-Q-ST-60-14\_0470035

The part tested for solderability shall be considered destroyed.

External Visual Inspection shall be done in accordance with applicable procurement specifications.

### Seal test

ECSS-Q-ST-60-14\_0470036

The sealing tests shall be recorded as "pass" where the results meet the requirements of the original procurement specification

1. Sealing tests include fine leaks or gross leaks or both, depending on the applicable specification.

ECSS-Q-ST-60-14\_0470037

The measurement values of leaks on non-conforming components shall be recorded in the relifing report.

## Nonconformance

ECSS-Q-ST-60-14\_0470038

ECSS-Q-ST-10-09 shall apply for the handling and processing of nonconformances.

1. The processing of nonconformances is identical for both relifing and normal procurement procedures.

ECSS-Q-ST-60-14\_0470039

Any components not satisfying at least one of the requirements included in this standard shall be considered as not conform.

ECSS-Q-ST-60-14\_0470040

When performing the sampling test, as per Table 6‑1, any batch of components failing the sampling rule defined in requirement 6.1.1c shall be considered as not conform.

ECSS-Q-ST-60-14\_0470041

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ECSS-Q-ST-60-14\_0470042

In the case specified in 6.2c, the test shall be repeated on a 100% basis on the whole lot and the causes of the nonconformance investigated and recorded in the relifing report.

ECSS-Q-ST-60-14\_0470043

In case of 100% test, as per Table 6‑1, any batch of components shall be declared as not conform when failing the following requirement:

lot size < 100 parts : 0 defect allowed

lot size > 100 parts : 1 defect allowed

## Relifing datecode

ECSS-Q-ST-60-14\_0470044

The relifing date code shall correspond to the week code of the first test performed on the lot.

ECSS-Q-ST-60-14\_0470045

This date code shall be assigned independent of the report conclusions.

ECSS-Q-ST-60-14\_0470046

The relifing date code shall not be marked on the component and no other additional marking added.

## Relifing report

ECSS-Q-ST-60-14\_0470047

When relifing a component, a relifing report shall be established and sent, on request, to the customer for information.

1. Guidelines of a Relifing report are given in Annex C.

## Certificate of Conformity

ECSS-Q-ST-60-14\_0470048

Once a batch is accepted, supported by a relifing report giving an “acceptable” decision or as a result of NCR processing, the original Certificate of Conformity shall be annotated with the relifing date code.

ECSS-Q-ST-60-14\_0470049

The Certificate of Conformity shall be delivered with the components.

ECSS-Q-ST-60-14\_0470050

Discarded batches shall be processed internally by the relevant reject system of the supplier.

The relifing NCR, if any, signed and dated by the supplier, shall be delivered with the components.

# Control parameters for Class 3 programmes

## Test requirements

### Requirements per EEE parts family

For relifing, the following tests, as specified in Table 7‑1 shall be performed:

External Visual Inspection

Electrical measurements

Specific test

1. The relifing procedure can be applied on a sub-lot containing only the quantity of components immediately needed for production. In this case, the relifing date-code is applicable only to parts actually tested. The time limits specified in Table 5‑1 remain applicable for the residual sub-lot.

When sampling is specified in Table 7‑1, it shall be performed in accordance with AQL 0,65 % level II according to ANSI ASQ Z1.4.

The relifing requirements defined in Table 7‑1 shall apply to Class 3 programmes.

1. Components that are not listed in the Table 7‑1 are not subject to relifing.

The specifications and methods to be used during relifing shall be those that were in effect for the initial procurement or, if demonstrated that they are not applicable, the most recent updated issues.

For all type of solid tantalum capacitors, the following specific tests shall be performed before the parametrical measurement:

Apply 9 discharges and 8 charges with a cycle time of 2 seconds and under nominal voltage and monitor the current during both charge and discharge tests to detect short circuit.

Perform a burn-in test for a duration of 96 hours, at rated voltage, at 85 °C.

For all type of non-solid tantalum capacitors, the following specific tests shall be performed before the parametrical measurement:

Perform a burn-in test for a duration of 96 hours, at rated voltage, at 85 °C.

For hybrids and commercial active parts, when electrical test is not practicable because of test program or product complexity, the validation may be transferred to use step such as functional test or programming stage.

When relifed, commercial components shall be tested as defined in Table 7‑1, providing in addition the following:

the availability of lifetest test results on the flight lot,

the availability of humidity test results on the flight lot as per ECSS-Q-ST-60-13, in the case of non-hermetic package sensitive to humidity,

a DPA is performed on 3 pieces for each lot of commercial components in the frame of the relifing procedure.

Table 7‑1: Control parameters and detailed application of categories for Class 3 programmes

| Component family | External Visual Inspection | ELECTRICAL | SPECIFIC  TESTS |
| --- | --- | --- | --- |
| **capacitors, glass (CYR, …)** | 100 % | 100 % | no |
| **capacitors, chip, solid tantalum**  **(TAJ, T495, CWR11, …)** | sampling | 100 % | yes  (see 7.1.1e) |
| **capacitors, leaded, solid tantalum**  **(CSR, …)** | sampling | 100 % | Yes  (see 7.1.1e) |
| **capacitors, leaded,**  **non solid (tantalum,(CLR79, …)** | 100 % | 100 % | yes  (see 7.1.1f) |
| **through-hole components using glass beads** | 100% | no | No |
| **opto discrete devices**  **(photodiodes, LED, phototransistors, optocouplers, …)** | 100 % | 100 % | No |
| **Hybrids** | 100 % | 100 %  (see 7.1.1g) | No |
| **oscillators (hybrids)** | 100 % | 100 % | No |
| **commercial active components** | 100% | sampling  (see 7.1.1g) | No |

### Electrical testing

A subset of DC parameters, as given in the Table of room temperature electrical measurements of the relevant procurement specification, ESCC or equivalent, shall be selected, submitted to customer’s approval and then measured.

1. 1 It is important to pay attention to the test and set up procedures which can have changed since the initial date code.
2. 2 Additional burn-in to be performed only when specified inTable 7‑1.

### External visual inspection

In case of doubt or anomaly regarding any surface of the leads, one part shall be sampled in order to make a solderability test according to the applicable test method.

The solderability test results shall be recorded in the relifing report.

The part tested for solderability shall be considered destroyed.

In case of doubt or anomaly in the integrity of the glass sealing, parts shall be submitted to seal test according to the applicable test method.

## Nonconformance

ECSS-Q-ST-10-09 shall apply for the handling and processing of nonconformances.

1. The processing of nonconformances is identical for both relifing and normal procurement procedures.

Any components that are not in compliance at least with one of the requirements of ECSS-Q-ST-10-09 shall be declared as not conform.

When performing the sampling test, as per Table 7‑1, any batch of components failing the sampling rule defined in requirement 7.1.1b shall be considered as not conform.

In the case specified in 7.2c, the test shall be repeated on a 100 % basis on the whole lot and the causes of the nonconformance investigated and recorded in the relifing report.

In case of 100 % test, as per Table 7‑1, any batch of components shall be declared as not conform when failing the following “pass” conditions:

lot size < 100 parts: 0 defect allowed

lot size > 100 parts: 1 defect allowed

## Relifing datecode

The relifing date code shall correspond to the week code of the last test performed on the lot.

The relifing date code shall be assigned independent of the report conclusions.

The relifing date code shall not be marked on the component and no other additional marking added.

## Relifing report

When relifing a component, a relifing report shall be established and sent, on request, to the customer for information.

1. Guidelines of an Relifing report are given in Annex C.

## Certificate of Conformity

Once a batch is accepted, supported by a relifing report giving an “acceptable” decision or as a result of NCR processing, the original Certificate of Conformity shall be annotated with the relifing date code.

The Certificate of Conformity shall be attached with the components during their delivery.

Discarded batches shall be processed internally by the relevant reject system of the supplier.

The relifing NCR, if any, signed and dated by the supplier, shall be delivered with the components.

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   Guidelines for a Relifing report
   1. Purpose of the Relifing report

The purpose of this document is to:

1. give the detailed references of the lot tested,
2. describe the relifing tests performed,
3. give the results obtained,
4. give the date of tests.
   1. Content of the Relifing report
5. The Relifing report gives the following generic information:
   1. part style
   2. detailed specification (with issue and variant)
   3. item identification by the supplier
   4. quantity stored
   5. original datecode
   6. date of storage
6. For each test, the Relifing report indicates:
   1. operator
   2. date of test
   3. quantity tested
   4. quantity rejected
   5. comments
7. The Relifing report includes a conclusion, either accepted or rejected.
8. The Relifing report indicates, after relifing, the new datecode.
9. Figure C-1 shows a proposed template of a Relifing report.

|  |  |  |  |
| --- | --- | --- | --- |
| Part Style: | | | |
| Detailed specification: | | Issue: | Var: |
| Item identification at User: | | | |
| Quantity Stored: | | Date code: | Date of Storage: |
| TESTS | RELIFING | | |
| 1. External visual |  | | |
| Operator |  | | |
| Date |  | | |
| Quantity tested |  | | |
| Quantity rejected |  | | |
| Comments |  | | |
| 2. Electrical tests |  | | |
| Operator |  | | |
| Date |  | | |
| Quantity tested |  | | |
| Quantity rejected |  | | |
| Comments |  | | |
| 3. Hermeticity |  | | |
| Operator |  | | |
| Date |  | | |
| Quantity tested |  | | |
| Quantity rejected |  | | |
| Comments |  | | |
| 4. DPA (if any) |  | | |
| Operator |  | | |
| Date |  | | |
| Quantity tested |  | | |
| Results |  | | |
| DPA Report number |  | | |
| 5. Other tests |  | | |
| Conclusion:  Accepted / Rejected |  | | |
| New date code |  | | |

: Example of a relifing traveller sheet

Bibliography

|  |  |
| --- | --- |
| ECSS-S-ST-00 | ECSS system – Description, implementation and general requirement. |
| MIL-HDBK-263 | Electrostatic Discharge Control Handbook for protection of Electronic Parts, Assemblies and Equipment (excluding Electrically Initiated Explosive Devices) |