SLOVENSKI STANDARD
SIST EN 16602-70-11:2015

01-april-2015

Zagotavljanje varnih proizvodov v vesoljski tehniki - Nabava plošč tiskanih vezij

Space product assurance - Procurement of printed circuit boards

Raumfahrtproduktsicherung - Beschaffung von Leiterplatten

Assurance produit des projets spatiaux - Approvisionnement des circuits imprimés

Ta slovenski standard je istoveten z: EN 16602-70-11:2015

ICS:

31.180	Tiskana vezja (TIV) in tiskane plošče	Printed circuits and boards
49.140	Vesoljski sistemi in operacije	Space systems and operations

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EUROPEAN STANDARD

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English version

Space product assurance - Procurement of printed circuit boards

Assurance produit des projets spatiaux - Approvisionnement des circuits imprimés

Raumfahrtproduktsicherung - Beschaffung von Leiterplatten

This European Standard was approved by CEN on 11 October 2014.

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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 CEN and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN 16602-70-11:2015) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN.

This standard (EN 16602-70-11:2015) originates from ECSS-Q-ST-70-11C.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2015, and conflicting national standards shall be withdrawn at the latest by July 2015.

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

This document has been prepared under a mandate 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).

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This Standard defines the requirements imposed on the customer, the supplier and the qualified PCB manufacturer for PCB procurement.

The requirements of clause 7 apply to both qualification and procurement of finished PCBs and do not include the manufacturing tolerances.

This Standard is applicable for the following type of boards:

- Rigid PCBs (single-sided, double-sided, multilayer, sequential multilayer and PCBs with metal core)
- Flexible PCBs (single-sided and double-sided)
- Rigid-flex PCBs (multilayer and sequential multilayer)
- High frequency PCBs
- Special PCBs.

PCBs are used for the mounting of components in order to produce PCB assemblies performing complex electrical functions. The PCBs are subjected to thermo-mechanical stresses during their assembly such as mounting of components by soldering, rework and repair under normal terrestrial conditions. In addition the assembled PCB is subjected to the environment imposed by launch and space flights. Therefore the qualification of a PCB supplier to ECSS-Q-ST-70-10 is of extreme importance before the procurement of PCB for space usage.

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

2 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 16602-70	ECSS-Q-ST-70	Space product assurance — Material, mechanical parts and processes
EN 16602-70-02	ECSS-Q-ST-70-02	Space product assurance — Thermal vacuum outgassing test for the screening of space materials
EN 16602-70-07	ECSS-Q-ST-70-07	Space product assurance — Verification and approval of automatic machine wave soldering
EN 16602-70-08	ECSS-Q-ST-70-08	Space product assurance — Manual soldering of high-reliability electrical connections
EN 16602-70-10	ECSS-Q-ST-70-10	Space product assurance — Qualification of printed circuit boards
EN 16602-70-28	ECSS-Q-ST-70-28	Space product assurance — Repair and modification of printed circuit board assemblies for space use
EN 16602-70-38	ECSS-Q-ST-70-38	Space product assurance — High-reliability soldering for surface-mount and mixed technology printed-circuit boards
	IEC 60249 (1993-05)	Base materials for printed circuits
	IEC 60326-2-am 1 (1992-06)	Printed boards. Part 2: Test methods
	IPC-4101	Specification for base materials for rigid and mulitlayer printed boards
	IPC-MF-150F	Metal foil for printed wiring applications
	IPC-CF-152B	Composite metallic material specification for printed wiring board

3 Terms, definitions and abbreviated terms

3.1 Terms from other standards

For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 apply.

3.2 Terms specific to the present standard

3.2.1 associated test coupon

small piece of PCB designated to have a limited specific set of tests performed

NOTE The associated test coupon is manufactured as part of a PCB and at the final manufacturing stage it is separated from it. The associated test coupon is thus associated with the PCB, with which it was simultaneously manufactured.

3.2.2 blister

delamination in the form of a localized swelling and separation between any of the layers of a lamination base material, or between base material and conductive foil or protective coating

[IEC 60194 (1999-04)]

3.2.3 cover layer (flexible circuit)

layer of insulating material that is applied covering totally or partially over a conductive pattern on the outer surfaces of a PCB

[IEC 60194 (1999-04)]

3.2.4 crazing

internal condition that occurs in reinforced base material whereby glass fibres are separated from the resin at the weave intersections

NOTE 1 This condition manifests itself in the form of connected white spots or crosses that are below the surface of the base material. It is usually related to mechanically induced stress.

NOTE 2 See also “measling”.

[IEC 60194 (1999-04)]

3.2.5 delamination

separation between plies within a base material, between base material and a conductive foil, or any other planar separation with a PCB

NOTE See also “blister”.

[IEC 60194 (1999-04)]

3.2.6 dewetting

condition that results when molten solder coats a surface and then recedes to leave irregularly-shaped mounds of solder that are separated by areas that are covered with a thin film of solder and with the basis metal not exposed

[IEC 60194 (1999-04)]

3.2.7 flexible PCB

PCB either single, double sided or multilayer consisting of a printed circuit or printed wiring using flexible base materials only

[IEC 60194 (1999-04)]

3.2.8 haloing

mechanically-induced fracturing or delamination, on or below the surface of a base material, that is usually exhibited by a light area around holes or other machined features

[IEC 60194 (1999-04)]

3.2.9 high frequency PCB

PCB used for high frequency applications, that has specific requirements to the dielectric properties of the base laminates as well as special dimensional requirements to the lay-out for electrical purposes

3.2.10 inclusions

foreign particles, metallic or non-metallic, that may be entrapped in an insulating material, conductive layer, plating, base material or solder connection

[IEC 60194 (1999-04)]

3.2.11 key personnel

personnel with specialist knowledge responsible for defined production or product assurance areas

3.2.12 measling

condition that occurs in laminated base material in which internal glass fibres are separated from the resin at the weave intersection

NOTE 1 This condition manifests itself in the form of discrete white spots or “crosses” that are below the surface of the base material. It is usually related to thermally-induced stress.

NOTE 2 See also “crazing”.

[IEC 60194 (1999-04)]

3.2.13 metal core PCB

PCB using a metal core base material

[IEC 60194 (1999-04)]

3.2.14 multilayer PCB

PCB that consist of rigid or flexible insulation materials and three or more alternate printed wiring and/or printed circuit layers that have been bonded together and electrically interconnected

[IEC 60194 (1999-04)]

3.2.15 prepreg

sheet of material that has been impregnated with a resin and cured to an intermediate stage

NOTE B-staged resin.

[IEC 60194 (1999-04)]

3.2.16 printed circuit board (PCB)

printed board that provides both point-to-point connections and printed components in a predetermined arrangement on a common base

NOTE This includes single-sided, double sided and multilayer PCBs with rigid, flexible, and rigid-flex base materials.

[IEC 60194 (1999-04)]

3.2.17 rigid double-sided PCB

double-sided PCB, either printed circuit or printed wiring, using rigid base materials only

[IEC 60194 (1999-04)]

3.2.18 rigid-flex PCB

PCB with both rigid and flexible base materials

[IEC 60194 (1999-04)]

3.2.19 rigid-flex double-sided PCB

double-sided PCB, either printed circuit or printed wiring, using combinations of rigid and flexible base materials

[IEC 60194 (1999-04)]

3.2.20 rigid-flex multilayer PCB

multilayer PCB, either printed circuit or printed wiring, using combinations of rigid multilayer and flexible single and double-sided base materials

3.2.21 rigid PCB

PCB using rigid base materials only

[IEC 60194 (1999-04)]

3.2.22 rigid single-sided PCB

single-sided PCB, either printed circuit or printed wiring, using rigid base materials only

[IEC 60194 (1999-04)]

3.2.23 rigid multilayer PCB

multilayer PCB, either printed circuit or printed wiring, using rigid base materials only

[IEC 60194 (1999-04)]

3.2.24 scratch

narrow furrow or grove in a surface

NOTE It is usually shallow and caused by the marking or rasping of the surface with a pointed or sharp object.

[IEC 60194 (1999-04)]

3.2.25 sequentially laminated multilayer PCB

multilayer PCB that is formed by laminating together through hole plated double-sided or multilayer PCBs

NOTE Thus, some of its conductive layers are interconnected with blind or buried vias.

[IEC 60194 (1999-04)]

3.2.26 test pattern

part of the PCB that refers to the copper pattern on and within the PCB substrate for a specific test

3.3 Abbreviated terms

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

Abbreviation	Meaning
CoC	certificate of conformance
DML	declared material list
n.a.	not applicable
PCB	printed circuit board
PTH	plated-through hole
PTFE	polytetrafluoroethylene
r.m.s.	root-mean-square
TBD	to be defined

4 Principles

For the need of this Standard the role "PCB manufacturer" as lowest level supplier has been explicitly introduced to allow proper allocation of requirements.