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MATRIX / COMPLIANCE

Conformance between ECSS-Q-ST-70-60 and IPC-6012DS

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1 SCOPE AND PURPOSE

This guideline document provides an assessment of the conformance of requirements from ECSS-Q-ST-70-60 towards IPC-6012DS and vice versa. It is provided for information.

2 DOCUMENTS

No	Reference	Document Title
AD01	ECSS-Q-ST-70-12C	Space Product Assurance – Design of PCBs
AD02	ECSS-Q-ST-70-60C	Space Product Assurance – Qualification and procurement of PCBs
AD03	IPC-6012D	Qualification and Performance Specification for Rigid Printed Boards
AD04	IPC-6012DS	Space and Military Avionics Applications Addendum to IPC-6012D

No	Reference	Document Title
RD01	IPC-2221B	Generic Standard on Printed Board Design
RD02	IPC-6011	Generic Performance Specification for Rigid Printed Boards
RD03	IPC-6013D	Qualification and Performance Specification for Flexible/Rigid-Flexible Printed Boards
RD04	IPC-6018C	Qualification and Performance Specification for High Frequency (Microwave) Rigid Boards
RD05	IPC-6018CS	Space and Military Avionics Applications Addendum to IPC-6018C

No	Document Title
Annex 1	Conformance Matrix IPC6012DS vs ECSS (excel file) – embedded in this pdf file

3 ABBREVIATIONS

AABUS	As Agreed Between User And Supplier
AD	Applicable Document
AOI	Automated Optical Inspection
AR	As Received
Au	Gold



Avg	Average
AQL	Acceptable Quality Level
C	Compliant
Cu	Copper
CVCM	Collectible Volatile Condensable Material
DPA	Destructive Physical Analysis
DR	Design Review
DWV	Dielectric Withstanding Voltage
ECSS	European Cooperation for Space Standardisation
ENEPIG	Electroless Nickel Electroless Palladium Immersion Gold
ENIG	Electroless Nickel Immersion Gold
ENIPIG	Electroless Nickel Immersion Palladium Immersion Gold
ESA	European Space Agency
FAI	First Article Inspection
HDI	High Density Interconnect
HWP	Hole Wall Pull Away
ICD	Interconnect Defect
IPC	Association connecting electronics industry (originally: Institute for Printed Circuits)
IST	Interconnect Stress Test
µvia	Microvia
min	Minimum
MRR	Manufacturing Readiness Review
NA	Not applicable
NC	Non-compliant
NFP	Non-Functional Pad
Ni	Nickel
Pb	Lead (metal)
PC	Partial compliant
PCB	Printed Circuit Board
PID	Process Identification Document
PTH	Plated Through-Hole
RD	Reference Document
Ref	Reference
RH	Relative Humidity
RMS	Root Mean Square
Rqt	Requirement
RR	Resin Recession
RW	Rework
SB	Solder Bath float test
SMT	Surface Mount Technology
Sn	Tin
THB	Temperature Humidity Bias
TML	Total Mass Loss
VDC	Voltage Direct Current
XRF	Xray Fluorescence

4 INSTRUCTIONS FOR USING THE CHECKLIST

The excel file conformance matrix of annex 1 is embedded to this pdf file. It lists all requirements that are amended in IPC-6012DS in the item numbers 2 to 75. Furthermore, in item numbers 76 to 118 the key requirements from IPC-6012D for class 3 are listed that are not amended and thus applicable to PCBs in conformance with IPC-6012DS. For each item the equivalent requirements from ECSS are provided. This is limited to rigid PCBs as this is the scope of IPC-6012D(S), and thus excluding rigid-flex PCBs.

The running item number is indicated in column A (nr 1 is not used to maintain synchronous numbering to the excel line item), the references to IPC-6012DS are indicated in column B, the references to IPC-6012D Class 3 are indicated in column C and the description of the IPC requirement is indicated in column D. The reference to ECSS-Q-ST-70-60 are indicated in column E, the reference to ECSS-Q-ST-70-12 are indicated in column F and the description of the ECSS requirement is indicated in column G. The description of requirements from IPC and ECSS are provided as a short summary, not the full requirement.

Line items 119 to 124 show some key requirements from ECSS that are not (clearly) specified in IPC. However, it is not the intention to provide a complete overview of all ECSS (and/or IPC) requirements, as this would not provide a pragmatic overview.

Column H provides a status of compliance of the IPC-6012DS towards ECSS-Q-ST-70-60. Column I provides a status of compliance of the ECSS-Q-ST-70-60 towards IPC-6012DS. This is done by the following indications:

- **C - compliant**
This status is stated in case requirements are deemed equivalent, which does not necessarily mean that they are exactly the same.
- **NC - non-compliant**
This status is stated in case the requirements allow for grossly different situations, even in case some overlap may exist between the requirements.
- **PC - partial compliance**
This status is stated in case requirements are mostly equivalent and the difference is deemed minor. It may be subjective in some cases if the status should show NC or PC. Nevertheless, it is deemed of added value to try to make a distinction for the purpose of this matrix.

Column J provides an assessment of the compliance status by providing a short comment or an indication if a non-compliance is considered to be a “key difference” between the two standardization systems.

5 SPECIFIED LEVEL OF DETAIL

Further to the above, the level of specified details in both standardization systems can be assessed by the following two means:

- Counting the number of acceptance criteria

The comparison in annex 1 shows that both standards are comparable regarding the number of acceptance criteria that are specified: approximately 117 line items for IPC and 123 line items for ECSS.

- Counting the reserved term “shall” that indicates a requirement

The word count for “shall” in ECSS indicates 352x requirements in ECSS-Q-ST-70-12 and 676x requirements in ECSS-Q-ST-70-60, which is a total of **1028x**. The word count for “should”, which indicates a recommendation, is excluded from this comparison.

The word count for “shall” is 425x in IPC-2221B, 52x in IPC-6011, 552x in IPC-6012D (amended by 128x “shall” in IPC-6012DS), which is a total of **1029x**.

The total word count for “shall” are thus very similar between the two standardization systems. However, ECSS standards include rigid-flex and RF technologies, while these are covered in separate IPC standards, i.e. IPC-6013D (613x “shall”), IPC-6018C (499x “shall”) and IPC-6018CS (136x “shall”), which are excluded from this comparison.

This assessment is provided purely for background information. No conclusions should be drawn from such global comparison alone.