IPC J-STD-001FS WAM1

Space Applications Electronic Hardware Addendum to IPC J-STD-001F Requirements for Soldered Electrical and Electronic Assemblies

Developed by the Space Electronic Assemblies J-STD-001 Addendum Task Group (5-22as) of the Assembly & Joining Processes Committee (5-20) of IPC

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Users of this publication are encouraged to participate in the development of future revisions.

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Space Applications Electronic Hardware Addendum to IPC J-STD-001F with Amendment 1, Requirements for Soldered Electrical and Electronic Assemblies

Table of Contents

The following topics are addressed in this Addendum.

0.1 Scope
0.1.1 Purpose
0.1.2 Precedence
0.1.3 Existing or Previously Approved Designs
0.1.4 Use
0.1.5 Lead-Free Tin
0.1.6 Use of Lead-Free Tin
0.1.6.1 Lead Free Control Plan
0.1.6.2 Mitigation
0.1.7 Red Plague (Cuprous Oxide Corrosion)
0.1.7.1 Red Plague Control Plan - Minimum Requirements
0.1.7.1.1 Shipping and Storage
0.1.7.1.2 Assembly
0.1.7.1.3 Limited Life Article

The following reference numbers are to J-STD-001F with Amendment 1 Clauses that are modified or added in this Addendum.

1.1	Scope
1.2	Purpose
1.5.1	Hardware Defects
1.7	Order of Precedence
1.7.1	Conflict
1.10	Personnel Proficiency
1.10.1	Vision Requirements
1.11	Acceptance Requirements
1.13.2.2	High Frequency Applications
1.13.2.3	High Voltage Applications
3.1	Materials
3.2	Solder
3.3	Flux
3.9	Tools and Equipment
4.2.3	Lighting
4.5.1	Gold Removal
4.6	Thermal Protection
4.9	General Part Mounting Requirements
4.9.2	Lead Deformation Limits
4.15.3	Drying/Degassing
4.17	Reflow Soldering
4.18.1	Exposed Surfaces
4.18.2	Solder Connection Defects
4.18.3	Partially Visible or Hidden Solder Connections
5.1.2	Strand Damage
5.3.6	Terminal Mounting - Soldering
5.5	Soldering to Terminals
5.6.3	Wire Staking
6.1	Through-Hole Terminations – General
6.1.1	Lead Forming
6.1.2	Termination Requirements
6.2.2	Through-Hole Component Lead Soldering
6.3.1	Lead Termination Requirements for Unsupported Holes
7	SURFACE MOUNTING OF COMPONENTS
7.1.2	Surface Mount Device Lead Forming
7.1.3	Unintentional Bending
7.2	Leaded Component Body Clearance
7.5.6	Castellated Terminations
7.5.8	Round or Flattened (Coined) Gull Wing Leads
7.5.14	Surface Mount Area Array Packages
7.5.15	Bottom Termination Components (BTC)
7.5.16	Components with Bottom Thermal Plane Terminations (D-Pak)
7.5.17	Flattened Post Connections
8.3	Post Solder Cleanliness
8.3.1	Foreign Object Debris (FOD)
8.3.2	Flux Residues and Other Ionic or Organic Contaminants
9.1.1	Blistering/Delamination
9.1.2	Weave Exposure/Cut Fibers
9.1.9	Burns
9.1.11	Measles
10	Coating, Encapsulation, Staking and Bonding
10.3.10	Rework or Touchup of Conformal Coating
10.5.1	Staking - Application
10.6	Bonding (Adhesive)
11	Witness (Torque/Anti-Tampering) Stripe
12.2.2	Visual Inspection
12.2.3	Sampling Inspection
13.2	Repair

0.1 Scope This Addendum provides requirements to be used in addition to, and in some cases, in place of, those published in J-STD-001F with Amendment 1 to ensure the reliability of soldered electrical and electronic assemblies that must survive the vibration and thermal cyclic environments getting to and operating in space.

0.1.1 Purpose When required by procurement documentation/drawings, this Addendum supplements or replaces specifically identified requirements of J-STD-001F with Amendment 1.

0.1.2 Precedence The contract takes precedence over this Addendum, referenced standards and User-approved drawings. In the event of a conflict between this Addendum and the applicable documents cited herein, this Addendum takes precedence. Where referenced criteria of this Addendum differ from the published J-STD-001F with Amendment 1, this Addendum takes precedence. In the event of conflict between the requirements of this Addendum and the applicable assembly drawing(s)/documentation, the applicable User approved assembly drawing(s)/documentation take precedence. See Table 1 of this Addendum, clauses 1.7 Order of Precedence and 1.7.1 Conflict.

0.1.3 Existing or Previously Approved Designs This Addendum **shall not** constitute the sole cause for the redesign of previously approved designs. When drawings for existing or previously approved designs undergo revision, they should be reviewed and changes made that allow for compliance with the requirements of this Addendum.

0.1.4 Use This Addendum is not to be used as a standalone document.

Where criteria are not supplemented, the Class 3 requirements of J-STD-001F with Amendment 1 **shall** apply. Where J-STD-001F with Amendment 1 criteria are supplemented or new criteria are added by this Addendum, the clause is listed in J-STD-001FS with Amendment 1, Table 1, Space Applications Requirements, and the entire J-STD-001F with Amendment 1 clause is replaced by this Addendum except as specifically noted.

The clauses modified by this Addendum do not include subordinate clauses unless specifically stated, e.g., 1.4 does not include 1.4.1. Clauses, Tables, Figures, etc., in J-STD-001F with Amendment 1 that are not listed in this Addendum are to be used as-published.

J-STD-001FS with Amendment 1 must be used with either J-STD-001F and J-STD-001F Amendment 1 or J-STD-001F with Amendment 1. For manufacturers not using Amendment 1, J-STD-001FS dated January 2015 must be used with J-STD-001F dated July 2014.

0.1.5 Lead-Free Tin For the purpose of this document, lead-free tin is defined as tin containing less than 3 percent lead by weight as an alloying constituent. Solder alloy Sn96.3Ag3.7 is exempt from this requirement. See Table 1 of this Addendum, clause 3.2.

0.1.6 Use of Lead-Free Tin The use of components, assemblies, packaging technology, mechanical hardware, and materials meeting any of the following conditions **shall** be prohibited unless documented and controlled through a User approved Lead Free Control Plan (LFCP) incorporating either a replating or hot solder dip (HSD) process that completely replaces the lead-free tin finish, or a minimum of two mitigation measures.

- Lead-free tin plating, metallization, etc., on external surfaces of parts, mechanical parts, etc., or in internal cavity surfaces, i.e., hybrid, relay crystal cans, MEMS, etc.
- Any components, printed circuit assemblies (PCAs), etc., assembled with lead-free tin solder alloys except Sn96.3Ag3.7, see Table 1 of this Addendum, clause 3.2.

0.1.6.1 Lead Free Control Plan The Lead Free Control Plan (LFCP) **shall** document controls and processes that assures that assemblies containing lead-free tin solder alloys and/or component finishes will perform as intended within the expected parameters of the mission, e.g., environment, duration, etc. At a minimum, the LFCP **shall:**

a. Document the use of lead-free tin technology and prevent its use without review and approval by the User prior to implementation.

b. Incorporate a minimum of two mitigation measures when the lead-free tin finish is not completely replaced through a replating or HSD process.

c. Include any special design requirements, mitigation measures, test and qualification requirements, quality inspection and screening, marking and identification, maintenance, and repair processes.

d. Require review and approval by the User prior to implementation.

The following documents may be helpful when developing the LFCP:

- GEIA-STD-0005-1, Performance Standard for Aerospace and High Performance Electronic Systems Containing Lead-free Solder
- GEIA-STD-0005-2, Standard for Mitigating the Effects of Tin Whiskers in Aerospace and High Performance Electronic Systems
- GEIA-HB-0005-1, Program Management / Systems Engineering Guidelines For Managing The Transition To Lead-Free Electronics
- GEIA-HB-0005-2, Technical Guidelines for Aerospace and High Performance Electronic Systems Containing Lead-free Solder and Finishes
- GEIA-STD-0006, Requirements for Using Solder Dip to Replace the Finish on Electronic Piece Parts