



IPC J-STD-001GS

**Space and Military  
Applications Electronic  
Hardware Addendum to  
IPC J-STD-001G  
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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IPC

# Space and Military Applications Electronic Hardware Addendum to IPC J-STD-001G 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 Red Plague (Cuprous Oxide Corrosion)
- 0.1.7 Materials and Processes Traceability

The following reference numbers are to J-STD-001G Clauses that are modified or added in this Addendum.

1.1	Scope
1.2	Purpose
1.7	Order of Precedence
1.7.1	Conflict
1.10	Personnel Proficiency
1.11	Acceptance Requirements
1.13.2.2	High Frequency Applications
1.13.2.3	High Voltage Applications
3.1	Materials
3.2	Solder
3.2.1	Solder – Lead Free
3.3	Flux
3.8.1	Component and Seal Damage
4.2.3	Lighting
4.5	Removal of Component Surface Finishes
4.5.1	Gold Removal
4.9	General Part Mounting Requirements
4.9.2	Lead Deformation Limits
4.15.3	Drying/Degassing
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

5.4.1.6	Insulation Sleeving (Wires Soldered to Pierced, Hook and Cup Terminals)
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
7.5.6	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	Conformal Coating – Application
10.3.10	Rework or Touchup of Conformal Coating
10.6 [NEW]	Bonding (Adhesive)
12.1.2	Visual Inspection
12.3	Statistical Process Control
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-001G to ensure the reliability of soldered electrical and electronic assemblies that must survive the vibration and thermal cyclic environments in space and military applications.

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

**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-001G, 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 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 conformance with the requirements of this Addendum.

**0.1.4 Use** This Addendum is not to be used as a stand-alone document.

Where criteria are not supplemented, the Class 3 requirements of J-STD-001G **shall** apply. Where J-STD-001G criteria are supplemented or new criteria are added by this Addendum, the clause is listed in J-STD-001GS, Table 1, Space and Military Applications Requirements, and the entire J-STD-001G 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-001G that are not listed in this Addendum are to be used as-published.

**0.1.5 Lead-Free Tin** For the purpose of this document, lead-free tin is defined as pure tin or any tin alloy containing less than 3% lead (Pb) by weight as an alloying constituent.

The use of lead-free tin solder alloys/lead-free tin for either the assembly of, or existing on, the external surfaces (platings, metallization, etc.) of components, sub-assemblies, packaging technologies, mechanical hardware **shall** be prohibited unless documented and controlled through a User approved Lead Free Control Plan (LFCP).

Solder alloy Sn96.3Ag3.7 is exempt from this requirement (inclusion in a User approved LFCP). See Table 1 of this Addendum, 3.2.

**0.1.6 Red Plague (Cuprous Oxide Corrosion)** Red Plague can develop in silver-coated soft or annealed copper conductors (component leads, single and multistranded wires and PCB conductors) when a galvanic cell forms between the copper base metal and the silver coating in the presence of moisture ( $H_2O$ ) and oxygen ( $O_2$ ). Once initiated, the sacrificial corrosion of the copper base conductor can continue indefinitely in the presence of oxygen. The color of the corrosion by-product (cuprous oxide crystals) may vary depending on the different levels of oxygen available, but is commonly noted as a red/reddish-brown discoloration on the silver coating surface.

The use of silver coating over any form of copper, e.g., component leads, PCB traces, wire/cable **shall** require the implementation of a User-approved Red Plague Control Plan (RPCP). See IPC-WP-113, Guidance for the Development and Implementation of a Red Plague Control Plan (RPCP), for technical guidance and a generic RPCP template.

**0.1.7 Materials and Processes Traceability** When required, the traceability of materials and processes used in the manufacture of electrical/electronic hardware **shall** be in compliance with IPC-1782, Standard for Manufacturing and Supply Chain Traceability of Electronic Products. Traceability Level **shall** be determined between the Manufacturer and the User.