IPC/WHMA-A-620C-S

Space Applications Electronic Hardware Addendum to IPC/ WHMA-A-620C

Developed by the IPC/WHMA-A-620 Space Electronic Assemblies Addendum Task Group (7-31fs) of the Product Assurance Committee (7-30) of IPC

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

Contact:

IPC

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Appendix A	Terms and Definitions

0.1 Scope This Addendum provides additional requirements over those published in IPC/WHMA-A-620C to ensure the performance of cable and wire harness assemblies that must survive the vibration and thermal cyclic environments getting to and operating in space.

Where content criteria are not supplemented, the Class 3 requirements of IPC/WHMA-A-620C apply.

0.1.1 Purpose When required by procurement documentation/drawings, this Addendum supplements or replaces specifically identified requirements of IPC/WHMA-A-620C.

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 IPC/WHMA-A-620C, this Addendum takes precedence. (See IPC/WHMA-A-620C 1.7.)

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 of this Addendum This Addendum **shall not** be used as a stand-alone document.

Where criteria are not supplemented by this Addendum, the Class 3 requirements of IPC/WHMA-A-620C **shall** apply. If an IPC/WHMA-A-620C requirement is changed or added by this Addendum, the clause is identified and only the process requirements and defects for that clause are listed in Table 1 of this Addendum, i.e., Target and Acceptable conditions are not listed. If a feature is not listed as a defect, it **shall** be considered acceptable. Target and Acceptable conditions (except where changed by this Addendum) and Figures are provided in IPC/WHMA-A-620C.

The clauses modified by this Addendum do not include subordinate clauses unless specifically stated, i.e., changes made to 1.4 do not affect 1.4.1 unless 1.4.1 is also addressed in this Addendum. Clauses, Tables, Figures, etc. in IPC/WHMA-A-620C that are not listed in this Addendum are to be used as-published.

When a paragraph refers to an entire chapter, for example the first paragraph in 15.1 of this Addendum, it is the user of the standard's responsibility to determine which clauses from that chapter are used from IPC/WHMA-A-620C and which clauses are covered by this Addendum.

0.1.5 Lead-Free Tin For the purpose of this document, lead-free tin is defined as tin containing less than 3% lead by weight as an alloying constituent. Solder alloy Sn96.3Ag3.7 is exempt from this requirement. See Table 1 of this Addendum 4.1.1.1.

The use of components, assemblies, packaging technology, mechanical hardware, and materials identified as having external surfaces (platings, metallization, etc.) of lead-free tin or assembled with lead-free tin solder alloys **shall** be prohibited unless documented and controlled through a User-approved Lead Free Control Plan (LFCP).

0.1.6 Red Plague (Cuprous Oxide Corrosion) Red Plague (cuprous oxide corrosion) can develop in silver-coated soft or annealed copper wire 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-coated copper wire and 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 White Plague (Fluorine Attack) During the manufacturing of fluoropolymer-insulated electrical wires and cables made with tin-coated, silver-coated, or nickel-coated copper or copper alloy conductors, the extrusion of fluorocarbon resin to form the insulation jacket occurs at a temperature high enough that oxidative degradation of the polymer will occur, resulting in the evolution or outgassing of a number of materials, including carbonyl fluoride (COF_2), an extremely reactive compound. This outgassing from the insulation is both internal, e.g., to the wire strand/cable bundle, and external, e.g., to