IPC/WHMA-A-620D-S

Space and Military Applications Electronic Hardware Addendum to IPC/WHMA-A-620D

Developed by the IPC/WHMA-A-620 Space and Military 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

Space and Military Applications Hardware Addendum to IPC/WHMA-A-620D, Requirements and Acceptance for Cable and Wire Harness Assemblies

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Appendix A	Terms and Definitions

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

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

0.1.1 Purpose When required by the contract or engineering documentation, this Addendum supplements or replaces specifically identified requirements of IPC/WHMA-A-620D.

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 reference documents cited herein, this Addendum takes precedence. (See IPC/WHMA-A-620D 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-620D **shall** apply. If an IPC/WHMA-A-620D 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., Acceptable conditions are not listed. If a feature is not listed as a defect, it **shall** be considered acceptable. Acceptable conditions (except where changed by this Addendum) and Figures are provided in IPC/WHMA-A-620D.

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-620D 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-620D and which clauses are covered by this Addendum.

0.1.5 Lead (Pb)-Free Tin For this document, the definition of lead (Pb)-free tin is tin containing less than 3% Pb by weight as an alloying constituent. 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 Pb-free tin or assembled with Pb-free tin solder alloys **shall** be prohibited unless documented and controlled through a User-approved Pb-Free Control Plan (LFCP). Solder alloy Sn96.3Ag3.7 is exempt from this requirement for a 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 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 may occur, possibly 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 the surrounding environment. In the presence of trace atmospheric moisture, e.g., humidity, the carbonyl-difluoride hydrolyzes to generate carbon dioxide (CO_2) and hydrogen fluoride (HF). The hydrogen fluoride (HF) will then hydrate to