

IPC-D-620A
2021 - December

**Design and Critical Process
Requirements for Cable and
Wiring Harnesses**

A standard developed by IPC



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Design and Critical Process Requirements for Cable and Wiring Harnesses

Developed by the Wire Harness Design Task Group (7-31k)
of the Product Assurance Committee (7-30) of IPC

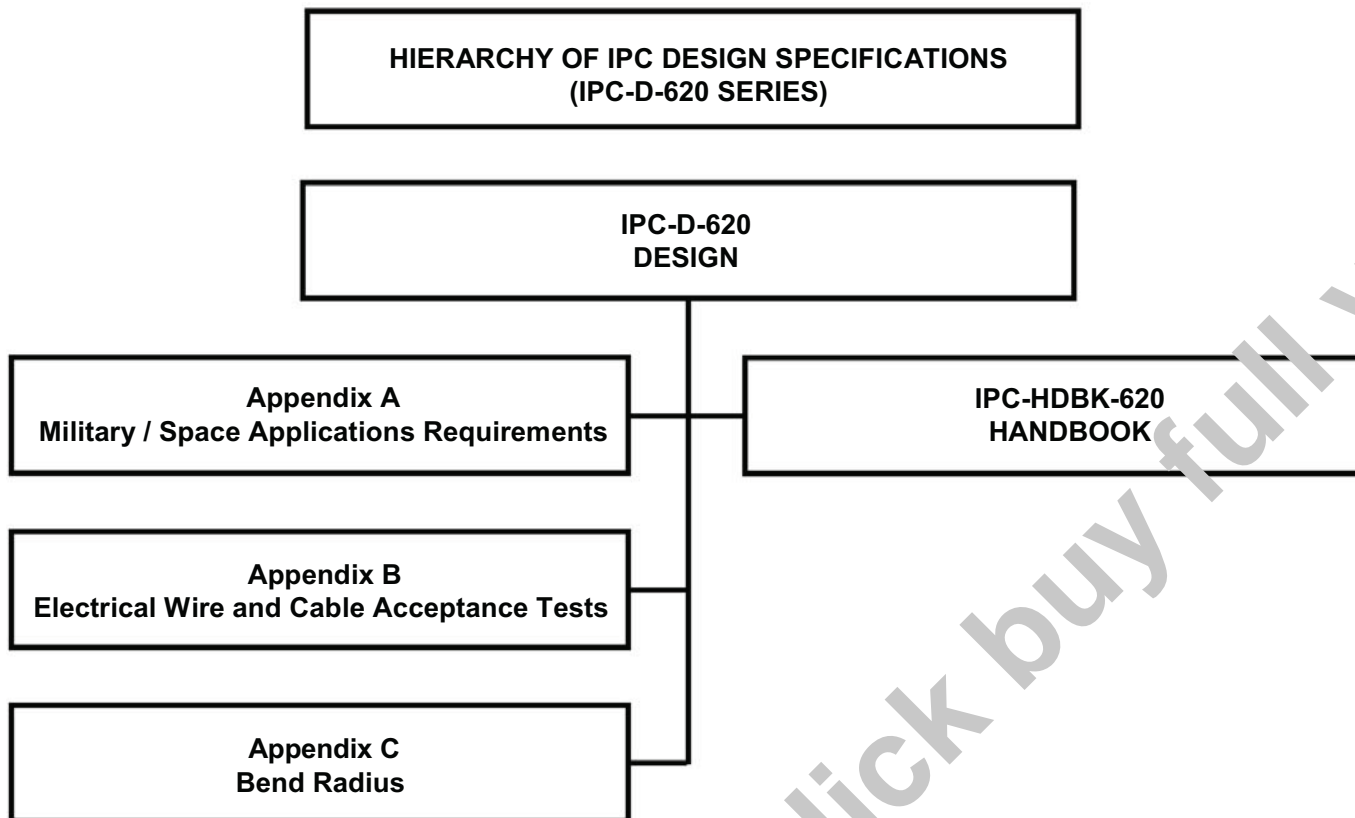
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Users of this publication are encouraged to participate in the
development of future revisions.

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FORWARD

This standard is intended to provide information on the design requirements for cable and wiring harness design, to the extent that they can be applied to the broad spectrum of cable and wiring harness design.

It is therefore crucial that decisions concerning the choice of product classification, wiring technology, connectorization requirements, and performance and reliability requirements be made as early as possible.

IPC-D-620 is supplemented by Appendices A-C and a handbook (IPC-HDBK-620), which provide the engineering rationale and technical guidance on cable and wiring harness design. The User needs, as a minimum, the Design Requirements document (IPC-D-620), and the engineering description of the final product.

As wiring and connector technology changes, specific requirements will be updated or new requirements added to the document set.

Acknowledgment

Members of the Wire Harness Design Task Group worked to develop this document. We thank them for their dedication and service to this effort. Any document involving a complex technology draws material from a vast number of sources across many continents. While the principal members of the Wire Harness Design Task Group (7-31k) of the Product Assurance Committee (7-30) are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of the IPC extend their gratitude.

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Table of Contents

1 GENERAL	1	3.2.7 Intellectual Property (IP) Control Requirements	11
1.1 Scope	1	4 SELECTION OF PARTS, MATERIALS AND PROCESSES	11
1.2 Purpose	1	4.1 Commonality	11
1.3 Performance / Product Classification	1	4.2 Flammability	11
1.4 Definition of Requirements	2	4.3 Outgassing	12
1.4.1 Design Requirement Format (A/N)	2	4.4 Flammability, Odor, And Offgassing	12
1.4.2 Requirements Flowdown	2	4.5 Toxic Products and Formulations	12
1.4.3 Commercial Off-The-Shelf (COTS)	2	4.6 Foreign Object Debris (FOD) Control Plan	12
1.4.4 Existing or Previously Approved Designs	2	4.7 Prohibited / Restricted Usage Parts, Materials, and Processes (PMP)	12
1.5 Measurement Units and Applications	3	4.7.1 Acetic Acid Cure RTV Silicone Sealants, Adhesives, and Coatings	12
1.5.1 Use of Measurement	3	4.7.2 Beeswax Wax (ALL TYPES) Lacing Tape	12
1.5.2 Verification of Dimensions	3	4.7.3 Beryllium (Be)	12
1.5.3 Line Drawings and Illustrations	3	4.7.4 Cadmium (Cd)	13
1.6 Definition of Terms	3	4.7.5 Crimping on Solder-Tinned and Solid Conductors	13
1.7 Engineering Documentation	3	4.7.6 Cuprous Oxide Corrosion (Red Plague)	14
1.8 Order of Precedence	3	4.7.7 Fluoride Attach (White Plague)	14
1.9 Conflict	3	4.7.8 EN / HN Grade Polyimide (Kapton®) Insulated Wiring	14
1.10 Clause References	4	4.7.9 Glass / Glass-Like Materials	14
1.11 Appendices A-C	4	4.7.10 Use of Lead-Free Tin (Sn) Materials and/or Processes	15
1.12 Approval of Departures from Standards and Requirements	4	4.7.11 Lock Washers	15
1.13 Supply Chain Traceability	4	4.7.12 Magnesium (Mg)	16
1.14 Trusted Source	4	4.7.13 Mercury (Hg)	16
1.15 Materials and Substances Declaration	4	4.7.14 Micro-D Connectors	16
2 APPLICABLE DOCUMENTS	5	4.7.15 Natural Rubber Materials	16
2.1 Aerospace	4	4.7.16 Polyvinyl Chloride (PVC)	16
2.2 Commercial	4	4.7.17 Silver (Ag)	16
2.3 Federal	5	4.7.18 Splices	17
2.4 Military Specifications	5	4.8 Wire & Cable	17
2.5 Reference	5	4.8.1 Conductor Sizing	18
3 DESIGN PHILOSOPHY	7	4.8.2 Conductor Material and Coating	18
3.1 General Design Requirements	8	4.8.3 Multi-Conductor Cables	19
3.1.1 Effect of Combined Conditions / Characteristics	8	4.8.4 Coaxial Cables	19
3.2 System Requirements Specification (SyRS)	9	4.8.5 Optical Fiber, Optical Fiber Cable, and Optical Fiber Assemblies	19
3.2.1 Interface Control Document (ICD)	9	4.9 Connectors	20
3.2.2 Performance and Reliability	9	4.9.1 Mating Provisions	21
3.2.2.1 Performance Reliability	9	4.9.2 Moisture Protection	21
3.2.2.2 Design for Maintainability (DFM)	10	4.9.3 Pin Assignment	21
3.2.2.3 Ergonomic Design	10	4.9.4 Protection of Connectors	22
3.2.2.4 Service Life	10	4.9.5 Protection of Severed Electrical Circuits	22
3.3 Workmanship	10	5 ELECTRICAL REQUIREMENTS	22
3.2.4 Environmental Requirements	10	5.1 Derating	2
3.2.5 Packaging, Handling, Shipping, and Transportation (PHS&T)	10		
3.2.6 Documentation Requirements	10		

5.2	Coronal Discharge (Suppression)	23	6.9	Identification and Marking	30
5.3	Electrical Bonding	23	6.9.1	Cable and Harness Assemblies	31
5.4	Shield Design and Grounding	23	6.9.2	Optical Cable	31
5.4.1	Electromagnetic Pulse (EMP) Environment	24	6.9.3	Connectors	31
5.4.2	Category IV Circuits	24	6.9.4	Clamp Locating Marks	31
5.4.3	Category I, II, III, and V Circuits (No EMP)	25	7	QUALITY ASSURANCE (QA) REQUIREMENTS	31
5.4.4	Ungrounded / Floating Shield Terminations (No EMP)	25	7.1	Responsibility for Inspections and Tests	31
5.4.5	Magnetic Shields	25	7.2	Classification of Inspections and Tests	32
5.5	Circuit Isolation	26	7.3	Workmanship, Acceptance, and Testing	32
5.5.1	Group-Grounding of Individual Shield Terminations	26	7.4	Qualification	32
5.5.2	Separation of Redundant Systems	26	7.5	Time-Critical or Limited-Life	32
6	ASSEMBLY/FABRICATION REQUIREMENTS	27	8	DOCUMENTATION	33
6.1	Wire Terminations	27	8.1	Data	33
6.1.1	Splices (Use Of)	27	8.2	Connector Orientation (Clocking)	34
6.1.2	Types of Splices	27	8.3	Connector Pin-Out	34
6.1.3	Dead-Ending	28	8.4	Dimensioning and Tolerance	34
6.1.4	Insulation Compatibility with Sealing and Servicing	28	9	DEFINITIONS AND ACRONYMS	34
6.2	Form Layout Fixture	28	APPENDIX A	Military/Space Applications	
6.3	Forming Wires into Cables and Harnesses	28		Requirements	48
6.4	Wire Lay	28	APPENDIX E	Electrical Wire and Cable	
6.5	Bend Radius	28		Acceptance Tests	52
6.6	Cable / Harness Management (Installation / Routing)	29	APPENDIX C	Bend Radius	54
6.7	Protection and Support	29			
6.8	Etching Fluoropolymer-Insulated Electrical Wire	30			

Figures		Tables		
Figure 3-1	Wire, Cables, and Harnesses	8	Table 1 Derating (Class 3, Military Space)	42
Figure 3-2	Cable and Harness Design Process	11	Table 2 Summary of Circuit Categories and Shielding Requirements	43
Figure 4-1	Waxed Lacing Tape	12	Table 3 Bond Classification	44
Figure 4-2	Red Plague (Cuprous Oxide Corrosion) on Braid, with Microsection (Inset)	14	Table 4 Types of Splices	46
Figure 4-3	White Plague (Fluorine Attack)	14	Table 5 Electrical Creepage and Clearance Distance	47
Figure 4-4	FN / HN Grade Polyimide (Kapton®)	14	Table A1 Military/Space Applications Requirements	49
Figure 4-5	Glass / Glass-Like Materials (e.g., Fuses)	14		
Figure 4-6	Tin Whiskers on Cardguide	15		
Figure 4-7	Lock Washer	15		
Figure 4-8	Serrated-face / Wedge-lock Washer (paired set)	15		
Figure 4-9	Micro-D Connector (Fiber / Copper Combination)	16		
Figure 4-10	In-Line Lash Solder Splice	17		
Figure 4-11	Fiber Optic Cable	19		
Figure 4-12	Exploded View of an Assembled Connector	19		
Figure 5-1	Solder Ferrule Termination	23		
Figure 5-2	Two-Piece Shield Crimp with Ground Wire	24		
Figure 5-3	Soldered Shield (Wrapped) Termination	24		
Figure 5-4	Group Grounding of Individual Shield Terminations	25		
Figure 6-1	Example of a Pre-Formed Heat-Shrinkable Branch Boot	27		
Figure 8-1	Connection Orientation (Clocking)	33		

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Design and Critical Process Requirements for Cable and Wiring Harnesses

1 GENERAL

1.1 Scope This document provides design and critical process requirements and technical insight that have been removed from the acceptance standards for cable and wire harness assemblies. Reference materials listed in this text are among those considered as required reading. The User is encouraged to obtain all relevant referenced materials as this document cannot (nor can any single document) cover every material, process, environment, performance, or safety aspect that affect a given design.

1.2 Purpose This document is the cable and wiring harness and systems-level design requirements companion to IPC/WHMA-A-620 and its associated space addendum.

The intent of this document is to set forth the general design requirements for electrical wiring harnesses and cable assemblies. This document is intended for use by the design engineer, manufacturing engineer, quality engineer, or other individual responsible for the tailoring of specific requirements of this document to the applicable performance class.

- a. In-Service Criteria. This document defines design requirements criteria to meet the expected performance and reliability for the expected product service life. It is not the intent of this document to establish or define “In Service” design requirements or acceptance criteria to address performance or reliability issues caused by aging or use. However, the criteria and limits that are currently detailed in this document may be considered to be wide enough to be applicable to the more common hardware degradation conditions caused by aging / use. Use of these criteria for “In Service” hardware conditions should be AABUS.
- b. Alternate / Contractor-Proprietary Documents or Processes. It is not the intent of this document to exclude any alternate or contractor-proprietary documents or processes that meet or exceed the baseline of requirements established by this document. Use of alternate or contractor-proprietary documents or processes **shall [A1A2A3]** require review and prior approval of the User.
- c. For purposes of this document:
 - The Designer is the design agent for the User.
 - The User is the individual, organization, company, contractually designated authority, or agency responsible for the procurement or design of electrical / electronic / electromechanical (EEE) hardware, and having the authority to define the class of equipment and any variation or restrictions to the requirements of this document (i.e., the originator / custodian of the contract detailing these requirements). The User is considered the Design Authority.
 - The Supplier is considered the individual, organization or company which provides the Manufacturer (assembler) components (e.g., electrical, electronic, electromechanical, mechanical, printed boards) and/or materials (e.g., solder, flux, cleaning agents).
 - The Manufacturer is considered the entity that provides a service or product to the User.

1.3 Performance / Product Classification This document recognizes that electrical wiring harnesses and cable assemblies are subject to performance / product classifications by intended end-item use. Three general end-product classes have been established to reflect differences in producibility, complexity, functional performance requirements, and verification (inspection/test) frequency. It should be recognized that there may be requirement overlaps between classes,

The User is responsible for defining the performance class required, whether compliance to any of the A through C Appendices is required, and to indicate any exceptions to specific parameters where appropriate.

Class 1 – General Electronic Products

Includes products suitable for applications where the major requirement is function of the completed assembly.

Class 2 – Dedicated Service Electronic Products

Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. Typically, the end-use environment would not cause failures.

Class 3 – High Performance/Harsh Environment Electronic Products

Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment must function when required, such as life support or other critical systems.