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Design and Critical Process Requirements for Optical Fiber, Optical Cable and Hybrid Wiring Harness Assemblies

Supersedes IPC-D-640
June 2016

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- Minimize time to market
- Contain simple (simplified) language
- Just include spec information
- Focus on end product performance
- Include a feedback system on use and problems for future improvement

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- Increase time-to-market
- Keep people out
- Increase cycle time
- Tell you how to make something
- Contain anything that cannot be defended with data

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IPC-D-640A

Design and Critical Process Requirements for Optical Fiber, Optical Cable and Hybrid Wiring Harness Assemblies

Developed by the Fiber Optic Cable Acceptability Task Group (7-31m) of the Acceptability Subcommittee (7-31) of IPC

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

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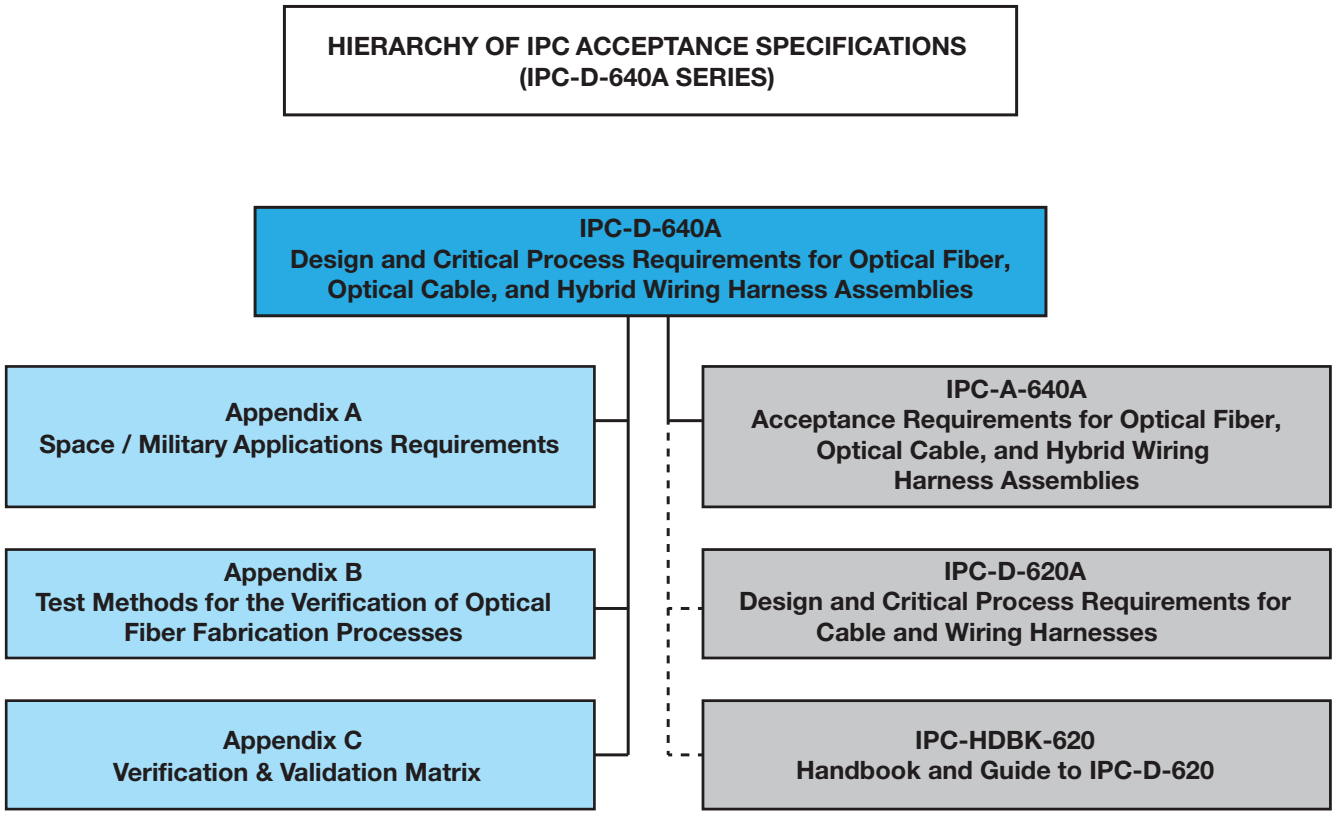

Figure 1 Hierarchy of IPC Design Specifications (IPC-D-640A Series)

FOREWARD

This standard provides information on the design and critical process requirements for optical fiber, optical cable, and hybrid wiring harness assemblies to the extent that they can be applied to the broad spectrum of optical cable and wiring harness design. It is therefore crucial that decisions concerning the choice of product classification, fiber technology, connectorization requirements, and performance and reliability requirements be made as early as possible.

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

IPC invites input on the effectiveness of the documentation and encourages User response through completion of ‘‘Suggestions for Improvement’’ forms located at the end of each document.

Acknowledgment

Any document involving a complex technology draws material from a vast number of sources across many continents. While the principal members of the Fiber Optic Cable Acceptability Task Group (7-31m) of the Acceptability Subcommittee (7-31) 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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Design and Critical Process Requirements for Optical Fiber, Optical Cable and Hybrid Wiring Harness Assemblies

1 GENERAL

1.1 Scope This document provides design and critical process requirements and technical insight for cable and wire harness assemblies incorporating optical fiber, optical cable and hybrid wiring technology. 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 impact a given design.

1.2 Purpose This standard is intended to provide information on the general design requirements for optical fiber, optical cable, hybrid wiring harness assemblies, and Fiber Optic Communications Systems (FOCS) to the extent that they can be applied to the broad spectrum of optical cable and wiring harness design.

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.

It is not the intent of this document to exclude any alternate documents or processes that meet or exceed the baseline requirements established by this document. Use of alternate documents or processes **shall [A1A2A3]** require review and prior approval of the User.

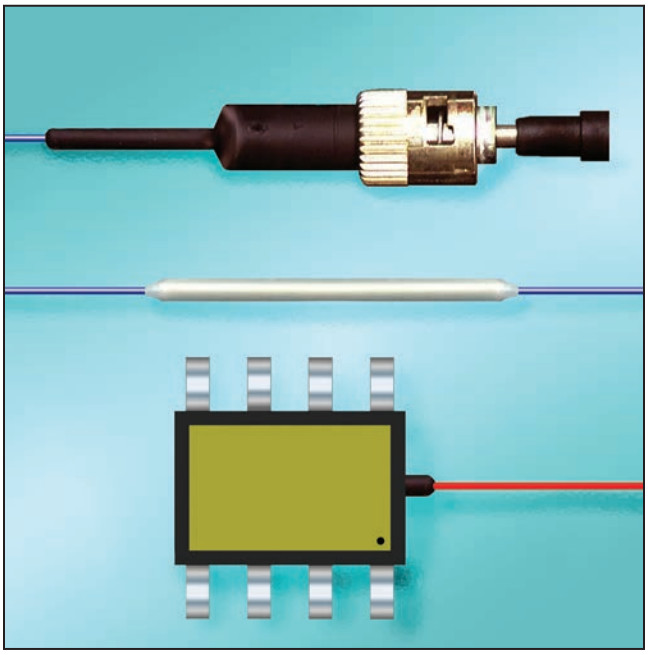

Figure 1-1 Optical Fiber Assemblies, Cables And Wiring Harnesses Connector, Splice and Transmitter
Image credit: NASA

For purposes of this document:

a. The Designer is the design agent for the User.

b. 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 product 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.

c. The Supplier is considered the individual, organization or company which provides the Manufacturer (assembler) components (electrical, electronic, electromechanical, mechanical, printed boards) and/or materials (solder, flux, cleaning agents).

d. The Manufacturer is considered the entity that provides a service or product to the User.

1.3 Performance / Product Classification This document recognizes that optical 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 product class. The contract **shall [A1A2A3]** specify the performance class required, whether compliance to any of the Appendices is required, and 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.