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Acceptance Requirements for Optical Fiber, Optical Cable, and Hybrid Wiring Harness Assemblies

Supersedes IPC-A-640
May 2017

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Standards Should:

- Show relationship to Design for Manufacturability (DFM) and Design for the Environment (DFE)
- 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
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- Contain anything that cannot be defended with data

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Acceptance Requirements for Optical Fiber, Optical Cable, and Hybrid Wiring Harness Assemblies

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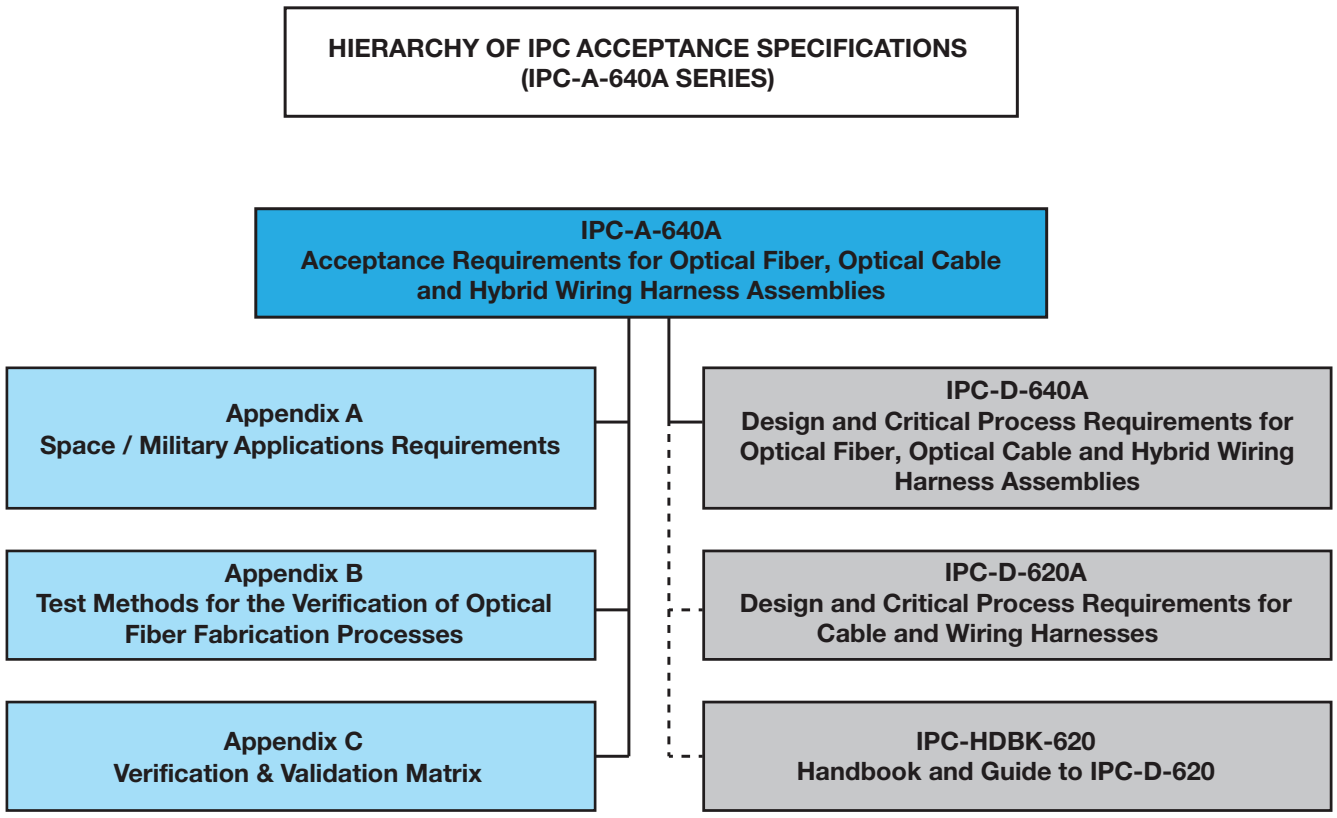

Figure 1 Hierarchy of IPC Design Specifications (IPC-A-640A Series)

FOREWARD

This standard provides information on the design and acceptance requirements for optical fiber, optical cable and hybrid wiring harness 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’’ form 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. Shown below are the principal members of the Fiber Optic Cable Acceptability Task Group (7-31m) of the Product Assurance Committee (7-30). 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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1 GENERAL

1.1 Scope This standard provides acceptance requirements and technical insight that have been removed from acceptance standards 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 reference 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 standard is intended to provide information on design and acceptance 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.

Neither this document nor its Appendices provide detailed procedures for the test, acceptance, commissioning and /or maintenance of FOCS.

This document is intended for use by the design engineer, manufacturing engineer, quality engineer or other individual(s) responsible for tailoring specific requirements of this document to the applicable performance class.

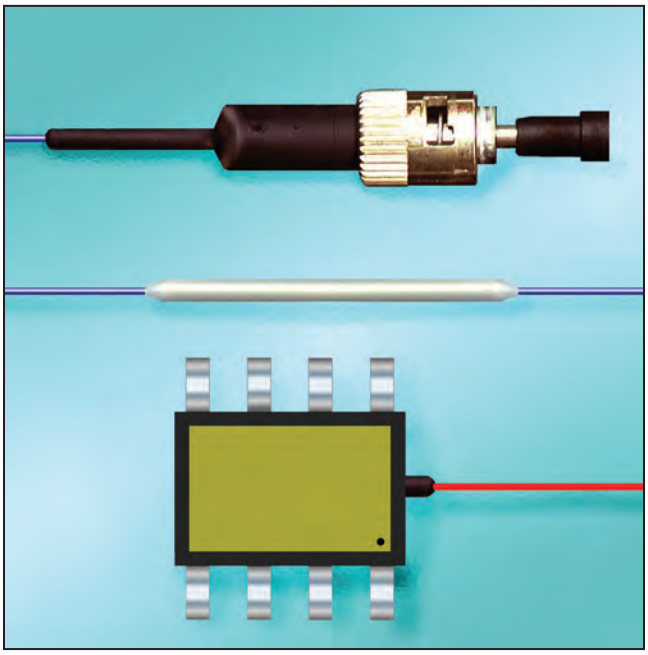

Figure 1-1 Optical Fiber Assemblies, Cables And Wiring Harnesses Connector, Splice and Transmitter
Image credit: NASA

a. This document defines acceptability criteria and limits for "New/Beginning of Life" hardware. It is not the intent of this document to establish or define "In Service" acceptance criteria to address performance or reliability issues caused by aging or use. However, the acceptability criteria and limits that are 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 acceptance of "In Service" hardware conditions **shall [D1D2D3]** be as agreed between User and Supplier (AABUS).

b. 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 [D1D2D3]** require review and prior approval of the User.

c. For purposes of this document:

   1) The Designer is the design agent for the User.

   2) 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 (e.g., the originator/custodian of the contract detailing these requirements). The User is considered the Design Authority.

   3) 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).

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

      Note: *In some instances, the Manufacturer may also be considered the Supplier to the User.*