

STANDARD FOR
OPTICAL FIBER DROP CABLE

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FOREWORD

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The user of this Standard is cautioned to observe any applicable health or safety regulations and rules relative to the manufacture and use of cable made in conformity with this Standard. This Standard hereafter assumes that only properly trained personnel using suitable equipment will manufacture, test, install and/or perform maintenance on cables defined by this Standard.

The Secretary can only accept questions of interpretation of ICEA Standards in writing at Headquarters at the address below, and the reply shall be provided in writing. Suggestions for improvements in this Standard are welcome. Questions and suggestions shall be sent to:

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**ICEA STANDARD
FOR
OPTICAL FIBER DROP CABLE**

PART 1

INTRODUCTION

1.1 Scope

1.1.1 General

This Standard covers optical fiber communications cables intended for use in outdoor and indoor/outdoor optical fiber drop applications. Materials, construction, and performance requirements are included in this Standard, together with applicable test procedures. Refer to ICEA S-104-696 for optical fiber communications cables intended for use in other combined indoor/outdoor applications, and to ICEA S-87-640 for optical fiber communication cables intended for use in other outdoor applications. Refer to ICEA S-83-596 for optical fiber communications cables intended only for indoor use.

1.1.2 Applications Space

Products covered by this Standard are intended for operation under conditions normally encountered in the last portion of all-optical networks. This space exists from the Network Access Point (NAP), or other hardware serving that purpose, ending at or inside the subscriber premises. These products convey communications signals (voice, video, and data) between the communications network and the subscriber premises. Products covered by this Standard may be factory-terminated with connectors or other telecommunications hardware as appropriate.

For the purposes of this Standard, user premises are defined as residential properties and small to medium sized businesses located in facilities that can be served by an optical cable having 12 or fewer fibers, with typical distances less than or equal to 100 m (300 ft) in length. Most applications will only require cables with four or fewer fibers. Products covered by this Standard are not intended for use in extended distance applications, which are typically characterized by higher fiber count cables and which specify more stringent design and performance requirements. The suitability of products covered by this Standard in applications other than those for which they are intended should be as agreed upon between the manufacturer and user.

1.1.3 Temperature Ranges

The normal temperature ranges for cables covered by this Standard are given in Table 1-1.

**Table 1-1
Cable Normal Temperature Ranges**

	Outdoor Cable		Indoor/Outdoor Cable (fire-resistant)	
	°C	°F	°C	°F
Operation	-40 to +70	(-40 to +158)	-40 to +70	(-40 to +158)
Storage and Shipping	-40 to +70	(-40 to +158)	-40 to +70	(-40 to +158)
Installation	-30 to +60	(-22 to +140)	-10 to +60	(+14 to +140)

1.1.4 Tensile Rating

For the purposes of this document, the standard tensile rating represents the maximum allowable installation load for the cable. The standard tensile ratings for products covered by this Standard are 1335 N (300 lbf) for cables designed for installation by pulling, and 440 N (100 lbf) for cables that are direct-buried, placed in the ground by trenching equipment, or blown into ducts. The residual load is defined as a load equivalent to 30 % of the standard tensile rating, as related to all cable designs except aerial self-supporting.

For self-supporting aerial applications there may be additional considerations, based on the particular application, which need to be addressed to ensure that the cable design is appropriate for the self-supporting distance (typically 30 m [100 ft] or less) and environmental loading requirements. See Paragraph 7.24 and Annex C for information on aerial plant requirements and considerations.

For aerial applications in which the drop cable is lashed to a separate messenger wire, the use of a cable designed for installation by direct burial, trenching, or pulling into duct may be adequate.

1.1.5 Minimum Bend Diameter

The standard minimum bend diameters for cables covered by this Standard are:

<u>Condition</u>	<u>Bend Diameter</u>
Unloaded (Installed):	20 x Cable OD
Loaded (During Installation):	40 x Cable OD

For cables not having a circular cross-section, bend diameter requirements are to be determined using the thickness (minor axis) as the cable diameter and bending in the direction of the preferential bend.

1.1.6 Fire-Resistance

Fire tests may be applicable based on the specific drop cable application. Users of this document are encouraged to consult pertinent Building and Fire Codes, such as those described in Paragraph 1.9, to ensure product compliance to the requirements for a particular installation.

For purposes of this document, cables intended strictly for outdoor use need not be listed for fire-resistance. Cables intended for indoor use, or which transition from outdoor to indoor, may be required to be tested and marked with the appropriate fire-resistance listing as referenced in Paragraph 1.9.

The choice of materials needed to achieve adequate fire-resistance may impact the ability of such cables to be handled at low temperatures. Refer to Table 1-1 for temperature ranges.

1.2 General

This publication is arranged such that cables may be selected from numerous constructions covering a broad range of installation and service conditions.

Parts 2 and 3 designate the materials, material characteristics, dimensions, and tests applicable to the particular component.

Part 4 covers assembly, cabling, and identification of individual optical fibers.

Part 5 includes cable coverings.

Part 6 provides other pertinent requirements not otherwise addressed by Parts 1 through 5, or by Parts 7 and 8 of this Standard.

Part 7 describes the test methods and performance requirements applicable to the component materials, in addition to Parts 2 & 3, and completed cables manufactured per this Standard. If there is a conflict between Parts 1 through 6 and Part 7, the provisions of Part 7 apply.

Part 8 contains routinely specified optical performance test methods and requirements for finished cables.

Part 9 contains cross-references to other standards and publications.

Annex A (Informative) contains information for users on ordering the types of cable products covered by this Standard.

Annex B (Informative) contains information on multimode fiber restricted modal launch (RML) performance.

Annex C (Informative) contains information on additional considerations for aerial drop cable installations.

Annex D (Informative) contains information on the fusing coordination test method for composite drop cables.

Annex E (Informative) contains information on other ICEA Standards not referenced elsewhere in this document.

1.3 Units

In this Standard metric (SI) units are used. Their approximate U.S. customary units are included where appropriate. Where approximate equivalents in alternate systems are included they are provided for information only and in most cases are rounded off for measurement convenience. Unless otherwise specified, the Rounding Method of ASTM E 29 shall be used. Rounding of U.S. customary units may be adjusted for measurement convenience. ICEA P-57-653 is a useful guide for metric units used in this publication.

1.4 Definitions

1.4.1 Cable Classification

In this Standard, communications cables are classified as one of the following types:

1.4.1.1 Composite Cables

Cables having both optical fibers and metallic conductors for the purposes of voice, video, or data transmission.

1.4.1.2 Dielectric Cables

Cables containing no metallic members or other electrically conductive materials.

1.4.1.3 Hybrid Cables

Cables which contain more than one type of optical fiber.

1.4.1.4 Indoor-Outdoor Cables

Cables that are listed for fire-resistance performance in accordance with one or more of the Codes listed in Paragraph 1.9, and which also meet the appropriate mechanical and environmental performance requirements for use outdoors, as defined elsewhere in this Standard. These cables are primarily used in applications that require a transition from the outside plant to indoors without a transition splice point. Some Codes allow for the passage of non fire-resistant cables from outdoors to indoors, but place additional restrictions on their use in such applications.

1.4.1.5 Metallic Cables

Cables that contain conductive members, including those not normally used to transmit information (voice, video, or data), such as metallic strength members, shields, or armors.

1.4.2 Network Access Point (NAP)

The point at which optical drop cables connect to the distribution network via splicing or the use of optical connectors. NAPs are characterized by closures supporting up to twelve subscriber drop connections and may include optical splitters.

1.4.3 Jackets and Sheaths

In this Standard, the term "jacket" refers to a continuous non-metallic covering, while "sheath" refers either to a continuous metallic covering or to a combination of jacket(s), together with metallic covering(s), strength member(s), or other components.

1.4.4 Optical Fiber and Electric/Electronic Terms

Refer to TIA/EIA-440 and to IEEE-812 for definitions of other optical fiber terms. Refer to ANSI/IEEE Standard 100 for definitions of other electrical and electronic terms.

1.4.5 Detail Specification

The term "Detail Specification" shall be used to refer to any requirement or set of requirements that are specific to the user's purchase. In case of conflict between a requirement called out in a Detail Specification and this Standard, the requirements of this Standard may be modified by agreement between the manufacturer and user. This definition does not apply to the optical fiber Detail Specifications referenced in Tables 2-1 and 2-2 of this Standard.

1.5 References

All documents referenced herein are listed in Part 9.

1.6 Information to Be Supplied by the User

When requesting proposals from cable manufacturers, the prospective user should describe the cable by referencing the pertinent Paragraphs of this Standard. To help avoid misunderstandings and possible misapplication of cable, the user should also provide relevant information concerning the intended application. Recommended ordering information is summarized in Annex A.

1.7 Modification of this Standard

Any requirement of this Standard may be modified by agreement between the manufacturer and user, but such modifications shall be clearly denoted as exceptions to this Standard. In this Standard, requirements which are recognized to have various options, but for which preferred values are given, have been introduced by phrases such as, "Unless otherwise specified," or "Unless otherwise modified by manufacturer and

user." Requirements not specified in this Standard, and which therefore must be determined in each case, are introduced by phrases such as ". . . established by agreement between manufacturer and user," or "as mutually agreed upon."

1.8 Quality Assurance

It is the responsibility of the manufacturer to establish a quality assurance system consistent with ANSI/ASQ Q9001, ISO 9001, TL 9000, or an alternate system acceptable to the user, which will assure conformance with the requirements of this Standard. When the user wishes to require a specific quality assurance program or special testing procedures, agreement between the user and the manufacturer should be reached before the order is placed.

1.9 Fire Resistance Codes

The fire-resistance requirements of optical fiber cable are addressed by the following Codes and are dependent upon the application for which it is being used and local jurisdictional requirements. Users are encouraged to contact the Local Authority Having Jurisdiction in order to determine the minimum fire-resistance requirements for a particular application, prior to placing an order.

United States Fire Resistance Codes:

1. NFPA 70, National Electrical Code (NEC)
2. Local Codes

Canada Fire Resistance Codes:

1. C22.2 No. 232, Canadian Standards Association (CSA)
2. Local Codes

Mexico Fire Resistance Codes:

1. Telecommunications - Cables - Optical Fiber Cables for Premises Applications (NMX-J-237-1997-NYCE)
2. Local Codes

1.10 Safety Considerations

Materials in the cable shall present no dermal or environmental hazards as defined by current industry Standards, or applicable federal or state laws and regulations. The manufacturer and user of cables made in accordance with this Standard are cautioned to observe any applicable health or safety rules and regulations relative to their manufacture and use. This Standard hereafter assumes that the manufacture, testing, installation, and maintenance of cables, defined herein, will be performed only by properly trained personnel, using suitable equipment, employing appropriate safety precautions, and working in accordance with applicable local, state and national safety requirements.