

**STANDARD FOR**  
**INDOOR-OUTDOOR**  
**OPTICAL FIBER CABLE**

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## FOREWORD

ICEA Standards are adopted in the public interest and are designed to eliminate misunderstanding between the manufacturer and user and to assist the user in selecting and obtaining proper products for his particular need. Existence of an ICEA Standard does not in any respect preclude the manufacture or use of products not conforming to the Standard.

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 perform manufacture, testing, installation and maintenance of cables defined by this Standard.

Questions of interpretation of ICEA Standards can only be accepted in writing, 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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# PART 1

## INTRODUCTION

### 1.1 Scope

This Standard covers optical fiber communications cables intended for use in Indoor-Outdoor optical fiber applications. Materials, constructions and performance requirements are included in the Standard, together with applicable test procedures. Refer to ICEA S-83-596 for optical fiber communications cables intended for indoor use, and to ICEA S-87-640 for optical fiber communication cables intended for outdoor use.

When a composite cable (a cable with both optical fibers and metallic conductors) is required, the applicable metallic conductor requirements shall be as established by agreement between the end user and the cable manufacturer. The requirements of ANSI/ICEA S-84-608 should be considered when determining appropriate requirements.

All designs covered by the Standard are intended for operation under normal conditions found in the outside plant environment and in the communications user's premises. These products normally convey communications signals (voice, video, and data) from point to point or point to multi point, within and outside buildings. Products covered by this Standard may be factory terminated with connectors or splicing modules.

Indoor-Outdoor cables are generally used in short lengths, to make interconnections within and between adjacent buildings. These cables are fully resistant to the typical outside plant environment, but their attenuation characteristics are not necessarily the same as long-length Outside Plant Communications cables. See part 8 of this specification.

The normal temperature ranges for cables covered by this Standard are listed in Table 1-1:

**Table 1-1  
Temperature Ranges**

	<u>Plenum</u>		<u>Riser and General Purpose</u>	
	°C		°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	0 to +60	(32 to +140)	-10 to +60	(+14 to +140)

The standard installation tensile rating for cables covered by this Standard is 2670 N (600 lb.) for cables with more than 12 fibers and 1335 N (300 lb.) for cables with less than or equal to 12 fibers. The residual load is defined as a load equivalent to 30 percent of the rated installation load.

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

Unloaded Condition (Installed):	20 x Cable OD
Loaded Condition (During Installation):	40 x Cable OD

Products covered by this Standard shall comply with the pertinent Fire Resistance Code(s) described in Section 1.9.

## **1.2 General**

This publication is arranged so 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 the 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 and completed cables manufactured under 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 contains Informative Ordering Information.

Annex B contains Informative Laser Bandwidth Information.

Annex C lists ICEA Telecommunication Cable Standards.

## **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 29-93 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 Dielectric Cables**

These cables contain no metallic members or other electrically conductive materials.

#### **1.4.1.2 Metallic Cables**

Cables which contain conductive members, not normally intended to be current-carrying, such as metallic strength members, sheaths, shields, or armors.

#### **1.4.1.3 Hybrid Cables**

Cables which contain more than one type of optical fiber.

### **1.4.2 Fire Rating of Cables <sup>1</sup>**

#### **1.4.2.1 Plenum Cables**

Optical fiber cables shall be listed as being suitable for use in ducts, plenums and other space used for environmental air and shall also be listed as having adequate fire-resistance and low smoke producing characteristics.

#### **1.4.2.2 Riser Cables**

Optical fiber cables shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall also be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

#### **1.4.2.3 General Purpose**

Optical fiber cables shall be listed as being suitable for general-purpose use, with the exception of risers, plenums, and other space used for environmental air, and shall be listed as being resistant to the spread of fire.

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<sup>1</sup> Note – The Fire Rating of Cables has been extracted from the National Electrical Code.

### **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 that is specific for the user's purchase. Any requirement called out in the Detail Specification shall override those stated in this Standard. This definition does not apply to the Detail Specification referred to in Tables 2-1 and 2-2.

## **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 reference to pertinent sections of this Standard. To help avoid misunderstandings and possible misapplication of cable, the user should also provide pertinent information concerning the intended application. Recommended ordering information is summarized in Annex A.

## **1.7 Modification of this Standard**

Any part of this Standard may be modified by agreement between the manufacturer and user, but such modifications shall be clearly denoted as exceptions to the 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, which 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/ASQC Q9000-1 and Q9004-1<sup>2</sup>, 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 of the optical fiber cables is determined by the following Codes:

- For the United States the Fire Resistance Codes are:
  1. NFPA 70, National Electrical Code (NEC)
  2. Local Codes
- For Canada the Fire Resistance Codes are:
  1. C22.2 No. 232, Canadian Standards Association (CSA)
  2. Local Codes
- For Mexico the Fire Resistance Codes are:
  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 manufacture, testing, installation and maintenance of cables defined herein will be performed only by properly trained personnel using suitable equipment and employing appropriate safety precautions.

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<sup>2</sup> These are equivalent to ISO 9000 and 9004.