



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

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**INSULATED CABLE ENGINEERS ASSOCIATION, Inc.**



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## FOREWORD

(This Foreword is not part of this Standard)

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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Alternatively, you can contact ICEA by utilizing the Contact link in the ICEA web site:

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This issue replaces the previous issue of ANSI/ICEA S-104-696-2001 *Standard for Indoor-Outdoor Optical Fiber Cable*. Major changes in this revision include the following:

- Addition of new fiber types
- Addition of normative index on Weatherized Indoor Cable Requirements

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## PART 1

### INTRODUCTION

#### 1.1 Scope

##### 1.1.1 Products

Indoor-outdoor cables covered by this Standard are generally derived from outdoor cable designs having the thermal and mechanical robustness that makes them suitable for use in the Outside Plant. Material changes are made, as required, to allow the designs to meet their intended fire rating. These cables can be expected to comply with all specification requirements stipulated in this Standard.

In cases where outside exposure is limited (less than 10 meters), a weatherized cable may be derived from an indoor cable design (backbone or interconnect). As required in Annex B, the indoor cable weatherized for outdoor use uses the basic requirements found in ICEA S-83-596. The requirements specified in Part 1 through 8 do not apply, except as invoked by Annex B.

Cable that is compliant with S-104-696 is considered compliant to S-83-596.

##### 1.1.2. Application Space

All designs covered by this 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 to make interconnections within and between adjacent buildings or to the first outdoor splice point. These cables are fully resistant to the typical outside plant environment, but their attenuation characteristics are not necessarily the same as Outside Plant Communications cables addressed in S-87-640. See part 8 of this specification.

When a hybrid 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.

For very-low temperature applications and 1625 nm fiber performance see S-87-640.

Use S-87-640 for general guidance in other special cases.

##### 1.1.3 Temperature Ranges

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

**Table 1-1  
Temperature Ranges**

Cable Fire Rating	Plenum		Riser and General Purpose	
	°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	0 to +60	(+32 to +140)	-10 to +60	(+14 to +140)

1.1.4 Tensile Rating

The standard installation tensile rating for cables covered by this Standard is:

- ≤ 12 fibers            1335 N (300 lbs)
- > 12 fibers            2670 N (600 lbs)

The residual load is defined as a load equivalent to 30 percent of the rated installation load.

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 30 x Cable OD for ribbon cables greater than or equal to 216 fibers.
Loaded (During Installation):	40 x Cable OD

\* Note: Other limits may be applied by manufacturers to limit the long term strain on composite strength members.

Smaller cable bend diameters are permissible as agreed upon between the user and manufacturer.

1.1.6 Fire-Resistance

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.