

National Standard for Composite Optical Cables



Overview

Article 770 covers the installation of optical fiber cables used to transmit light for control, signaling and communication.

Key Takeaways

Composite optical cables in the U. S. are primarily governed by the National Electrical Code (NEC) Article 770, supplemented by UL testing standards and ITU-T recommendations for performance and safety.

NEC Requirements

The National Electrical Code (NEC) Article 770 sets the baseline for the installation of optical fiber cables, including composite types that may carry electrical conductors along with optical fibers. Key points include: Installation Rules: Cables must follow proper raceway, conduit, or tray installation practices, ensuring they do not obstruct access or create hazards. Fire Safety: Composite cables are subject to flame propagation and smoke density tests.

For example, Type OFN-LS cables are low-smoke, fire-resistant, and suitable for general-purpose use, while OFNP cables meet stricter plenum requirements. Bonding and Grounding: Composite cables with conductive elements must comply with bonding and grounding requirements to prevent electrical hazards. Separation from Power Circuits: NEC mandates separation from high-voltage circuits unless cables are rated for shared pathways.

UL and ANSI Testing Standards

Composite optical cables are tested under UL 1685 (Vertical-Tray Fire-Propagation and Smoke-Release Test) and ANSI/UL 1666 (Flame Propagation Height for Vertical Shafts) to ensure fire safety. These tests measure: Flame spread along cable traysSmoke density generationCompliance with plenum, riser, or general-purpose classifications Cables meeting higher safety designations can be substituted for lower-rated applications, e.g., plenum-rated cables can be used in riser installations. ITU-T RecommendationsInternationally, ITU-T G-series Recommendations, including Supplement 47, provide guidance on the transmission characteristics, environmental performance, and material properties of optical fibers and cables.

These standards cover: Attenuation and chromatic dispersionPolarization mode dispersion (PMD) and its environmental sensitivityMechanical and thermal stress effects on installed fibers While ITU-T standards are informative rather than mandatory in the U. S., they are widely referenced for performance verification and design of high-capacity optical networks.

Summary

In practice, compliance with NEC Article 770, UL/ANSI fire and smoke tests, and manufacturer installation guidelines ensures that composite optical cables are safely installed and meet national standards. For high-performance or international projects, ITU-T recommendations provide additional guidance on optical performance and environmental resilience. Proper adherence to these standards ensures safety, reliability, and long-term functionality of optical fiber infrastructure.

Article Content

NEC Fiber Art 770 | PDF | Cable | Optical Fiber

Article 770 covers the installation of optical fiber cables used to transmit light for control, signaling and communication. Further, it contains the installation requirements for optical raceways,

The NEC and Optical Fiber Cable and Raceway Rules | EC&M

Because optical fibers don't carry current, the normal NEC rules related to ampacity don't apply — unless, of course, you run them with current-carrying conductors or use a fiber-conductor

ARTICLE Optical Fiber Cables

Introduction to article 770—Optical Fiber Cables and raceways gnaling, and communications. This article also contains the installation requirements for optical fiber raceways, as well as the

GB/T 29839-2013: Optical fiber composite low-voltage ... (PDF English)

This standard specifies the optical fiber composite low voltage cable product code, specifications, models and marking, materials, technical requirements, marking, delivery length,

Recommendation ITU-T G Suppl. 47 (03/2025)

Supplement 47 to ITU-T G-series Recommendations provides information on the general transmission characteristics of single-mode optical fibres and cables specified in the ITU-T G.65x-series of

Standard for Installing and Testing Fiber Optics

Although most fiber optic cables are not conductive, any metallic hardware used in fiber optic cabling systems (such as wall-mounted termination boxes, racks, and patch panels) must be grounded.

BS EN 60794

The object of this document is to establish uniform generic requirements for the geometrical, transmission, material, mechanical, ageing (environmental exposure), climatic and electrical

2023 National Electrical Code

The listing requirements for Class 2 and Class 3 cables have been moved to new Article 722 which consolidates the listing requirements for power-limited cables, and also includes the new Class 4

Choosing the right fiber cable to meet the National Electrical Code

As a follow up this post looks at how installers can meet the specific US National Electrical Code (NEC) regulations by choosing the right fiber cable, and which standards to follow for individual deployments.

Optical Fiber Cables and Raceways | UpCodes

The article outlines definitions for various types of optical fiber cables, including abandoned, composite, and conductive cables, and details installation requirements, including compliance with specific

Fiber Optic Systems Standards and Recommendations

Here we list some of the international and national standards that govern optical cable characteristics and measurement methods. This may not be a complete list, but it covers most of the standard

Standards for Optical Cable Assembly Manufacturers

The standards for optical cable assembly manufacturers address the overall goals of reliable, consistently produced jumpers and pigtails; intermateability using parts from different

National Electrical Code revisions focus on optical-fiber cables

The National Electrical Code (NEC)) was revised in 1996 to accommodate technological advances in intrabuilding wiring practices. Specifically, the 1996 version of the code includes modifications and

Optical Fiber Cable

This Standard applies to non-conductive optical fiber cable and conductive optical fiber cable intended to be installed indoors in non-hazardous locations in accordance with CSA C22.1,

FOA Standards

The FOA charter is "To promote professionalism in fiber optics through education, certification and standards," and has been involved in these standards committees for decades. FOA decided to write

ARTICLE Optical Fiber Cables

Introduction to article 770—Optical Fiber Cables and raceways AArticle 770 covers the installation of optical fiber cables, which transmit light for control, signaling, and communications. This article also

Major Recommendations: Optical

These standards provide attributes and values for optical fibres and cables which are needed to support: Network applications such as those recommended in Recommendation ITU-T G.957 up to 2.5 Gbit/s

The Ins and Outs of Optical Fiber Cable Installation

Article 770 doesn't reference 300.15, so you don't need to put splices or terminations of optical fiber cable in boxes. On the other hand, composite (hybrid) optical fiber cables [770.9 (C)] that contain

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

