CORNING OPTICAL COMMUNICATIONS GENERIC SPECIFICATION FOR 1728-3465 FIBER STRANDED SUBUNIT RIBBONIZED DIELECTRIC CABLES FOR OUTDOOR APPLICATIONS

August 2024
PGS178
Revision 02

Corning Optical Communications reserves the right to update this specification without prior notification.

Master Format 33 83 00 Communications Distribution

1.0 General Considerations

1.1 The cable shall meet all requirements stated in this specification. The cable is designed and tested to meet the applicable requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-2023 and GR-20-CORE.

2.0 Fiber Specifications

2.1 Detailed information on the fiber types available for this cable design can be found in the following documents:

Dispersion Unshifted and Non-Zero Dispersion-Shifted Single-mode Fiber: Generic Specification PGSF001, “Generic Specification for Single-mode Optical Fiber in Loose Tube and Ribbon Cables.”

50/125 µm and 62.5/125 µm Multimode Fiber: Generic Specification PGSF002, “Generic Specification for Multimode Optical Fiber in Loose Tube and Ribbon Cables.”

2.2 All ribbons in the cable shall be usable and meet required specifications.

2.3 Each ribbon shall contain 12 or 24 fibers.

2.4 The fiber ribbon dimensions shall be measured in accordance with FOTP-123, "Measurement of Optical Fiber Ribbon Dimensions."

2.5 All fibers in the ribbon shall be parallel with no cross over along the entire length of the cable.

2.6 Each fiber within a ribbon shall be distinguishable by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

2.7 The fibers shall be colored with ultraviolet (UV) curable inks.

2.8 Each 12-fiber ribbon shall be distinguishable by means of print identification.

2.9 The ribbon matrix material shall be removable with industry standard peelable methods or commercially available heat strippers.

3.0 Cable Construction

3.1 Optical fiber ribbons shall be placed inside a flexible subunit.

3.1.1 Cables with 1728 optical fibers shall utilize six flexible subunits containing sixteen 12-fiber and 24-fiber ribbons.

3.1.2 Cables with 3456 optical fibers shall utilize twelve flexible subunits containing sixteen 12-fiber and 24-fiber ribbons.

3.2 The fiber ribbons shall not adhere to the inside of the stranded subunit.

3.3 Each individual fiber ribbon within the subunit features a unique printed ID for fast, easy identification and efficient fiber splicing management.

3.4 Stranded subunits containing fiber ribbons shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

3.5 Each subunit shall consist of a finger-peelable plastic jacket and contain two water-blocking yarns that act as ripcords, enabling rapid access to the ribbon stack for faster termination.

3.6 Subunits shall be stranded throughout the cable length using a planetary stranding process.

3.7 A water-swellable tape shall be applied around the cable core. A combination of water-swellable materials in the cable shall swell to fill voids and block the ingress of water. The water blocking materials shall be non-nutritive to fungus, electrically non-conductive, and free from dirt and foreign matter.

3.8 The cable core shall contain multiple strength elements, applied in parallel and embedded into the jacket walls in opposing positions outside of the water-swellable tape to provide longitudinal tensile and anti-buckling strength.

3.9 The non-armored, all-dielectric design shall contain four glass reinforced plastic rods arranged in two opposing pairs.

3.10 The armored design shall contain two round steel wire strength elements in opposing positions.

3.11 All-dielectric cables (non-armored) shall be sheathed with polyethylene (PE). The nominal jacket thickness shall be 2.0 mm and the minimum nominal jacket thickness over the strength elements shall be at least 0.65 mm. Jacketing material must surround the tensile strength members and shall be applied directly over the water swellable tape. The polyethylene shall provide ultraviolet light protection and shall not promote the growth of fungus. See Figure 1.

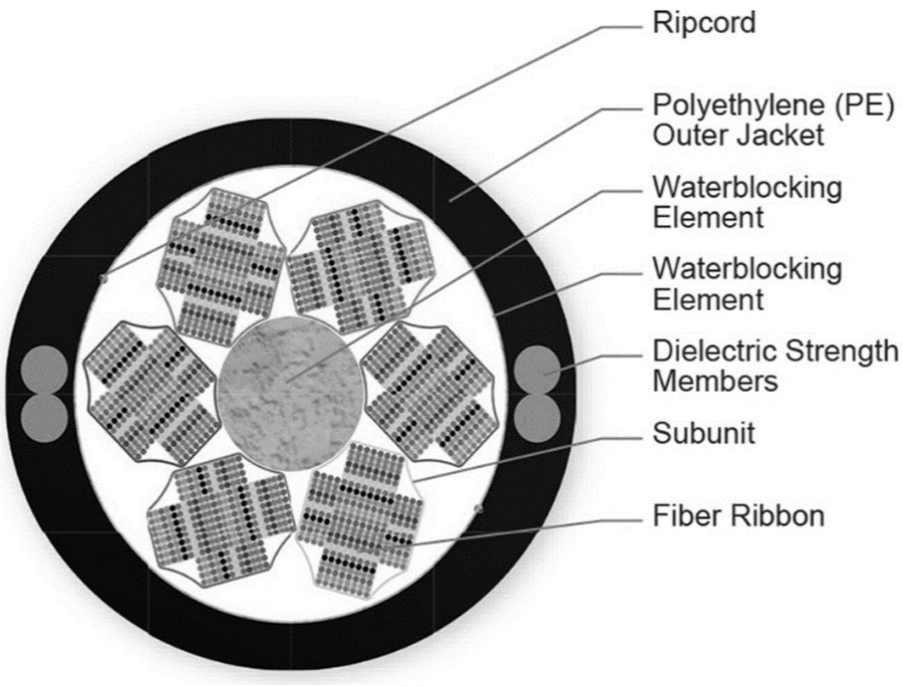

Figure 1: All Dielectric Cable

3.12 Armored cables shall have a corrugated steel tape armor, plastic coated on both sides for corrosion resistance, and shall be applied with overlapping seam with the corrugations in register. The polyethylene (PE) jacket shall be applied over the corrugated steel tape armor. The nominal jacket thickness shall be 2.5 mm and the nominal jacket thickness over the strength elements shall be 0.75 mm. The polyethylene shall provide ultraviolet light protection and shall not promote the growth of fungus. See Figure 2.

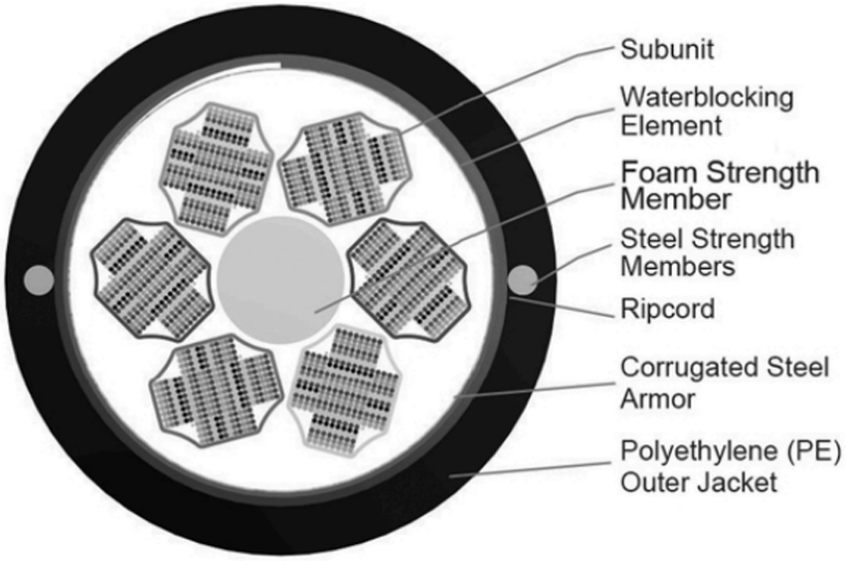

Figure 2: Armored Cable

3.13 The jacket material shall be Type M for type, class, category, and grade as described in ICEA S-87-640 (2023).

3.14 The jacket or sheath shall be free of holes, splits, and blisters.

3.15 The dielectric cable design jacket shall contain no metal elements.

3.16 Cable jackets shall be marked with manufacturer's name, month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code® (NESC), the Telcordia® Suggested Optical Cable Code (SOC Code), fiber count, fiber type, fiber diameter, cable diameter, cable weight, minimum bend diameter, and maximum tensile strength. The actual length of the cable shall be within -0/+1% of the length markings. The marking shall be in contrasting color to the cable jacket.

3.17 If the initial marking fails to meet the specified requirements (*i.e.,* improper text statement, color, legibility, or print interval), the cable may be remarked using a contrasting alternate color. The numbering sequence shall differ from the previous numbering sequence. The preferred remarking color shall be blue, with the secondary choice being yellow.

3.18 The maximum pulling tension shall be 2700 N during installation (short term) and 890 N long term installed.

3.19 The minimum bend radius shall be 15 times the cable outside diameter during installation and operation.

3.20 The shipping, storage, and operating temperature range of the cable shall be -40°C to +70°C. The installation temperature range of the cable shall be -20°C to +70°C.

3.21 The cable shall have maximum cabled attenuation of 0.40 / 0.40 / 0.30 dB/km (With up to 5% of fibers with maximum attention value of up to 0.5/0.5/0.4) at respective operation wavelengths of 1310 / 1383 / 1550 nm.

4.0 Cable Identification

4.1 Jacket Printing

The outer cable jacket shall be marked with the manufacturer's name or ETL file number, date of manufacture, shop order number, optional SOC code (SR##########), listing symbol, fiber count, fiber type, fiber diameter, cable diameter, cable weight, minimum bend diameter, and maximum tensile strength and sequential length markings every two feet (e.g., “CORNING ROCKETRIBBON(R) OPTICAL CABLE - MM/YYYY”). The marking shall be in contrasting color to the cable jacket.

5.0 Cable Performance Specifications

5.1 When tested in accordance with FOTP-3A, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-40°C and +70°C) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB/km at 1300 nm for multimode fiber.

5.2 When tested in accordance with FOTP-82B, "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable," a 3 m length of unaged cable shall withstand a 1 m static head or equivalent continuous pressure of water for a minimum of 1 hour without leakage through the open cable end.

5.3 When tested in accordance with FOTP-41A, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 220 N/cm applied uniformly over the length of the sample. The 220 N/cm load shall be applied at a rate of 3 mm per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 110 N/cm. Alternatively, it is acceptable to remove the 220 N/cm load entirely and apply the 110 N/cm load within five minutes at a rate of 3 mm per minute. The 110 N/cm load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 110 N/cm load. The change in attenuation shall

not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.3 dB at 1300 nm for multimode fiber.

5.4 When tested in accordance with FOTP-104A, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter ≤ 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

5.5 When tested in accordance with FOTP-25C, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," except that the number of impacts shall be two at three locations along a one-meter cable length and the impact energy shall be at least 4.4 Nm (in accordance with ICEA S-87-640), the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

5.6 When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 696 mm, the cable shall withstand a rated tensile load of 2700 N and residual load of 800 N, which is 30% of the rated installation load. The axial fiber strain shall be ≤ 60% of the fiber proof level after completion of 60-minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be ≤ 20% of the fiber proof level after completion of 10-minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.3 dB at 1300 nm for multimode fiber.

5.7 When tested in accordance with FOTP-85A, "Fiber Optic Cable Twist Test," a length of cable no greater than 2 m shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.3 dB at 1300 nm for multimode fiber.

5.8 When tested in accordance with FOTP-37A, "Low or High Temperature Bend Test for Fiber Optic Cable," the cable shall withstand four full turns around a mandrel of ≤ 30 times the cable diameter after conditioning for four hours at test temperatures of -30°C and +60°C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.3 dB at 1550 nm for single-mode fiber and 0.5 dB at 1300 nm for multimode fiber.

5.9 Optical Fiber ribbons shall perform as follows:

5.9.1 When tested in accordance with FOTP-141, “Twist Test for Optical Fiber Ribbons,” the individual fibers from a 0.3 meter length of ribbon shall not

separate when subject to 20 mechanical cyclic twists at 30 cycles per minute while under a 500 g load. Each cyclic twist shall rotate the ribbon 180° in each direction.

5.9.2 When tested in accordance with FOTP-131, “Measurement of Optical Fiber Ribbon Residual Twist,” the change in ribbon flatness of a 50 cm ribbon sample shall be ≤ 8°/cm while under a 100 g load. Prior to testing, the ribbon sample shall be aged at 85°C, uncontrolled relative humidity, for 30 days.

5.9.3 When tested in accordance with ANSI/ICEA S-87-640-2023, Part 7.17, “Ribbon Separability Test,” a 0.3 m ribbon sample shall be separable by hand. After separation, there shall be no mechanical damage to the fibers, and the color of the fibers shall still be discernible.

6.0 Packing and Shipping

6.1 The completed cable shall be packaged for shipment on returnable wooden reels. Required cable lengths shall be stated in the purchase order.

6.2 Top and bottom ends of the cable shall be available for testing.

6.3 Both ends of the cable shall be sealed to prevent the ingress of moisture.

6.4 Each reel shall have a reel tag attached identifying the reel and cable.

The reel tag shall include the following information:

Cable Number
Shipped Cable Length in Feet or Meters
Manufacturer Order Number
Date Cable Was Tested
Cable Length Markings
a: Top (Inside End of Cable)
b: Bottom (Outside End of Cable)
Manufacturer Product
Customer Order Number
Item Number

The reel (one flange) marking shall include:

“Corning Optical Communications”
An arrow indicating proper direction of roll when handling
Forklift handling illustration
"DO NOT SHIP REEL ON SIDE" or “DO NOT LAY REEL ON ITS SIDE”

6.5 Each cable shall be accompanied by a cable data sheet.

The cable data sheet shall include the following information:

Corning Cable Number
Corning Factory Order Number
Alternate Customer
Ordered Length
Actual Shipped Length
Measured Attenuation of Each Fiber
(For lengths > 1000 m)
Corning Product Number
Customer Name
Customer Purchase Order Number
Maximum Billable Length
Bandwidth Specification
(where applicable)

7.0 Quality Assurance Provisions

7.1 All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.

7.2 The cable manufacturer shall be TL 9000 registered.

8.0 Miscellaneous

8.1 At the request of the customer, the cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

Gen Spec PGS178 Revision History

Revision #	Date	Reason for Change
1	October 2023	Generated Specification.
2	August 2024	Update applicable requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable to requirements set forth in ANSI/ICEA S-87-640-2023, Corrected reference to PSG178 Revision History