

CORNING OPTICAL COMMUNICATIONS SPECIFICATION FOR TIGHT BUFFER OPTICAL FIBER CABLES (SIMPLEX AND DUPLEX) FOR INDOOR INTERCONNECT APPLICATIONS

September 2017
PGS003
Revision 20

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

Master Format 27 15 23 Communications Optical Fiber Horizontal Cabling

1.0 General Considerations

The cable must meet the requirements of the National Electrical Code[®] (NEC)[®] Section 770.

- 1.1 Non-Plenum Applications - Applicable Flame Tests: UL 1666. Cables shall be listed OFNR.
- 1.2 Plenum Applications - Applicable Flame Test: NFPA 262. Cables shall be listed OFNP.
- 1.3 Finished cables shall conform to the applicable performance of the Insulated Cable Engineers Association, Inc. (ICEA) *Standard for Fiber Optic Premises Distribution Cable* (ICEA S-83-596).

2.0 Fiber Specifications

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

Dispersion Un-shifted Single-mode Fiber: Generic Specification F3, "Generic Specification for Single-mode Optical Fiber in Tight Buffer Cables."

50/125 μm and 62.5/125 μm Multimode Fiber: Generic Specification F4, "Generic Specification for Multimode Optical Fiber in Tight Buffer Cables."

3.0 Cable Construction

- 3.1 The coated fiber shall have a low friction slip layer placed between the acrylate coating of the optical fiber and the thermoplastic buffer. The diameter of the thermoplastic buffer coating shall be $900 \pm 50 \mu\text{m}$.

- 3.2 The fiber coating and buffer shall be removable with commercially available stripping tools in a single pass for connectorization of splicing.
- 3.3 Buffered fiber(s) shall be surrounded with high modulus strength yarns. The strength yarns shall serve as the tensile strength members of the cable.
- 3.4 Cable Jacket
 - 3.4.1 The jacket shall be continuous, free from pinholes, splits, blisters, or other imperfections. The jacket shall have a consistent, uniform thickness; jackets extruded under high pressure are not acceptable. The jacket shall be smooth, as is consistent with the best commercial practice. The jacket shall provide the cable with a tough, flexible, protective coating, able to withstand the stresses expected in normal installation and service.
 - 3.4.2 The standard cable jacket colors shall be orange for cables containing multimode fiber except for cables containing 50/125 μm Laser Optimized Fiber, which shall have an aqua colored jacket. The standard cable jacket color shall be yellow for cables containing single-mode fiber.
 - 3.4.3 Cable jackets shall be capable of being colored any of the 12 colors identified in EIA/TIA-598, "Optical Fiber Cable Color Coding", if requested to enhance cable identification.
- 3.5 The cable shall be all-dielectric.
- 3.6 Riser and Plenum Minimum Bend Radius
 - 3.6.1 For riser and plenum rated cables, the minimum bend radius of the cable in it's installed configuration shall be 5X the cable outer diameter for cables containing multimode fiber. The minimum bend radius of the cable in it's installed configuration shall be 2.5cm (1 in) for cables containing single mode fiber. The minimum bend radius of the riser and plenum rated cables shall be 5.0 cm (2.0in) when under load.

4.0 Cable Identification

- 4.1 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#####), fiber count, fiber type, flame rating, listing symbol, and sequential length markings every two feet (e.g., "CORNING OPTICAL

COMMUNICATIONS OPTICAL CABLE - MM/YY. The marking shall be in contrasting color to the cable jacket.

5.0 Cable Performance Specifications

5.1 Temperature Range.

5.1.1 Interconnect Applications. The storage temperature range for the cable on the original shipping reel shall be -40 °C to +70 °C. The installation temperature range shall be 0 °C to +60 °C. The operating temperature range shall be 0 °C to +70 °C. Testing shall be in accordance with FOTP-3.

5.2 Crush Resistance

When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 35 N/cm (20 lbf/in) applied uniformly over the length of the compression plate. While under compressive load, the fiber shall not experience an attenuation change greater than 0.40 dB at 1550 nm (single-mode) or greater than 0.60 dB at 1300 nm (multimode).

5.3 Cyclic Flexing

When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test," the cable shall withstand 25 mechanical flexing cycles at a rate of 30 ± 1 cycles per minute. The fiber shall not experience an attenuation change greater than 0.40 dB at 1550 nm (single-mode) or greater than 0.60 dB at 1300 nm (multimode). The jacket shall not crack, split, or tear.

5.4 High and Low Temperature Bend

When tested in accordance with FOTP-37, "Fiber Optic Cable Bend Test, Low and High Temperature," the cable shall withstand four full turns around a mandrel at test temperatures of 0 °C and +60 °C. The mandrel diameter shall be the greater of 20 times the cable OD or 50 mm. The fibers shall not experience an attenuation change greater than 0.40 dB at 1550 nm (single-mode) or greater than 0.60 dB at 1300 nm (multimode).

5.5 Impact Resistance

When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies," the cable shall withstand a minimum of 2

impact cycles at 3 locations spaced a minimum distance of 150 mm. The impact energy shall be 0.74 N•m. The fibers shall not experience an attenuation change greater than 0.40 dB at 1550 nm (single-mode) or greater than 0.60 dB at 1300 nm (multimode). The jacket shall not crack, split or tear.

5.6 Temperature Cycling

When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation after the second cycle at the extreme operational temperatures (0 °C to +70 °C), shall not exceed 0.40 dB/km at 1550 nm (single-mode) or 0.60 dB/km at 1300 nm (multimode). The change in attenuation is measured with respect to the baseline values measured at room temperature before temperature cycling.

5.7 Twist

When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test," a length of cable no greater than 0.3 meters will withstand 10 cycles of mechanical twisting. The fiber shall not experience an attenuation change greater than 0.40 dB at 1550 nm (single-mode) or greater than 0.60 dB at 1300 nm (multimode). No cracks or splits in the jacket shall be present when inspected under 5X magnification.

5.8 Tensile and Fiber Strain

When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," and FOTP-38, "Measurement of Fiber Strain in Cables Under Tensile Load," a length of cable shall be tested for a rated tensile load of 220 N (50 lbf). For cables with an outer diameter less than 2.0 mm the rated tensile load shall be 150 N (34 lbf). While under the rated tensile load, the fiber shall not experience a measured fiber strain greater than 60% of the fiber proof test level. After being held at the residual load (30% of the rated tensile load) the fiber shall not experience a measured fiber strain greater than 20% of the fiber proof test level nor an attenuation change greater than 0.40 dB at 1550 nm (single-mode) or greater than 0.60 dB at 1300 nm (multimode). After the tensile load is removed, the fibers shall not experience an attenuation change greater than 0.40 dB at 1550 nm (single-mode) or greater than 0.60 dB at 1300 nm (multimode).

6.0 Packing and Shipping

- 6.1 The cable shall be packaged in cartons and/or wound on spools. Each package shall contain only one continuous length of cable. The packaging

shall be constructed so as to prevent damage to the cable during shipping and handling.

- 6.2 When the length of an order requires a wooden reel the cable shall be covered with a three layer laminated protective material. The outer end of the cable shall be securely fastened to the reel head so as to prevent the cable from becoming loose in transit.

- 6.3 Reel Marking and Labeling. Every cable shall come with the following information:

6.3.1 Reel Label:

Part number
Reel number
Length (ft/m)
Marking (ft/m) top and bottom
Date of manufacture
Listing information

6.3.2 Bar Code Label:

Package ID
Reel number
Quantity
Customer ID
Package count
Factory order number
Release part number
Length (ft)
"Ship to:" address
"Attention to:"

6.3.3 Stenciling:

Manufacturer's name and address
Direction of rotation
Reel size
"DO NOT LAY REEL ON SIDE"

7.0 Quality Assurance Provisions

- 7.1 All optical fibers in cables lengths of 300 m or greater shall be 100 % attenuation tested. The attenuation shall be measured at 850 nm and 1300 nm for multimode fibers. The attenuation shall be measured at 1310 nm and 1550 nm for single-mode fibers. The manufacturer shall store these values for a minimum of 5 years. These values shall be available upon request.
- 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 PGS003 Revision History

Revision #	Date	Reason for Change
10	July 00	Corning Name Change and Title change to generic title
11	June 01	Removed "teflon" replaced with "low friction slip layer"
12	September 01	Removed references to "UL" listings and replaced with "ETL". Did not change UL when referring to standard tests, ie., UL1666.
13	Aug 02	Added aqua jacket color
14	Nov 02	Editorial changes, end of year review
15	July 05	DKH: Corrected test description for twist testing
16	Sept 06	Updated Jacket printing
17	Sep 09	In section 4.2, change to new print statement, "CORNING CABLE SYSTEMS OPTICAL CABLE - MM/YY - SO#### - SR##### - 2 MM50 PRETIUM 300 ULTRA-BEND 7.5 – TB2 - OFNR FT4 c(ETL)us XXXXX FEET". Also added reference to new shop order number and optional SOC Code
18	Nov 09	In section 4.1, sentence 1, deleted "of more". This was a typographical error and should have been "or more". However, since this gen spec is for 1 and 2 fiber zipcords, "or more" is not applicable. Added 3.6 and 3.6.1, "For riser and plenum rated cables, the minimum bend radius of the cable in its installed configuration shall be 5X the cable outer diameter for cables containing multimode fiber. The minimum bend radius of the cable in its installed configuration shall be 2.5mm (1 in) for cables containing single mode fiber. The minimum bend radius of the riser and plenum rated cables shall be 5.0 cm (2.0in) when under load".
19	April 12	Added information on colored jackets
20	Sept 17	Re-formatted and added Master format number