

An Overview of ITU-T G.657: Characteristics of Bend Insensitive, Single-Mode Optical Fiber for Access Networks White Paper

Optical
Fiber

CORNING

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The ITU-T G.657 standard, developed by Study Group 15, was approved and introduced in December 2006. This standard describes two categories of single-mode optical fiber suitable for use in the access networks.

Category A fibers are suitable for transmission in the O, E, S, C and L-band (throughout the 1260 to 1625 nm range). Fibers in this category have the same transmission and interconnection properties as G.652.D fibers with improved bending loss and tighter dimensional specifications.

Category B fibers are suitable for transmission at 1310, 1550, and 1625 nm for restricted distances that are associated with in-building transport of signals. These fibers have different splicing and connection properties than G.652 fibers, but are capable at very low values of bend radius.

The two categories are summarized below:

Category A

- Fibers with improved bend loss and required compliance to G.652
- Typically these fibers have a slightly lower mode-field diameter, but are still within G.652 specification range
- Intended for use anywhere in the network
- Minimum specified bend radius is 10 mm
- An example, Corning® SMF-28e® XB fiber, can be used extensively in hardware and equipment such as small-size distribution cabinets for access networks.

Category B

- Fibers with greatly improved bend loss, not necessarily G.652 compliant
- Minimum specified bend radius is 7.5 mm
- Several technologies such as photonic crystal fibers and hole-assisted fiber, which have very low bending loss can be used because G.652 compliance is not required.
- No water peak attenuation specification
- No chromatic or polarization mode dispersion recommendations
- Intended for short reach applications where dispersion and PMD are not an issue

Table 1: Summary of ITU-T G.657 Tables A and B

Parameter	ITU-T G.657 Table A	ITU-T G.657 Table B
1 turn x 15 mm diameter @1550 nm	Not specified	≤ 0.5 dB
1 turn x 15 mm diameter @1625 nm	Not specified	≤ 1.0 dB
1 turn x 20 mm diameter @1550 nm	≤ 0.75 dB	≤ 0.1 dB
1 turn x 20 mm diameter @1625 nm	≤ 1.5 dB	≤ 0.2 dB
10 turns x 30 mm diameter @1550 nm	≤ 0.25 dB	≤ 0.03 dB
10 turns x 30 mm diameter @1625 nm	≤ 1.0 dB	≤ 0.1 dB
1310 nm MFD Nominal	8.6-9.5 μm	6.3-9.5 μm
MFD Tolerance	± 0.4 μm	± 0.4 μm
Clad Diameter	125.0 ± 0.7 μm	125.0 ± 0.7 μm
Core Clad Concentricity	≤ 0.5 μm	≤ 0.5 μm
Clad Non-Circularity	≤ 1%	≤ 1%
Zero Dispersion Slope (ps/(nm ² ·km))	≤ 0.092	Not specified
Zero Dispersion Wavelength	1300-1324 nm	Not specified
Cable Cutoff Wavelength	≤ 1260 nm	≤ 1260 nm
PMD _Q (ps/√km) [M=20, Q = 0.01%]	≤ 0.20	Not specified
Proof Test	100 kpsi	100 kpsi

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