

# Corning® SMF-28® ULL Optical Fiber Portfolio

## Product Information



Corning's SMF-28® ULL optical fiber portfolio has the lowest-loss terrestrial-grade fibers available in the market – with millions of kilometers deployed worldwide. The newest addition, SMF-28 ULL fiber with advanced bend, is an ITU-T G.654.C-compliant fiber with best-in-class performance specifications. This evolutionary product provides ultra-low loss, with attenuation available down to 0.15 dB/km at 1550 nm, lower latency, and meets the fiber macrobend loss requirements of the ITU-T G.657.A1 standard. SMF-28 ULL fiber with advanced bend is designed for the most challenging long-haul and high data rate networks, enabling customers to scale to  $\geq 800\text{G}$  data rates at a lower overall cost per bit. All products in the SMF-28 ULL fiber portfolio are also available in a smaller 200  $\mu\text{m}$  outer diameter for use in high density cable designs.

## SMF-28 ULL Optical Fiber with Advanced Bend Specifications

### Compliant to ITU-T G.654.C

#### Maximum Attenuation

Wavelength (nm)	Maximum Value* (dB/km)
1550	$\leq 0.16$
1625	$\leq 0.18$

\*Alternate attenuation offerings available upon request.

#### Macrobend Loss

Mandrel Radius (mm)	Number of Turns	Wavelength (nm)	Induced Attenuation* (dB)
10	1	1550	$\leq 0.75$
10	1	1625	$\leq 1.5$
15	10	1550	$\leq 0.25$
15	10	1625	$\leq 1.0$

Meets or exceeds the macrobend loss requirements of the ITU-T G.657.A1 standard.

\*The induced attenuation due to fiber wrapped around a mandrel of a specified radius.

#### Point Discontinuity

Wavelength (nm)	Point Discontinuity (dB)
1550	$\leq 0.05$

### Cable Cutoff Wavelength ( $\lambda_{cc}$ )

$\lambda_{cc} \leq 1520 \text{ nm}$

### Mode Field Diameter

Wavelength (nm)	Mode Field Diameter ( $\mu\text{m}$ )
1550	$10.5 \pm 0.5$

### Dispersion

Wavelength (nm)	Dispersion Value [ps/(nm·km)]
1550	$\leq 18$
1625	$\leq 22$

Zero Dispersion Wavelength ( $\lambda_0$ ):  $1300 \text{ nm} \leq \lambda_0 \leq 1324 \text{ nm}$   
 Zero Dispersion Slope ( $S_0$ ):  $\leq 0.092 \text{ ps}/(\text{nm}^2 \cdot \text{km})$

### Polarization Mode Dispersion (PMD)

	Value (ps/√km)
PMD Link Design Value	$\leq 0.04^*$
Maximum Individual Fiber PMD	$\leq 0.1$

\*Complies with ITU-T G.650-2 Appendix IV, ( $m = 20$ ,  $Q = 0.01\%$ ), August 2015.

The PMD link design value is a term used to describe the PMD of concatenated lengths of fiber (also known as  $\text{PMD}_0$ ). This value represents a statistical upper limit for total link PMD. Individual PMD values may change when fiber is cabled.

### ColorPro® Identification Technology

SMF-28 ULL fiber is also available in colored variants, enabled by ColorPro® identification technology. Corning fibers with ColorPro® identification technology deliver better efficiency in cable manufacturing, simplify inventory management, and leverage an enhanced fiber product offering.

### How to Order

Contact your sales representative, or call the Optical Fiber Customer Service Department:  
 Ph: 1-607-248-2000 (U.S./Can.)  
 +44-1244-525-320 (Europe)  
 Email: [cofic@corning.com](mailto:cofic@corning.com)  
 Please specify the fiber type, attenuation, and quantity when ordering.



# SMF-28 ULL Optical Fiber Specifications

## Compliant to ITU-T G.652.B

### Maximum Attenuation

Wavelength (nm)	Maximum Value* (dB/km)
1310	≤ 0.30 - 0.31
1550	≤ 0.16 - 0.17
1625	≤ 0.18 - 0.19

\*Alternate attenuation offerings available upon request.

### Macrobend Loss

Mandrel Radius (mm)	Number of Turns	Wavelength (nm)	Induced Attenuation* (dB)
16	1	1550	≤ 0.1
25	100	1310	≤ 0.05
25	100	1550	≤ 0.05
30	100	1625	≤ 0.05

\*The induced attenuation due to fiber wrapped around a mandrel of a specified radius.

### Point Discontinuity

Wavelength (nm)	Point Discontinuity (dB)
1310	≤ 0.05
1550	≤ 0.05

### Cable Cutoff Wavelength ( $\lambda_{cc}$ )

$\lambda_{cc} \leq 1260$  nm

### Mode Field Diameter

Wavelength (nm)	Mode Field Diameter ( $\mu$ m)
1310	9.2 ± 0.5
1550	10.5 ± 0.5

### Dispersion

Wavelength (nm)	Dispersion Value [ps/(nm·km)]
1550	≤ 18
1625	≤ 22

Zero Dispersion Wavelength ( $\lambda_0$ ): 1300 nm ≤  $\lambda_0$  ≤ 1324 nm  
Zero Dispersion Slope ( $S_0$ ): ≤ 0.092 ps/(nm<sup>2</sup>·km)

### Polarization Mode Dispersion (PMD)

	Value (ps/√km)
PMD Link Design Value	≤ 0.04*
Maximum Individual Fiber PMD	≤ 0.1

\*Complies with ITU-T G.650-2 Appendix IV, (m = 20, Q = 0.01%), August 2015.

The PMD link design value is a term used to describe the PMD of concatenated lengths of fiber (also known as PMD<sub>0</sub>). This value represents a statistical upper limit for total link PMD. Individual PMD values may change when fiber is cabled.



## Dimensional Specifications

### Glass Geometry

Fiber Curl	$\geq 4.0$ m radius of curvature
Cladding Diameter	$125.0 \pm 0.7$ $\mu\text{m}$
Core-Clad Concentricity	$\leq 0.5$ $\mu\text{m}$
Cladding Non-Circularity	$\leq 0.7\%$

Coating Geometry	Standard Offering	Smaller Coating Diameter Option
Coating Diameter	$242 \pm 5$ $\mu\text{m}$	$200 \pm 5$ $\mu\text{m}$
Coating-Cladding Concentricity	$< 12$ $\mu\text{m}$	$\leq 10$ $\mu\text{m}$

## Environmental Specifications

Environmental Test	Test Condition	Induced Attenuation 1310 nm, 1550 nm, and 1625 nm (dB/km)
Temperature Dependence	$-60^{\circ}\text{C}$ to $+85^{\circ}\text{C}^*$	$\leq 0.05$
Temperature Humidity Cycling	$-10^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ up to 98% RH	$\leq 0.05$
Water Immersion	$23^{\circ}\text{C} \pm 2^{\circ}\text{C}$	$\leq 0.05$
Heat Aging	$85^{\circ}\text{C} \pm 2^{\circ}\text{C}$	$\leq 0.05$
Damp Heat	$85^{\circ}\text{C}$ at 85% RH	$\leq 0.05$

Operating Temperature Range:  $-60^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

\*Reference temperature =  $+23^{\circ}\text{C}$

## Mechanical Specifications

### Proof Test

The entire fiber length is subjected to a tensile stress  $\geq 100$  kpsi (0.69 GPa). Higher proof test levels are available.

### Length

Fiber lengths available up to 50.4 km/spool.

## Performance Characterizations

Characterized parameters are typical values.

Core Diameter	8.2 $\mu\text{m}$
Effective Group Index of Refraction ( $n_{\text{eff}}$ )	1310 nm: 1.4606 1550 nm: 1.4620
Fatigue Resistance Parameter ( $n_d$ )	20
Coating Strip Force	Dry: 0.6 lbs. (3 N) Wet, 14-day room temperature: 0.6 lbs. (3 N)
Rayleigh Backscatter Coefficient (for 1 ns Pulse Width)	1310 nm: -77 dB 1550 nm: -82 dB