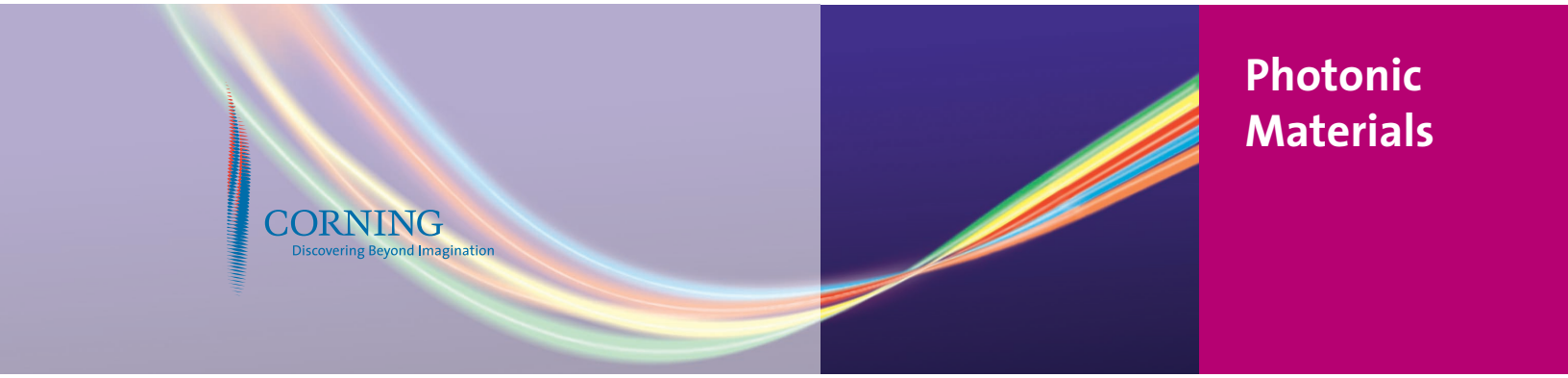
Corning® SMF-28e® Photonic Fiber

Extreme Precision for Demanding OEM Applications



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Corning's SMF-28e® photonic fiber provides further evidence of Corning's long history of service to original equipment manufacturers (OEMs). The fiber's attributes, specifically customized for optical connectorization and component applications, allow OEMs to reduce manufacturing cost, standardize processes and improve performance. SMF-28e photonic fiber delivers the quality, versatility and proven performance our customers count on for their components.

Features

- Industry-leading optical and geometry specifications
- Exceptional performance and splice-ability
- Standard 200 kpsi proof-test
- Suitable for all transmission systems and fully compatible with SMF-28e® optical fiber, the world's most widely demanded full-spectrum fiber
- In compliance with or exceeding the industry's most stringent requirements including:
  - ITU-T G.652 (Categories A, B, C & D)
  - IEC Specifications 60793-2-50 Type B1.3
  - TIA/EIA 492-CAAB
  - Telcordia's GR-20

Applications

- Connectors
- Couplers
- Pigtails
- DWDM components
- Other components

The Single-Mode Fiber for Connectors and Components

Corning uses its legendary geometry control and quality leadership to manufacture SMF-28e photonic fiber. We focus on tailoring product attributes that allow OEMs to minimize scrap and overall insertion loss while improving active and splice performance. Through precise manufacturing techniques, we assure geometric performance along the entire length of fiber while maintaining nominal mode-field performance.

We proof stress the entire length of SMF-28e photonic fiber to ≥ 200 kpsi, which provides OEMs with increased reliability and reduced handling concerns. In addition, we specify a fiber cut-off wavelength of 1280 nm, enabling operability at both 1310 nm and 1550 nm in bare fiber applications.

Designed for Versatility and Performance

For better understanding of the applicable value to customers, Corning has completed studies using active and passive alignment techniques as well as modeled results. This research shows that significant splice performance improvement can result from focusing on nominal geometry performance and reducing deviation of a fiber's core-clad concentricity, cladding diameter, cladding non-circularity and fiber curl. This improvement minimizes high-loss outliers and reduces the average splice loss, contributing to maximized OEM process efficiencies.

Corning manufactures the family of SMF-28e fibers using an outside vapor deposition (OVD) process, which produces a totally synthetic, ultra-pure fiber. As a result, Corning fibers have consistent geometric properties, high strength and low attenuation. OEMs can count on Corning SMF-28e photonic fiber to deliver excellent performance and reliability, reel after reel. Measurement methods comply with ITU Recommendations G.650, IEC 60793-1 and Telcordia GR-20-CORE.

Optical Specifications

Fiber Attenuation

Maximum Attenuation

Wavelength (nm)	Maximum Value* (dB/km)
1310	≤0.35
1383**	≤0.35
1550	≤0.20
1625	≤0.23

*Maximum specified attenuation value available within the stated ranges.
**Attenuation values at this wavelength represent post-hydrogen aging performance.
Alternate attenuation offerings available upon request.

Attenuation vs. Wavelength

Range (nm)	Ref. λ (nm)	Max. α Difference (dB/km)
1285 – 1330	1310	0.03
1525 – 1575	1550	0.02

The attenuation in a given wavelength range does not exceed the attenuation of the reference wavelength (λ) by more than the value α.

Macrobend Loss

Mandrel Diameter (mm)	Number of Turns	Wavelength (nm)	Induced Attenuation* (dB)
32	1	1550	≤0.05
50	100	1310	≤0.05
50	100	1550	≤0.05
60	100	1625	≤0.05

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

Point Discontinuity

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

Fiber Cutoff Wavelength (λ_{cf})

$\lambda_{cf} \leq 1280$ nm

Mode-Field Diameter

Wavelength (nm)	MFD (µm)
1310	9.2 ± 0.4
1550	10.4 ± 0.5

Dispersion

Wavelength (nm)	Dispersion Value [ps/(nm•km)]
1550	≤18.0
1625	≤22.0

Zero Dispersion Wavelength (λ_0): 1302 nm ≤ λ_0 ≤ 1322 nm
Zero Dispersion Slope (S_0): ≤ 0.089 ps/(nm^2•km)

Polarization Mode Dispersion (PMD)

	Value (ps/√km)
PMD Link Design Value	≤0.06*
Maximum Individual Fiber	≤0.2

*Complies with IEC 60794-3: 2001, Section 5.5, Method 1, (m = 20, Q = 0.01%), September 2001.

The PMD link design value is a term used to describe the PMD of concatenated lengths of fiber (also known as PMD_Q). This value represents a statistical upper limit for total link PMD. Individual PMD values may change when fiber is cabled. Corning's fiber specification supports network design requirements for a 0.20 ps/√km maximum PMD.

Dimensional Specifications

Glass Geometry

Fiber Curl	≥ 5.0 m radius of curvature
Cladding Diameter	125.0 ± 0.3 µm
Core-Clad Concentricity	≤ 0.30 µm
Cladding Non-Circularity	≤ 0.7%

Coating Geometry

Coating Diameter	245 ± 5 µm
Coating-Cladding Concentricity	<12 µm
Coloring Diameter	250 + 15/-9 µm

Environmental Specifications

Environmental Test	Test Condition	Induced Attenuation 1310 nm, 1550 nm & 1625 nm (dB/km)
Temperature Dependence	-60°C to +85°C*	≤0.05
Temperature Humidity Cycling	-10°C to +85°C* up to 98% RH	≤0.05
Water Immersion	23°± 2°C	≤0.05
Heat Aging	85°± 2°C*	≤0.05
Damp Heat	85°C at 85% RH	≤0.05

*Reference temperature = +23°C

Operating Temperature Range: -60°C to +85°C

Mechanical Specifications

Proof Test

The entire fiber length is subjected to a tensile stress ≥200 kpsi (1.4 GPa)*.

*Higher proof test levels available.

Length

Fiber lengths available up to 25.2* km/spool.

*Longer spliced lengths available.

Performance Characterizations

Characterized parameters are typical values.

Core Diameter	8.2 µm
Numerical Aperture	0.14 *NA is measured at the one percent power level of a one-dimensional far-field scan at 1310 nm.*
Zero Dispersion Wavelength (λ_0)	1313 nm
Zero Dispersion Slope (S_0)	0.086 ps/(nm²•km)
Refractive Index Difference	0.36%
Effective Group Index of Refraction (N_{eff})	1310 nm: 1.4677 1550 nm: 1.4682
Fatigue Resistance Parameter (N_d)	20
Coating Strip Force	Dry: 0.6 lbs. (3N) Wet, 14-day room temperature: 0.6 lbs. (3N)
Rayleigh Backscatter Coefficient (for 1 ns Pulse Width)	1310 nm: -77 dB 1550 nm: -82 dB
Individual Fiber Polarization Mode Dispersion	0.02 ps/√km

Formulas

Dispersion

$$\text{Dispersion} = D(\lambda): \approx \frac{S_0}{4}\left[\lambda - \frac{\lambda_0^4}{\lambda^3}\right] \text{ps/(nm•km)},$$

for $1200 \text{ nm} \le \lambda \le 1625 \text{ nm}$

λ = Operating Wavelength

Cladding Non-Circularity

$$\text{Cladding Non-Circularity} = \left[1 - \frac{\text{Min. Cladding Diameter}}{\text{Max. Cladding Diameter}}\right] \times 100$$

For More Information

For more information about Corning's leadership in specialty fiber technology, visit our website at www.corning.com/photonicmaterials.

To obtain additional technical information or an engineering sample, or to place an order for this product, please contact us:

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