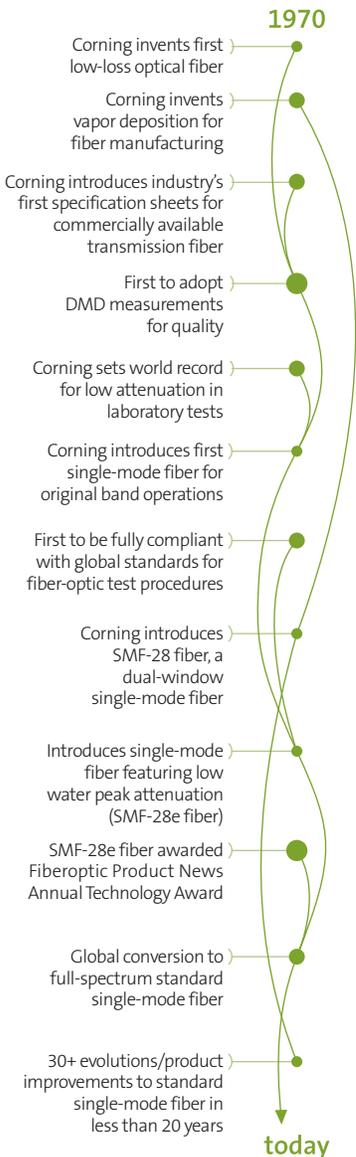


Corning® SMF-28e® Optical Fiber Product Information



Evolving Networks Now

At Corning Optical Fiber, we are continually pushing single-mode fiber to new performance levels. Building on our leadership position in the optical fiber industry, Corning is evolving our already formidable products to meet customer requirements like never before. As the first manufacturer to upgrade standard single-mode fiber worldwide, we're providing our customers with greater value today and in the future. Corning® SMF-28e® optical fiber is:

- * Corning's standard single-mode fiber offering, delivering optimized capability, network design flexibility and confidence in long-term performance
- * 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
 - ISO 11801 OS2
- * The industry leader in comprehensive standard single-mode fiber specifications

As Corning's premier standard single-mode fiber, SMF-28e fiber is one in a long line of optical innovations. Corning SMF-28e, an ITU-T G.652.D-compliant optical fiber, is expanding the capability of the world's most dynamic metropolitan and access networks.

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Building on a Solid Foundation

Corning SMF-28e fiber has the same reliability, splicing performance and easily strippable coating that customers have trusted in Corning® SMF-28® fiber, the long-standing industry benchmark for quality and performance. SMF-28e fiber offers enhanced capabilities and specifications, while providing full compatibility and interoperability with legacy standard single-mode networks.

Our 30 years of experience are reflected in this evolution of standard single-mode fiber, which not only meets and exceeds the highest industry standards, but also provides an excellent combination of optical, environmental, dimensional and mechanical specifications.

Confidence for Today and the Future

SMF-28e fiber is optimized for metropolitan and access networks that support all broadband applications. SMF-28e fiber has been a qualified product offering since 2001 and has been successfully deployed in communications networks worldwide, proving its performance capabilities in diverse applications.

As the ideal fiber choice for rapidly growing and dynamically changing metropolitan and access networks, SMF-28e fiber provides immediate value to the customer. It is one of the easiest fibers to handle and install because of its world-class geometry, CPC® coating technology and bending specifications. Additionally, its full-spectrum capability enables flexible network designs, increases fiber capacity and prepares network infrastructures for emerging technologies and architectures.

Corning® Optical Fiber – The Measure of Trust

Corning's Service Advantage

Corning Optical Fiber delivers the world's most comprehensive package of innovative products and services, including:

- * Worldwide sales support and door-to-door customer service
- * Full range of fibers and special order capabilities
- * Specialized support from technical experts
- * Extensive fiber delivery capabilities with proven success rates
- * Real-time, Web-based customer information
- * Dedicated account support for our long-term supply customers
- * Fiber support services and technical information for end-customers

At Corning Optical Fiber, we strive to provide the best possible customer service and technical support – before, during and after the sale. As a customer, you'll benefit from our established and extensive support infrastructure that's ready to meet your specific needs.

Corning's Product Advantage

Our enhanced, dual acrylate CPC® coatings provide excellent protection. Designed to be mechanically stripped, with an outside diameter of 245 µm, they are optimized for many single- and multi-fiber cable designs, including loose tube, ribbon, slotted core and tight buffer cables.

Corning is committed to product excellence and meeting the evolving needs of our customers. As updates to fiber characteristics or performance specifications become available, they will be posted on the Corning Optical Fiber website at www.corning.com/opticalfiber

Optical Specifications

Fiber Attenuation

Maximum Attenuation

| Wavelength (nm) | Maximum Value* (dB/km) |
|-----------------|------------------------|
| 1310 | 0.33 – 0.35 |
| 1383** | 0.31 – 0.35 |
| 1550 | 0.19 – 0.20 |
| 1625 | 0.20 – 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 |

Cable Cutoff Wavelength (λ_{ccf})

$$\lambda_{ccf} \leq 1260 \text{ nm}$$

Mode-Field Diameter

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

Dispersion

| Wavelength (nm) | Dispersion Value [ps/(nm \cdot km)] |
|-----------------|---------------------------------------|
| 1550 | ≤ 18.0 |
| 1625 | ≤ 22.0 |

Zero Dispersion Wavelength (λ_0): $1302 \text{ nm} \leq \lambda_0 \leq 1322 \text{ nm}$

Zero Dispersion Slope (S_0): $\leq 0.089 \text{ ps}/(\text{nm}^2 \cdot \text{km})$

Polarization Mode Dispersion (PMD)

| | Value (ps/ $\sqrt{\text{km}}$) |
|--------------------------|---------------------------------|
| PMD Link Design Value | $\leq 0.06^*$ |
| 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/ $\sqrt{\text{km}}$ maximum PMD.

Dimensional Specifications

Glass Geometry

| | |
|--------------------------|--|
| Fiber Curl | $\geq 4.0 \text{ m}$ 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

| | |
|--------------------------------|-------------------------|
| Coating Diameter | $245 \pm 5 \mu\text{m}$ |
| Coating-Cladding Concentricity | $< 12 \mu\text{m}$ |

Environmental Specifications

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

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

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

How to Order

Contact your sales representative,
or call the Optical Fiber Customer
Service Department:
Ph: 607-248-2000 (U.S. and Canada)
+44-1244-287-437 (Europe)
Email: opticalfibres@corning.com
Please specify the fiber type, attenuation
and quantity when ordering.

Mechanical Specifications

Proof Test

The entire fiber length is subjected to a tensile stress ≥ 100 kpsi (0.7 GPa)*.

*Higher proof test levels available.

Length

Fiber lengths available up to 50.4* km/spool.

*Longer spliced lengths available.

Performance Characterizations

Characterized parameters are typical values.

| | |
|--|--|
| Core Diameter | 8.2 μm |
| Numerical Aperture | 0.14 <i>NA is measured at the one percent power level of a one-dimensional far-field scan at 1310 nm.</i> |
| Zero Dispersion Wavelength (λ_0) | 1313 nm |
| Zero Dispersion Slope (S_0) | 0.086 ps/(nm ² •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/ $\sqrt{\text{km}}$ |

Formulas

Dispersion

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

for 1200 nm $\leq \lambda \leq$ 1625 nm

λ = Operating Wavelength

Cladding Non-Circularity

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

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