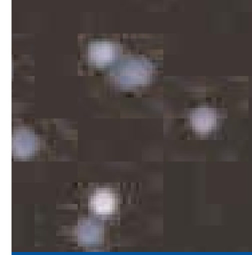

Corning® LEAF® Optical Fiber

The Large Effective Area Advantage

For Multi-Window Applications

CORNING

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Issued: 2/99
ISO 9001 Registered

With the invention of LEAF® optical fiber, Corning has broken the bandwidth barrier by developing a fiber product that optical scientists had thought impossible: a low dispersion fiber with a large effective area (A_{eff}) and excellent bend performance. LEAF fiber represents the next generation of non-zero dispersion-shifted (NZ-DSF) optical fiber, outperforming current NZ-DSF designs.

The Large Effective Area Advantage

LEAF fiber's larger A_{eff} offers higher power-handling capability, improved optical signal-to-noise ratio, longer amplifier spacing, and maximum dense wavelength division multiplexing (DWDM) channel plan flexibility. Fiber with a larger A_{eff} also provides a critical performance advantage — the ability to uniformly reduce all non-linear effects (Figure 1). Non-linear effects represent the greatest performance limitation in today's multi-channel DWDM systems.

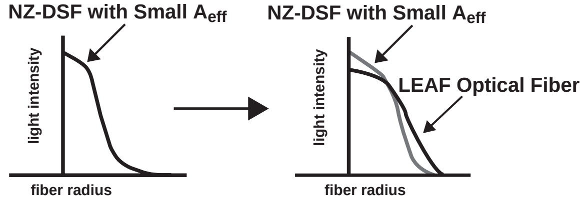
The Next Generation

In addition to outperforming other NZ-DSF fibers in the conventional band (C-Band: 1530-1565 nm), LEAF fiber facilitates the next technological development in fiber-optic networks — the migration to the long band (L-Band: 1565-1625 nm). In tests conducted by Corning, LEAF optical fiber demonstrated superior transmission performance and system cost benefits when compared to NZ-DSFs with smaller effective areas. In both C-Band and L-Band operation, LEAF fiber demonstrated greater ability to handle more channels by reducing non-linear effects such as four-wave mixing, self-phase modulation and cross-phase modulation in multi-channel DWDM transmission.

Reduce Network Costs

With its increased optical reach advantage, LEAF fiber requires fewer amplifiers and regenerators, and therefore provides immediate and long-term cost savings. LEAF fiber is also compatible with installed base fibers and photonic components. In fact, LEAF fiber's slightly larger mode-field diameter improves its splicing performance, especially when connecting to standard single-mode fiber such as Corning® SMF-28™ fiber. And, as with all Corning optical fiber, LEAF fiber's geometry package is the best in the industry. With LEAF fiber, it is easy and economical to increase the information-carrying capacity of your network.

Figure 1



LEAF fiber's larger A_{eff} increases the area where the light can propagate, thereby reducing non-linear effects.

Count on Corning® Fiber

Fiber For Today & Tomorrow

While LEAF fiber is exceptionally suited to operate with 2.5 Gbps DWDM systems, it offers system designers the capability to use today's 32-channel, 10 Gbps systems, and provides the ability to upgrade in the future to tomorrow's 40+ channel, 10 Gbps systems. Additionally, LEAF fiber's tight specifications on polarization mode dispersion (PMD) prepare fiber installed today for operation at data rates greater than 10 Gbps.

LEAF Fiber – All About Value

With LEAF fiber's proven large A_{eff} advantage, the industry's best geometry package, and inherent future-proof design, LEAF fiber continues to be the fiber of choice for today's high-capacity and tomorrow's all-optical networks. Network providers on the leading edge have embraced large A_{eff} technology as the fiber "platform" for high-data-rate networks now and in the future.

Technology Awards

Corning Incorporated has received multiple industry awards for its patented LEAF optical fiber. Independent panels of experts have chosen LEAF fiber based on its technical merits for the following awards:

- "Commercial Technology Achievement Award for Fiber-Optics" from *Laser Focus World* Magazine, 1999
- "Annual Technology Award" from *Fiberoptic Product News*, 1998

Coating

Corning fiber is protected for long-term performance and reliability by the CPC coating system. Corning's enhanced, dual acrylate CPC coatings provide excellent fiber protection and are easy to work with. CPC coatings are designed to be mechanically stripped and have an outside diameter of 245 µm. CPC coatings are optimized for use in many single and multi-fiber cable designs including loose tube, ribbon, slotted core and tight buffer cables.

Optical Specifications

Attenuation

≤ 0.25 dB/km at 1550 nm

≤ 0.25 dB/km at 1625 nm

- No point discontinuity greater than 0.10 dB at 1550 nm
- Attenuation at 1383 ± 3 nm shall not exceed 1.0 dB/km

Attenuation vs Wavelength

Range (nm)	Ref. λ (nm)	Max Increase α (dB/km)
1525 - 1575	1550	0.05
1625	1550	0.05

The attenuation in a given wavelength range does not exceed the attenuation of the reference wavelength (λ) by more than the value α. In all cases, a maximum attenuation of ≤ 0.25 dB/km applies at 1550 nm and 1625 nm.

Attenuation With Bending

Mandrel Diameter (mm)	Number of Turns	Wavelength (nm)	Induced Attenuation (dB)
32	1	1550 & 1625	≤0.50
75	100	1550 & 1625	≤0.05

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

Mode-Field Diameter

- 9.20 to 10.00 µm at 1550 nm

Dispersion

- Total Dispersion: 2.0 to 6.0 psec/(nm•km) over the range 1530 to 1565 nm
- 4.5 to 11.2 psec/(nm•km) over the range of 1565 to 1625 nm

Fiber Polarization Mode Dispersion (PMD)

	Value (ps/$\sqrt{km}$)
PMD Link Value	≤0.08*
Maximum Individual Fiber	≤0.2

**Complies with IEC SC 86A/WG1, Method 1, September 1997 (n=24, Q=0.1%)*

The PMD link value is a term used to describe the PMD of concatenated lengths of fiber (also known as the link quadrature average). This value is used to determine a statistical upper limit for system PMD performance.

PMD values may change when fiber is cabled. Corning's fiber specification supports emerging network design requirements for high-data-rate systems operating at 10 Gbps (TDM) rates and higher.

Environmental Specifications

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

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

**Reference Temperature = +23°C*

Dimensional Specifications

Standard Length (km/reel)

- 4.4 - 25.2*

**Longer spliced lengths available at a premium.*

Glass Geometry

- Fiber Curl: ≥ 4.0 m radius of curvature
- Cladding Diameter: 125.0 ± 1.0 µm
- Core/Clad Concentricity: ≤ 0.5 µm
- Cladding Non-Circularity: ≤ 1.0%

Defined as:

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

Coating Geometry

- Coating Diameter: 245 ± 5 µm
- Coating/Cladding Concentricity: < 12 µm

Mechanical Specifications

Proof Test

- The entire length of fiber is subjected to a tensile proof stress ≥ 100 kpsi (0.7 GN/m^2)*

**Higher proof test available at a premium.*

Performance Characterizations

Characterized parameters are typical values.

Effective Area (A_{eff})

- 72 μm^2

Effective Group Index of Refraction (N_{eff})

- 1.469 at 1550 nm

Fatigue Resistance Parameter (n_d)

- 20

Coating Strip Force

- Dry, 0.6 lbs (3.0 N)
- Wet, 14 days room temperature: 0.6 lbs (3.0 N)

Dispersion Calculation

$$\text{Dispersion} = D(\lambda) = \left(\frac{D(1565\text{ nm}) - D(1530\text{ nm})}{35} * (\lambda - 1565)\right) + D(1565\text{ nm})$$

λ = *Operating wavelength up to 1565*

$$\text{Dispersion} = D(\lambda) = \left(\frac{D(1625\text{ nm}) - D(1565\text{ nm})}{60} * (\lambda - 1625)\right) + D(1625\text{ nm})$$

λ = *Operating wavelength from 1565–1625*

Corning fiber is made in the U.S.A.

Ordering Information

To order Corning® LEAF® CPC optical fiber, contact your sales representative, or call the Telecommunications Products Division Customer Service Department at **910-395-7659** (North America) and **+1 607-974-7174** (International). Please specify the following parameters when ordering.

Fiber Type: Corning® LEAF® Non-Zero Dispersion-Shifted Single-Mode Fiber

Fiber Attenuation Cell: dB/km

Fiber Quantity: kms

Other: (Requested ship date, etc.)

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Corning, NY 14831

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