



Bendable.
Compatible.
The choice is simple.

Ultra.

CORNING

Ultra is Here.

Network owners have much to consider when choosing the right fiber for access networks.

With a life span of 15 to 20 years, upgrades to higher data rates must be supported and the network has to maximize coverage area from the central office. **Low-loss G.652.D fibers** with improved attenuation support both system upgrades and extended coverage. However, lacking additional bend resilience, they are also limited for allowing cable and hardware miniaturization and low cost deployment techniques.

Macrobend improved G.657 fibers enable these smaller cable designs and low-cost installations techniques. However, these fibers tend to be designed with smaller mode field diameter (MFD) and may feature a lower refractive index “trench” region around the core to assist in bend resistance which can cause difficulties during the installation process when connected to existing G.652.D fibers.

Fortunately, technology advances have now removed the need to trade-off between desirable properties. Corning® SMF-28® Ultra fiber delivers low attenuation and improved macrobend performance while maintaining the same MFD diameter of legacy G.652.D fibers for seamless integration into your existing network.

Today, when it comes to selecting the right fiber type for your network you don't have to compromise.

Bend Matters

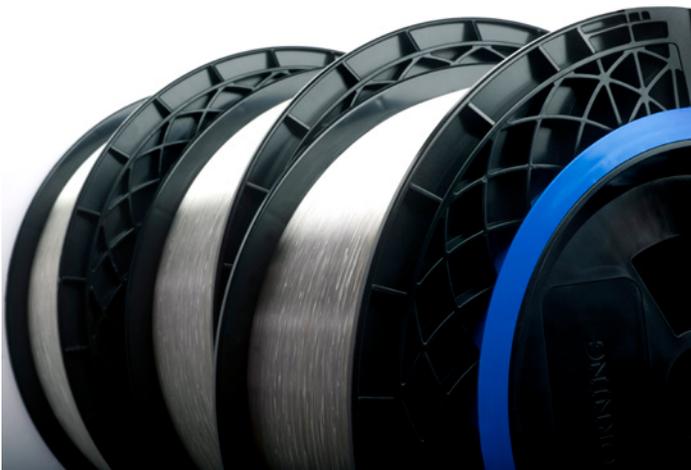
SMF-28 Ultra fiber delivers up to 10x better macrobend loss compared to the G.652.D standard for 30 mm radii bends and up to 33% better macrobend loss compared to the G.657.A1 standard for 10 mm radii bends, enabling:

- Tighter packing in smaller and lighter cable designs. This allows more efficient use of infrastructure through lower space occupancy in ducts in addition to faster deployment speeds and product handling.
- Reduced installation time by minimizing rework due to loss at bends that occur during installation and maintenance, allowing cable housing in smaller cabinets and closures.
- Future upgrades to higher capacities by ensuring low loss at longer wavelengths where fiber is more sensitive to bending.

Compatibility Matters

The enhanced macrobend performance of SMF-28 Ultra fiber is delivered with a 9.2 μm MFD (at 1310nm) which is fully backwards compatible with traditional single-mode fibers allowing for seamless integration into existing G.652.D networks and removing concerns relative to:

- Field Installation: the glass design of SMF-28 Ultra fiber ensures that fully automated splicing machines used in the field, can yield optimal splicing performance using default single-mode splicing programs, assuring fast and efficient installation for installers and network operators.
- Field Inspection & Test: although not a functional concern, splicing G.652.D fibers to G.657 fibers can lead to misleading OTDR inspection results due to MFD mismatch, so called “gainers” and “exaggerated losses”. Investigation of these features can result in delays and involve additional re-testing which can lead to further network disruption. Splicing SMF-28 Ultra to pre-existing G.652 fiber eliminates this concern, simplifying the inspection process and allows the installation to progress unhindered.



Key Specifications

| Attribute | SMF-28® Ultra Fiber | ITU-T G.652.D | ITU-T G.657.A1 |
|--|---------------------|------------------|------------------|
| Attenuation @ 1310 nm | ≤ 0.32 dB/km | ≤ 0.4 dB/km | ≤ 0.4 dB/km |
| Attenuation @ 1383 ± 3 nm | ≤ 0.32 dB/km | ≤ 0.4 dB/km | ≤ 0.4 dB/km |
| Attenuation @ 1550 nm | ≤ 0.18 dB/km | ≤ 0.3 dB/km | ≤ 0.3 dB/km |
| Attenuation @ 1625 nm | ≤ 0.20 dB/km | ≤ 0.4 dB/km | ≤ 0.4 dB/km |
| Macrobend Loss, 1 turn x 10 mm radius @ 1550 nm | ≤ 0.50 dB | Not specified | ≤ 0.75 dB |
| Macrobend Loss, 1 turn x 10 mm radius @ 1625 nm | ≤ 1.5 dB | Not specified | ≤ 1.5 dB |
| Macrobend Loss, 10 turns x 15 mm radius @ 1550 nm | ≤ 0.05 dB | Not specified | ≤ 0.25 dB |
| Macrobend Loss, 10 turns x 15 mm radius @ 1625 nm | ≤ 0.30 dB | Not specified | ≤ 1.0 dB |
| Macrobend Loss, 100 turns x 30 mm radius @ 1625 nm | ≤ 0.01 dB | ≤ 0.1 dB | Not specified |
| Mode Field Diameter @ 1310 nm | 9.2 ± 0.4 μm | 8.6-9.5 ± 0.6 μm | 8.6-9.5 ± 0.4 μm |
| PMD Link Design Value | ≤ 0.04 ps/√km | ≤ 0.20 ps/√km | ≤ 0.20 ps/√km |
| Maximum Individual Fiber PMD | ≤ 0.1 ps/√km | Not specified | Not specified |

Loss Matters

Fiber signal loss – or attenuation – is integral to concerns around performance, transmission speed and cost. SMF-28 Ultra fiber offers 10% lower attenuation than typical G.652.D fibers, so service providers can:

- Extend reach, allowing up to 20% improvement in subscriber coverage from a central office and facilitating possible central office consolidation in access networks.
- Extend distances between regeneration sites or amplifiers, extend cable lifetime (by allowing more repairs) and improve Optical Signal to Noise Ratio (OSNR) to allow upgrading to 40 Gb/s, 100 Gb/s, and beyond in long-haul networks.

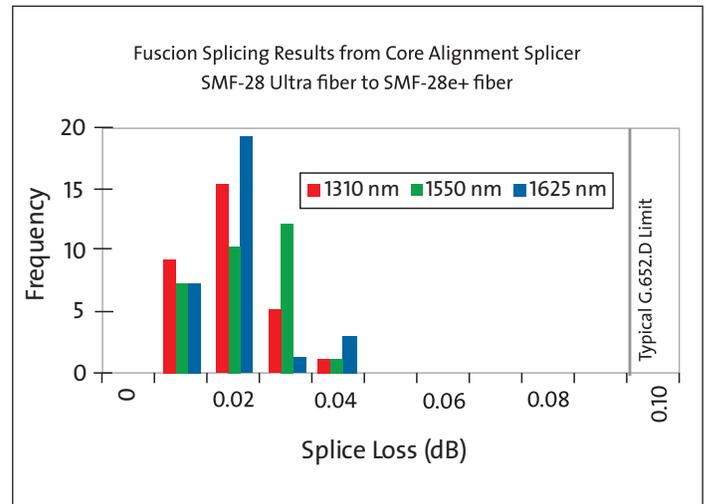
Simplicity Matters

The need for using different fiber types (e.g. improved-bend G.657.A1 as well as G.652.D) in different parts of the network can lead to compatibility issues and increase inventory management complexity. Also suitable for use in metro and long-haul networks, where lower attenuation can be exploited even further, SMF-28 Ultra fiber can reduce costs associated with inventory complexity, providing one robust solution across all network applications.



Splicing

Corning asked an independent 3rd party to test the splicing performance of SMF-28 Ultra fiber. Fiber splicing and connectivity are key considerations that led Corning to design SMF-28 Ultra fiber with the same nominal MFD – 9.2 μm @ 1310 nm – like other conventional single-mode fibers. As a result, this full spectrum fiber splices and connects interchangeably with SMF-28+® fiber and other standard single-mode fibers using the same methods, procedures, equipment, and fully automated core-alignment splicing recipes.



Mechanical Reliability

SMF-28 Ultra fiber is made with Corning's patented OVD manufacturing process to the same exacting standards as all of its optical fibers including historic single-mode fibers such as SMF-28e fiber and SMF-28e+ fiber. As such, it continues the legacy of high reliability operation in all applications currently met by Corning fibers.

Conclusion

Since introducing the first low-loss optical fiber in 1970, Corning's optical fiber innovations have been focused on better meeting the needs of our customers and the network operators we serve. Transmission technologies and bandwidth demand continue to grow rapidly, and optical fiber performance requirements must continue to evolve to provide robust and cost effective system performance. Corning SMF-28 Ultra fiber breaks the historical trade off paradigm and combines improved loss and bend in a single high-performance fiber that remains fully backward compatible to existing single-mode fibers for seamless integration into existing access networks. Don't compromise between bend resilience, compatibility and low loss; choose them all with SMF-28 Ultra fiber.

CORNING

Corning Incorporated

One Riverfront Plaza
Corning, NY 14831 U.S.A
Ph: +1 607-248-2000
Email: cofic@corning.com
www.corning.com/opticalfiber

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