

FTTx

AllWave® FLEX ZWP Single-Mode Fiber

Full Spectrum and
Bend-Insensitive Fiber
Optimized for FTTx and
Premises Applications

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Introduction

Modern fiber networks are pushing fiber to the home and desk. As fiber is installed in the last mile of Fiber-to-the-Home (FTTx) networks, it is subject to a greater degree of bending, since smaller distribution cabinets and compact fiber management systems are required. Additionally, fiber is being pushed into buildings and closer to the desk to carry optical bandwidth to the end user. All of these aspects have put more stringent demands on the robustness and bend performance of single-mode fibers than ever before. These demanding applications have led OFS to develop a new bend-insensitive optical fiber, AllWave FLEX Zero Water Peak (ZWP) fiber, optimized for access and enterprise networks.

AllWave FLEX ZWP fiber is the latest extension of the industry leading AllWave ZWP family. AllWave FLEX Fiber has several key design advantages over standard matched clad single-mode fiber:

- Optimized waveguide design for excellent macrobend performance
- Zero Water Peak for full spectrum CWDM applications
- Excellent fiber geometries leading to better splice performance
- Industry leading Polarization Mode Dispersion (PMD)
- G652D-compliant.

The fiber uses a highly optimized ZWP design that is G652D compliant. This means that this fiber is fully backwards-compatible with the embedded base of existing single-mode fiber. Like AllWave fiber, the AllWave FLEX Product has no water peak and the attenuation is stable in a hydrogen environment. Figure 1 shows the attenuation spectrum of zero water peak fibers, such as AllWave FLEX Fiber, compared to standard low water peak and conventional single-mode fibers.

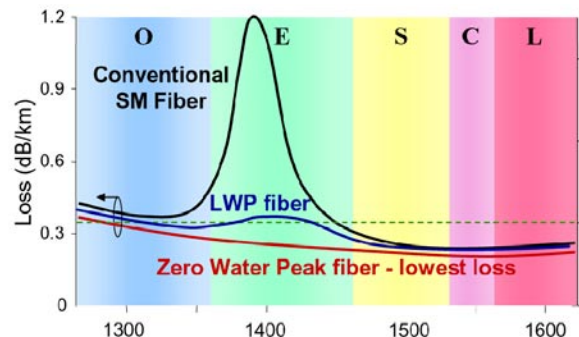


Figure 1. Comparison of optical loss spectrum of zero water peak fibers to low water peak fiber and conventional single-mode fiber

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Zero water peak performance means 12% lower loss at 1385 nm than low water peak fibers. Further, our patented process maintains the excellent attenuation performance even after hydrogen aging. ZWP fiber allows the use of six new channels in the 1360 - 1480 nm band enabling a total of 18 channels with a 20 nm spacing of coarse wavelength division multiplexing (CWDM) as described in ITU standard 694.2. Currently 65% of single-mode sales in North America are G.652D fibers (LWP and ZWP) so networks will be ready to use the expanded bandwidth.

Exceptional Bend Performance for Bend-Sensitive Applications and Installations

AllWave *FLEX* Fiber is a highly optimized single-mode design that combines the strengths of the original Bell Labs bend-insensitive single-mode fiber design with the industry leading AllWave ZWP performance. The result is a fiber that meets the ITU G.652D specification and has macrobend performance that is significantly better than matched clad single-mode fiber. A key difference is that OFS specifies bend performance for AllWave *FLEX* Fiber out to 1625 nm and down to 20 mm diameters, while standard single-mode typically specifies bend performance out to 1550 nm for diameters down to 32 mm. Thus, unlike matched clad single-mode fiber, the AllWave *FLEX* Product can protect system performance across the entire C and L bands against inadvertent bends that occur in the optical fiber cable.

This improved bend performance facilitates the design of tight enclosures required for FTTx applications. Figure 2 shows some sample results for 2 mm cordage. The data clearly show the improved bend performance of AllWave *FLEX* Fiber as compared to matched clad single-mode fiber at higher wavelengths. The bend performance also results in lower attenuation in difficult cabling situations such as tight buffering, ribbon cables and low temperature applications.

Exceptional Splice Properties for High Performance Networks and Reliable Installation

AllWave *FLEX* Fiber offers improved geometric performance for benchmark splicing performance. Two factors that lead to low splice loss are the core clad offset and the mode field diameter (MFD). AllWave *FLEX* Fiber is manufactured using vapor-axial deposition (VAD) technology with rod and tube over-cladding. This process produces excellent fiber geometries with typical core/clad offsets of less than 0.2 microns. This leads to very repeatable splice performance for repeat splices of the same fibers. Further, the small MFD variation results repeatable low loss splices when spliced to other AllWave *FLEX* Fibers. Table 2 gives the bidirectional splice loss results for AllWave *FLEX* Fiber splices to various G.652 fibers. The results show excellent splice performance.

Tighter specifications and enhanced performance of AllWave *FLEX* Fiber result in a product that both exceeds

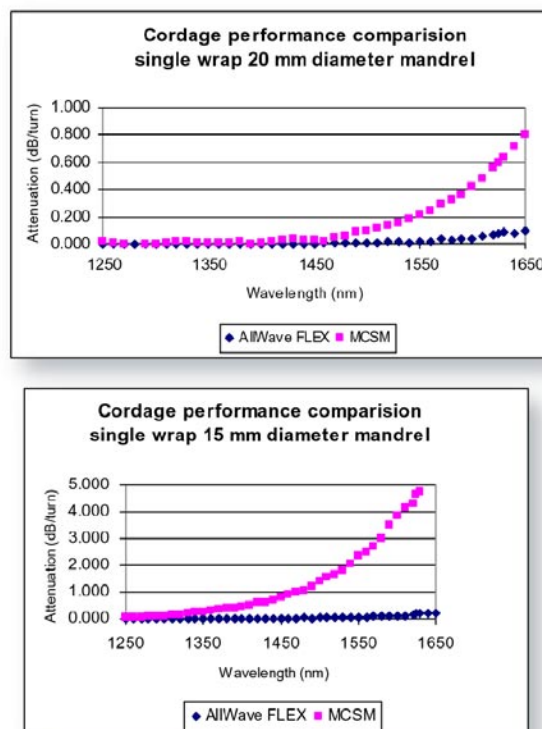


Figure 2. Attenuation for AllWave *FLEX* Fiber and bend optimized matched clad single-mode fiber wrapped around 20 and 15 mm diameter mandrels as a function of wavelength².

Median Bidirectional OTDR Loss (dB)	
AllWave® ZWP Fiber	0.03 dB
AllWave® <i>FLEX</i> ZWP Fiber	0.02 dB
Competitive matched clad single-mode fiber	0.03

Table 2. Bidirectional splice loss data for AllWave *FLEX* Fiber spliced to AllWave and competitive singlemode fibers.

² Data courtesy of Peter Weimann, Senior Product/R&D Engineer at OFS

the benchmark bending performance of the original AT&T Depressed Clad fiber and the industry leading performance of the original G652D AllWave full spectrum product and is ready for tomorrow's demanding applications.

Exceptional PMD for Reliable Networks Today and Tomorrow

AllWave *FLEX* Fiber uses OFS' patented technology to produce industry leading polarization mode dispersion (PMD). Transmission rates are continuously increasing with 40 Gb/s transceivers available today. PMD is costly to mitigate electronically and the most cost-effective solution is to install low PMD fibers today and be ready for tomorrow's requirements.

Summary

AllWave *FLEX* Fiber is a G652D compliant ZWP fiber with exceptional bending performance designed for FTTx and premise applications. OFS' patented process produces stable attenuation results in hydrogen environments that simulate long term use. This helps assure that the full spectrum from 1260 to 1625 nm is available for CWDM applications both now and in the future. AllWave *FLEX* Fiber is G652D compliant and has macrobend performance that is far superior to matched clad single-mode fiber. Our manufacturing process is optimized to produce excellent geometries and low PMD. This results in a fiber that produces low splice losses and is ready to handle the high bandwidth applications of the future. AllWave *FLEX* Fiber is ready to enable compact and low loss FTTx networks. Find out more about how this fiber can help you at www.ofsoptics.com.



For additional information please contact your sales representative. You can also visit our website at <http://www.ofsoptics.com> or call 1-888-fiberhelp.

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