

FAQ

OM5 WIDEBAND MULTIMODE OPTICAL FIBER

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What is OM5 wideband multimode optical fiber?

OM5 wideband multimode optical fiber (WBMMF) extends the ability of conventional OM4 multimode fiber to support multiple wavelengths. Unlike traditional multimode fiber, which is optimized to support transmission only at 850 nanometers (nm), OM5 fibers, including OFS LaserWave® WideBand Optical Fiber, are specifically designed to support data traffic from 850 to 940 nm. This capability enables transmission over multiple wavelengths using the same strand of fiber, using Wavelength Division Multiplexing (WDM) technology. This significantly increases the capacity of a multimode fiber while maintaining its cost advantages for short reach applications.

What were the drivers behind the integration of WDM into multimode optical fiber?

In order to increase transmission speeds to 10/25 gigabits per second (Gb/s), transceiver vendors simply increased the speed of their devices (lasers and detectors). When 40 and 100 Gb/s standards were first developed, transmission schemes that used parallel fibers were introduced. This increase in fiber count provided a simple solution to limitations of the technology available at the time. It was well accepted in the industry and allowed multimode links to maintain their link cost advantage. Increasing the number of fibers is practical to a point, but too many fibers can become unwieldy due to cable management challenges. Consequently, the industry developed WDM technology that operated at shorter wavelengths. At today's higher speeds, two-wavelength Bi-Directional (BiDi) and four wavelength SWDM4 provide cost effective solutions that include duplex 100 Gb/s links, and a migration path from 40 to 400 Gb/s and beyond.

What products take advantage of WBMMF's capabilities?

There are standards compliant, proprietary, and Multi-Source Agreement (MSA) transceivers available today that take advantage of WBMMF, including BiDi and SWDM4 products. Both 40 and 100 Gb/s transceivers operating over a pair of fibers are available. 400GBASE-SR4.2 is the first standards-based, IEEE 802.3 Ethernet solution that uses multimode WDM technology, transmitting 400Gb/s over 4 pairs of multimode fiber on links up to 150 meters on OM5 fiber.

What were the main technical challenges to be overcome?

The biggest issue on the fiber side was widening the usable wavelength range of the fiber. Typically, a multimode fiber is "peaked" for the highest bandwidth at a single wavelength. In the case of OM3 and OM4 fibers, that wavelength is 850 nm. Bandwidth at other wavelengths is notably less. This limits the use of WDM with these fibers. With WBMMF and its improved waveguide design, high bandwidth is achieved across a range of operating wavelengths from 850 to 940 nm.

Is WBMMF backward compatible to legacy equipment, or is it intended only for use in greenfield installations?

All OM5 fibers, including OFS' LaserWave WideBand Fiber are fully compliant with OM4 specifications and support existing applications to the same link distance, while providing additional OM4-like transmission capability from 850 nm to 940 nm. OM5 fibers are backward compatible with all OM4 fiber, including LaserWave FLEX 550 (OM4) fiber. Up to four different wavelength ranges are available in this region, so capacity can be increased over current OM4 fiber by a factor of four.

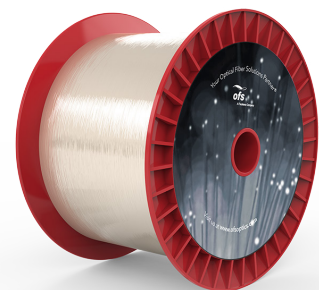
What about standards?

Multimode wideband fiber was standardized in June 2016 by the Telecommunications Industry Association (TIA) in TIA-492AAAE. In 2020, TIA revised the multimode fiber standard, incorporating OM5 into ANSI/TIA-492AAAF. Wideband fiber was incorporated into the TIA cabling standard, ANSI/TIA-568.3-D, in October 2016. ANSI/TIA-568.3 is currently in revision.

IEC added wideband fiber in IEC 60793-2-10 Ed. 6.0, in August 2017. The latest revision is IEC 60793-2-10:2019 published in May 2019. In 2017, the international cabling standard, ISO/IEC 11801-1 added OM5 cable.

IEEE Std 802.3bs™-2017, 200 Gb/s and 400 Gb/s Ethernet was the first standard to include OM5 fiber as an approved media type for 400GBASE-SR16, specifying 70 m reach for OM3 and 100 m reach for OM4/OM5. The 100m reach is the same as OM4 fiber, as the application operates only at 850nm (not a WDM application). Similarly, 64 Gb/s Fibre Channel FC-PI-7 also includes OM5 as an approved media type, with the same reach as OM4 fiber.

IEEE Std 802.3cm™-2020 was the first standard to take advantage of OM5's WDM capabilities with 400GBASE-SR4.2, a 400 Gb/s BiDi solution that can support 150 meter OM5 links and 100 meter OM4 links.

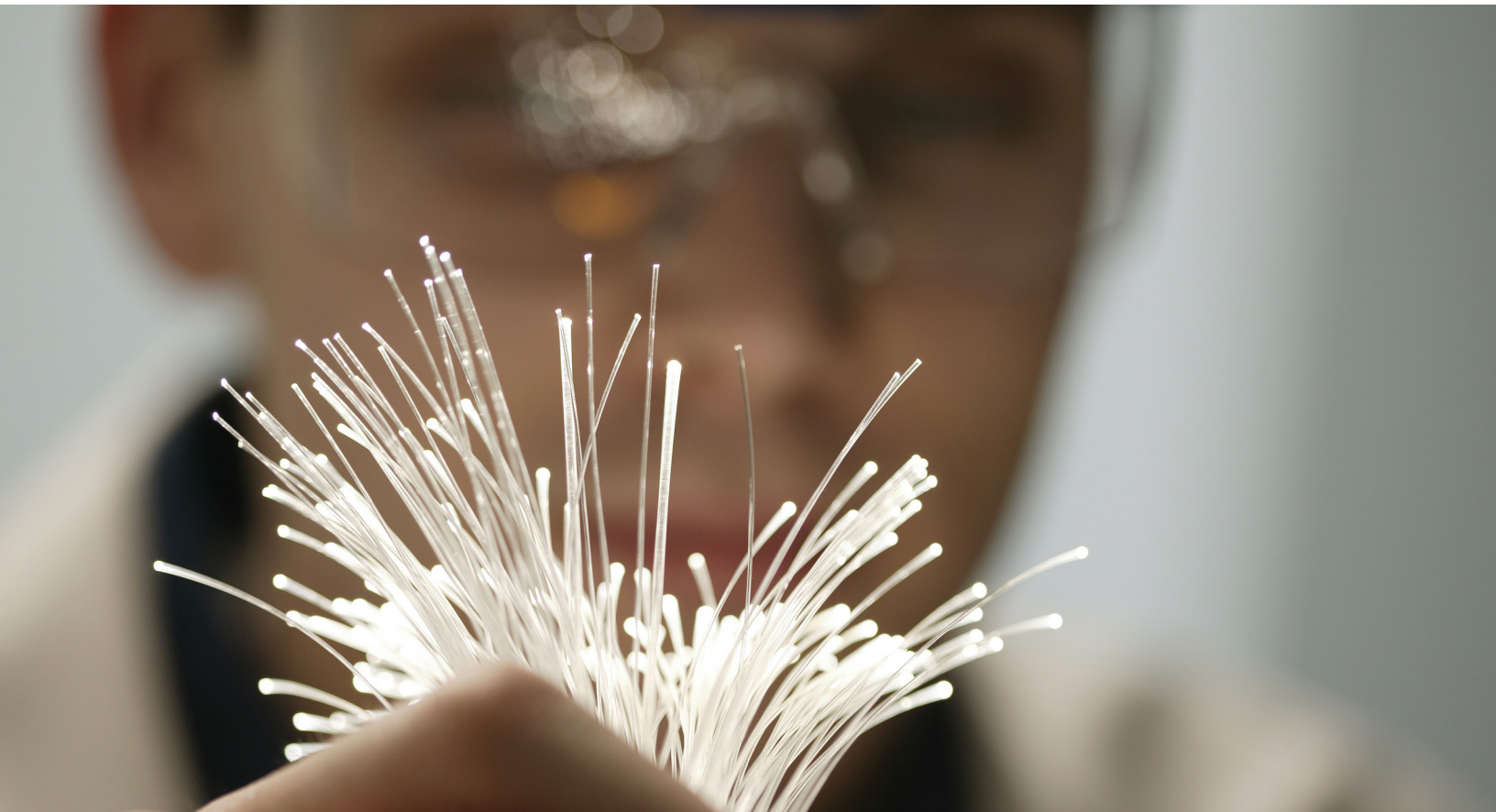




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You can also visit our website at www.ofsoptics.com or call 1-888-fiberhelp (1-888-342-3743) USA or 1-770-798-5555 outside the USA.



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