

PANDUIT[®]

infrastructure for a connected world

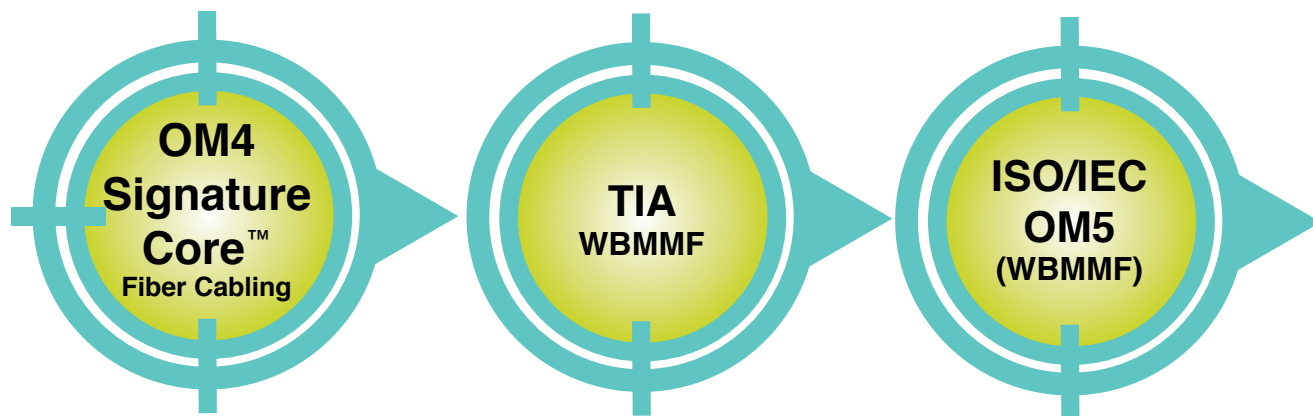
Leaders in the Advancement of Multimode Fiber

OM **4** / **SIGNATURE CORE**[™]

OM **5** / **SIGNATURE CORE**[™]

Fiber Future and Beyond

Major Milestones in the Advancement of Multimode Fiber (MMF) Transmission



Panduit releases first MMF in 2011 minimizing total dispersion, enabling longest channel reach. In 2013 allows Cisco's new BiDi to go further

June 2016 Panduit Chairs TIA Task Group responsible for development of wideband multimode fiber (WBMMF)

International Standards Organization announced (October 2016) nomenclature 'OM5' for next revision of ISO/IEC 11801

key

FACTS

OM5 (WBMMF) Basics

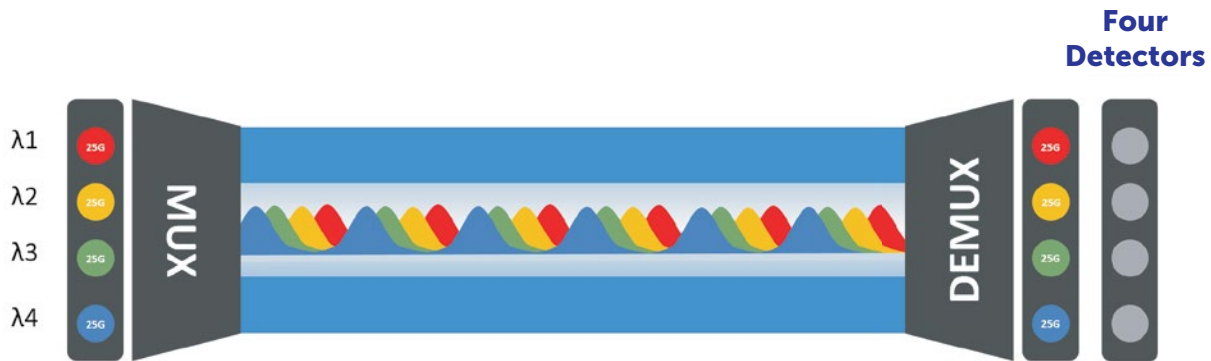
Wideband Multimode Fiber (WBMMF) is the newest multimode fiber standard developed by a TIA Joint Task Group, Chaired by Panduit. WBMMF is referred to as OM5 in the ISO/IEC 11801: Information Technology – Generic Cabling for Customer Premises.

OM5 fiber is a laser optimized multimode fiber (MMF) with bandwidth characteristics specified for Short Wave Division Multiplexing (SWDM). This new classification of fiber is designed to support multiple wavelengths between 850 and 953nm that can be aggregated for high bandwidth applications.

OM5 shares the same geometry (50µm core, 125µm cladding) with OM3 and OM4, thus OM5 is backward compatible with these fiber types. For applications/systems operating at a single 850nm wavelength, OM5 provides no greater bandwidth than OM4.

SWDM applications are not exclusive to OM5, both OM3 and OM4 fiber continue to be highly relevant. OM3 and OM4 minimum performance levels for SWDM applications are referenced in a multi-source agreement (MSA) publication from the **SWDM Alliance** and further addressed in Panduit's **Signature Core™ Fiber Optic Cabling Brochure**.





Four Lasers

OM5 is specified to operate over the wavelengths from 850nm to 953nm and is initially expected to support 4 VCSELs at 30nm wavelength spacing.

In the above example, four wavelengths of light each transmit 25Gbps resulting in 100Gbps across a single fiber, and full transmit (Tx) / receive (Rx) over a pair of fibers (as opposed to previous generation 100Gbps standards that required many fibers or parallel optics). This concept can be applied to OM3, OM4 and OM5 fiber grades.

Combined with other transmission technologies such as higher speed VCSELs, parallel optics (i.e. more strands of fiber) and advanced optical modulation techniques (e.g. PAM-4), a future roadmap beyond 400G is feasible on a single fiber.

Relevance of Chromatic Dispersion in Multimode Fiber

A key factor limiting the bandwidth of multimode fiber at high data rates (>10G) is not just modal dispersion but also chromatic dispersion. Panduit has made it possible through the reduction of modal and chromatic dispersion in MMF to achieve extra reach for higher data rate applications.

Panduit was first to effectively address the challenge of minimizing chromatic and modal dispersion in multimode fiber and pioneered the development of a new breed of multimode fiber – learn more at: www.panduit.com/signature-core.

OM4 SIGNATURE CORE™

Fiber Extends Reach of Cisco BiDi

(OM4 Signature Core™ Launched in 2011
Cisco BiDi Launched in 2013)

TIA (TR-42.12)

Panduit Chairs WBMMF Task Group

(Published June 2016)

IEC

OM5 11801

(October 2016)

OM5 SIGNATURE CORE™

Fiber Optic Cabling System

(OM5 Signature Core™
Launched October 2017)

new breed
multimode
FIBER

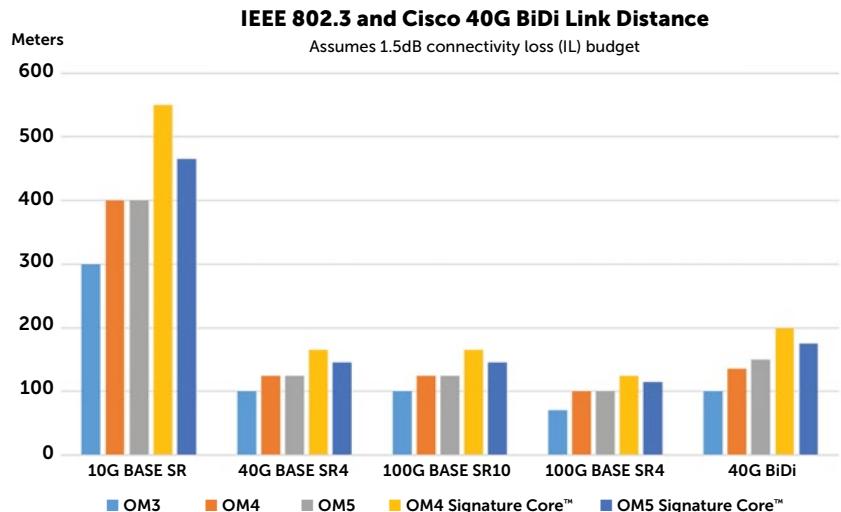
Pushing the Limits

Are the OM3, OM4 and OM4 Signature Core™ Fiber Optic Cabling Systems relevant to go beyond 100G Ethernet/128G Fibre Channel over duplex Multimode Fiber?

Yes, as with OM5, using more advanced modulation techniques a future roadmap beyond 100G is possible.

Transceivers under development will look to support new and legacy OM3, OM4 and OM4 Signature Core™ cabling plant – supporting at least 100G Ethernet/128G Fibre Channel transmission over two multimode fibers.

Panduit's OM4 Signature Core™ extends the reach on average by 20% compared to the defined OM4 standard. As data rates accelerate, OM4 Signature Core™ will remain relevant providing a cost-effective path to 100G Ethernet/128G FC with the highest performance available.



pushing
the **LIMITS**

Leading the Way


Panduit played a leading role in the development of OM5 fiber within the Telecommunications Industry Association (TIA) Joint Task Group on WBMMF as Chair during the standards development process, and was first to market with a wideband multimode fiber that provides extended reach for systems operating at multiple wavelengths (e.g. Cisco's BiDi). www.panduit.com/signature-core.

Panduit's Position on OM5 Fiber

OM5 is just one example of how high data rates can be supported using multimode fiber. OM4 and the OM4 Signature Core™ Fiber Optic Cabling System will continue to be highly relevant in terms of supporting higher data transmission rate applications that are using both 850nm and SWDM/multi-wavelengths.

Careful consideration must be made in terms of return on investment to determine which fiber grade provides 'best value' as a transmission medium to support both current and future needs of your physical layer infrastructure. OM4 Signature Core™ outperforms OM5 for applications operating either a single or dual wavelength in many cases.

OM5 Signature Core™ outperforms the standard OM5 fiber for any SWDM applications, providing on average 15% extended reach while maintaining high and reliable performance.



Panduit is highly active in standards development and industry advancements, driven to solve customer challenges and exceed expectations with best-in-class product solutions, service and support.

Contact Panduit to learn more about high bandwidth solutions for high speed networks.

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