

SUMITOMO SPECIFICATION

FutureFLEX®

**Multimode 50 μ m Core Optical Fiber (OM2, OM3 & OM4)
Gigabit Grade**



SUMITOMO ELECTRIC LIGHTWAVE CORP.

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SEL is a Member of the Sumitomo Electric Industries, Ltd. Group

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1. GENERAL

This specification covers the design requirements and performance standards for the optical fiber described below. This fiber is used in Sumitomo's optical cables. The features described in this document are intended to provide information on the performance of Sumitomo Electric's optical fiber and aid in handling and use. Refer to the appropriate *cable* specification for details regarding the finished cable's performance.

1.1 Fiber Description

Sumitomo's Gigabit Grade 50/125 μm Multimode (MM) optical fiber is a graded index fiber with glass core, glass cladding and dual acrylate protective coatings. This Type Ia TIA specified fiber is optimized for operation at both 850 and 1300 nm transmission. It is fully compatible with commercially available splicing and connector products and can be spliced to other commercially available 50 μm MM fibers. 50 μm MM fiber is ideal for data and local area networks and is available in three grades, based on maximum gigabit Ethernet link distance requirements (see Section 2.3).

1.2 Quality

Sumitomo ensures a high level of quality through ISO / TL 9000 registered Quality Management Systems and our commitment to continuous improvement. Guaranteed, high quality products have been manufactured at Sumitomo's facility in Research Triangle Park, North Carolina since 1984.

1.3 Reliability

Sumitomo ensures product reliability through rigorous qualification testing of each product family to meet or exceed industry standards. Both initial and periodic qualification testing are performed to assure the fiber's performance and durability in the field environment.

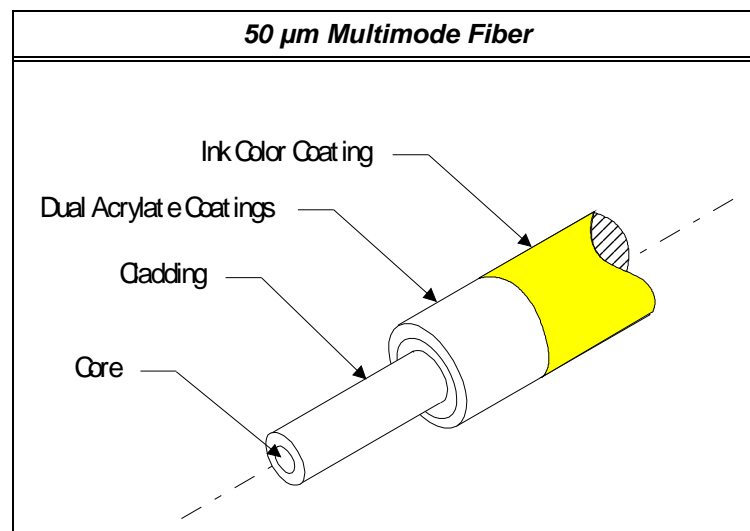
Sumitomo supports industry standards organizations such as Bell Communications Research (Telcordia), Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electrotechnical Commission (IEC), American Society for Testing and Materials (ASTM), Rural Utilities Service (RUS), The Institute of Electrical and Electronics Engineers (IEEE), and Insulated Cable Engineers Association (ICEA).

2. Multimode Optical Fiber

2.1 General Design

Sumitomo employs 50 μm Multimode (MM) optical fiber manufactured by chemical vapor deposition. This high quality glass has excellent geometry, high strength characteristics, high bandwidth, and low attenuation. The MM fiber is fully compatible with other commercially available MM fibers and is designed for transmission at 850 and 1300 nm wavelengths.

The 50 μm MM fiber is a graded index design. It's optical properties are achieved through a Germanium doped silica based core with a pure silica cladding. A dual acrylate protective coating is applied over the glass cladding to provide the necessary bending and tensile strength required for handling in the field and to ensure maximum fiber lifetime through increased reliability.



2.2 Construction

Fiber Region	Property	Test Procedure	Specification	
Glass Fiber	Core	Diameter Non-Circularity Core/Cladding Offset	EIA/TIA-455-58 EIA/TIA-455-45 EIA/TIA-455-45	$50 \pm 2.5 \mu\text{m}$ $\leq 5\%$ $\leq 1.5 \mu\text{m}$
	Cladding	Diameter Non-Circularity	EIA/TIA-455-45 EIA/TIA-455-45	$125 \pm 1.0 \mu\text{m}$ $< 1.0 \%$
Coating	Buffer	Material Inked Diameter	EIA/TIA-455-55	UV-Acrylate $250 \pm 15 \mu\text{m}$

2.3. Optical Characteristics

Property	Test Procedure	Specification		
Maximum Attenuation at 850 / 1300 nm	EIA/TIA-455-61	2.5 / 1.0 dB/km		
Point Discontinuities (850 and 1300 nm)	EIA/TIA-455-59	≤ 0.1 dB		
Attenuation Change vs. Wavelength 800 to 900 nm 1250 to 1350 nm	EIA/TIA-455-46	≤ 1 dB/km ≤ 0.2 dB/km		
Attenuation Change vs. Bending 100 wraps / 75 mm	EIA/TIA-455-62	≤ 0.5 dB		
Min. Overfilled Launch Bandwidth (MHz km) 850nm 1300nm	EIA/TIA-455-204	Std. Grade OM2	Ext'd Grade OM3	Max Grade OM4
		500	1500	3500
		N/A	500	500
Min. Gigabit Ethernet Distance 850 nm 1300 nm	EIA/TIA-455-204			
		550 m	1 km	1 km
		550 m	600 m	600 m
Min. 10-Gigabit Ethernet Distance 850 nm 1310 nm	EIA/TIA-455-204			
		N/A	300 m	550 m
		N/A	300 m	300 m
Laser EMB @ 850 nm (MHz*km) 850 nm 1300 nm	EIA/TIA-455-204			
		N/A	2000	4700
		N/A	500	500
Point Discontinuities (850 and 1300 nm)	EIA/TIA-455-59 or EIA/TIA-455-78	≤ 0.2 dB/pt		
Numerical Aperture	EIA/TIA-455-177	0.200 ± 0.015		
Group Index of Refraction 850 nm 1300 nm	EIA/TIA-455-44	1.483 1.479		

2.4 Mechanical Characteristics

<i>50 μm Multimode Fiber</i>			
Property	Test Procedure	Specification	
Proof-test Stress	EIA/TIA-455-31	100 kpsi	
Minimum Bend Radius	Short Term	16.0 mm	
	Long Term	37.5 mm	

3. Testing and Inspection

The optical properties of all fibers are measured prior to cable manufacturing and remain traceable throughout the manufacturing process and the lifetime of the cable.

After cabling, we use statistical process control techniques along with periodic verification to insure 100% compliance to attenuation requirements in each length of cable with bi-directional OTDR at all operating wavelengths. Cable dimensional measurements are also made at final inspection and recorded.

4. Installation / Handling Practices

Sumitomo has incorporated a wide range of technical support and training services for our fiber optic cable products into our Technical Support Services (TSS) program. TSS offers training in the areas of cable installation sheath entry, splicing, testing, and system troubleshooting. The services are available in a variety of media formats and can be customized to better accommodate individual training needs. The TSS program consists of an extensive series of recommended procedure documents, training courses with classroom and hands-on instruction, as well as demonstration video tapes. Please contact Sumitomo's Customer Service department for more information.

5. Ordering Information

To learn more about Sumitomo's cables or to place an order, call, fax, e-mail, or write us at:

Sumitomo Electric Lightwave Corp.
78 Alexander Drive
Research Triangle Park, NC 27709
Attn: Customer Service Department
Phone: 800-358-7378
919-541-8100
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Sumitomo Electric Lightwave reserves the right to improve, enhance, or modify the cable's features and specifications. For special requirements different than those shown above, please contact our Inside Sales Department. Each Sumitomo Electric Lightwave Corp. optic

cable and/or its manufacture may be covered by one or more of the following US Patents: 4,715,677 4,729,629 4,763,983 4,770,489
4,828,349 4,953,945 5,043,037 5,082,347 5,165,003 D331,567 5,247,599 5,410,901 5,471,555 5,642,452.