Verrillon®
VHM5000 Series Fibers

Verrillon Harsh Environment Fibers from AFL are available in a number of designs. The VHM5000 Series is a multimode graded-index optical fiber available with coatings and coating combinations, including Polyimide, high temperature acrylates, Silicone-PFA and hermetic Carbon. Typically, these fibers are used in down-hole data logging, distributed sensing and imaging applications where the temperature and hydrogen partial pressures are extreme.

Verrillon carbon-coated optical fibers provide exceptionally high levels of hermeticity compared to commercial fibers. We provide extensive data that demonstrates the performance of our fiber. In addition, we provide one-stop shopping for customers requiring multi-count cabled hermetic fibers, if required, in metal jacketing tubes.

Consistent with our founding principles, we specialize in application optimized fibers, providing our customers unmatched flexibility in the their system design and performance.

Features

- Best glass resistance to hydrogen at high temperatures and pressures in the entire industry
- Wide range of protective coatings available, depending on application requirements
- Suitable for use in high pressure, high temperature and corrosive environments
- Carbon coating provides exceptional resistance to H_2 and moisture ingression
- Predicted lifetime for hermetic fiber under typical operating conditions exceeds most requirements
- Extensive test and measurement data for optical fiber performance under "harsh conditions" provided with fiber

Specifications

PART NO.	**MMF-50-4-P-125-4**
Description	50/125/155 µm Polyimide coated, Graded Index, Multimode Fiber
PARAMETER	**VALUE**
Material	
Coating	Polyimide
Geometry	
Core Diameter (µm)	50 ± 2.5
Clad Diameter (µm)	125 ± 2
Core Non-Circularity (%)	≤ 5
Clad Non-Circularity (%)	≤ 1
Core/Clad Offset (µm)	≤ 1.5
Coating Diameter (µm)	155 ± 5
Polyimide Coating Concentricity[1]	≥ 80
Optical	
NA (nominal)	0.20
Attenuation[2] @ 850 nm (dB/km) @ 1300 nm (dB/km)	 ≤ 3.0 ≤ 1.2
Bandwidth @ 850 nm (MHz-km) @ 1300 nm (MHz-km)	 ≥ 300 ≥ 300
Mechanical	
Proof Test (kpsi)	≥ 100
Operating Temperature (°C)	-65 to +300

[1] Measured as (Min. Wall/Max. Wall) x 100 [2] Measured on loose coil

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Specifications

PART NO.	MMF-50-4-CP-125-2	MMF-50-4-CP-125-3	MMF-50-4-CP-125-4
Description	50/125/155 µm Carbon/Polyimide coated, Graded Index Multimode Fiber, 200 kpsi	50/125/155 µm Carbon/Polyimide Graded Index, Multimode Fiber, 150 kpsi	50/125/155 µm Carbon/Polyimide coated, Graded Index Multimode Fiber
PARAMETER	**VALUE**		
Material			
Hermetic	Carbon	Carbon	Carbon
Coating	Polyimide	Polyimide	Polyimide
Geometry			
Core Diameter (µm)	50 ± 2.5	50 ± 2.5	50 ± 2.5
Clad Diameter (µm)	125 ± 2	125 ± 2	125 ± 2
Core Non-Circularity (%)	≤ 5	≤ 5	≤ 5
Clad Non-Circularity (%)	≤ 1	≤ 1	≤ 1
Core/Clad Offset (µm)	≤ 1.5	≤ 1.5	≤ 1.5
Coating Diameter (µm)	155 ± 5	155 ± 5	155 ± 5
Polyimide Coating Concentricity[1]	≥ 80	≥ 80	≥ 80
Optical			
NA (nominal)	0.20	0.20	0.20
Attenuation[2] @ 850 nm (dB/km) @ 1300 nm (dB/km)	 ≤ 3.0 ≤ 1.2	 ≤ 3.0 ≤ 1.2	 ≤ 3.0 ≤ 1.2
Bandwidth @ 850 nm (MHz-km) @ 1300 nm (MHz-km)	 ≥ 300 ≥ 300	 ≥ 300 ≥ 300	 ≥ 300 ≥ 300
Mechanical			
Proof Test (kpsi)	≥ 200	≥ 150	≥ 100
Operating Temperature (°C)	-65 to +300	-65 to +300	-65 to +300

[1] Measured as (Min. Wall/Max. Wall) x 100

[2] Measured on loose coil

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Specifications

PART NO.	MMF-50-4-CSPFA-125-1	MMF-50-4-CSPFA-125-5	MMF-50-4-CSPFA-125-6	MMF-50-4-CSPFA-125-7
Description	50/125/750 µm Carbon/ Silicone/PFA, Graded Index, Multimode Fiber, 150 kpsi	50/125/400 µm Carbon/ Silicone/PFA coated, Graded Index, Multimode Fiber	50/125/250 µm Carbon/ Silicone/PFA coated, Graded Index, Multimode Fiber	50/125/250 µm Carbon/ Silicone/PFA coated, Graded Index, Multimode Fiber, 150 kpsi
PARAMETER	**VALUE**			
Material				
Hermetic	Carbon	Carbon	Carbon	Carbon
Primary Coating	Silicone	Silicone	Silicone	Silicone
Secondary Coating	PFA	PFA	PFA	PFA
Geometry				
Core Diameter (µm)	50 ± 2.5	50 ± 2.5	50 ± 2.5	50 ± 2.5
Clad Diameter (µm)	125 ± 2	125 ± 2	125 ± 2	125 ± 2
Core Non-Circularity (%)	≤ 5	≤ 5	≤ 5	≤ 5
Clad Non-Circularity (%)	≤ 1	≤ 1	≤ 1	≤ 1
Core/Clad Offset (µm)	≤ 1.5	≤ 1.5	≤ 1.5	≤ 1.5
Combined Coating Diameter (µm)	750 ± 25	400 ± 50	250 ± 50	250 ± 50
Optical				
NA (nominal)	0.20	0.20	0.20	0.20
Attenuation[1] @ 850 nm (dB/km) @ 1300 nm (dB/km)	 ≤ 3.0 ≤ 1.0	 ≤ 3.0 ≤ 1.2	 ≤ 3.0 ≤ 1.2	 ≤ 3.0 ≤ 1.2
Bandwidth @ 850 nm (MHz-km) @ 1300 nm (MHz-km)	 ≥ 300 ≥ 300	 ≥ 300 ≥ 300	 ≥ 300 ≥ 300	 ≥ 300 ≥ 300
Mechanical				
Proof Test (kpsi)	≥ 150	≥ 100	≥ 100	≥ 150
Operating Temperature (°C)	-40 to +200	-40 to +200	-40 to +200	-40 to +200

[1] Measured on loose coil