ofs
Leading Optical Innovations

Matched Cladding
Single-Mode Fiber

Optical Fiber Performance for Your Most Demanding Applications

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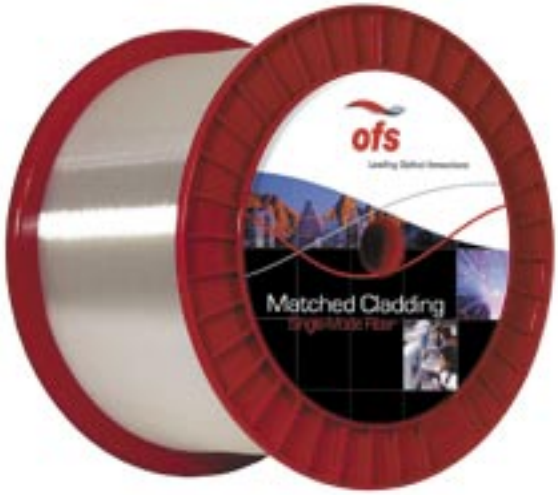
Product Description

The OFS Matched Cladding SM332 Single-Mode Optical Fiber sets the standard for optical fiber performance. The exacting specifications and quality control of OFS allows you to take advantage of the full capability of this fully ITU-T G.652.B compliant, single-mode fiber.

SM332 Single-Mode fiber consists of a germanium-doped core surrounded by a silica cladding. The nominal mode field diameter is 9.2 µm, making this fiber compatible with most single-mode fibers. Although characteristics are optimized for operation in the 1310 nm region, where dispersion is lowest, operation in the lowest loss 1550 nm region is also possible.

OFS was one of the first fiber manufacturers to specify maximum limits on polarization mode dispersion (PMD). PMD can affect performance in digital systems at very high bit rates and in high capacity analog systems.

Excellent control of the geometrical properties of this fiber allows low loss splicing with either single fiber or mass fusion techniques. It can be readily spliced to most other manufacturers' matched clad fibers with extremely low splice loss, increasing installation efficiency and maintaining system performance.



Long-term Reliability

OFS fibers feature a dual layer of UV-cured acrylate material which is applied directly to the glass surface. The benefits of the dual coating include:

- Cushions fiber against microbending loss
- Provides abrasion and cut-through resistance for protection and ease of use
- Extremely stable over wide range of environmental conditions for long-term reliability
- Resistant to color change for easy fiber identification after aging

Specifications:

Attenuation (Customer must specify maximum value within range):	0.31 - 0.35 dB/km at 1310 nm 0.21 - 0.25 dB/km at 1550 nm
Zero Dispersion Wavelength	1302 nm $\leq \lambda_0 \leq$ 1322 nm
Dispersion Slope	$\leq$ 0.092 ps/nm^2-km
1550 nm Dispersion	$\leq$ 18 ps/nm^2-km
Fiber Polarization Mode Dispersion Link Design Value (LDV)[1]	$\leq$ 0.1 ps/$\sqrt{\text{km}}$
Mode Field Diameter	9.2 ± 0.4 µm at 1310 nm
Cladding Diameter	125.0 ± 0.7 µm
Core/Cladding Concentricity Error	$\leq$ 0.5 µm
Fiber Cutoff Wavelength (λ_c)	1150 - 1340 nm
Cabled Cutoff Wavelength (λ_{cc})	$\leq$ 1260 nm
Coating Diameter (uncolored)	245 - 260 µm
Proof Test Levels	0.7 GPa (100 kpsi) minimum (or as specified)

[1] PMD value may change when cabled. Check with your cable manufacturer for specific PMD limits in cable form.

Transmission Characteristics:

Attenuation:

The maximum attenuation (loss) in dB/km may be specified within the ranges indicated:

Wavelength (nm)	Maximum Attenuation (dB/km)
1310	0.31 - 0.35
1550	0.20 - 0.25

Attenuation vs. Wavelength:

The maximum attenuation in the wavelength region from 1285 nm to 1330 nm is no more than 0.05 dB/km greater than the attenuation at 1310 nm.

The maximum attenuation in the wavelength region from 1525 nm to 1575 nm is no more than 0.05 dB/km greater than the attenuation at 1550 nm.

Macrobending Attenuation:

The maximum attenuation with bending does not exceed the specified values with the following deployment conditions:

Deployment Condition	Wavelength	Induced Attenuation
1 turn, 32 mm (1.2 inch) diameter	1550 nm	≤ 0.50 dB
	1625 nm	≤ 0.50 dB
100 turns, 50 mm diameter	1310 nm	≤ 0.05 dB
	1550 nm	≤ 0.10 dB

Attenuation at Water Peak:

The attenuation at the OH absorption peak (1383 ± 3 nm) is less than or equal to 1.0 dB/km.

Chromatic Dispersion:

Zero dispersion wavelength (λ_0):	1302 - 1322 nm
The maximum dispersion slope (S_0) at λ_0:	0.092 ps/nm^2-km

Dispersion at any wavelength (λ) in the range 1200 - 1600 nm may be calculated using the following equation:

$$\text{Dispersion} = D(\lambda) = S_0 \frac{\lambda}{4} \left[1 - \frac{\lambda_0^4}{\lambda^4}\right] \text{ps/nm}^2\text{-km}$$

Point Discontinuities:

There are no attenuation discontinuities greater than 0.10 dB at 1310 nm or 1550 nm.

Mode Field Diameter:

at 1310 nm	9.2 ± 0.4 µm
at 1550 nm	10.5 ± 1.0 µm (Typical)

Fiber Polarization Mode Dispersion[1]:

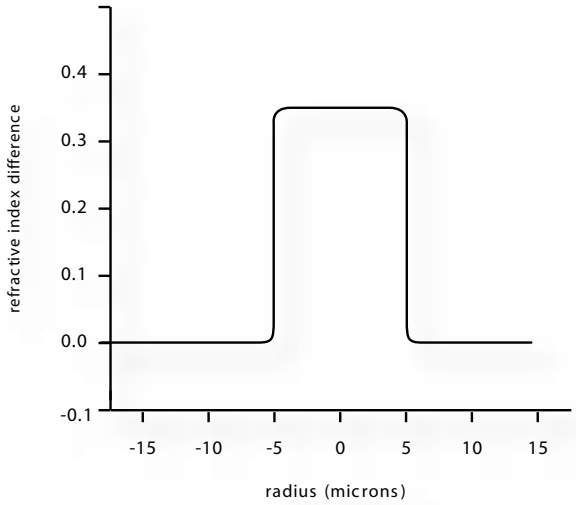
PMD Link Design Value (LDV)[2]	≤ 0.1 ps/$\sqrt{km}$
Maxium Individual Fiber	≤ 0.2 ps/$\sqrt{km}$

Cutoff Wavelength:

Fiber Cutoff Wavelength (λ_c):	1150 – 1340 nm
Cable Cutoff Wavelength (λ_{cc}):	≤ 1260 nm

[1] PMD value may change when cabled. Check with your cable manufacturer for specific PMD limits in cable form.

[2] The PMD Link Design Value complies with IEC 60794-3 Ed.3.0, Method 1, March 31, 2000, March 31, 2000 (N=24, Q=0.1%). Details are described in IEC 61282-3 TR Ed.1.0, October 27, 2000."

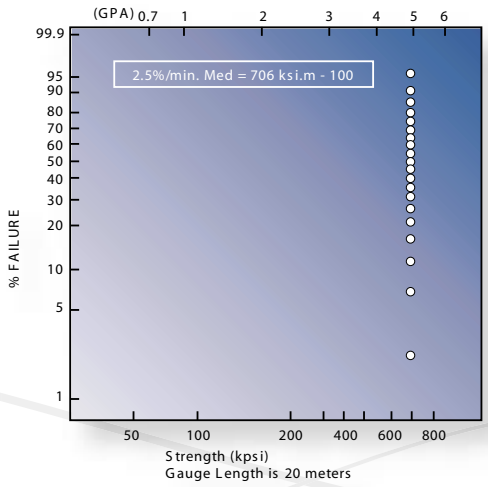


Typical Refractive Index Profile

Other Performance Characterizations:

(Values stated are typical values)

Nominal zero dispersion wavelength (λ_0) :	1312 nm
Nominal dispersion slope at λ_0:	0.088 ps/nm^2-km
Index of refraction difference between core and cladding:	0.33%
Typical Core Diameter:	8.3 µm
Effective Group Index of Refraction:	
1310 nm	1.466
1550 nm	1.467
Dynamic Fatigue Parameter (nd):	> 20
Rayleigh Backscattering Coefficient: (for 1 µs pulse width)	
1310 nm	– 49.6 dB
1550 nm	– 52.1 dB
Weight Per Unit Length:	64 grams/km



Typical Weibull Plot of Strength

Geometrical Characteristics:

Glass Geometry:	
Cladding Diameter:	125.0 ± 0.7 µm
Core/Clad Concentricity Error:	≤ 0.5 µm
Cladding Noncircularity:	≤ 1.0%
Coating Geometry:	
Coating Diameter (colored):	245 - 260 µm
Coating/Cladding Concentricity Error:	≤ 12 µm
Length:	
Standard spool lengths are:	12.6, 25.2, 37.8 and 50.4 km
Lengths cut to specific customer request are also available.	

Environmental Characteristics:

Operating Temperature Range:	– 60°C to +85°C
Temperature Dependence of Attenuation	
Induced Attenuation, –60°C to +85°C at 1310 and 1550 nm):	≤ 0.05 dB/km
Temperature – Humidity Cycling	
Induced Attenuation, –10°C to +85°C and 95% relative humidity at 1310 and 1550 nm:	≤ 0.05 dB/km
Water Immersion, 23°C	
Induced Attenuation due to Water Immersion at 23 ± 2°C at 1310 and 1550 nm:	≤ 0.05 dB/km
Accelerated Aging (Temperature), 85°C	
Induced Attenuation due to Temperature Aging at 85 ± 2°C at 1310 and 1550 nm:	≤ 0.05 dB/km
Retention of Coating Color:	
OFS coated fiber shows no discernible change in color when aged. • for 30 days at 95°C and 95% relative humidity. • for 20 days in dry heat, 125°C.	

Ordering Information:

Fiber Type:	Matched Cladding SM 332Single-Mode Fiber
Attenuation:	1310 nm maximum dB/km 1550 nm maximum dB/km
Length:	meters or kilometers
Number/Color of Spools:	# spools
Color:	If applicable

OFS' fiber is available natural (uncolored) or with distinctive color inks applied to the fiber coating. The following colors are available:

1. Blue
2. Orange
3. Green
4. Brown
5. Slate
6. White
7. Red
8. Black
9. Yellow
10. Violet
11. Rose
12. Aqua

Fibers are also available with a 900 µm PVC buffer.

Mechanical Characteristics:

Proof Test: 0.7 GPa (100 kpsi)
Higher proof test levels are available upon request.

Coating (Performance Characterization):	
Coating Strip Force (force to mechanically strip the dual coating)	≥ 1.3 N (0.3 lbf.) and < 8.9 N (2.0 lbf.)
Pullout Force (Adhesion of Coating to Glass Surface):	> 6.2 N (1.4 lbf.) and < 22.2 N (4.9 lbf.)

Fiber Curl: ≥ 2 m

Fiber Shipping Spool Mechanical Specifications:

	A	B
Flange Diameter:	23.50 cm (9.25 in.)	26.50 cm (10.43 in.)
Barrel Diameter:	15.24 cm (6.00 in.)	15.24 cm (6.00 in.)
Traverse Width:	11.94 cm (4.70 in.)	15.01 cm (5.91 in.)
Weight:	0.51 kg (1.36 lbs)	0.90 kg (1.97 lbs)

Note: Spool A is used for shipped lengths of fiber < 30 km
Spool B is used for shipped lengths of fiber ≥ 30 km

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

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