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THORLABS

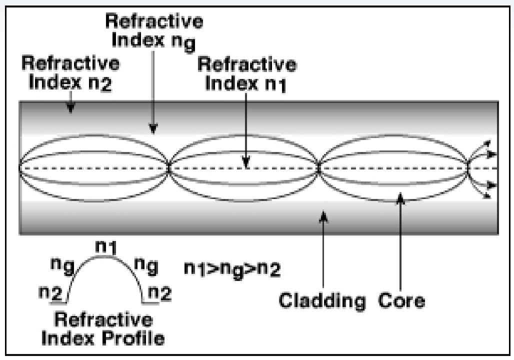
GIF625-10 - MAR 20, 2019

Item # GIF625-10 was discontinued on MAR 20,2019. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

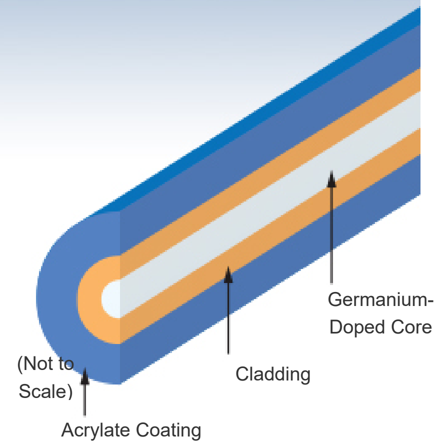
GRADED-INDEX (GRIN) MULTIMODE FIBERS

- ▶ Graded Refractive Index Profile Enables High Bandwidth
- ▶ Ø50 µm Core and Ø62.5 µm Core Options
- ▶ OM1, OM2, OM3, and OM4 Fibers Available

GIF50D



Refractive Index Profile of Graded-Index Fiber



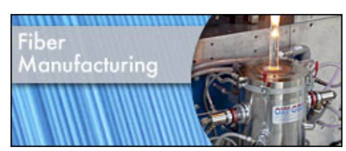
Graded-Index Multimode Fiber Cross Section

OVERVIEW

Features

- Ø50 µm Core / Ø125 µm Cladding and Ø62.5 µm Core / Ø125 µm Cladding Fibers Available
- Three Bandwidth Options (OM2, OM3, or OM4) for Ø50 µm Core Fiber (See *Specs* Tab for More Information)
- Ø62.5 µm Core Fiber Available Pre-Spooled in 10 m, 100 m, and 1000 m Lengths

Stock Patch Cables Using This Fiber			
Fiber Type	Connectors	Available Lengths	Patch Cable Item #
GIF625	FC/PC	1, 2, 3, 5, 10, 20 m	M31Lxx
GIF50C	FC/PC	1, 2, 5 m	M115Lxx
GIF50E	FC/PC	1, 2, 5 m	M116Lxx
GIF50E	FC/PC to LC/PC	1, 2, 5 m	M117Lxx



Thorlabs' graded-index (GRIN) multimode fiber provides lower modal dispersion and less bend loss than traditional multimode step-index fiber, with a broad operating wavelength range from 800 - 1600 nm (see the *Graphs* tab for attenuation plots over this range). Because of the larger core size compared to single mode fiber, these fibers provide a higher transmission capacity and are used for short-range communication networks and high-speed transmission applications. The gradient of the refractive index between the core and cladding determines the available bandwidth at a given wavelength.

Our Ø50 µm core / Ø125 µm cladding graded-index fibers provide improved transmission rates and are available with three different bandwidths (OM2, OM3, or OM4). The fiber coating is a Ø242 µm mechanically strippable acrylate coating. These fibers are particularly well suited for use in telecom applications; the bandwidth is optimized for high-performance 850 nm laser systems, but can also be used with LEDs at 850 nm or 1300 nm at a reduced bandwidth (see the *Specs* tab for more information).

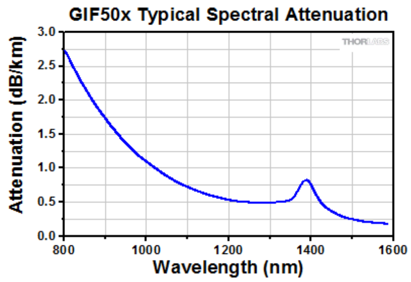
Low-loss, high-bandwidth Ø62.5 µm core / Ø125 µm cladding graded-index fiber (OM1) uses a dual-layer acrylate coating that protects against water, temperature, and humidity extremes. GIF625 fiber is offered per meter or pre-spooled in lengths of 10 m, 100 m or 1 km.

SPECS

Item #		GIF50C	GIF50D	GIF50E	GIF625
Geometrical and Physical Specifications					
Core Diameter		50.0 ± 2.5 µm			62.5 ± 2.5 µm
Cladding Diameter		125.0 ± 1.0 µm			125 ± 1 µm
Coating Diameter		242 ± 5 µm			245 ± 10 nm
Core Non-Circularity		≤5%			≤5%
Cladding Non-Circularity		≤1.0%			≤1%
Coating Non-Circularity		-			≤5%
Core-Cladding Concentricity[a]		≤1.5 µm			≤8 µm
Coating-Cladding Concentricity		<12 µm			-
Core Doping		Germanium			Germanium
Coating Material		Acrylate			Acrylate
Proof Test		≥100 kpsi			≥100 kpsi
Core Index		Proprietary[b]			Proprietary[b]
Cladding Index		Proprietary[b]			Proprietary[b]
Operating Temperature		-60 to 85 °C			-60 to 85 °C
Optical Specifications					
Operating Wavelength		800 - 1600 nm			800 - 1600 nm
Numerical Aperture		0.200 ± 0.015			0.275 ± 0.015
Optical Multimode (OM) Type		OM2	OM3	OM4	OM1
Bandwidth	**High-Performance EMB (@ 850 nm)[c]**	950 MHz•km	2000 MHz•km	4700 MHz•km	-
	Overfilled Modal Bandwidth[d]	700 MHz•km @ 850 nm 500 MHz•km @ 1300 nm	1500 MHz•km @ 850 nm 500 MHz•km @ 1300 nm	3500 MHz•km @ 850 nm 500 MHz•km @ 1300 nm	≥200 MHz•km @ 850 nm ≥500 MHz•km @ 1300 nm
Attenuation		≤2.3 dB/km @ 850 nm ≤0.6 dB/km @1300 nm			≤2.9 dB/km @ 850 nm ≤0.6 dB/km @ 1300 nm
Macrobend Attenuation		-			100 Turns on a Ø75 mm Mandrel: ≤0.5 dB @ 850 nm and @ 1300 nm
Effective Group Index of Refraction		1.482 @ 850 nm 1.477 @ 1300 nm			1.496 @ 850 nm 1.491 @ 1300 nm
Zero Dispersion Wavelength		1295 nm (Min) 1315 nm (Max)			1320 nm (Min) 1365 nm (Max)
Zero Dispersion Slope		≤0.101 ps/(nm^2•km)			≤0.11 ps/(nm^2•km)

- This is also known as the core-cladding offset.
- We regret that we cannot provide this proprietary information.
- For high-performance laser systems, ensured via minEMBc per TIA/EIA 455-220A and IEC 60793-1-49.
- For LED sources overfilling the fiber. OFL BW, per TIA/EIA 455-220A and IEC 60793-1-41. For more information on overfilling, please see the *Launch Conditions* section of our Multimode Fiber Tutorial.

GRAPHS



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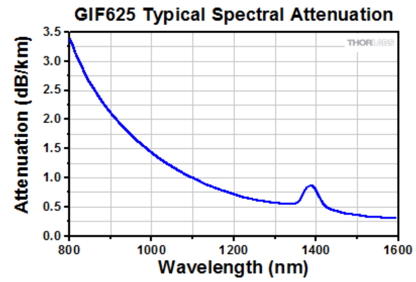

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DAMAGE THRESHOLD

Laser-Induced Damage in Silica Optical Fibers

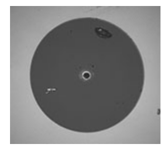
Quick Links
Damage at the Air / Glass Interface
Intrinsic Damage Threshold
Preparation and Handling of Optical Fibers

The following tutorial details damage mechanisms relevant to unterminated (bare) fiber, terminated optical fiber, and other fiber components from laser light sources. These mechanisms include damage that occurs at the air / glass interface (when free-space coupling or when using connectors) and in the optical fiber itself. A fiber component, such as a bare fiber, patch cable, or fused coupler, may have multiple potential avenues for damage (e.g., connectors, fiber end faces, and the device itself). The maximum power that a fiber can handle will always be limited by the lowest limit of any of these damage mechanisms.

While the damage threshold can be estimated using scaling relations and general rules, absolute damage thresholds in optical fibers are very application dependent and user specific. Users can use this guide to estimate a safe power level that minimizes the risk of damage. Following all appropriate preparation and handling guidelines, users should be able to operate a fiber component up to the specified maximum power level; if no maximum is specified for a component, users should abide by the "practical safe level" described below for safe operation of the component. Factors that can reduce power handling and cause damage to a fiber component include, but are not limited to, misalignment during fiber coupling, contamination of the fiber end face, or imperfections in the fiber itself. For further discussion about an optical fiber's power handling abilities for a specific application, please contact Thorlabs' Tech Support.

Damage at the Air / Glass Interface

There are several potential damage mechanisms that can occur at the air / glass interface. Light is incident on this interface when free-space coupling or when two fibers are mated using optical connectors. High-intensity light can damage the end face leading to reduced power handling and permanent damage to the fiber. For fibers terminated with optical connectors where the connectors are fixed to the fiber ends using epoxy, the heat generated by high-intensity light can burn the epoxy and leave residues on the fiber facet directly in the beam path.


Click to Enlarge
Damaged Fiber End


Click to Enlarge
Undamaged Fiber End

Damage Mechanisms on the Bare Fiber End Face

Damage mechanisms on a fiber end face can be modeled similarly to bulk optics, and industry-standard damage thresholds for UV Fused Silica substrates can be applied to silica-based fiber. However, unlike bulk optics, the relevant surface areas and beam diameters involved at the air / glass interface of an optical fiber are very small, particularly for coupling into single mode (SM) fiber. therefore, for a given power density, the power incident on the fiber needs to be lower for a smaller beam diameter.

The table to the right lists two thresholds for optical power densities: a theoretical damage threshold and a "practical safe level". In general, the theoretical damage threshold represents the estimated maximum power density that can be incident on the fiber end face without risking damage with very good fiber end face and coupling conditions. The "practical safe level" power density represents minimal risk of fiber damage. Operating a fiber or component beyond the practical safe level is possible, but users must follow the appropriate handling instructions and verify performance at low powers prior to use.

Estimated Optical Power Densities on Air / Glass Interface[a]

Type	Theoretical Damage Threshold[b]	Practical Safe Level[c]
CW (Average Power)	~1 MW/cm^2	~250 kW/cm^2
10 ns Pulsed (Peak Power)	~5 GW/cm^2	~1 GW/cm^2

- All values are specified for unterminated (bare) silica fiber and apply for free space coupling into a clean fiber end face.
- This is an estimated maximum power density that can be incident on a fiber end face without risking damage. Verification of the performance and reliability of fiber components in the system before operating at high power must be done by the user, as it is highly system dependent.
- This is the estimated safe optical power density that can be incident on a fiber end face without damaging the fiber under most operating conditions.

Calculating the Effective Area for Single Mode and Multimode Fibers

The effective area for single mode (SM) fiber is defined by the mode field diameter (MFD), which is the cross-sectional area through which light propagates in the fiber; this area includes the fiber core and also a portion of the cladding. To achieve good efficiency when coupling into a single mode fiber, the diameter of the input beam must match the MFD of the fiber.

As an example, SM400 single mode fiber has a mode field diameter (MFD) of ~Ø3 µm operating at 400 nm, while the MFD for SMF-28 Ultra single mode fiber operating at 1550 nm is Ø10.5 µm. The effective area for these fibers can be calculated as follows:

SM400 Fiber: Area = Pi x (MFD/2)^2 = Pi x (1.5 µm)^2 = 7.07 µm^2 = 7.07 x 10^{-8} cm^2

SMF-28 Ultra Fiber: Area = Pi x (MFD/2)^2 = Pi x (5.25 µm)^2 = 86.6 µm^2 = 8.66 x 10^{-7} cm^2

To estimate the power level that a fiber facet can handle, the power density is multiplied by the effective area. Please note that this calculation assumes a uniform intensity profile, but most laser beams exhibit a Gaussian-like shape within single mode fiber, resulting in a higher power density at the center of the beam compared to the edges. Therefore, these calculations will slightly overestimate the power corresponding to the damage threshold or the practical safe level. Using the estimated power densities assuming a CW light source, we can determine the corresponding power levels as:

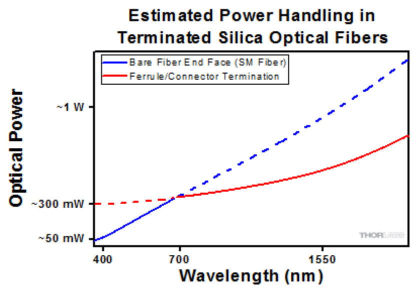
SM400 Fiber: 7.07 x 10^{-8} cm^2 x 1 MW/cm^2 = 7.1 x 10^{-8} MW = 71 mW (Theoretical Damage Threshold)
7.07 x 10^{-8} cm^2 x 250 kW/cm^2 = 1.8 x 10^{-5} kW = 18 mW (Practical Safe Level)

SMF-28 Ultra Fiber: 8.66 x 10^{-7} cm^2 x 1 MW/cm^2 = 8.7 x 10^{-7} MW = 870 mW (Theoretical Damage Threshold)
8.66 x 10^{-7} cm^2 x 250 kW/cm^2 = 2.1 x 10^{-4} kW = 210 mW (Practical Safe Level)

The effective area of a multimode (MM) fiber is defined by the core diameter, which is typically far larger than the MFD of an SM fiber. For optimal coupling, Thorlabs recommends focusing a beam to a spot roughly 70 - 80% of the core diameter. The larger effective area of MM fibers lowers the power density on the fiber end face, allowing higher optical powers (typically on the order of kilowatts) to be coupled into multimode fiber without damage.

Damage Mechanisms Related to Ferrule / Connector Termination

Fibers terminated with optical connectors have additional power handling considerations. Fiber is typically terminated using epoxy to bond the fiber to a ceramic or steel ferrule. When light is coupled into the fiber through a connector, light that does not enter the core and propagate down the fiber is scattered into the outer layers of the fiber, into the ferrule, and the epoxy used to hold the fiber in the ferrule. If the light is intense enough, it can burn the epoxy, causing it to vaporize and deposit a residue on the face of the connector. This results in localized absorption sites on the fiber end face that reduce coupling efficiency and increase scattering, causing further damage.



Click to Enlarge
Plot showing approximate input power that can be incident on a single mode silica optical fiber with a termination. Each line shows the estimated power level due to a specific damage mechanism. The maximum power handling is limited by the lowest power level from all relevant damage mechanisms (indicated by a solid line).

For several reasons, epoxy-related damage is dependent on the wavelength. In general, light scatters more strongly at short wavelengths than at longer wavelengths. Misalignment when coupling is also more likely due to the small MFD of short-wavelength SM fiber that also produces more scattered light.

To minimize the risk of burning the epoxy, fiber connectors can be constructed to have an epoxy-free air gap between the optical fiber and ferrule near the fiber end face. Our high-power multimode fiber patch cables use connectors with this design feature.

Determining Power Handling with Multiple Damage Mechanisms

When fiber cables or components have multiple avenues for damage (e.g., fiber patch cables), the maximum power handling is always limited by the lowest damage threshold that is relevant to the fiber component. In general, this represents the highest input power that can be incident on the patch cable end face and not the coupled output power.

As an illustrative example, the graph to the right shows an estimate of the power handling limitations of a single mode fiber patch cable due to damage to the fiber end face and damage via an optical connector. The total input power handling of a terminated fiber at a given wavelength is limited by the lower of the two limitations at any given wavelength (indicated by the solid lines). A single mode fiber operating at around 488 nm is primarily limited by damage to the fiber end face (blue solid line), but fibers operating at 1550 nm are limited by damage to the optical connector (red solid line).

In the case of a multimode fiber, the effective mode area is defined by the core diameter, which is larger than the effective mode area for SM fiber. This results in a lower power density on the fiber end face and allows higher optical powers (on the order of kilowatts) to be coupled into the fiber without damage (not shown in graph). However, the damage limit of the ferrule / connector termination remains unchanged and as a result, the maximum power handling for a multimode fiber is limited by the ferrule and connector termination.

Please note that these are rough estimates of power levels where damage is very unlikely with proper handling and alignment procedures. It is worth noting that optical fibers are frequently used at power levels above those described here. However, these applications typically require expert users and testing at lower powers first to minimize risk of damage. Even still, optical fiber components should be considered a consumable lab supply if used at high power levels.

Intrinsic Damage Threshold

In addition to damage mechanisms at the air / glass interface, optical fibers also display power handling limitations due to damage mechanisms within the optical fiber itself. These limitations will affect all fiber components as they are intrinsic to the fiber itself. Two categories of damage within the fiber are damage from bend losses and damage from photodarkening.

Bend Losses

Bend losses occur when a fiber is bent to a point where light traveling in the core is incident on the core/cladding interface at an angle higher than the critical angle, making total internal reflection impossible. Under these circumstances, light escapes the fiber, often in a localized area. The light escaping the fiber typically has a high power density, which burns the fiber coating as well as any surrounding furcation tubing.

A special category of optical fiber, called double-clad fiber, can reduce the risk of bend-loss damage by allowing the fiber's cladding (2nd layer) to also function as a waveguide in addition to the core. By making the critical angle of the cladding/coating interface higher than the critical angle of the core/clad interface, light that escapes the core is loosely confined within the cladding. It will then leak out over a distance of centimeters or meters instead of at one localized spot within the fiber, minimizing the risk of damage. Thorlabs manufactures and sells 0.22 NA double-clad multimode fiber, which boasts very high, megawatt range power handling.

Photodarkening

A second damage mechanism, called photodarkening or solarization, can occur in fibers used with ultraviolet or short-wavelength visible light, particularly those with germanium-doped cores. Fibers used at these wavelengths will experience increased attenuation over time. The mechanism that causes photodarkening is largely unknown, but several fiber designs have been developed to mitigate it. For example, fibers with a very low hydroxyl ion (OH) content have been found to resist photodarkening and using other dopants, such as fluorine, can also reduce photodarkening.

Even with the above strategies in place, all fibers eventually experience photodarkening when used with UV or short-wavelength light, and thus, fibers used at these wavelengths should be considered consumables.

Preparation and Handling of Optical Fibers

General Cleaning and Operation Guidelines

These general cleaning and operation guidelines are recommended for all fiber optic products. Users should still follow specific guidelines for an individual product as outlined in the support documentation or manual. Damage threshold calculations only apply when all appropriate cleaning and handling procedures are followed.

1. All light sources should be turned off prior to installing or integrating optical fibers (terminated or bare). This ensures that focused beams of light are not incident on fragile parts of the connector or fiber, which can possibly cause damage.

2. The power-handling capability of an optical fiber is directly linked to the quality of the fiber/connector end face. Always inspect the fiber end prior to connecting the fiber to an optical system. The fiber end face should be clean and clear of dirt and other contaminants that can cause scattering of coupled light. Bare fiber should be cleaved prior to use and users should inspect the fiber end to ensure a good quality cleave is achieved.

3. If an optical fiber is to be spliced into the optical system, users should first verify that the splice is of good quality at a low optical power prior to high-power use. Poor splice quality may increase light scattering at the splice interface, which can be a source of fiber damage.

4. Users should use low power when aligning the system and optimizing coupling; this minimizes exposure of other parts of the fiber (other than the core) to light. Damage from scattered light can occur if a high power beam is focused on the cladding, coating, or connector.

Tips for Using Fiber at Higher Optical Power

Optical fibers and fiber components should generally be operated within safe power level limits, but under ideal conditions (very good optical alignment and very clean optical end faces), the power handling of a fiber component may be increased. Users must verify the performance and stability of a fiber component within their system prior to increasing input or output power and follow all necessary safety and operation instructions. The tips below are useful suggestions when considering increasing optical power in an optical fiber or component.

1. Splicing a fiber component into a system using a fiber splicer can increase power handling as it minimizes possibility of air/fiber interface damage. Users should follow all appropriate guidelines to prepare and make a high-quality fiber splice. Poor splices can lead to scattering or regions of highly localized heat at the splice interface that can damage the fiber.

2. After connecting the fiber or component, the system should be tested and aligned using a light source at low power. The system power can be ramped up slowly to the desired output power while periodically verifying all components are properly aligned and that coupling efficiency is not changing with respect to optical launch power.

3. Bend losses that result from sharply bending a fiber can cause light to leak from the fiber in the stressed area. When operating at high power, the localized heating that can occur when a large amount of light escapes a small localized area (the stressed region) can damage the fiber. Avoid disturbing or accidently bending fibers during operation to minimize bend losses.

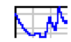
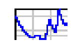
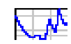
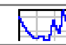
4. Users should always choose the appropriate optical fiber for a given application. For example, large-mode-area fibers are a good alternative to standard single mode fibers in high-power applications as they provide good beam quality with a larger MFD, decreasing the power density on the air/fiber interface.

5. Step-index silica single mode fibers are normally not used for ultraviolet light or high-peak-power pulsed applications due to the high spatial power densities associated with these applications.

MM FIBER SELECTION

Thorlabs offers multimode bare optical fiber with silica, zirconium fluoride (ZrF_4), or indium fluoride (InF_3) cores. The table below details all of Thorlabs' multimode bare optical fiber offerings. Attenuation plots can be found by clicking the graph icons in the column to the right.

Index Profile	NA	Fiber Type	Item #	Core Size	Wavelength Range	Attenuation (Click for Graph)
Step Index	0.100	Fluorine-Doped Cladding, Enhanced Coating View These Fibers	FG010LDA	Ø10 µm	400 to 550 nm and 700 to 1000 nm	
			FG025LJA	Ø25 µm	400 to 550 nm and 700 to 1400 nm	
			FG105LVA	Ø105 µm	400 to 2100 nm (Low OH)	
	0.22	Glass-Clad Slilca Multimode Fiber View These Fibers	FG050UGA	Ø50 µm	250 to 1200 nm (High OH)	
			FG105UCA	Ø105 µm		
			FG200UEA	Ø200 µm		
			FG050LGA	Ø50 µm	400 to 2400 nm (Low OH)	
			FG105LCA	Ø105 µm		
			FG200LEA	Ø200 µm		
		High Power Double TECS / Silica Cladding Multimode Fiber View These Fibers	FG200UCC	Ø200 µm	250 to 1200 nm (High OH)	
			FG273UEC	Ø273 µm		
			FG365UEC	Ø365 µm		
			FG550UEC	Ø550 µm		
			FG910UEC	Ø910 µm		
			FG200LCC	Ø200 µm	400 to 2200 nm (Low OH)	
			FG273LEC	Ø273 µm		
			FG365LEC	Ø365 µm		
			FG550LEC	Ø550 µm		
			FG910LEC	Ø910 µm		
		Solarization-Resistant Multimode Fiber for UV Use View These Fibers	FG105ACA	Ø105 µm	180 to 1200 nm Acrylate Coating for Ease of Handling	
			FG200AEA	Ø200 µm		
			FG300AEA	Ø300 µm		
			FG400AEA	Ø400 µm		
			FG600AEA	Ø600 µm		
			UM22-100	Ø100 µm	180 to 850 nm Polyimide Coating for Use up to 300 °C	
			UM22-200	Ø200 µm		
			UM22-300	Ø300 µm		
			UM22-400	Ø400 µm		
			UM22-600	Ø600 µm		
	0.39	High Power TECS Cladding Multimode Fiber View These Fibers	FT200UMT	Ø200 µm	300 to 1200 nm (High OH)	
			FT300UMT	Ø300 µm		
			FT400UMT	Ø400 µm		
			FT600UMT	Ø600 µm		
			FT800UMT	Ø800 µm		
			FT1000UMT	Ø1000 µm		
			FT1500UMT	Ø1500 µm		
			FT200EMT	Ø200 µm	400 to 2200 nm (Low OH)	
			FT300EMT	Ø300 µm		
			FT400EMT	Ø400 µm		
			FT600EMT	Ø600 µm		
			FT800EMT	Ø800 µm		
			FT1000EMT	Ø1000 µm		
			FT1500EMT	Ø1500 µm		
		Square-Core Multimode Fiber View These Fibers	FP150QMT	150 µm x 150 µm	400 to 2200 nm (Low OH)	

Index Profile	NA	Fiber Type	Item #	Core Size	Wavelength Range	Attenuation (Click for Graph)
	0.50	High NA Multimode Fiber View These Fibers	FP200URT	Ø200 µm	300 to 1200 nm (High OH)	
			FP400URT	Ø400 µm		
			FP600URT	Ø600 µm		
			FP1000URT	Ø1000 µm		
			FP1500URT	Ø1500 µm		
			FP200ERT	Ø200 µm	400 to 2200 nm (Low OH)	
			FP400ERT	Ø400 µm		
			FP600ERT	Ø600 µm		
			FP1000ERT	Ø1000 µm		
			FP1500ERT	Ø1500 µm		
	0.20	Mid-IR Fiber with Zirconium Fluoride (ZrF_4) Core View These Fibers		Various Sizes Between Ø100 µm and Ø600 µm	285 nm to 4.5 µm	
	0.26	Mid-IR Fiber with Indium Fluoride (InF_3) Core View These Fibers		Ø100 µm	310 nm to 5.5 µm	
Graded Index	0.20	Graded-Index Fiber for Low Bend Loss View These Fibers	GIF50C	Ø50 µm	800 to 1600 nm	
			GIF50D			
			GIF50E			
	0.275		GIF625	Ø62.5 µm	800 to 1600 nm	

Ø50 µm Core / Ø125 µm Cladding Fiber

Part Number	Description	Price	Availability
GIF50C	**Graded-Index Multimode Fiber, Ø50 µm Core / Ø125 µm Cladding, OM2 , 0.200 NA**	**$1.29** **Per Meter** **Volume Pricing Available**	**Today**
GIF50D	**Graded-Index Multimode Fiber, Ø50 µm Core / Ø125 µm Cladding, OM3, 0.200 NA**	**$1.29** **Per Meter** **Volume Pricing Available**	**Today**
GIF50E	**Graded-Index Multimode Fiber, Ø50 µm Core / Ø125 µm Cladding, OM4, 0.200 NA**	**$1.29** **Per Meter** **Volume Pricing Available**	**Today**

Ø62.5 µm Core / Ø125 µm Cladding Fiber

Part Number	Description	Price	Availability
GIF625	**Graded-Index Multimode Fiber, Ø62.5 µm Core / Ø125 µm Cladding, OM1, 0.275 NA**	**$1.29** **Per Meter** **Volume Pricing Available**	**Today**
GIF625-10	**Graded-Index Multimode Fiber, Ø62.5 µm Core / Ø125 µm Cladding, OM1, 0.275 NA, 10 Meters**	**$13.24**	**Today**
GIF625-100	**Graded-Index Multimode Fiber, Ø62.5 µm Core / Ø125 µm Cladding, OM1, 0.275 NA, 100 Meters**	**$77.49**	**Today**
GIF625-1000	**Graded-Index Multimode Fiber, Ø62.5 µm Core / Ø125 µm Cladding, OM1, 0.275 NA, 1000 Meters**	**$408.68**	**Today**

Visit the *Graded-Index (GRIN) Multimode Fibers* page for pricing and availability information:
https://www.thorlabs.com/newgrouppage9.cfm?objectgroup_id=358