



LE VERRE FLUORÉ

INFRARED SOLUTIONS

CATALOG





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Since 1985, Le Verre Fluoré is the undisputed leader of fluoride glass technology. In addition to the definition of the classical ZBLAN glass (1979), it also produced the first fluoroindate glass fibers (1992), the first singlemode fluoride fibers, the first laser fibers, and the first polarization maintaining fibers.

For fiber lasers, double core fibers have been developed, and also rectangular and D-shaped core fibers. A variety of rare earth doped fibers have been manufactured, including those with large lanthanide concentrations (up to 10 %).

Le Verre Fluoré has reported the record values of the lowest attenuations in fluoride fibers:

- 1.04 dB/km at 2.56 μm in ZBLAN,
- 15 dB/km at 2.5 and 3.5 μm for fluoroindate fibers.

LE VERRE FLUORÉ DESIGNS, DEVELOPS, MANUFACTURES AND SUPPLIES:

Low Loss Fluoride Glass IRguide® fibers & cables

Zirconium fluoride based (ZFG) Indium fluoride based (IFG) and Aluminium Fluoride based (AFG)

- Operating wavelength: 0,3-4,5 μm to 0,3-5,5 μm
- Fiber types:
 - Multimode
 - Single-mode
 - Double clad
 - Rare Earth-doped (up to 100 000 ppm)
 - Polarization-Maintaining
 - Low birefringence
 - On demand core/cladding profile
- Custom IR fiber development

Le Verre Fluoré provides the most transparent fluoride fibers of the market.

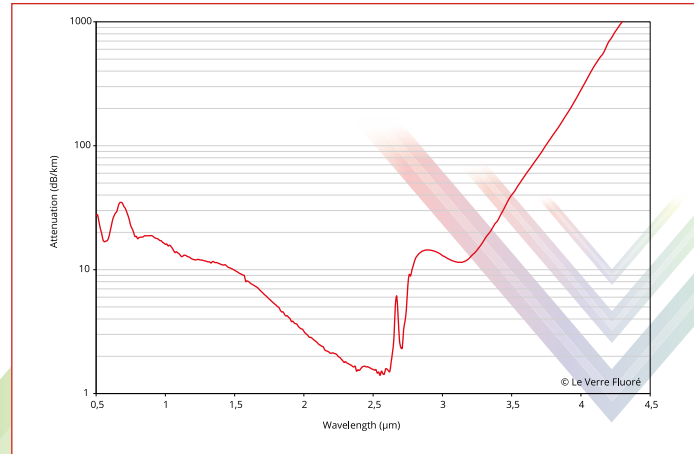
IRguide® components & assemblies

- Vis-IR Fiber assemblies
- High fill factor coherent & incoherent IR Fiber bundles
- IR fiber feedthrough; IR flow cell
- Components and Assemblies for Astronomy & Spectrometry:
Dispersion balanced fiber link,
Polarization rotator, Broadband IR coupler, Focal plane dissector, Fiber Optic Delay Line
- Beam combiner
Ex.: FLUOR (Fiber Link Unit for Optical Recombination) installed on Mount Wilson Observatory (CA)

Standard ZFG multimode IRguide® fibers

Fiber	Operating wavelength	Ø Core	Ø Clad	Ø Coating	NA	Attenuation	Bending radius	Operating Temperature
ZFG	0,3 - 4,3µm	100 µm	150 µm	220 µm	0,2	≤ 0,05 dB/m [0,3 - 3,4 µm] ≤ 0,1 dB/m [3,4 - 3,6 µm] ≤ 1 dB/m [3,6 - 4,3 µm]	≥ 50mm	-180°C to 150°C
		200 µm	250 µm	340 µm				
		300 µm	350 µm	500 µm				
		400 µm	450 µm	610 µm				

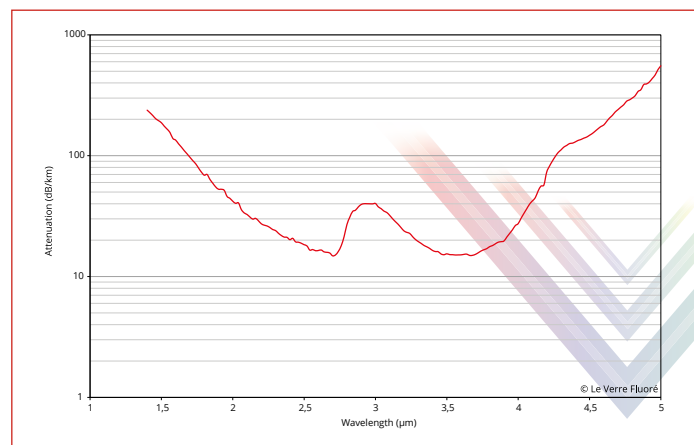
Typical 200/250 µm ZFG multimode fiber attenuation



Standard IFG multimode IRguide® fibers

Fiber	Operating wavelength	Ø Core	Ø Clad	Ø Coating	NA	Attenuation	Bending radius	Operating Temperature
IFG	0,3 - 5,3µm	130 µm	200 µm	250 µm	0,3	≤ 0,05 dB/m [2 - 4.1 µm] ≤ 0,1 dB/m [1.7 - 4.3 µm] ≤ 1 dB/m [0,3 - 5,3 µm]	≥ 50mm	-180°C to 150°C
		200 µm	250 µm	340 µm				

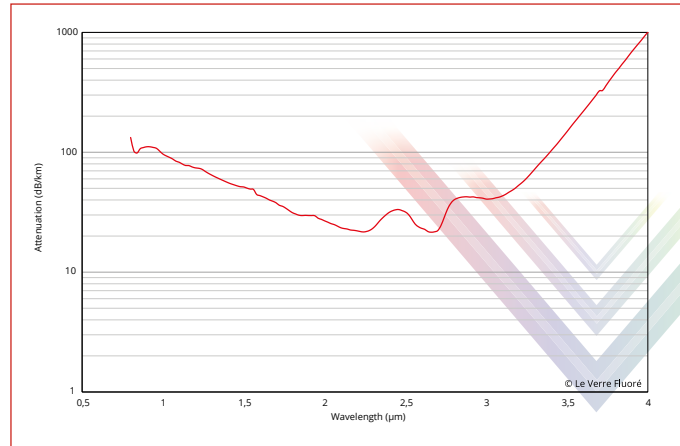
Typical 200/250 µm IFG multimode fiber attenuation



Standard AFG multimode IRguide® fibers

Fiber	Operating wavelength	Ø Core	Ø Clad	Ø Coating	NA	Attenuation	Bending radius	Operating Temperature
AFG	0,3 - 4µm	200 µm	250 µm	340 µm	0,2	$\leq 0,06$ dB/m [1.7 - 3.1 µm] $\leq 0,1$ dB/m [1.2 - 3.3 µm] ≤ 1 dB/m [0,3 - 4 µm]	≥ 50 mm	-180°C to 150°C
		450 µm	480 µm	600 µm	0,2			
		200 µm	250 µm	275 µm	0,3			

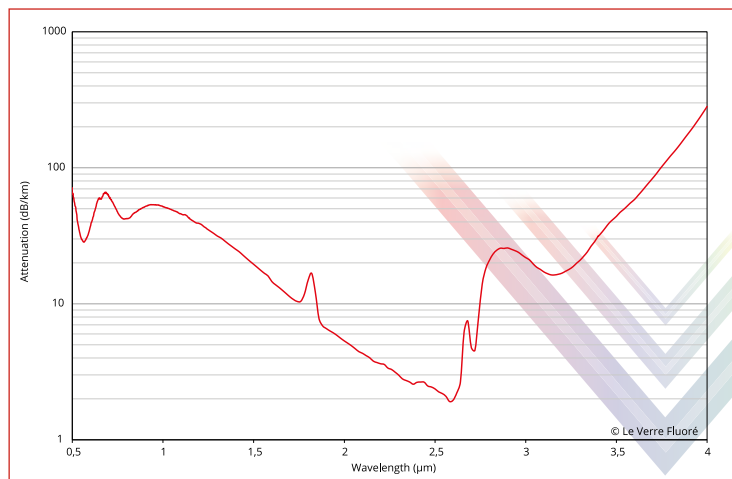
Typical 200/250 µm AFG multimode fiber attenuation



Standard ZFG single mode IRguide® fibers

Fiber	Operating wavelength	Ø Core	Ø Clad	Ø Coating	NA	Attenuation	Cutoff wavelength	Bending radius	Operating Temperature
ZFG	0,3 - 4,3 µm	6,5 µm	125 µm	200 µm	0,23	$\leq 0,05$ dB/m [2 - 3,4µm] $\leq 0,1$ dB/m [3,4 - 3,6µm] ≤ 1 dB/m [3,6 - 4,3µm]	1,95 µm	≥ 20 mm	-180°C to 150°C

Typical 6,5/125 µm ZFG single mode fiber attenuation



On demand single mode and multimode IRguide® fibers

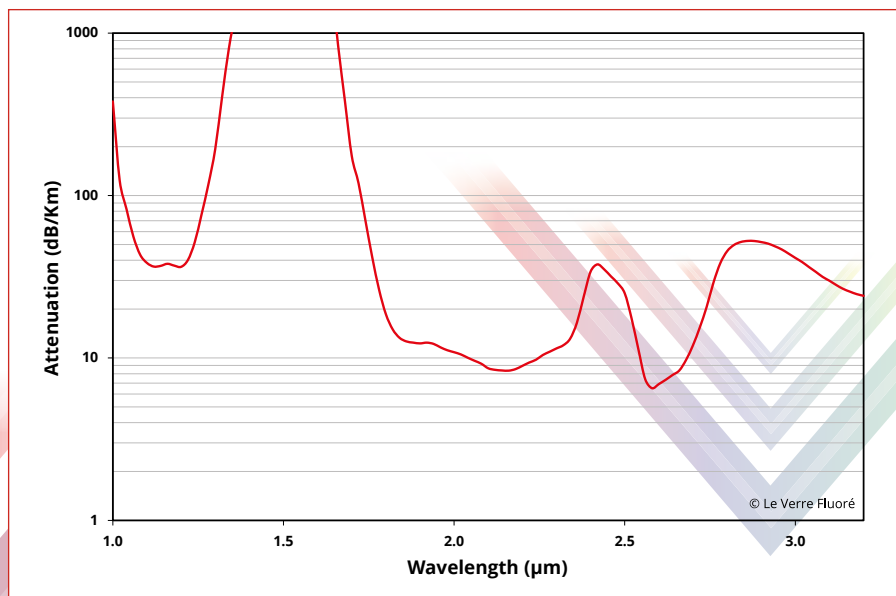
Fiber type	Ø Core	Core type	NA	Dopant (concentration up to 100 000 ppm)
Multimode	50 to 1000 µm	Circular, D shape, hexagonal, octogonal	0,12 to 0,35	Ce, Pr, Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm, Yb
Single mode	1 to 20 µm	Circular	0,1 to 0,35	

Single mode double clad doped IRguide® fibers

Those fibers can generate laser with rare earth dopants (up to 10% concentration).

Ø Core	NA	Dopant (concentration up to 100 000 ppm)	2nd core shape
1 to 20 µm	0,1 to 0,35	Ce, Pr, Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm, Yb	D shape, parallel, etc....

Typical double core singlemode 7% Er doped ZFG attenuation



Polarization maintaining fibers

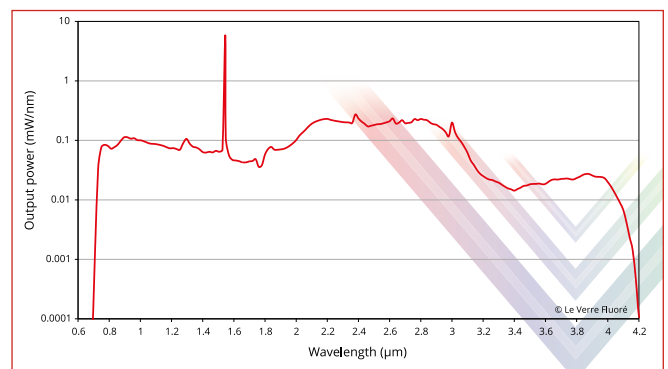
Le Verre Fluoré has designed a special polarization maintaining fiber.

Cable specifications

Each of our fibers can be wired with standard connectors, and waterproof protections :

Cable type	Connector	Cable structure	Cable length	Core shift
Multimode	SMA, FC/PC	Kevlar, stainless steel	0 – 50 m	<5 μm
Single mode	FC/PC, FC/APC, E2000			<0,5 μm

Broadband SuperContinuum IR Source



Features

- High brightness single-mode IR beam
- Outstanding wavelength coverage

Specifications

Wavelength coverage	800 – 4000 nm
Output power	> 400 mW
Beam quality	TEM00 Gaussian beam
Repetition rate	100 kHz
Output coupling	FC/APC connector

Applications

- IR spectrometry
- IR Countermeasure
- Spectral fingerprinting
- Hyperspectral imagery
- Research & Development
- Your application



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