

SPECIALTY FIBERS

& COMPONENTS

exail



**Specialty fibers
and components
for demanding
applications**

With over 25 years of expertise in fiber design and manufacturing, Exail develops high-performance specialty fibers and components for the most demanding industrial applications. Produced in environmentally controlled facilities in Lannion, France, our fibers meet the highest standards of proof strength, dimensional tolerance, and optical quality. From telecom and sensing to space, defense, and fiber lasers, Exail delivers reliable solutions engineered to perform in the most demanding operating conditions. Our ISO 9001-certified production lines, expanded technical teams, and collaborative customer approach ensure each solution is tailored to application needs, from early design to full-scale production.

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Your challenge, our dedicated and custom solutions.

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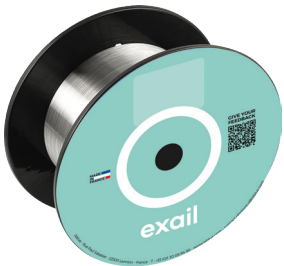
Our sales and technical team is ready to assist you. For any request, feel free to contact us:
contact.photonics@exail.com

LASER & AMPLIFIER FIBERS

Exail develops a full range of doped optical fibers dedicated to a wide range of fiber laser designs and applications.

Main specifications

Number of Claddings	Single, Double, Triple Clad
Active Doping	Er, Yb, Er/Yb, Tm, Ho, Tm/Ho, Nd P-doped for Raman Amplifier
Core Diameter	up to 30 μm , LMA
Polarization Maintaining	Panda design available



Applications

- Lidar
- High power continuous and pulsed lasers or amplifiers
- 0.9 μm femtoseconds laser sources
- 1 μm industrial lasers
- 1.5 and 2 μm Eye-safe lasers
- CATV and telecom amplifiers
- Space grade amplifiers and lasers

Key features

- Highest efficiency Er/Yb fibers on the market
- High temperature coating
- WW distance record for coherent Lidar for wind measurement
- First PM Neodymium LMA fiber
- More than 15 years experience in Radiation Resistant Doped fiber
- TRL9 Erbium doped fiber
- E-store for fast delivery from stock

Focus on



The need for new Earth and universe observation satellites is becoming more and more important, with new challenges in this very hostile space environment where components are exposed to ionizing radiation. Longer missions, very distant satellite for deep space sensing, and new telecommunication demands necessitate stronger photonic devices and components to withstand ionizing radiation.

Exail has produced more than 20 flying navigation systems that are equipped with our fibers and components. We have developed a strong experience in the qualification of such devices in collaboration with end users as well as National Space and Nuclear agency for the last 15 years.

OPTICAL FIBER SENSORS

For more than 15 years, Exail has developed a large experience in the use of optical fibers in extreme conditions from undersea to space environments including medical to aerospace applications. Exail is now offering a large variety of beyond standards fiber for various applications.

Fibers Type	Cladding diameter (µm)	Wavelength range (nm)	PM designs	Key features
PM Gyro Fibers 	40-80	820 to 1550	Tiger Panda	• No twist for easy coil winding • Low PER fluctuation over wide temperature range • Space grade available • Reduced coating, acrylate and silicon coating available
Polarizing Fibers 	80-125	780 to 1550	Tiger	• > 100 nm polarizing window • > 30 dB extinction ratio • Available as bare fiber, polarizer, full assembly
Spun Fibers 	8-125	1310 to 1550	Tiger Elliptical Core	• Matched PM fiber for current sensors available • EC for low temperature dependence application
Photosensitive Fibers 	80-125	1000 to 1600	Optional	• Cladding Mode Free • Low residual birefringence and twist • PM versions available
Harsh Environments 	125-600	350 to 1600	Optional	• Singlemode and multimode fibers • Radiation-hardened designs • Cryogenic to +400 °C operation with advanced coating materials, including polyimide and aluminum

Focus on



Since its inception, Exail has been manufacturing fibers for its own fiber-optic gyroscopes (FOG). Today, Exail is a globally recognized manufacturer of FOG-based inertial navigation systems and equips systems in various markets

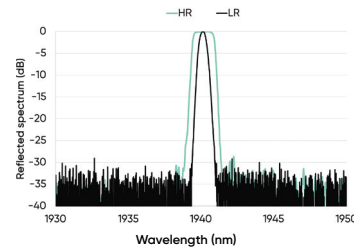
and environments: space, energy, naval and land defense or volcanology. Exail's products are operating from the deepest oceans to outer space (-6 km up to 1,600,000 km).

FIBER BRAGG GRATINGS

Whether you need to select a particular wavelength, flatten the gain on a WDM or shape a spectrum to your particular requirements, Exail's components are suited for the most advanced needs. In addition, Exail provides on demand athermal or dissipative packages.

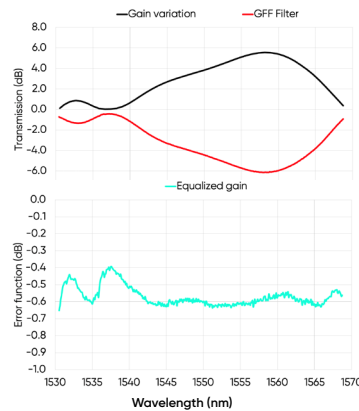
FBG laser mirrors pairs

- All fiber types: single, double or triple clads; PM
- From 600 to 2100 nm
- HR reflectivity up to 99.9%
- HR FWHM from 0.5 to 1.5 nm



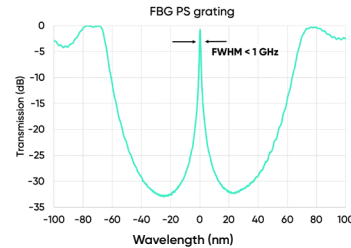
Gain flattening filters

- Low reflection slanted GFF for Terrestrial and Submarine grades
- Available in recoat, athermal or non-athermal package
- C&L bands
- PM version available



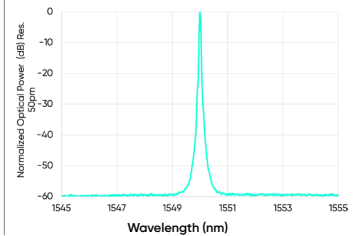
Ultra-narrow bandwidth filters

- Narrow band: < 1 GHz bandwidth filter
- Low Insertion Loss
- Fine adjustment of central wavelength
- Athermal packaging available

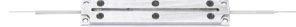


Low linewidth single frequency lasers (DFB)

- Combination of Exail doped fibers and FBG technologies
- 1.5 and 2 μm available
- 0.1 kHz linewidth
- Up to 40 mW output power

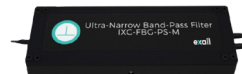


Focus on



High power mirrors (100 W to 1kW signal)

- High Power Mirror Laser cavity at 1, 1.5 and 2 μm
- Improved thermal slope by a factor of ten
- Custom specifications available



Ultra-narrow band-pass filter module

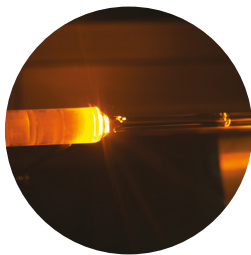
- Flat-top symmetrical pass-band filter
- Down to 1 GHz (8 pm) up to 4 GHz FWHM
- ± 100 pm fine tuning

CUSTOM SOLUTIONS

Exail, as a recognized manufacturer of high-end specialty fibers and components, offers singlemode and PM fibers to meet the growing demand of optical fiber in R&D and production. Exail can also accommodate various customization requirements. In addition, our production processes and capacities allow us to address large volume requests.

Commodity fibers	Cladding diameter (μm)	Wavelength range (nm)	PM designs	Key features
Bend-insensitive fibers 	60 - 125	1450 to 1650	Optional	• Wide range of cladding diameters • Acrylate and polyimide coating • PM versions available
PM Panda fibers 	125	630 to 780 700 to 850 800 to 950 950 to 1150 1480 to 1650 1850 to 2200	Yes	• High birefringence ensuring excellent polarization maintenance over long lengths • Low attenuation • Dual-layer UV acrylate coating (polyimide or 900 μm on request)

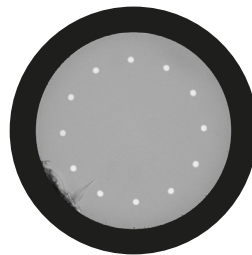
Custom fibers



Mastering of the entire production process, from the preform to the fiber characterization

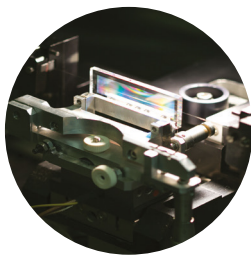


Custom Fiber Coils



Multicore fibers

Custom components



FBG from 400 to 2,100 nm
Apodized profile,
High SLSR
All fiber types

Custom systems



Fiber based dosimeter



Narrow linewidth single frequency laser