



FURUKAWA
SOLUTIONS

MEDICAL SOLUTIONS



Optical Fiber Solutions for Medical Laser Devices

Fiber Optic Medical Technology


Optical Fiber, Cable, and Assemblies for
Power Delivery, Imaging, and Sensing Applications

WWW.OFSOPTICS.COM/MEDICAL

55 Darling Drive, Avon, CT 06001



GUIDING LIGHT
FOR A BETTER LIFE.™



OFS engineers work with you from development, ideation, and customized prototypes to final product.

OUR CUSTOMERS RANGE FROM
START UPS TO GLOBAL CORPORATIONS

About OFS

With more than 35 years of experience in designing and manufacturing fiber optic products and solutions for the medical industry, OFS continues to innovate in this area, working closely with its customers to help bring life-saving, life-enhancing medical technology to market.

Customized Solutions

We partner with innovative companies ranging from start ups to large global corporations seeking high quality, cutting edge and customized fiber optic solutions to match their specific needs.

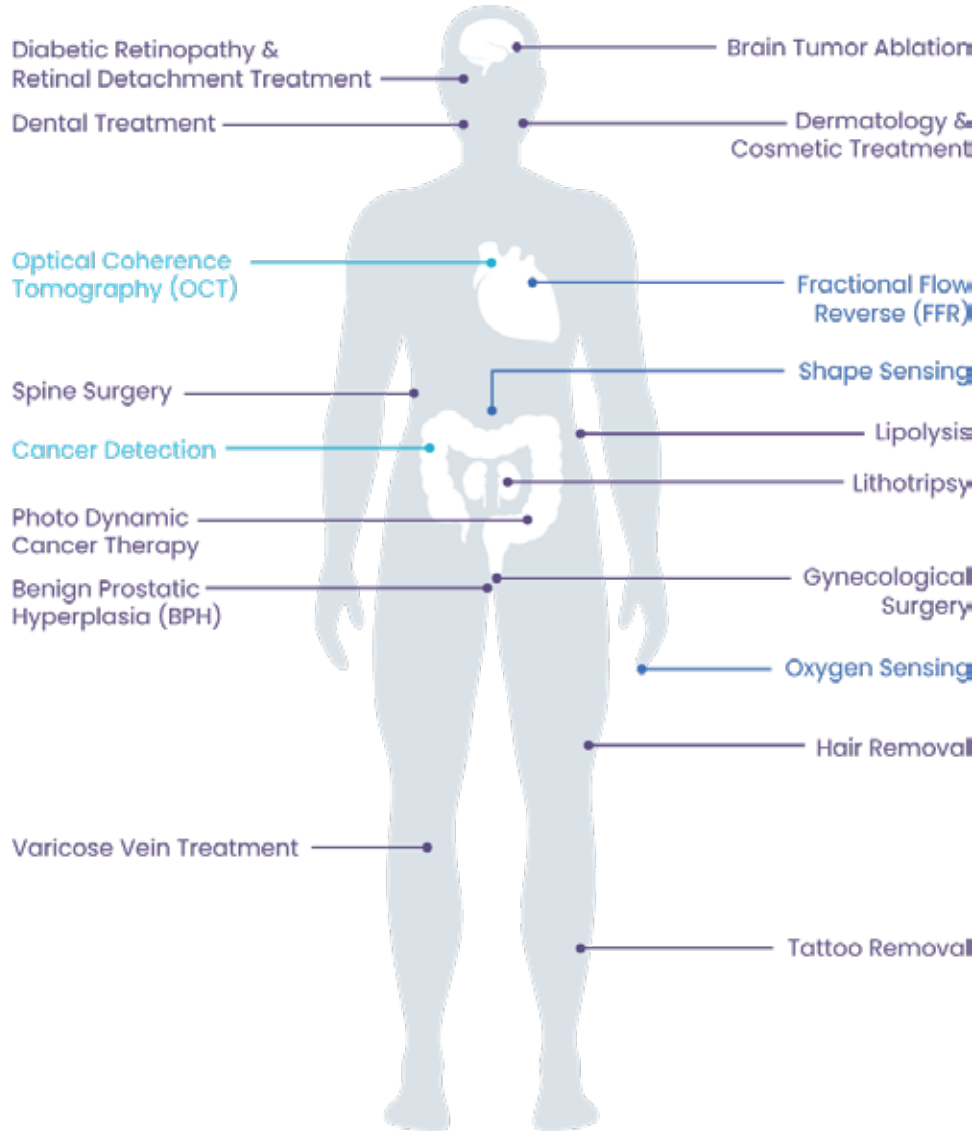
Global Premier Manufacturer

OFS is a vertically integrated optical fiber manufacturer, from the glass preform to optical fiber and cable design to finished assemblies in a low-bioburden room. Our engineering and manufacturing expertise help make vision and custom design a reality in the design and production of specialty optical fibers.

Dedicated to Medical Standards

OFS is ISO13485 certified, follows FDA Good Manufacturing Practices, and tests fibers to USP Class VI standards and ISO10993 for biocompatibility.

Medical Applications



SENSING



IMAGING



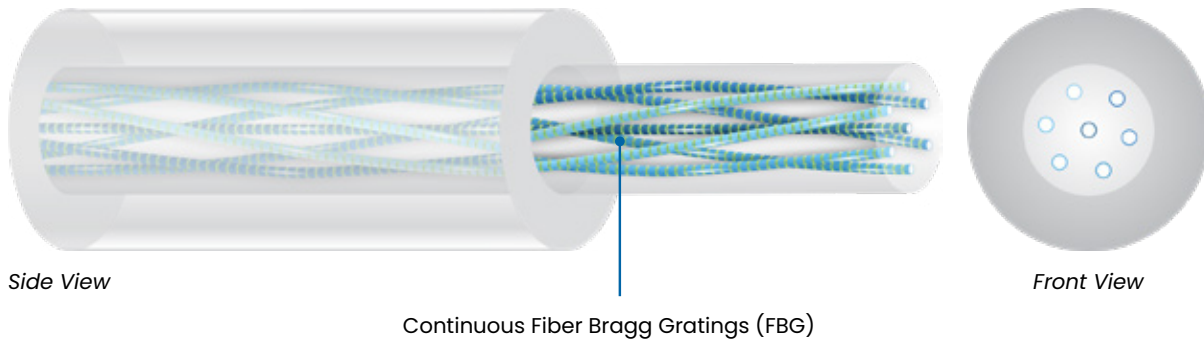
POWER DELIVERY



Shape Sensing

Twisted Multicore Fiber with Continuous Gratings for Sensing

Optical fiber shape sensing is a form of distributed sensing that uses scattered signals from optical fibers to ascertain local curvature and twist and thus, the shape of a given structure.



Key Features

- Multicore fiber with continuous Fiber Bragg Gratings
- Designed for shape sensing applications
- Multicore connectorization and fan-outs
- Low back reflection termination

Product Specifications	
Fiber Dimensions/ Geometric Properties	
Fiber Core Geometry	6 around 1
Cladding Diameter	125 μm
Coating Type	Acrylate
Coating Diameter	200 μm
Coating Concentricity	< 8 μm
Core-to-Core Spacing	35 μm
Center Core Concentricity in Glass	0.5 μm
Twist Rate	50 twists/m
Numerical Aperture	0.21
Mode Field Diameter at 1550 nm	6 μm
Fiber Proof Strength	100 kpsi
Gratings Characteristics	
Grating Length	35 μm
Typical Spacing Between Gratings	125 μm
Grating Center Wavelength	1540 nm
Typical Integrated Grating Reflectivity in each Core for 1 cm of Grating	-70 dB
Typical Array Length	25 m



For further details and applications, request a copy of our white paper, entitled **“Multicore Optical Fiber Grating Arrays for Sensing Applications.”**
www.ofsoptics.com/shape-sensing

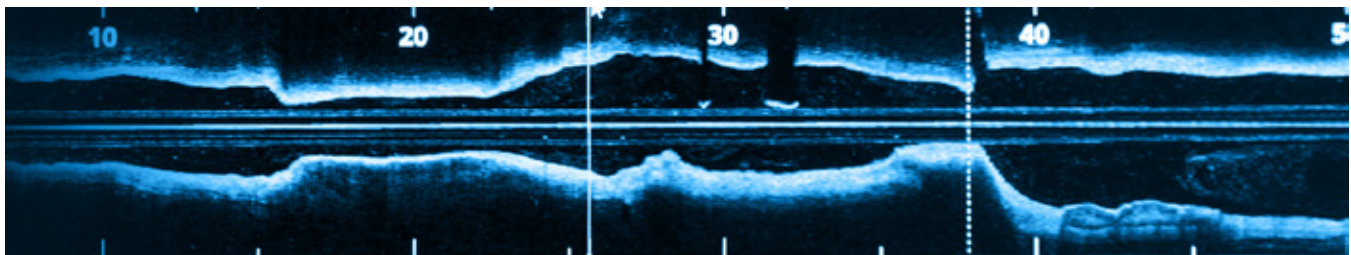


Optical Fiber Solutions
for Imaging & Sensing Medical Applications

OFS plays an important role in the expanding adoption of optical coherence tomography (OCT) in such applications as cardiology, oncology, and gastroenterology.

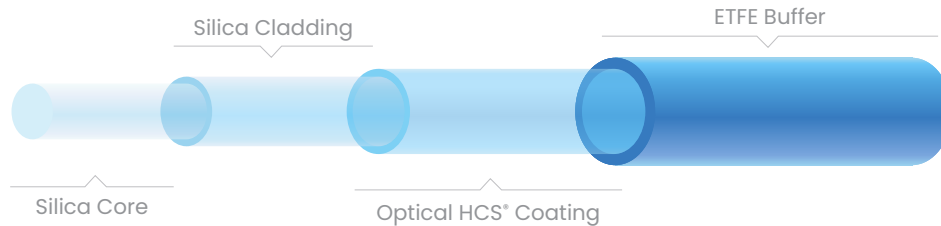
Single-mode							
Operating Wavelength	NA	MFD	Clad	Coating	Coating Material	Part Number	
1310 nm	0.12	9.3	125 ± 1 μm	155 ± 5 μm	PYROCOAT*	BF05717-01	
1270 - 1340 nm	0.12	9.3	125 ± 1 μm	155 ± 5 μm	PYROCOAT	BF05717-06	
1310 nm	0.12	9.3	80 ± 2 μm	100 ± 4 μm	PYROCOAT	BF04441-09	
820 - 850 nm	0.12	6.0	125 ± 1 μm	155 ± 5 μm	PYROCOAT	BF04701	
Multimode Graded-Index							
	NA	Core	Clad	Coating	Coating Material	Part Number	
	0.20	50 ± 3 μm	125 ± 1 μm	155 ± 5 μm	PYROCOAT	F17015	
	0.275	62.5 ± 3 μm	125 ± 1 μm	155 ± 5 μm	PYROCOAT	F19230-01	

PYROCOAT is a registered trademark of OFS FITEL, LLC for polyimide coating.





Multimode Step-Index Optical Fibers for High Power Delivery Under Tight Bends HCxtreme® Product Family

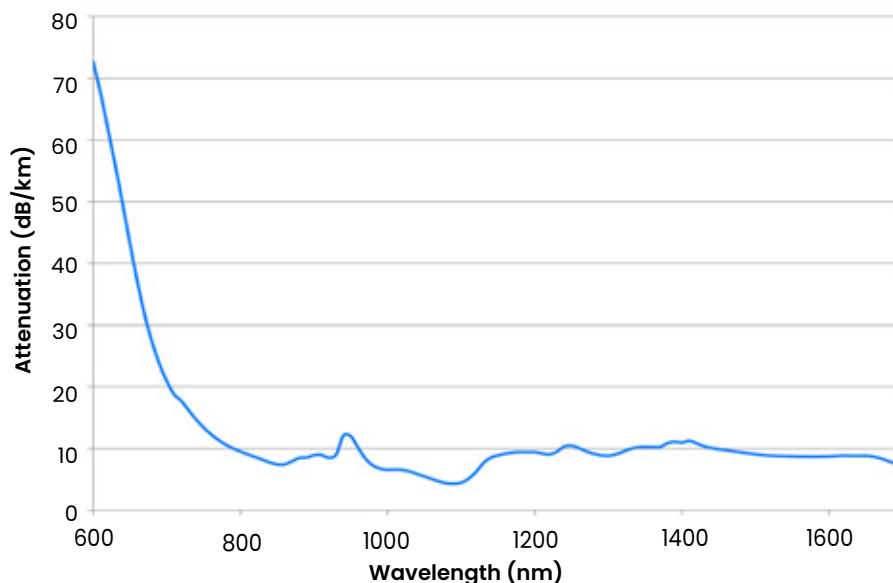


Reliable Laser Delivery Down to 5 mm While Under Power

HCxtreme® Optical Fiber technology addresses the problem of fiber failure due to tight bending of optical fiber under power. This optimized fiber design reduces bend loss and offers superior performance in high power laser delivery applications that require tight bending.

Item Name	Diameters in μm				NA	Buffer Color	Part Number
	Core	Cladding	Coating	Buffer			
200-22 HCX	200	240	270	375	0.22	Blue	F26445
272-22 HCX	272	299	330	400	0.22	Blue	F24748
365-22 HCX	365	400	430	550	0.22	Blue	F18940
550-22 HCX	550	600	630	750	0.22	Blue	F18941
940-22 HCX	940	1000	1035	1400	0.22	Blue	F18942

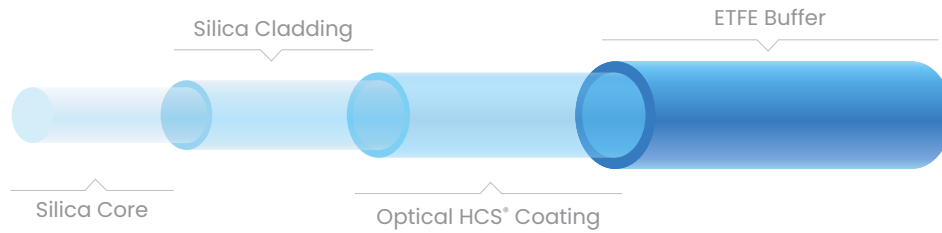
Typical Spectral Attenuation for HCxtreme Optical Fiber



For further details and testing methodology, request a copy of our white paper, entitled **“Study of Optical Fiber Damage Under Tight Bend with High Optical Power at 2140 nm.”**



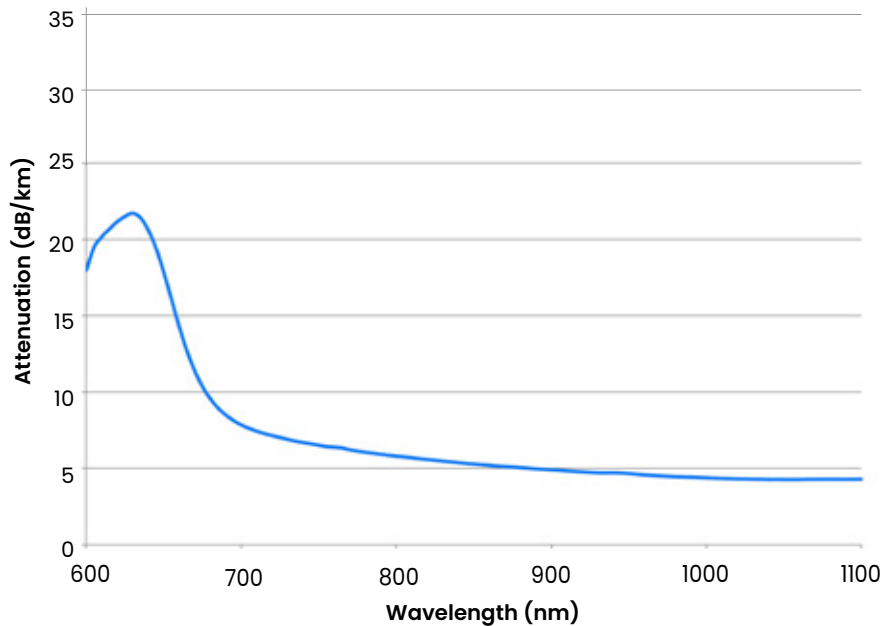
Multimode Step-Index Optical Fibers for High Power Delivery
 Improved Fiber Strength to Reduce Static Fatigue



HCL fibers are low-OH core/glass clad, coated with HCS[®] fluoroacrylate to improve both fiber strength and static fatigue resistance. ETFE is used as the outer buffer on these step-index, multimode fibers. They are available in a variety of core sizes and core/clad ratios.

Item Name	Diameters in μm				NA	Buffer Color	Part Number
	Core	Cladding	Coating	Buffer			
200-22 HCL	200	240	260	375	0.22	Blue	BF06856-01
365-22 HCL	365	400	430	550	0.22	Blue	BF05147
365-22 HCL	365	400	430	730	0.22	Blue	BF06341
550-22 HCL	550	600	630	750	0.22	Blue	BF06338
940-22 HCL	940	1000	1035	1400	0.22	Blue	BF06337

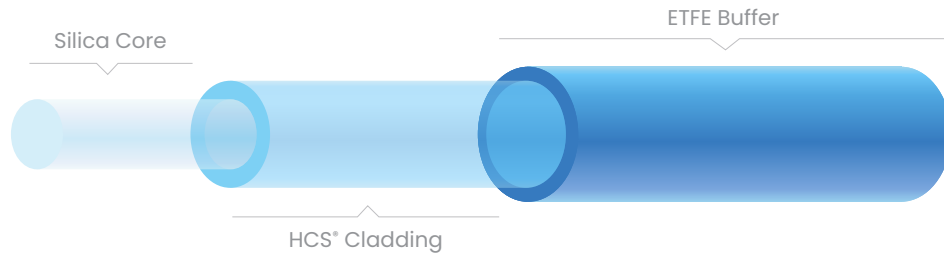
Typical Spectral Attenuation for HCL Optical Fiber





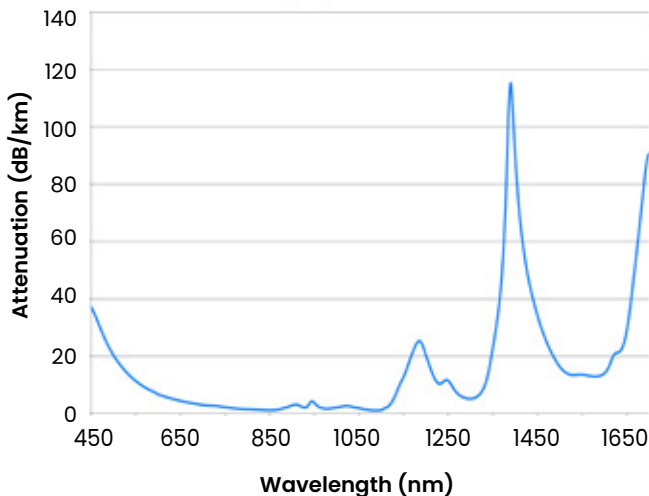
Multimode Step-Index Optical Fibers for a Broad Range of Power Delivery Procedures with High NA for Greater Illumination or Reflection Capture

The OFS family of high-power delivery optical fibers includes the HCS product line. ETFE is used as the outer buffer on these step-index, multimode fibers. They are available in a variety of core sizes. HCS fibers have a pure silica core, a hard polymer cladding, and an ETFE outer buffer.

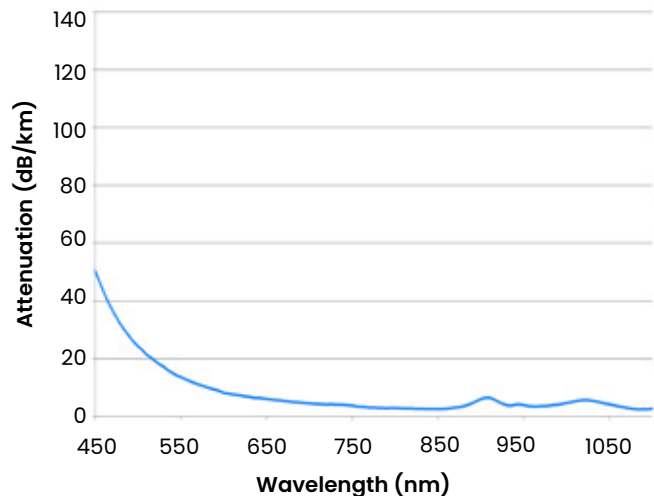


Item Name	Diameters in μm			NA	Part Number
	Core	Cladding	Buffer		
200 μm HCS Low OH Fiber	200	230	500	0.37	CF01493-10
300 μm HCS Low OH Fiber	300	330	650	0.37	CF01493-11
400 μm HCS Low OH Fiber	400	430	730	0.37	CF01493-12
600 μm HCS Low OH Fiber	600	630	1040	0.37	CF01493-14
800 μm HCS Low OH Fiber	800	830	1040	0.37	CF01493-65
1000 μm HCS Low OH Fiber	1000	1035	1400	0.37	CF01493-15
1500 μm HCS Low OH Fiber	1500	1535	2000	0.37	CF01493-62
200 μm HCS Low OH Fiber	200	230	500	0.43	CF05578-01
400 μm HCS Low OH Fiber	400	430	730	0.43	CF05578-03

Typical Spectral Attenuation
 for HCS 0.43 NA Optical Fiber



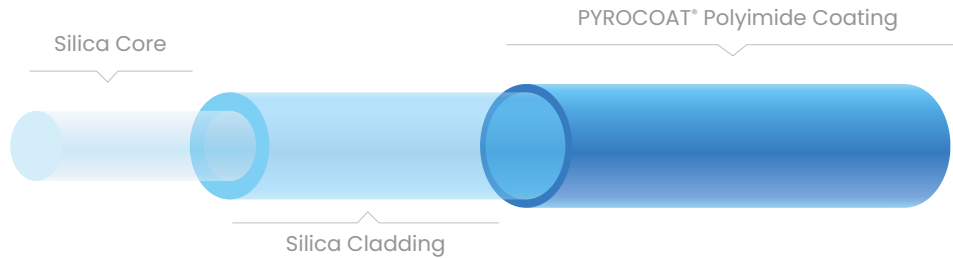
Typical Spectral Attenuation
 for HCS 0.37 NA Optical Fiber





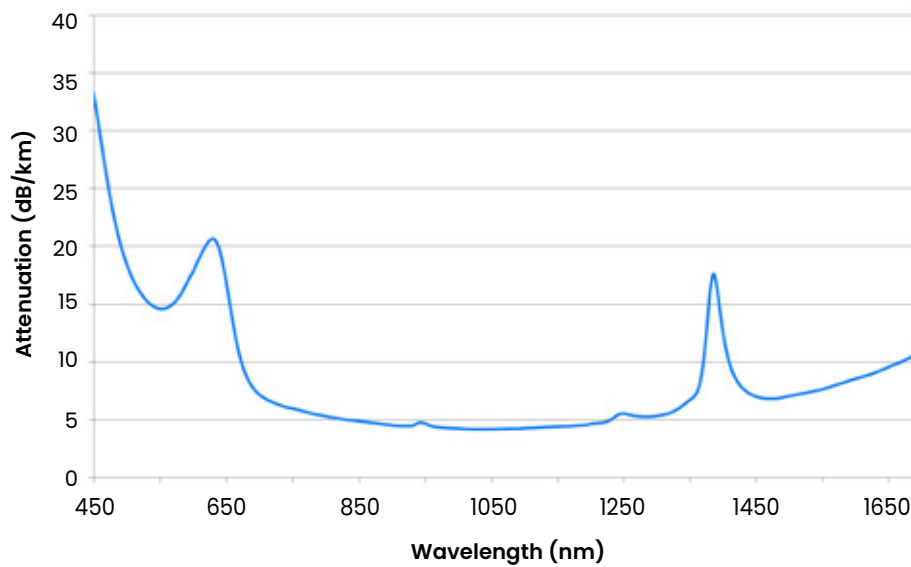
Multimode Step-Index Optical Fibers for Higher Temperature Requirements
 with a Hard Thin Polyimide Coating Suitable
 for Small Lumens and Harsh Environments

The OFS family of high-power delivery optical fibers includes the TCL product line. TCL fibers are low-OH, all-silica, and are polyimide coated.



Item Name	Diameters in μm			NA	Part Number
	Core	Cladding	Coating		
100 μm TCL Low OH Fiber	100	120	140	0.22	CF04406-11
200 μm TCL Low OH Fiber	200	220	250	0.22	F17023
200 μm TCL Low OH Fiber	200	240	270	0.22	CF04406-14
320 μm TCL Low OH Fiber	320	385	415	0.22	F17850
400 μm TCL Low OH Fiber	400	440	470	0.22	F24963

Typical Spectral Attenuation for TCL Low OH Optical Fiber



Cables for Harsh Environments

Device manufacturers depend on OFS optical fibers to repeatedly and reliably communicate critical data.

OFS has the ability to package your optical fiber-based solution with various coatings, buffers and cable jackets tailored to your critical application requirements.



Customizable Fiber Tips and Assemblies

Customizable assemblies for diagnostics and treatments.

From simple flat cleaving to complex-shape, OFS offers highly customizable fiber tip assemblies for your needs.

Your products are made and packaged in an environmentally controlled room, ready for sterilization.

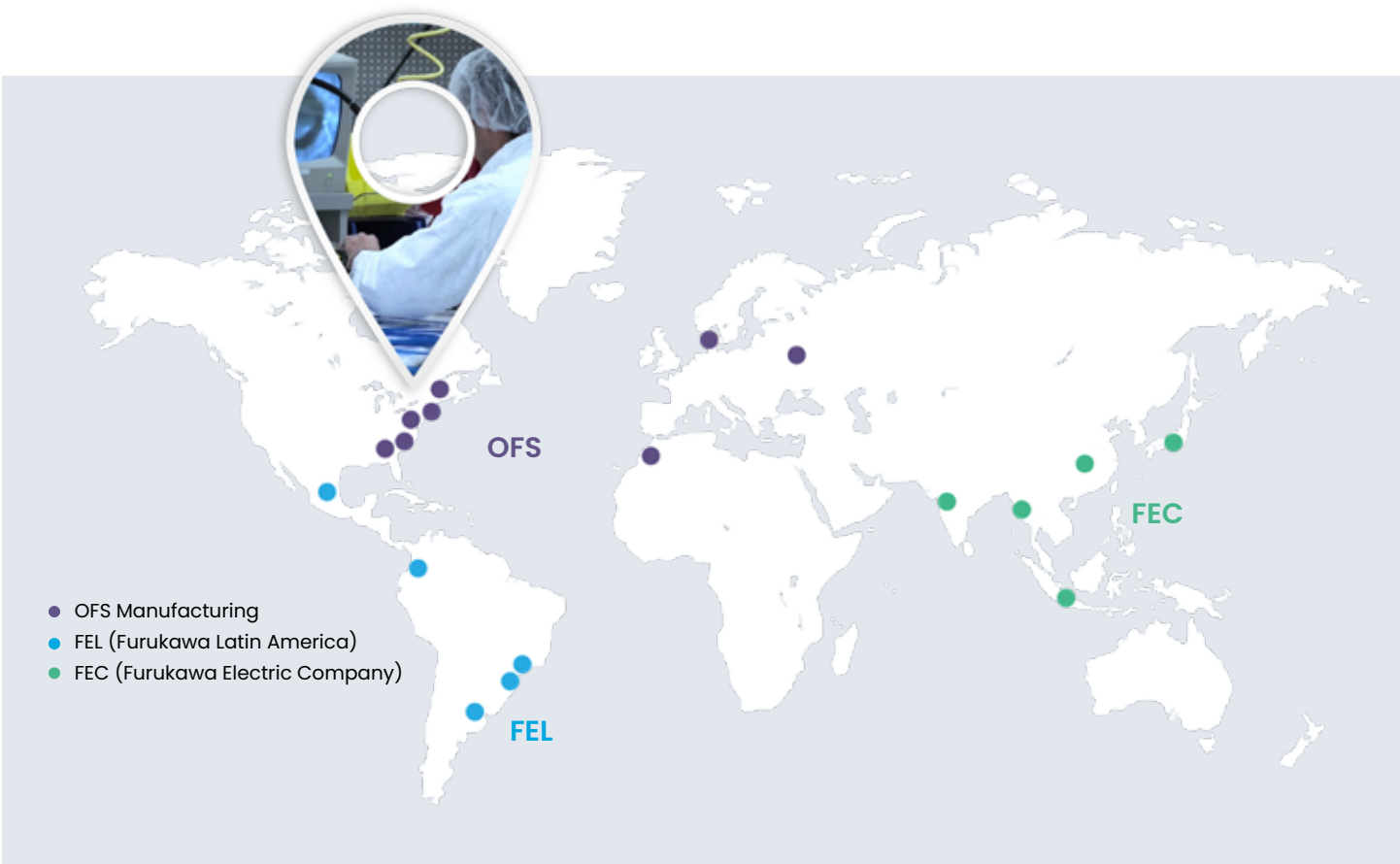
Key Features

- Single-use disposable products
- Multiple-use sterilizable products
- Sub-assemblies
- Final-assemblies
- Various connectors available



Global Manufacturing

Our medical products are made primarily in our Avon, Connecticut (USA) location.





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Medical Optical Fiber Solutions

CONTACT US

For additional information please contact your sales representative.

You can also visit our website at www.ofsoptics.com or call 1-888-FIBER-HELP (1-888-342-3743) from inside the USA or +1-770-798-5555 from outside the USA.



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