



A Furukawa Company

Specialty Photonics Division

Your **medical** Optical Fiber Solutions Partner

# HCXtreme™ Optical Fiber

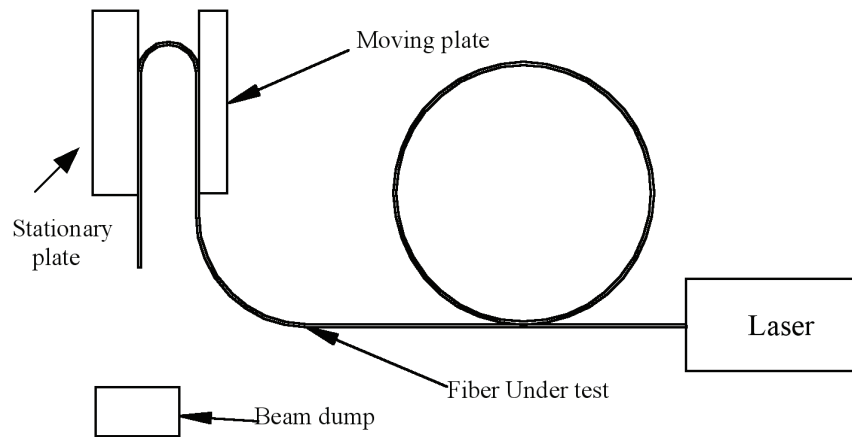
for High Power Under Tight Bends

**Fibers transmit power without breakage at a 5 mm bend**

HCXtreme™  
Optical Fiber for high power under tight bends™

- Reliable
- Biocompatible
- Sterilizable
- Custom Assemblies

# HCXtreme Optical Fibers for High Power Under Tight Bends



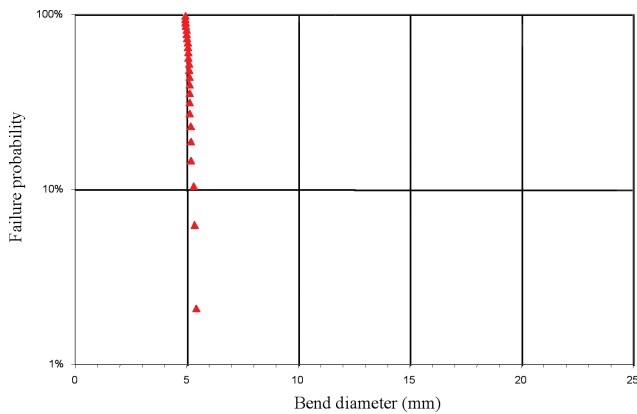
## Experimental Setup

100W of laser power is launched into the fiber when bent, excess fiber was looped into a diameter of 20 cm

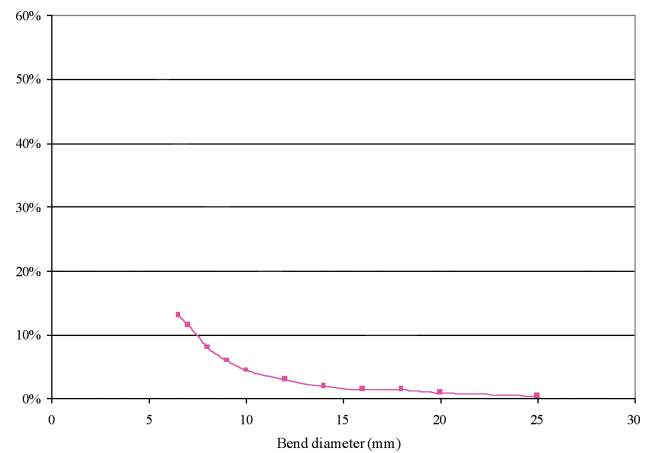
HCXtreme Fiber coating technology solves the problem of fiber failure due to excessive bending of optical fiber under power. In testing down to 2.5 mm radius bend, HCXtreme fibers continued to transmit power without breakage.\*

Optimized fiber design reduces bend loss and offers superior performance in laser energy delivery. HCXtreme provides higher laser damage threshold improving fiber performance for improved overall system performance.

Silica optical fibers are increasingly used to deliver laser power in various medical applications. Damage to the optical fiber caused by the high laser power level and tight bending of the fiber in these applications poses serious concern.



Fiber failure probability vs. bend diameter under low laser power  
[Fiber tested: 365  $\mu\text{m}$  core; 400  $\mu\text{m}$  clad; 0.22 NA]



HCXtreme bend loss under 100W laser with 0.22 NA launch  
[Fiber tested: 365  $\mu\text{m}$  core; 400  $\mu\text{m}$  clad; 0.22 NA]

\*Actual performance in any given application should be validated by customer testing.

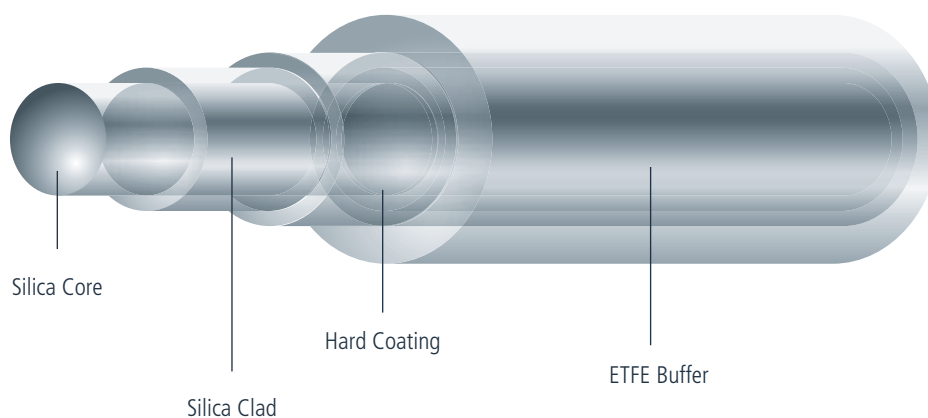
# Specification Sheet



Multimode Step-Index  
**HCXtreme™** Fibers for high power in tight bends

	272-22 HCXtreme	272-29 HCXtreme	365-22 HCXtreme	550-22 HCXtreme	940-22 HCXtreme
<b>Optical Properties</b>					
Numerical aperture	0.22	0.29	0.22	0.22	0.22
Attenuation @ 850 nm	≤10 dB/km	≤12 dB/km	≤10 dB/km	≤10 dB/km	≤10 dB/km
Water content	Low OH	Low OH	Low OH	Low OH	Low OH
<b>Dimensions/Geometric Properties</b>					
Core diameter	272 ± 6 μm	272 ± 10 μm	365 ± 10 μm	550 ± 12 μm	940 ± 15 μm
Cladding diameter	299 ± 6 μm	326 ± 10 μm	400 ± 10 μm	600 ± 10 μm	1000 ± 15 μm
Hard coating diameter	330 ± 7 μm	356 ± 10 μm	430 ± 10 μm	630 ± 10 μm	1035 ± 15 μm
Buffer diameter	400 ± 30 μm	420 ± 30 μm	730 ± 30 μm	750 ± 30 μm	1400 ± 50 μm
Clad/coating offset	≤9 μm	≤10 μm	≤9 μm	≤9 μm	≤11 μm
<b>Coating/Buffer Descriptions</b>					
Coating material	Hard coating	Hard coating	Hard coating	Hard coating	Hard coating
Buffer material	ETFE	ETFE	ETFE	ETFE	ETFE
Operating temperature	-65 to +125°C	-65 to +125°C	-65 to +125°C	-65 to +125°C	-65 to +125°C
<b>Mechanical and Testing Data</b>					
Bend radius:	Short-term	≥24 mm	≥24 mm	≥29 mm	≥58 mm
	Long-term	≥40 mm	≥40 mm	≥47 mm	≥94 mm
Proof test level	≥100 kpsi (0.689 GPa)	≥100 kpsi (0.689 GPa)	≥100 kpsi (0.689 GPa)	≥75 kpsi (0.517 GPa)	≥100 kpsi (0.689 GPa)
Product Description Code:	272-22 HCXtreme	272-29 HCXtreme	365-22 HCXtreme	550-22 HCXtreme	940-22 HCXtreme
Order by Part Number:	<b>F20295</b>	<b>F18939</b>	<b>F18940</b>	<b>F18941</b>	<b>F18942</b>
Typical Applications	Cascaded Laser Power Delivery • Near-IR (up to 2100 nm) Laser Power Delivery • High-Power Laser Delivery • Laser Surgery • Laser Welding and Cutting • Industrial Cabling				

**Options:** Core Diameter, Clad Diameter, Numerical Aperture, Proof Test, Cabling, Connectorization, Metalization, Additional Coatings, other Buffer Colors, Low Bioburden Packaging and Manufacturing



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

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