

# Ultra-High NA Single-Mode Fibers



Nufern Ultra-High NA fibers are excellent bridge fibers between high NA waveguides and low NA transmission fiber. Ultra-High NA fibers provide excellent coupling efficiencies to high NA waveguides. In addition, the composition of Ultra-High NA fibers are tailored to thermally expand the core during splicing thus achieving lower splice loss to transmission fiber.

## Typical Applications

- Fluoride and other non-silica fibers
- Planar Waveguides
- Fiber tails for high NA sources

## Features & Benefits

- High numerical aperture — Bend insensitive fiber for miniature packages
- Thermally expandable core — Low splice loss to transmission fiber
- Small Mode Field Diameter — High coupling efficiency with Planar Waveguides

## Optical Specifications

Operating Wavelength (nominal)	1100 - 1600 nm
Mode Field Diameter@ 1100 nm	3.3 ± 0.3 μm
Mode Field Diameter@ 1310 nm	4.0 ± 0.3 μm
Mode Field Diameter@ 1550 nm	4.8 ± 0.3 μm
Second Mode Cut-Off	1000 ± 50 nm
Numerical Aperture (nominal)	0.28
Bend Loss @ 1100 nm (100 turns, 25 mm radius)	< 0.001 dB
Bend Loss @ 1550 nm (100 turns, 25 mm radius)	-
Bend Radius for 0.05 dB (per 100 turns, 1100nm)	Much Less than LTBR
Bend Radius for 0.05 dB (per 100 turns, 1550nm)	-

## UHNA1

Operating Wavelength (nominal)	1100 - 1600 nm
Mode Field Diameter@ 1100 nm	3.3 ± 0.3 μm
Mode Field Diameter@ 1310 nm	4.0 ± 0.3 μm
Mode Field Diameter@ 1550 nm	4.8 ± 0.3 μm
Second Mode Cut-Off	1000 ± 50 nm
Numerical Aperture (nominal)	0.28
Bend Loss @ 1100 nm (100 turns, 25 mm radius)	< 0.001 dB
Bend Loss @ 1550 nm (100 turns, 25 mm radius)	-
Bend Radius for 0.05 dB (per 100 turns, 1100nm)	Much Less than LTBR
Bend Radius for 0.05 dB (per 100 turns, 1550nm)	-

## UHNA3

Operating Wavelength (nominal)	960 - 1600 nm
Mode Field Diameter@ 1100 nm	2.6 ± 0.3 μm
Mode Field Diameter@ 1310 nm	3.3 ± 0.3 μm
Mode Field Diameter@ 1550 nm	4.1 ± 0.3 μm
Second Mode Cut-Off	900 ± 50 nm
Numerical Aperture (nominal)	0.35
Bend Loss @ 1100 nm (100 turns, 25 mm radius)	< 0.001 dB
Bend Loss @ 1550 nm (100 turns, 25 mm radius)	-
Bend Radius for 0.05 dB (per 100 turns, 1100nm)	Much Less than LTBR
Bend Radius for 0.05 dB (per 100 turns, 1550nm)	-

## UHNA4

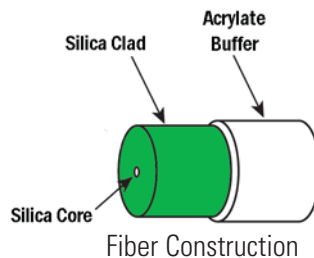
Operating Wavelength (nominal)	1100 - 1600 nm
Mode Field Diameter@ 1100 nm	2.6 ± 0.3 μm
Mode Field Diameter@ 1310 nm	3.3 ± 0.3 μm
Mode Field Diameter@ 1550 nm	4.0 ± 0.3 μm
Second Mode Cut-Off	1050 ± 50 nm
Numerical Aperture (nominal)	0.35
Bend Loss @ 1100 nm (100 turns, 25 mm radius)	< 0.001 dB
Bend Loss @ 1550 nm (100 turns, 25 mm radius)	-
Bend Radius for 0.05 dB (per 100 turns, 1100nm)	Much less than LTBR
Bend Radius for 0.05 dB (per 100 turns, 1550nm)	-

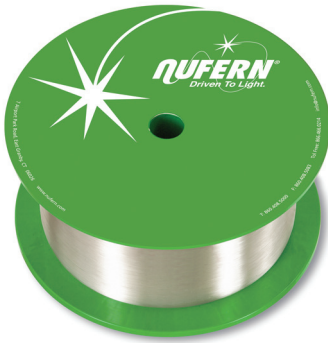
## UHNA7

Operating Wavelength (nominal)	1500 - 2000 nm
Mode Field Diameter@ 1100 nm	-
Mode Field Diameter@ 1310 nm	-
Mode Field Diameter@ 1550 nm	3.2 ± 0.3 μm
Second Mode Cut-Off	1450 ± 50 nm
Numerical Aperture (nominal)	0.41
Bend Loss @ 1100 nm (100 turns, 25 mm radius)	-
Bend Loss @ 1550 nm (100 turns, 25 mm radius)	< 0.001 dB
Bend Radius for 0.05 dB (per 100 turns, 1100nm)	-
Bend Radius for 0.05 dB (per 100 turns, 1550nm)	Much less than LTBR

## Geometrical & Mechanical Specifications

Clad Diameter	125.0 ± 1.5 μm	125.0 ± 1.5 μm	125.0 ± 1.5 μm	125.0 ± 1.5 μm
Coating Diameter	250 ± 20 μm	250 ± 20 μm	250 ± 20 μm	250 ± 20 μm
Core-Clad Concentricity	< 0.5 μm	< 0.5 μm	< 0.5 μm	< 0.5 μm
Coating/Clad Offset	≤ 5 μm	≤ 5 μm	≤ 5 μm	≤ 5 μm
Proof Test Level	≥100 kpsi (0.7 GN/m <sup>2</sup> )	≥100 kpsi (0.7 GN/m <sup>2</sup> )	≥100 kpsi (0.7 GN/m <sup>2</sup> )	≥100 kpsi (0.7 GN/m <sup>2</sup> )
Coating Material	UV Cured, Dual Acrylate	UV Cured, Dual Acrylate	UV Cured, Dual Acrylate	UV Cured, Dual Acrylate
Operating Temperature	- 55 to + 85° C	- 55 to + 85° C	- 55 to + 85° C	- 55 to + 85° C
Short-Term Bend Radius	≥ 12 mm	≥ 12 mm	≥ 12 mm	≥ 12 mm
Long-Term Bend Radius	≥ 25 mm	≥ 25 mm	≥ 25 mm	≥ 25 mm





# Ultra-High NA Select Cut-Off Fiber

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## Optical Specifications

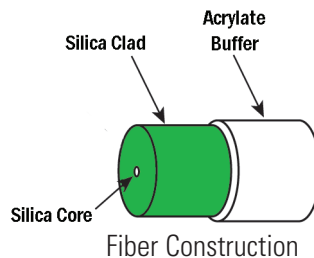
Operating Wavelength (nominal)	980 - 1600 nm
Mode Field Diameter	$5.0 \pm 1.0 \mu\text{m}$ @ 1550 nm
Second Mode Cut-Off	$920 \pm 50 \text{ nm}$
Numerical Aperture (nominal)	0.28

## Geometrical & Mechanical Specifications

Clad Diameter	$125.0 \pm 1.0 \mu\text{m}$
Coating Diameter	$245 \pm 15 \mu\text{m}$
Core-Clad Concentricity	$< 0.5 \mu\text{m}$
Coating/Clad Offset	$\leq 5 \mu\text{m}$
Proof Test Level	$\geq 100 \text{ kpsi}$ ( $0.7 \text{ GN/m}^2$ )
Core Composition	Photosensitive
Coating Material	UV Cured, Dual Acrylate
Operating Temperature	- 40 to + 85° C

## PS-GSF-3/125

**Note:** The active version of this fiber, PS-ESF-3/125, is also available.



RoHS