

# 105 Micron Core Power Delivery Fibers

Nufern's specialty multimode step-index fibers are designed for compatibility with the majority of fiber-coupled, single-emitter, diode-laser packages and support the diode laser power delivery market. These power delivery fibers are available in 105/125 core/clad ratio in low and high NA versions. Other fiber diameters are available upon request.

## Typical Applications

- Fiber coupled diode lasers
- Couplers and pump combiners

## Features & Benefits

- 0.12, 0.15 and 0.22 NA — Compatible with majority of fiber-coupled, diode-laser packages
- Exceptional geometric uniformity and core/clad concentricity — Ease of coupling to pump diodes

### Optical Specifications

Operating Wavelength (nominal)  
Numerical Aperture (nominal)  
OH Level

### Geometrical & Mechanical Specifications

Core Diameter  
Clad Diameter  
Coating Diameter  
Core-Clad Concentricity  
Coating Material  
Short-Term Bend Radius  
Long-Term Bend Radius  
Proof Test Level

### MM-S105-125-12A

800 – 1600 nm  
0.12 ± 0.02  
Low

105 ± 3 μm  
125 ± 2 μm  
245 ± 15 μm  
< 3 μm  
UV Cured, Dual Acrylate  
≥ 12 mm  
≥ 25 mm  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

### MM-S105/125-15A

800 – 1600 nm  
0.15 ± 0.02  
Low

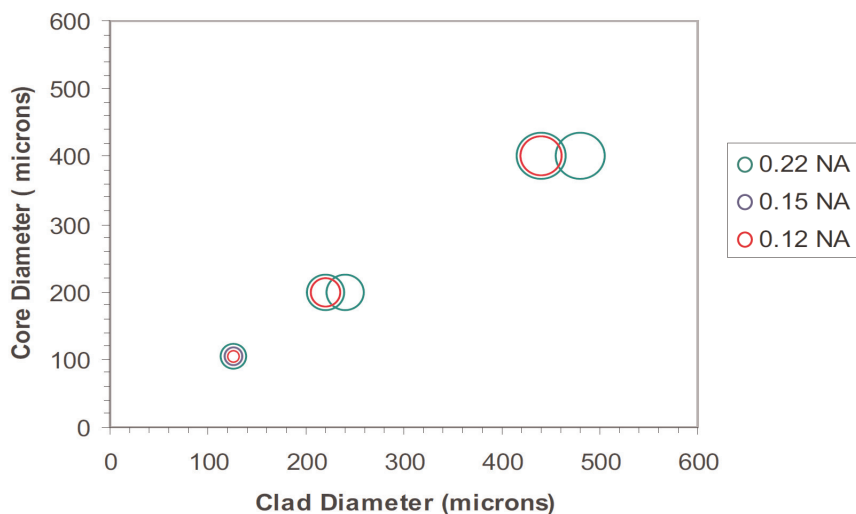
105 ± 3 μm  
125 ± 2 μm  
245 ± 15 μm  
< 3 μm  
UV Cured, Dual Acrylate  
≥ 12 mm  
≥ 25 mm  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

### MM-S105/125-22A

800 – 1600 nm  
0.22 ± 0.02  
Low

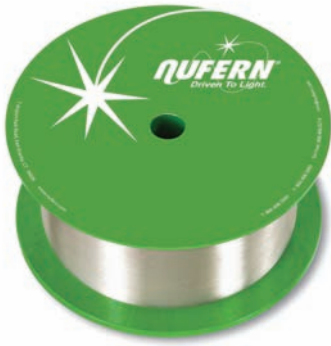
105 ± 3 μm  
125 ± 2 μm  
245 ± 15 μm  
< 3 μm  
UV Cured, Dual Acrylate  
≥ 12 mm  
≥ 25 mm  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

## Nufern Standard Power Delivery Fibers



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# 200 Micron Core Power Delivery Fibers

Nufern's specialty multimode step-index fibers are designed for compatibility with the majority of fiber-coupled, bar and stack diode-laser packages and support the diode laser power delivery market. These power delivery fibers are available in 200/220 and 200/240 core/clad ratios in low and high NA versions. Other fiber diameters are available upon request.

## Typical Applications

- Fiber coupled diode lasers
- Couplers and pump combiners

## Features & Benefits

- 0.12 and 0.22 NA — Compatible with majority of fiber-coupled, diode-laser packages
- Exceptional geometric uniformity and core/clad concentricity — Ease of coupling to pump diodes

### Optical Specifications

Operating Wavelength (nominal)  
Numerical Aperture (nominal)  
OH Level

### Geometrical & Mechanical Specifications

Core Diameter  
Clad Diameter  
Coating Diameter  
Core-Clad Concentricity  
Coating Material  
Proof Test Level

### MM-S200/220-12A

800 – 1600 nm  
0.12 ± 0.02  
Low

200 ± 4 μm  
220 ± 3 μm  
320 ± 15 μm  
< 5 μm  
UV Cured, Dual Acrylate  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

### MM-S200/220-22A

800 – 1600 nm  
0.22 ± 0.02  
Low

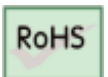
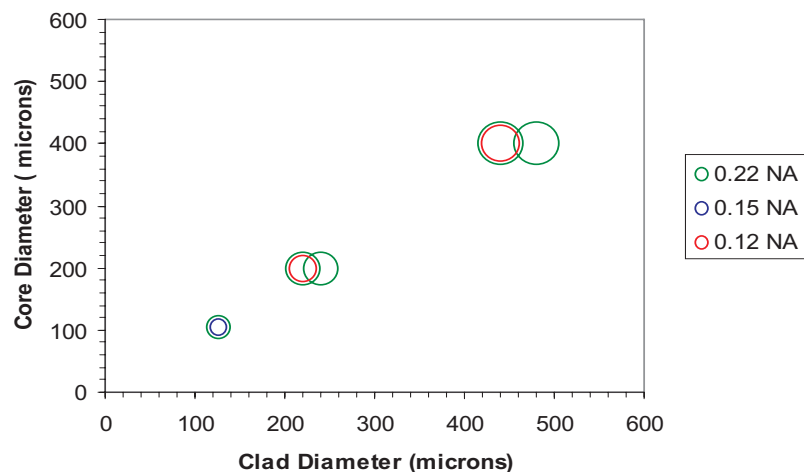
200 ± 4 μm  
220 ± 3 μm  
320 ± 15 μm  
< 5 μm  
UV Cured, Dual Acrylate  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

### MM-S200/240-22A

800 – 1600 nm  
0.22 ± 0.02  
Low

200 ± 4 μm  
240 ± 3 μm  
320 ± 15 μm  
< 5 μm  
UV Cured, Dual Acrylate  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

## Nufern Standard Power Delivery Fibers



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# 400 Micron Core Power Delivery Fibers

Nufern's specialty multimode step-index fibers are designed for compatibility with the majority of fiber-coupled, bar and stack diode-laser packages and support the diode laser power delivery market. These power delivery fibers are available in and 400/440 and 400/480 core/clad ratios in low and high NA versions. The 400/480 has a low refractive index fluoroacrylate coating for added power confinement. Other fiber diameters are available upon request.

## Typical Applications

- Fiber coupled diode lasers
- Couplers and pump combiners

## Features & Benefits

- 0.12 and 0.22 NA — Compatible with majority of fiber-coupled, diode-laser packages
- Exceptional geometric uniformity and core/clad concentricity — Ease of coupling to pump diodes

### Optical Specifications

Operating Wavelength (nominal)  
Numerical Aperture (nominal)  
Cladding Numerical Aperture  
OH Level

### Geometrical & Mechanical Specifications

Core Diameter  
Clad Diameter  
Coating Diameter  
Core-Clad Concentricity  
Coating Material  
Proof Test Level

### MM-S400/440-12A

800 – 1600 nm  
0.12 ± 0.02  
NA  
Low

400 ± 9 μm  
440 ± 8 μm  
625 ± 25 μm  
< 5 μm  
UV Cured, Dual Acrylate  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

### MM-S400/440-22A

800 – 1600 nm  
0.22 ± 0.02  
NA  
Low

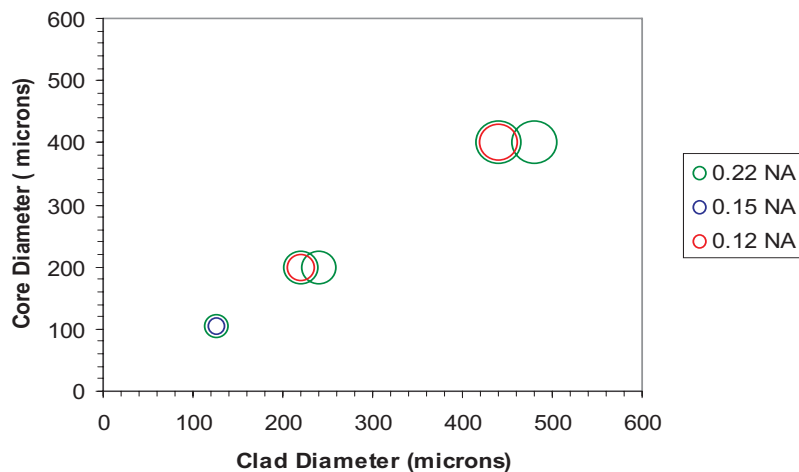
400 ± 9 μm  
440 ± 8 μm  
625 ± 25 μm  
< 5 μm  
UV Cured, Dual Acrylate  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

### MM-S400/480-22FA

800 – 1600 nm  
0.22 ± 0.02  
0.46 (nominal)  
Low

400 ± 9 μm  
480 ± 8 μm  
640 ± 25 μm  
< 5 μm  
Low Index Polymer  
≥ 100 kpsi (0.7 GN/m<sup>2</sup>)

## Nufern Standard Power Delivery Fibers



RoHS

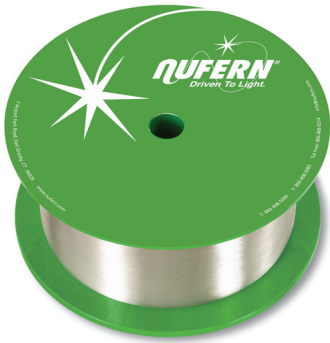


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# NuBEAM Large Core Delivery Fibers



Nufern's specialty multimode step-index fibers are designed for compatibility with the majority of fiber interconnect systems. They also support the diode laser power delivery market. These power delivery fibers are available in many core/clad ratios and in low or high NA versions. **The buffer can be a low refractive index fluoroacrylate coating for added power confinement, or traditional silicone.** Other fiber diameters are available upon request.

追加詳細説明は、5.6頁にあります。

## Typical Applications

- Fiber coupled diode lasers
- Couplers and pump combiners
- Beam delivery cables
- Spectroscopy and instrumentation

## Features & Benefits

- Compatible with majority of fiber interconnect systems & fiber-coupled, diode-laser packages
- Exceptional geometric uniformity and core/clad concentricity — Ease of assembly
- Clean room fiber draw — Eliminates coating "hot spots"

## Optical Specifications

Operating Wavelength (nominal)  
Numerical Aperture  
OH Level

## MM-S200/230/660-S-TN

800 – 1600 nm  
0.22 ± 0.02  
Low

## MM-S400/440/660-S-TN

800 – 1600 nm  
0.22 ± 0.02  
Low

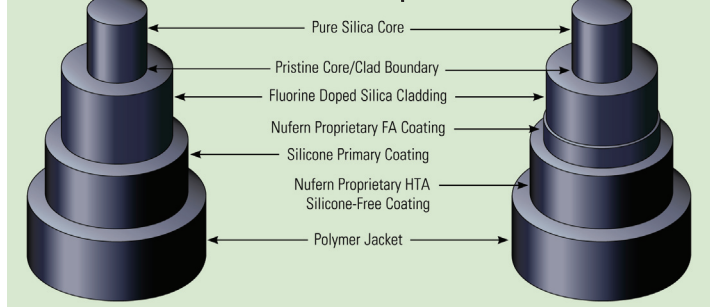
## Geometrical & Mechanical Specifications

Core Diameter  
Inner Clad Diameter (nominal)  
Outer Clad Diameter  
Cladding Profile  
Buffer Diameter (Silicone)  
Outer Buffer Diameter (Transparent Nylon)  
Short Term Bend Radius  
Long Term Bend Radius  
Core Type  
Proof Test Level

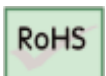
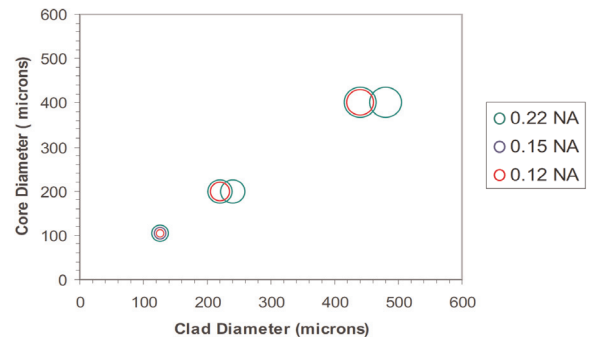
204 ± 4 μm  
235 μm  
675 ± 15 μm  
Depressed  
780 ± 30 μm  
1100 ± 60 μm  
≥ 33 mm  
≥ 99 mm  
Pure Silica Core  
≥ 70 kpsi (0.48 GN/m<sup>2</sup>)

410 ± 10 μm  
450 μm  
675 ± 15 μm  
Depressed  
780 ± 30 μm  
1100 ± 60 μm  
≥ 33 mm  
≥ 99 mm  
Pure Silica Core  
≥ 70 kpsi (0.48 GN/m<sup>2</sup>)

## Fiber Construction Option Details



## Nufern Standard Delivery Fibers

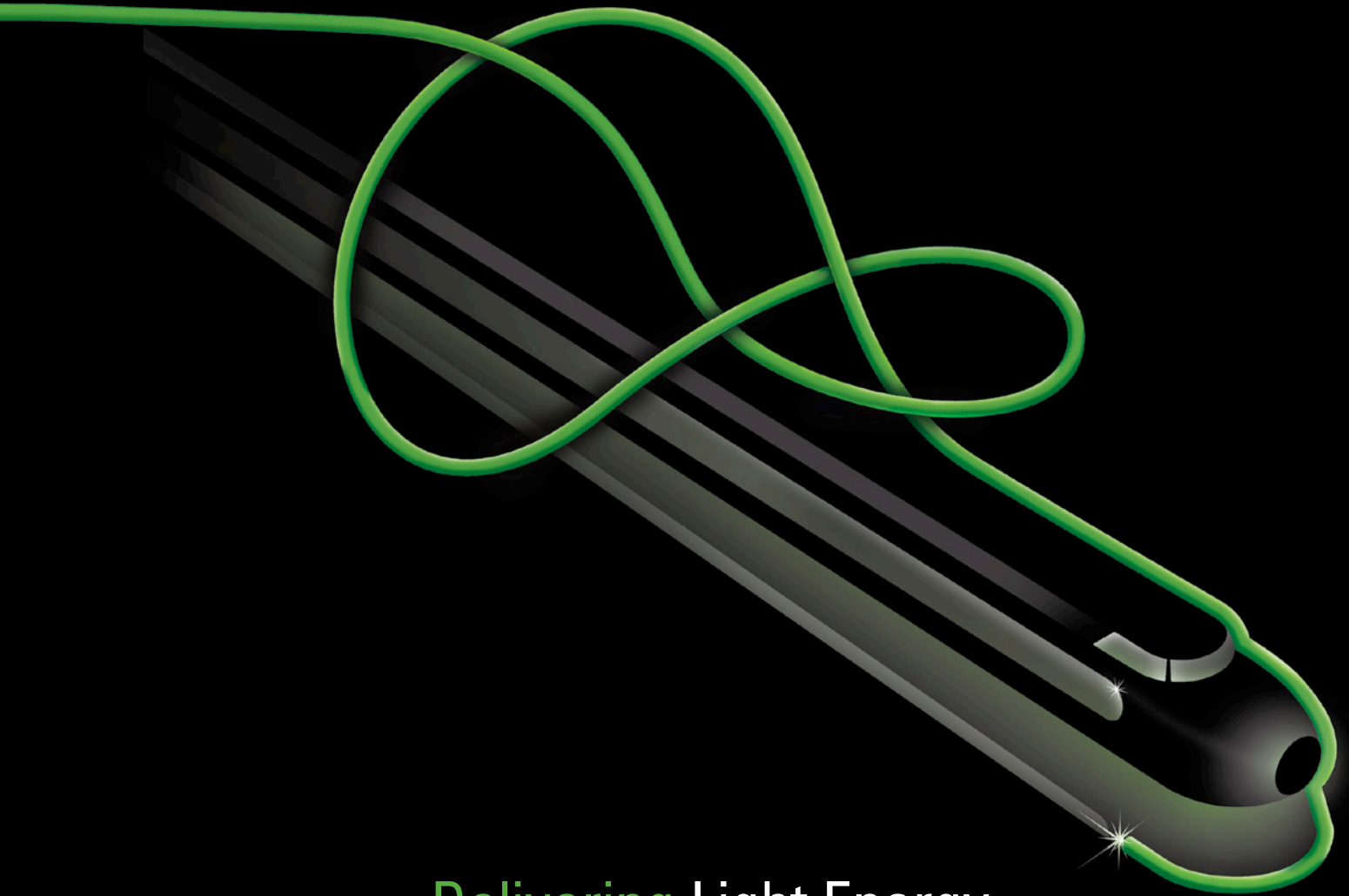


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# NUBEAM™



## Delivering Light Energy

Benefiting from an environmentally controlled facility and many years of experience, the engineers at Nufern have developed a new generation of beam delivery fibers designed to address the laser industries' ever increasing need for greater power handling capability. The output power, beam quality and performance characteristics of many near-IR lasers has improved significantly in recent years. This ongoing technological advance requires fibers with attributes previously required only in telecom and space born environments. NuBEAM fibers, made with knowledge, experience, and controls developed by Nufern for these applications are unique in demonstrating levels of technology, quality, performance and life expectancy required for lowest life cycle cost and highest productivity.



OPTICA FIBERS — SUB-ASSEMBLIES — FIBER LASERS

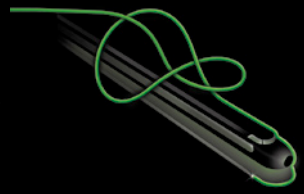
[www.nufern.com](http://www.nufern.com)



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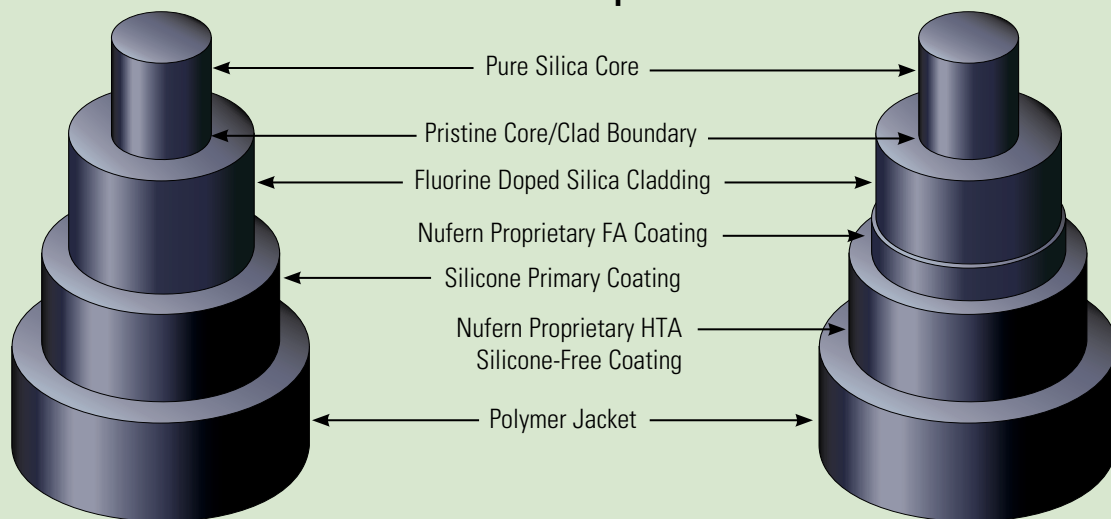
### Optical Benefits

- Nufern proprietary processes yield precision diameter control over very long fiber lengths resulting in the lowest level of fiber induced beam perturbation.
- Pure silica core technology results in high damage resistance and very low attenuation in the 800 nm to 1600 nm power transmission band.
- Nufern ultra clean and environmentally controlled draw room yields the most pristine glass/polymer boundary eliminating "hot spots" and point sources of thermal failure.
- Optical silicone free buffer technology uses Nufern proprietary fluoro-acrylate coating developed for the fiber laser market.

### Mechanical Benefits

- Nufern process equipment is controlled by proprietary operating software that yields extremely high strength, highest fatigue failure resistant glass necessary for durable final products.
- 100% proof test and clean room processing yields high-strength, long-life fibers suitable for use even in harsh mechanical environments.
- Tight process control parameters & specifications result in a minimum lot-to-lot variability, yielding lowest cost termination.

### Fiber Construction Option Details



### Applications

- Industrial / Military
  - Laser Pump diode pigtailed
  - Laser Beam delivery for: Cutting, Welding, Soldering, Brazing, Directed Energy
  - Body in white and other mandatory "silicone free" environments
- Medical
  - Diagnostics
  - Photodynamic Therapy (PTD) delivery tools
  - Not designed for bio-compatibility (internal medicine) or sterilization
- Scientific
  - Spectroscopy
  - Sensors
  - Instrumentation: Plasma, Pyrometry, Semiconductor, Thomson Scattering

### Completion

- Buffer
  - Available with industry standard silicone
  - Nufern proprietary HTA — a silicone free coating for critical applications such as in a paint shop.
- Jacket
  - Nylon
  - Tefzel
  - Acrylate

