

# 20/400 Ultra Matched+ Yb-doped LMA Double Clad Fibers



Nufer's Ultra Matched (M+) Large Mode Area (LMA) active double clad fibers are ideal for high power fiber lasers and amplifiers used in defense, industrial, and medical applications. These fibers feature a 20 micron diameter core and 400 micron diameter clad size with a low NA (0.065) core. These M+ fibers represent the next generation of matched fibers. They are matched with ultra-high precision to their passive 20/400 LMA M+ counterparts to ensure excellent splice compatibility and low loss. As with all Nufern standard LMA fibers, these fibers are proof tested to 100 kpsi, an industry requirement for long term reliability. The M+ fibers are specified to the tightest specifications including the MFD, and use NuCOAT-FA coating technology ensuring excellent preservation of beam quality and extending operating life at the high power levels demanded by today's industrial fiber laser applications. These ultra matched fibers are available in non-PM (LMA) and PM (PLMA) versions.

## Typical Applications

- Monolithic high power lasers & amplifiers
- Material processing
- Non-linear optics/frequency doubling
- Defense, industrial and medical

## Features & Benefits

- Ultra Matched (M+) — Providing the lowest possible splice loss
- NuCOAT-FA fluoroacrylate coating — Greater fiber durability in extreme environmental operating & storage conditions
- State of the art Yb-doped glass — Useful for generating high CW powers
- PANDA-style stress structure for increased birefringence — Superior optical performance and uniformity
- All fiber proof tested to > 100 kpsi — Critical for ensuring long term reliability when coiling

## Optical Specifications

	PLMA-YDF-20/400-M+	LMA-YDF-20/400-M+
Operating Wavelength	1015 – 1115 nm	1060 – 1115 nm
Core NA	0.065 ± 0.005	0.065 ± 0.005
First Cladding NA (5%)	≥ 0.46	≥ 0.46
Mode Field Diameter	16.70 ± 1.00 μm @ 1060 nm	16.7 ± 1.0 μm @ 1060 nm
Core Attenuation	≤ 30.0 dB/km @ 1300 nm ≤ 15.0 dB/km @ 1200 nm	≤ 30.0 dB/km @ 1300 nm ≤ 15.0 dB/km @ 1200 nm
Cladding Attenuation	≤ 15.0 dB/km @ 1095 nm	≤ 15.0 dB/km @ 1095 nm
Cladding Absorption	1.5 dB/m at 975 nm 0.5 ± 0.1 dB/m at 915 nm	0.40 ± 0.05 dB/m at 915 nm
Birefringence	nominal $4 \times 10^{-4}$	N/A
Slope Efficiency	> 70.0% @ 915 nm	> 70.0% @ 915 nm

## Geometrical & Mechanical Specifications

Cladding Diameter	405.0 ± 7.0 μm	N/A
Cladding Diameter (flat-to-flat)	N/A	400.0 ± 7.0 μm
Core Diameter	20.0 ± 1.5 μm	20.0 ± 1.5 μm
Coating Diameter	550.0 ± 15.0 μm	550.0 ± 15.0 μm
Core/Clad Offset	≤ 1.20 μm	≤ 1.20 μm
Proof test Level	≥ 100 kpsi (0.7 GN/m <sup>2</sup> )	≥ 100 kpsi (0.7 GN/m <sup>2</sup> )

The ultra matched passive fibers are also available.  
Coating Requirements: Low Index Polymer NuCOAT-FA.



7 Airport Park Road, East Granby, CT 06026 • 860.408.5000 • Toll-free 866.466.0214 • Fax 860.844.0210 • E-mail [info@nufern.com](mailto:info@nufern.com) • [www.nufern.com](http://www.nufern.com) • Nufern products are manufactured under an ISO 9001:2008 certified quality management system.



Custom developed fiber (FUD) specifications are subject to change without notice. Other configurations such as alternative form factors, optimized cut-off and UV cured color coating may be available. Let us know how Nufern can assist with your requirements.

# 20/400 Ultra Matched+ Passive LMA Double Clad Fiber



Nufern's Ultra Matched+ (M+) Large Mode Area (LMA) passive double clad fibers are ideal for high power fiber lasers and amplifiers used in military, industrial, and medical applications. These fibers feature a 20 micron diameter core and 400 micron diameter clad size with a low NA (0.065) core. These M+ fibers represent the next generation of matched fibers. They are matched with ultra-high precision to their active Yb-doped 20/400 LMA M+ counterparts to ensure excellent splice compatibility and low loss. As with all Nufern standard LMA fibers, these fibers are proof tested to 100 kpsi, an industry requirement for long term reliability. The M+ fibers are specified to the tightest specifications including the MFD, and use NuCOAT™ coating technology ensuring excellent preservation of beam quality and extending operating life at the high power levels demanded by today's industrial fiber laser applications.

## Typical Applications

- High power fiber lasers
- CW and pulsed amplifiers
- LMA fiber couplers & pump combiners
- Military, industrial and medical

## Features & Benefits

- NuCOAT™ fluoroacrylate coating — Greater fiber durability in extreme environmental operating & storage conditions
- LMA core design — Useful for transmitting high CW powers
- “Few” moded core design — Easy to maintain single mode LP01 beam through fiber & components
- Ultra Matched (M+) — Providing the lowest possible splice loss
- All fiber proof tested to > 100 kpsi — Critical for ensuring long term reliability when coiling

## Optical Specifications

Operating Wavelength	1060 – 1600 nm
Core NA	0.065 ± 0.005
First Cladding NA (5%)	≥ 0.46
Mode Field Diameter	16.7 ± 1.0 μm @ 1060 nm
Core Attenuation	≤ 30.0 dB/km @ 1300 nm ≤ 15.0 dB/km @ 1200 nm
Cladding Attenuation	≤ 15.0 dB/km @ 1095 nm

## LMA-GDF-20/400-M+

## Geometrical & Mechanical Specifications

Cladding Diameter	395.0 ± 3.0 μm
Core Diameter	20.0 ± 1.5 μm
Coating Diameter	550.0 ± 15.0 μm
Core/Clad Offset	≤ 1.20 μm
Clad Non-Circularity	≤ 0.50 %
Proof test Level	≥ 100 kpsi (0.7 GN/m <sup>2</sup> )

The precision matched (M) fibers are also available - see PLMA-YDF-20/400-M and LMA-YDF-20/400-M



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