

# Eye Safe 25P/250 Thulium-Doped LMA Double Clad Fibers



Nufern thulium-doped double clad fibers utilize glass compositions specifically optimized for a high degree of cross-relaxations between Tm ions, enabling efficient conversion of 793 nm pump photons into signal photons at 2 μm. The precision matched -M fiber version offers higher absorption and extraordinary efficiency. In addition, the waveguide design in -M version is specifically tailored to suppress higher order modes for improved beam quality and enabling highly reliable splicing to precision matched passive fibers. While the high Tm concentration of -M version is optimal for operation at higher wavelengths in the 2 μm gain spectrum, the -LC fiber features a lower Tm-concentration best suited for operation in the shorter wavelength region. Both fibers feature a 25 μm core and 250 μm clad diameter allowing for a large mode field diameter and short device lengths thereby minimizing non-linear effects such as SBS and SRS. Precision matched 25/250 passive fibers are available for use in components and beam delivery.

## Typical Applications

- Eye Safe (~2μm) lasers & amplifiers
- Military and commercial lidar
- ~2μm fiber lasers for pumping solid state Ho lasers
- High peak power pulsed fiber amplifiers

## Features & Benefits

- NuCOAT<sup>TM</sup> fluoroacrylate coating — Greater fiber durability in extreme environmental operating & storage conditions
- Unique low NA Tm-doped core design — Robust single-mode beam quality
- Optimized composition for 793nm pumping — Very high conversion efficiency
- High pump absorption — Short fiber length, efficient lasing in the ~2μm window
- All fiber proof tested to > 100 kpsi — Critical for ensuring long term reliability when coiling

## Optical Specifications

	LMA-TDF-25P/250-M	LMA-TDF-25P/250-LC
Operating Wavelength	1900 – 2100 nm	1900 – 2100 nm
Core NA	0.090 ± 0.010	0.090
First Cladding NA (5%)	≥ 0.460	≥ 0.460
Cladding Attenuation	≤ 15 dB/km @ 860 nm	≤ 15 dB/km @ 860 nm
Cladding Absorption	2.10 ± 0.30 dB/m at 1180 nm 6.30 dB/m at 793 nm	1.00 ± 0.20 dB/m at 1180 nm 3.00 dB/m at 793 nm

## Geometrical & Mechanical Specifications

Cladding Diameter	250.0 ± 5.0 μm	250.0 ± 5.0 μm
Core Diameter	24.0 ± 1.5 μm	25.0 ± 2.0 μm
Coating Diameter	395.0 ± 15.0 μm	395.0 ± 15.0 μm
Core/Clad Offset	≤ 2.00 μm	N/A
Coating Material	Low Index Acrylate	Low Index Acrylate
Proof test Level	≥ 100 kpsi (0.7 GN/m <sup>2</sup> )	≥ 100 kpsi (0.7 GN/m <sup>2</sup> )

The passive version of each fiber is also available.



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.

NU0090-01/23/2017



光技術をサポートする  
株式会社オプトサイエンス

<http://www.optoscience.com>

東京本社 〒160-0014 東京都新宿区内藤町1番地 内藤町ビルディング TEL:03-3356-1064  
大阪支店 〒532-0011 大阪市淀川区西中島7-7-2 新大阪ビル西館 TEL:06-6305-2064  
名古屋営業所 〒450-0002 名古屋市中村区名駅2-37-21 東海ソフトビル TEL:052-569-6064

E-mail: [info@optoscience.com](mailto:info@optoscience.com)