

# EyeSafe 25 Micron Core Thulium-Doped LMA Double Clad Fibers



True LMA fiber featuring a unique low NA (< 0.1) high concentration Tm-doped core design. It is fully optimized for high slope efficiency (composition has demonstrated > 130% quantum efficiency) when pumped at 793 nm. This extraordinary efficiency is due to composition enabled cross relaxation of Thulium ions in the core. The high Tm concentration allows short device lengths and high pump conversion efficiency while the low NA (few moded) core design is ideal for applications where robust single-mode beam quality is critical. The high NA (0.46) large pump cladding waveguide allows for efficient coupling of high pump powers. The large core diameter (25  $\mu\text{m}$ ) maintains a large mode field diameter and short device length, thereby minimizing non-linear effects such as SBS and SRS.

## Typical Applications

- High power 2  $\mu\text{m}$  CW and pulsed EyeSafe lasers & amps
- EyeSafe industrial & medical lasers
- Military and commercial LIDAR
- 2  $\mu\text{m}$  TEM<sub>00</sub> fiber lasers for pumping crystal lasers

## Features & Benefits

- Unique low NA Tm-doped core design — Robust single-mode beam quality
- Optimized composition for 793 nm pumping — Very high conversion efficiency
- High pump absorption — Short fiber length, efficient lasing in the ~2  $\mu\text{m}$  window

## Optical Specifications

	PLMA-TDF-25P/400-HE	LMA-TDF-25P/400-HE
Operating Wavelength	1900 – 2100 nm	1900 – 2100 nm
Core NA	0.090	0.090
First Cladding NA (5%)	$\geq 0.460$	$\geq 0.460$
Cladding Attenuation	$\leq 15.0$ dB/km @ 860 nm	$\leq 15.0$ dB/km @ 860 nm
Cladding Absorption	$0.80 \pm 0.10$ dB/m at 1180 nm	$0.60 \pm 0.10$ dB/m at 1180 nm
Birefringence	$2.40$ dB/m at 793 nm nominal $2.5 \times 10^{-4}$	$1.80$ dB/m at 793 nm N/A

## Geometrical & Mechanical Specifications

	PLMA-TDF-25P/400-HE	LMA-TDF-25P/400-HE
Cladding Diameter	$400.0 \pm 15.0$ $\mu\text{m}$	N/A
Cladding Diameter (flat-to-flat)	N/A	$400.0 \pm 15.0$ $\mu\text{m}$
Core Diameter	$25.0 \pm 2.5$ $\mu\text{m}$	$25.0 \pm 2.5$ $\mu\text{m}$
Coating Diameter	$550.0 \pm 20.0$ $\mu\text{m}$	$550.0 \pm 20.0$ $\mu\text{m}$
Coating Material	Low Index Polymer	Low Index Polymer
Proof-test Level	$\geq 100$ kpsi (0.7 GN/m <sup>2</sup> )	$\geq 100$ kpsi (0.7 GN/m <sup>2</sup> )

The passive version of each fiber is also available.



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Nufern products are manufactured under an ISO 9001:2008 certified quality management system.



Standard specifications and design parameters are listed above. 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.