



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 μm) 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 μm CW and pulsed EyeSafe lasers & amps
- EyeSafe industrial & medical lasers
- Military and commercial LIDAR
- 2 μm TEM₀₀ 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 $\sim 2 \mu\text{m}$ window

Optical Specifications

Operating Wavelength
Core NA
First Cladding NA (5%)
Cladding Attenuation
Cladding Absorption

Birefringence

PLMA-TDF-25P/400-HE

1900 – 2100 nm
0.090
 ≥ 0.460
 $\leq 15.0 \text{ dB/km @ } 860 \text{ nm}$
 $0.80 \pm 0.10 \text{ dB/m at } 1180 \text{ nm}$
2.40 dB/m at 793 nm
nominal 2.5×10^{-4}

LMA-TDF-25P/400-HE

1900 – 2100 nm
0.090
 ≥ 0.460
 $\leq 15.0 \text{ dB/km @ } 860 \text{ nm}$
 $0.60 \pm 0.10 \text{ dB/m at } 1180 \text{ nm}$
1.80 dB/m at 793 nm
N/A

Geometrical & Mechanical Specifications

Cladding Diameter
Cladding Diameter (flat-to-flat)
Core Diameter
Coating Diameter
Coating Material
Proof test Level

$400.0 \pm 15.0 \mu\text{m}$
N/A
 $25.0 \pm 2.5 \mu\text{m}$
 $550.0 \pm 20.0 \mu\text{m}$
Low Index Polymer
 $\geq 100 \text{ kpsi (} 0.7 \text{ GN/m}^2 \text{)}$

N/A
 $400.0 \pm 15.0 \mu\text{m}$
 $25.0 \pm 2.5 \mu\text{m}$
 $550.0 \pm 20.0 \mu\text{m}$
Low Index Polymer
 $\geq 100 \text{ kpsi (} 0.7 \text{ GN/m}^2 \text{)}$

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.

