

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



Coherent 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  $\mu$ m. 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  $\mu$ m gain spectrum, the -LC fiber features a lower Tm-concentration best suited for operation in the shorter wavelength region. Both fibers feature a 25  $\mu$ m core and 250  $\mu$ m 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 (~2 $\mu$ m) lasers & amplifiers
- Military and commercial lidar
- ~2 $\mu$ m 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 ~2 $\mu$ m window
- All fiber proof tested to > 100 kpsi — Critical for ensuring long term reliability when coiling

## Optical Specifications

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

### LMA-TDF-25P/250-M

1900 – 2100 nm  
0.090  $\pm$  0.010  
 $\geq$  0.460  
 $\leq$  15 dB/km @ 860 nm  
2.10  $\pm$  0.30 dB/m at 1180 nm  
11.40 dB/m at 793 nm

### LMA-TDF-25P/250-LC

1900 – 2100 nm  
0.090  
 $\geq$  0.460  
 $\leq$  15 dB/km @ 860 nm  
1.00  $\pm$  0.20 dB/m at 1180 nm  
3.00 dB/m at 793 nm

## Geometrical & Mechanical Specifications

Cladding Diameter  
Core Diameter  
Coating Diameter  
Core/Clad Offset  
Coating Material  
Proof-test Level

250.0 $\pm$ 5.0 $\mu$ m	250.0 $\pm$ 5.0 $\mu$ m
24.0 $\pm$ 1.5 $\mu$ m	25.0 $\pm$ 2.0 $\mu$ m
395.0 $\pm$ 15.0 $\mu$ m	395.0 $\pm$ 15.0 $\mu$ m
$\leq$ 2.00 $\mu$ m	N/A
Low Index Acrylate	Low Index Acrylate
$\geq$ 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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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 Coherent can assist with your requirements.

# 25/250 with 0.09 NA Matched Passive LMA Double Clad Fiber



Coherent's Large Mode Area (LMA) passive double clad fiber are ideal for high power fiber lasers and amplifiers used in military, industrial, and medical applications. This fiber features a 25 micron diameter core and 250 micron diameter clad size with a low NA (0.09) core. It is precision matched to Tm-doped 25P/250 LMA to ensure excellent splice compatibility and low loss. As with all Coherent standard LMA fibers, this fiber is proof-tested to 100 kpsi, an industry requirement for long term reliability. It utilizes the latest fiber design and NuCOAT-FA™ coating technology to ensure excellent preservation of beam quality and extended operating life at the high power levels demanded by today's industrial fiber laser applications.

## Typical Applications

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

## Features & Benefits

- NuCOAT-FA™ fluoroacrylate coating — Greater fiber durability in extreme environmental operating & storage conditions
- Unique LMA core design — Useful for transmitting high CW powers
- “Few” moded core design — Easy to maintain single mode LP01 beam through fiber & components
- Tight geometric tolerances — Superior optical performance and uniformity
- All fiber proof tested to > 100 kpsi — Critical for ensuring long term reliability when coiling

## Optical Specifications

Operating Wavelength	800 – 2100 nm
Core NA	0.090 ± 0.010
First Cladding NA (5%)	≥ 0.460
Cladding Attenuation	≤ 15.0 dB/km @ 1095 nm

## LMA-GDF-25/250-09M

## Geometrical & Mechanical Specifications

Cladding Diameter	247.0 ± 3.0 μm
Core Diameter	24.0 ± 1.5 μm
Coating Diameter	395.0 ± 15.0 μm
Core/Clad Offset	≤ 2.00 μm
Clad Non-Circularity	≤ 0.5 %
Coating Material	Low Index Acrylate
Proof test Level	≥ 100 kpsi (0.7 GN/m <sup>2</sup> )



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