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 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_{FA}™ 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 11.40 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
Prooftest Level	≥ 100 kpsi (0.7 GN/m²)	≥ 100 kpsi (0.7 GN/m²)

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The passive version of each fiber is also available.

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Low Index Specialty Multimode Beam Delivery Fibers

Coherent's passive, Germanium-doped, low NA specialty beam delivery fibers are designed to complement standard Coherent Ytterbium-doped fibers such as LMA-YDF-20/400-M, LMA-YDF-25/250-M and LMA-YDF-30/250-M. These Germanium-doped fibers are available with a high 0.11 NA and 25 micron core, in both 250 and 400 micron form factors. These fibers can be spliced with low losses to the 0.06 NA fibers and ensure good beam stability as the low power is delivered to the work piece. Both offerings have NuCOAT-FA™ coating technology, which provides excellent reliability at elevated power levels demanded by today's industrial fiber laser applications. As with all Coherent fibers, they are drawn in a clean room and prooftested to > 100 kpsi, allowing them to carry high powers for a long, worry-free lifetime.

Typical Applications

- Beam Delivery for CW & Pulsed Lasers
- Fiber Coupled Isolators
- Military, Industrial and Medical

Features & Benefits

- Complimentary high NA passive fibers — ensures continuation of excellent beam quality
- Exceptional geometric uniformity and core/clad concentricity — Ease of splicing to active fibers
- NuCOAT_{FA}™ coating technology — provides an extended operating life at high power levels
- Prooftested to > 100 kpsi — an industry requirement for long term reliability.

Optical Specifications	**BD-G25/250-11FA**	**BD-G25/400-11FA**
Operating Wavelength	800 – 2100 nm	800 – 2100 nm
Core NA	0.110 ± 0.010	0.110 ± 0.010
First Cladding NA (5%)	≥ 0.460	≥ 0.460
Cladding Attenuation	≤ 15.0 dB/km @ 1095 nm	≤ 15.0 dB/km @ 1095 nm
Geometrical & Mechanical Specifications		
Cladding Diameter	250.0 ± 3.0 µm	400.0 ± 5.0 µm
Core Diameter	25.0 ± 1.5 µm	25.0 ± 1.5 µm
Coating Diameter	395.0 ± 15.0 µm	550.0 ± 15.0 µm
Core/Clad Offset	≤ 2.00 µm	≤ 2.00 µm
Clad Non-Circularity	≤ 0.5 %	≤ 0.5 %
Coating Material	Low Index Acrylate	Low Index Acrylate
Prooftest Level	≥ 100 kpsi (0.7 GN/m²)	≥ 100 kpsi (0.7 GN/m²)

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