

Eye Safe 10P/130 Thulium-Doped Single-Mode Double Clad Fibers



Nufern Thulium-doped double clad fiber utilizes a glass composition specifically optimized for highly efficient operation around the important 2 μm wavelength when pumped at ~ 793 nm. These small core low NA fibers facilitate highly efficient single-mode operation while the telecom-like 130 μm cladding diameter makes handling, including cleaving and splicing, as simple as possible.

Typical Applications

- Low to mid power CW and pulsed Eye Safe 2 μm lasers & amplifiers
- Eye Safe industrial & medical lasers
- Military and commercial LIDAR
- 2 μm output TEM₀₀ fiber lasers for pumping solid state crystal lasers

Features & Benefits

- NuCOAT™ fluoroacrylate coating — Greater fiber durability in extreme environmental operating & storage conditions
- LMA single mode core design and short amplifier length — Useful for generating high peak powers
- Easy to maintain single-mode LP01 beam through fiber & components
- PANDA-style stress structure for increased birefringence — Superior optical performance and uniformity
- All fiber proof tested to > 100 kpsi — Critical for ensuring long term reliability when coiling

Optical Specifications

	SM-TDF-10P/130-HE	PM-TDF-10P/130-HE
Operating Wavelength (nominal)	2000 nm	2000 nm
Core NA	0.150	0.150
First Cladding NA (5%)	≥ 0.46	≥ 0.46
Cladding Attenuation	≤ 15.0 dB/km @ 860 nm	≤ 15 dB/km @ 860 nm
Cladding Absorption	1.00 ± 0.30 dB/m at 1180 nm	1.60 ± 0.30 dB/m at 1180 nm
Birefringence	3.00 dB/m at 793 nm N/A	4.70 dB/m at 793 nm nominal 1.5×10^{-4}

Geometrical & Mechanical Specifications

Cladding Diameter	N/A	130.0 ± 1.0 μm
Cladding Diameter (flat-to-flat)	130.0 ± 2.0 μm	N/A
Core Diameter	10.0 ± 1.0 μm	10.0 ± 1.0 μm
Coating Diameter	215.0 ± 10.0 μm	215.0 ± 10.0 μm
Coating Material	Low Index Polymer	Low Index Polymer
Proof test Level	≥ 100 kpsi (0.7 GN/m ²)	≥ 100 kpsi (0.7 GN/m ²)

The passive version of each fiber is also available.



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.



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<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 FAX: 03 (3356) 3466 E-mail: info@optoscience.com
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 FAX: 06 (6305) 1030 E-mail: osk@optoscience.com
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 FAX: 052 (569) 8064 E-mail: ngo@optoscience.com

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



The first 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 793nm. 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) 250µm pump cladding waveguide allows for efficient coupling of high pump powers. The large core diameter (25µm) maintains a large mode field diameter and short device length thereby minimizing non-linear effects such as SBS and SRS.

Typical Applications

- Eye Safe 2µm lasers & amplifiers
- Military and commercial lidar
- 2µm output TEM₀₀ fiber lasers for pumping solid state crystal lasers
- High peak power pulsed fiber amplifiers

Features & Benefits

- NuCOAT™ 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 λ window
- All fiber proof tested to > 100 kpsi — Critical for ensuring long term reliability when coiling

Optical Specifications

Operating Wavelength (nominal)	2000 nm
Core NA	0.090
First Cladding NA (5%)	≥ 0.460
Cladding Attenuation	≤ 15 dB/km @ 860 nm
Cladding Absorption	1.90 ± 0.20 dB/m at 1180 nm 9.50 dB/m at 793 nm

LMA-TDF-25P/250-HE

Geometrical & Mechanical Specifications

Cladding Diameter (flat-to-flat)	250.0 ± 8.0 µm
Core Diameter	25.0 ± 2.5 µm
Coating Diameter	395.0 ± 15.0 µm
Coating Material	Low Index Polymer
Proof test Level	≥ 100 kpsi (0.7 GN/m ²)

The passive version of each fiber is also available.



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.



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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 FAX: 03 (3356) 3466 E-mail: info@optoscience.com
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 FAX: 06 (6305) 1030 E-mail: osk@optoscience.com
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 FAX: 052 (569) 8064 E-mail: ngo@optoscience.com

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 ~2 μm window

Optical Specifications

	PLMA-TDF-25P/400-HE	LMA-TDF-25P/400-HE
Operating Wavelength (nominal)	2000 nm	2000 nm
Core NA	0.090	0.090
First Cladding NA (5%)	≥ 0.460	≥ 0.460
Cladding Attenuation	≤ 15.0 dB/km @ 860 nm	≤ 15.0 dB/km @ 860 nm
Cladding Absorption	0.80 ± 0.10 dB/m at 1180 nm	0.60 ± 0.10 dB/m at 1180 nm
Birefringence	2.40 dB/m at 793 nm nominal 2.5×10^{-4}	1.80 dB/m at 793 nm N/A

Geometrical & Mechanical Specifications

Cladding Diameter	400.0 ± 15.0 μm	N/A
Cladding Diameter (flat-to-flat)	N/A	400.0 ± 15.0 μm
Core Diameter	25.0 ± 2.5 μm	25.0 ± 2.5 μm
Coating Diameter	550.0 ± 20.0 μm	550.0 ± 20.0 μm
Coating Material	Low Index Polymer	Low Index Polymer
Proof-test Level	≥ 100 kpsi (0.7 GN/m ²)	≥ 100 kpsi (0.7 GN/m ²)

The passive version of each fiber is also available.



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.



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TEL: 03 (3356) 1064 FAX: 03 (3356) 3466 E-mail: info@optoscience.com
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 FAX: 06 (6305) 1030 E-mail: osk@optoscience.com
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 FAX: 052 (569) 8064 E-mail: ngo@optoscience.com