

High Power Fiber Laser Sub-Assemblies

Nufer's all fiber laser sub-assemblies, ideal building blocks for laser integrators, incorporate our industry leading large mode area fiber--LMA-YDF-20/400. These sub-assemblies, comprised solely of fiber-based components, are optimized for efficient, high power CW laser operation and deliver diffraction limited beam quality in a fully engineered, robust package.

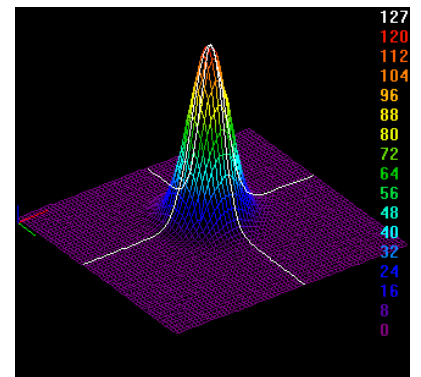
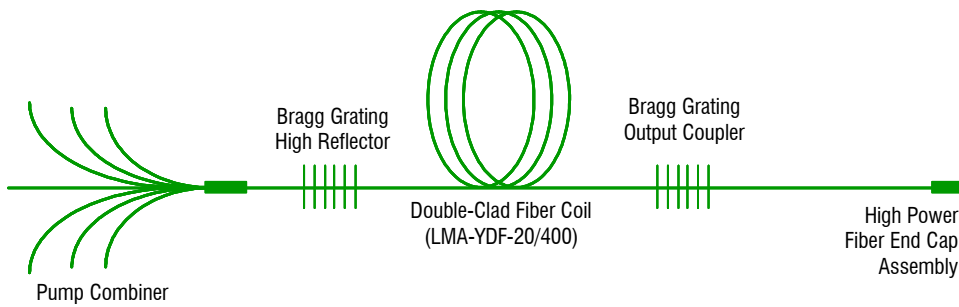
Applications:

- Military and aerospace
- Industrial material processing
- Marking and printing
- Medical

Features and Benefits:

- Comprised solely of fiber-based components
- Compatible with existing pump sources
- Single-mode output

Schematic - Fiber Laser Sub-Assembly



Output Beam Quality

SUB-ASSEMBLY SPECIFICATIONS

	HP-LSA-20/400-975-A	HP-LSA-20/400-915-A	HP-LSA-20/400-940-A
Pump Details	7 x 975 nm	7 x 915 nm	7 x 940 nm
Pump Pigtail Fibers	MM-S200/220-22A	MM-S200/220-22A	MM-S200/220-22A
Output Beam (M^2)	< 1.3	< 1.3	< 1.3
Output Beam Diameter (nominal)	160 μ m	160 μ m	160 μ m
Output Beam Divergence (nominal)	4°	4°	4°
Laser Wavelength (nominal)	1085 nm	1085 nm	1085 nm
Tested Output Power	100 W	TBD	TBD

CUSTOM OPTIONS

- Various pump combiner options are available including 7 x 1 pump combiners using MM-S105/125-22A fiber, pump combiners based on 3 x 1 (MM-S400/440-22A) and 19 x 1 (MM-S105/125-22A).
- Bi-directional pump combiners may be readily incorporated using (6+1) x 1 coupler design. Available with either MM-S105/125 or MM-S200/220 fibers.
- Alternative lasing wavelengths may be readily accommodated.
- Variety of end preparations and connectorization options are available.

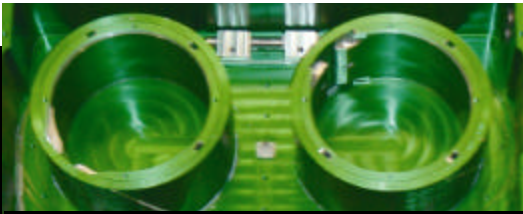
SUB-ASSEMBLY GENERAL CAPABILITIES ON REVERSE SIDE



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General Sub-Assemblies Capabilities

Nuferm's high power laser sub-assemblies are designed around our standard LMA-YDF-20/400 fiber which has generated over 800W of CW output power with diffraction limited beam quality. Our PLMA-YDF-20/400 Panda-style PM fiber is used to produce custom linear polarized lasers operating with similar high efficiency.

All components used in our sub-assemblies utilize Nuferm double-clad fibers—from gratings through pump combiners—ensuring the same high standards and compatibility critical for reliable, high power operation.

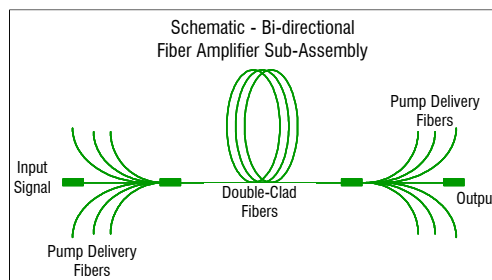
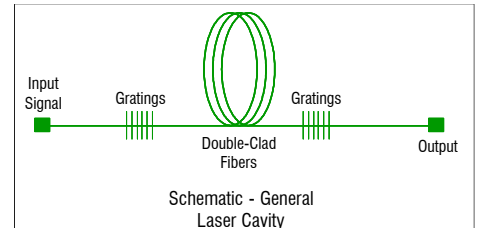
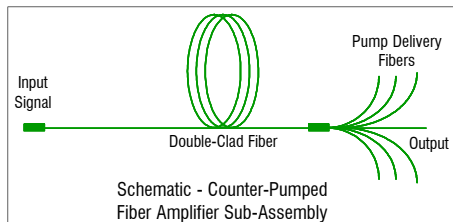
In addition to the LMA-20/400 sub-assemblies, custom fiber laser and amplifier sub-assemblies can be designed around any Nuferm standard double-clad fiber.

FIBER SPECIFICATIONS

	PM-YDF-5/125	LMA-YDF-30/400	LMA-YDF-30/250
Pump Absorption	~ 0.6 dB/m @ 915 nm	~ 1.0 dB/m @ 915 nm	~ 1.8 dB/m @ 915 nm
Features	Panda-style PM with photosensitive core	Large core, high non-linear threshold	Very short length, high peak powers
Applications	Low power lasers and amplifier; low cost sub-assemblies	High power single frequency amplifiers, high average power pulsed amplifiers	Short pulse amplifiers, high peak powers

DESIGN OPTIONS

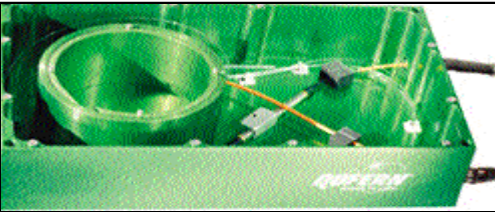
- Co-pumped or counter-pumped
- Bi-directional pumped
- Polarization maintained
- Pulsed or CW



COMPONENT DETAILS

- In addition to active Yb-doped and Er:Yb double-clad fibers, Nuferm offers a range of support fibers ranging from double-clad beam delivery fibers, photosensitive double-clad fibers, laser pigtail fibers and Panda-style PM delivery fibers
- Double-clad fiber gratings written in compatible un-doped double-clad fibers are made to specification and delivered spliced to the optimum active coil length
- High power testing to customer specifications available upon request





High Power Polarized Laser Sub-Assemblies

Nufern's polarized fiber laser sub-assemblies, ideal building blocks for laser integrators, incorporate our industry leading Panda-style large mode area fiber--PLMA-YDF-20/400. All components used in our sub-assemblies utilize Nufern double-clad fibers--from gratings through pump combiners--ensuring the same high standards and compatibility critical for reliable, high power operation. These sub-assemblies are optimized for efficient, high power CW laser operation, deliver diffraction limited beam quality and high polarization extinction ratio (PER) in a fully engineered, robust package.

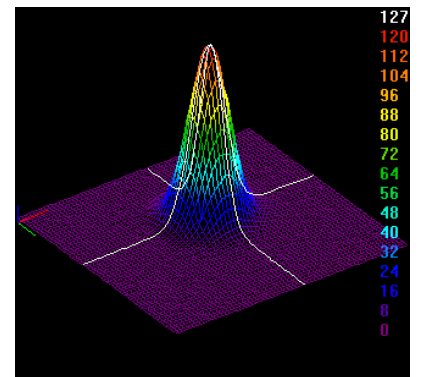
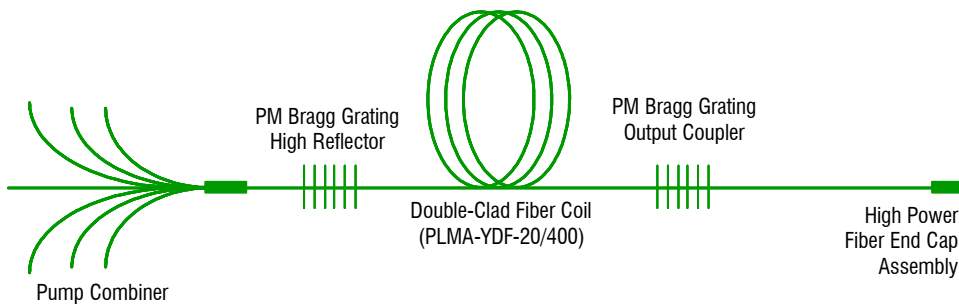
Applications:

- Military and aerospace
- Industrial material processing
- Marking and printing
- Medical

Features and Benefits:

- Comprised solely of fiber-based components
- Compatible with existing pump sources
- Single-mode output
- High polarization extinction ratio

Schematic - Polarized Laser Sub-Assembly

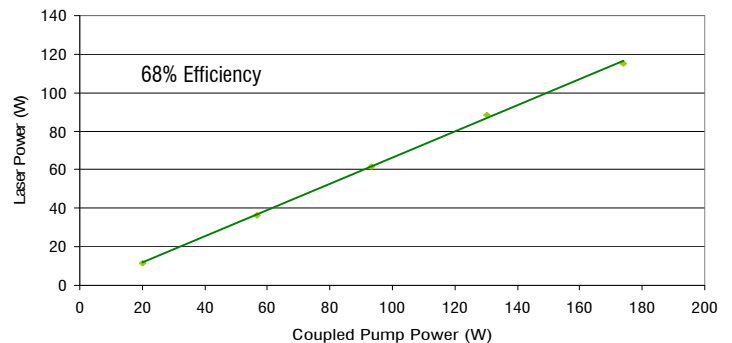


Output Beam Quality

SUB-ASSEMBLY SPECIFICATIONS

	HP-PLSA-20/400-975
Pump Details	7 x 975 nm
Pump Pigtail Fibers	MM-S200/220-22A
Output Beam (M ²)	< 1.3
Output Beam Diameter (nominal)	160 μm
Output Beam Divergence (nominal)	4°
Laser Wavelength (nominal)	1085 nm
Tested Output Power	100 W
PER	≥ 15

Measured Slope Efficiency For PLMA-YDF-20/400 Based Fiber Laser



CUSTOM OPTIONS

- Various pump combiner options are available including 7 x 1 pump combiners using MM-S105/125-22A fiber, pump combiners based on 3 x 1 (MM-S400/480-22A) and 19 x 1 (MM-S105/125-22A).
- Alternative pump and lasing wavelengths may be readily accommodated.
- Variety of end preparations and connectorization options are available.

