



A Furukawa Company

Optical Gain Fiber
Double Clad and Glass Clad



OPTICAL GAIN FIBER

for Fiber Lasers and Amplifiers

Ytterbium

Ytterbium Polarization-Maintaining

Erbium-Ytterbium Polarization-Maintaining

Erbium-Ytterbium

Cladding Pumped Optical Fibers

Erbium-Ytterbium, Erbium Ytterbium PM Double and Glass Clad

These fibers enable fiber lasers and amplifiers with good beam profile characteristics, high wallplug efficiencies, compact foot-prints, superior reliability, and maintenance-free operation. They also accommodate high energies during pulsed operation and at high repetition rates.

Erbium-Ytterbium (Double Clad)

The single-mode core of this fiber is co-doped with both erbium and ytterbium. It is then surrounded by a silica cladding and covered with a low-index protective coating. The resulting double-clad fiber is used for single-mode fiber lasers and amplifiers operating in the 1530 to 1565 nm range.

Erbium-Ytterbium (Glass Clad)

The core of this fiber is identical to that of the erbium-ytterbium double-clad fiber described above. It is surrounded by a shaped glass inner cladding, which in turn is surrounded by a circular outer glass cladding. This glass-clad fiber is used for single-mode fiber lasers and amplifiers operating in the 1530 to 1565 nm range.

Erbium-Ytterbium PM (Double Clad)

TrueMode-kW cavities are designed to support one of two delivery options. For stand-alone use, single-mode output is efficiently coupled to common 20/400 μm delivery fiber. This provides a cladding-stripped and speckle-free clean output beam, ready for splicing to cabling. For combined use, a compatible output fiber is provided.

Typical Applications

- Construction of multi-watt amplifiers around 1550 nm
- LIDAR, CATV, FTTx, FSOC

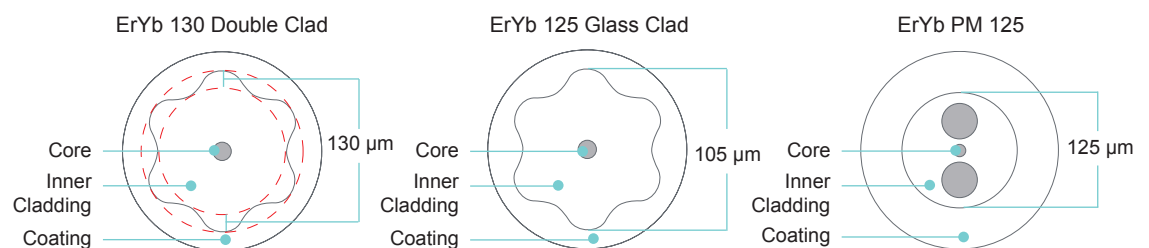
Features and Benefits (EY Double and Glass Clad)

- Core recipe optimized for high optical efficiency and shortest device lengths
- Pump wavelength 910 - 980 nm
- Low-splice-loss achieved to conventional single-mode fiber and most commercially available passive double-clad fibers
- High conversion efficiency
- Patented cladding designs result in efficient mode mixing while maintaining good splice-ability
- Robust against 1 μm parasitics

Additional Features and Benefits (EY Glass Clad)

- Higher reliability: no optical power in contact with polymer coating, hence no coating degradation concerns
- Ease of assembly: Circular 125 μm outer cladding means that conventional telecom-grade splicers, cleavers, recoaters can be used
- Improves spliceability with conventional SM and MM passive fibers
- No low-index recoating necessary: even heat-shrink splice protector works well

	ErYb 130 (Double Clad)	ErYb 125 (Glass Clad)	ErYb PM 125
Properties			
Core numerical aperture	0.17	>0.20	0.17
Cladding numerical aperture	0.45	>0.24	0.45
Mode field diameter @ 1550 nm	7 μm	7 μm	7 μm
Ytterbium clad absorption @ 915 nm	>1.2 dB/m	>1.5 dB/m	>0.5 dB/m
Star cladding diameter	130 μm	105 μm	Not specified
Beat length @ 1060 nm	N/A	N/A	<4.0 mm
Beat length @ 1550 nm	N/A	N/A	<6.0 mm
Circular cladding diameter	N/A	125 μm	125 μm
Coating outer diameter	250 μm	250 μm	250 μm
Mechanical and Testing Data			
Proof test level	100 kpsi	100 kpsi	100 kpsi
Order by Part Number	552 HPWR 510	552 HPWR 065	300 380 334



Cladding Pumped Optical Fibers

Ytterbium, Ytterbium PM Double Clad

The single-mode core of this optical fiber is doped with ytterbium. It is then surrounded by a silica cladding and covered with a low-index protective coating. These fibers enable fiber lasers and amplifiers with good beam profile characteristics, high wallplug efficiencies, compact footprints, superior reliability, and maintenance-free operation. They also accommodate high energies during pulsed operation and at high repetition rates.

Typical Applications

- Fiber lasers
- Fiber amplifiers
- High-energy, pulsed operation

Ytterbium

The single-mode core of this fiber is doped with ytterbium. It is then surrounded by a silica cladding and covered with a low-index protective coating. The resulting double-clad fiber is used for single-mode fiber lasers and amplifiers operating in the 1040 to 1200 nm range.

Typical Applications

- Construction of single-mode fiber lasers emitting at 1040 to 1200 nm

Features and Benefits

- Star-shaped cladding gives efficient mode mixing and improves spliceability
- Low-index polymer coating maintains strength and gives high cladding NA

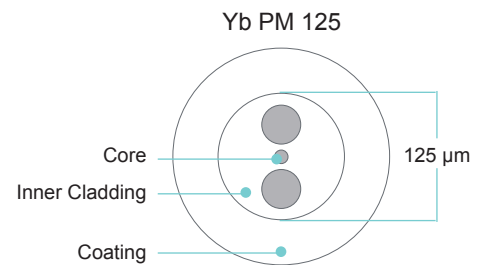
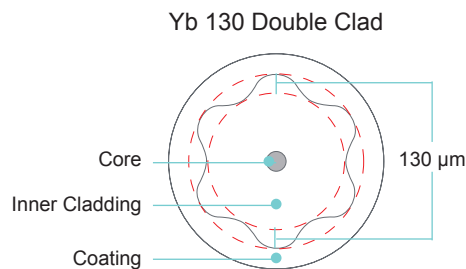
Ytterbium PM

Ytterbium double-clad PM optical fibers are used for single-mode optical fiber lasers and amplifiers operating in the 1040 to 1200 nm range with polarized outputs.

Features and Benefits

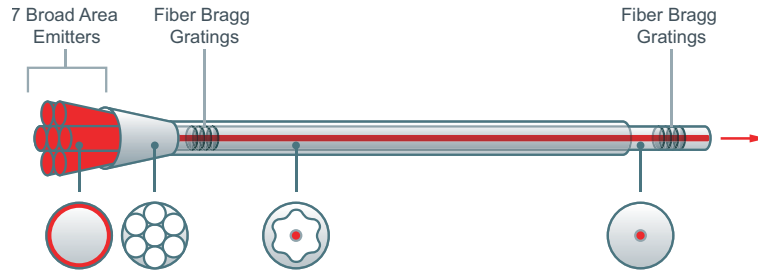
- Ytterbium concentrations optimized for efficiency
- Low-splice-loss achieved to conventional single-mode fiber and most commercially available passive double-clad fibers

	Yb 130	Yb PM 125
Properties		
Core numerical aperture	0.12	0.12
Cladding numerical aperture	0.45	0.45
Mode field diameter @ 1550 nm	6 μm	6 μm
Ytterbium clad absorption @ 915 nm	>0.5 dB/m	>0.5 dB/m
Beat length @ 1060 nm	Not Specified	<4.0 mm
Beat length @ 1550 nm	Not Specified	<6.0 mm
Circular cladding diameter	Not Specified	125 μm
Coating outer diameter	250 μm	250 μm
Mechanical and Testing Data		
Proof test level	100 kpsi	100 kpsi
Order by Part Number	107 986 820	552 HPWR 004



Cladding Pumped Fiber
Laser and Amplifier

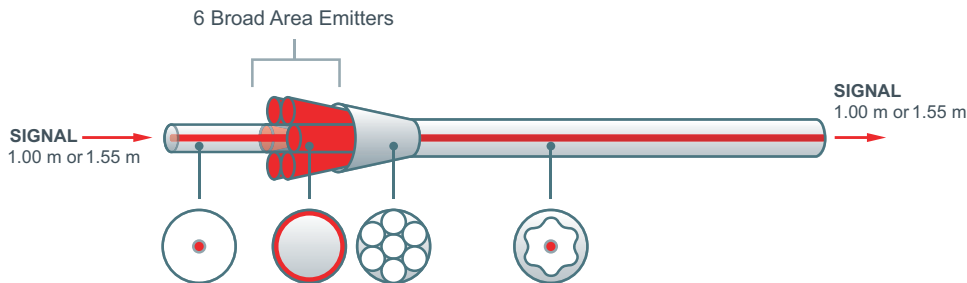
Cladding Pumped Fiber **LASER (CPFL)**



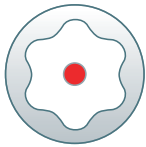
Output Wavelength:

- 1064 nm
- 1083 nm
- 1100 nm
- 1117 nm

Cladding Pumped Fiber **AMPLIFIER (CPFA)**

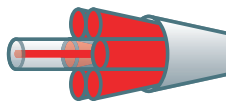


Cladding Pumped Fibers



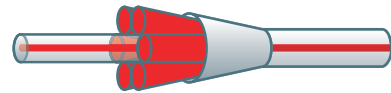
Also Available Separately

Combiners for CPF Lasers



Multimode Input (105/125 μm)
 CPF Output (0.45 NA)

Cladding Pumped Fiber Gain Module Configurations



Includes Combiner and Cladding Pumped Fiber
 Models of Gain Modules Available
 Yb, PM Yb, ErYb Double & Glass Clad, PM ErYb



For additional information please contact your sales representative.

You can also visit our website at www.ofsoptics.com
 or call 1-888-FIBER-HELP (1-888-342-3743) from inside the USA
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