CP1100 Ytterbium-Doped Double Clad Fiber

For specialized amplifiers, marking and free-space communications lasers at 1075 nm – 1100 nm

'Cladding-Pump' is perhaps the most significant innovation yet in the field of active fiber devices. By harnessing the high power outputs of multimode pump diodes, cladding-pump fibers have made the goal of multi-watt lasers and amplifiers a reality.

CP1100 employs Fibercore Limited's QPS (quasi polygonal, sinusoidal) fabrication technology (US Patent 6411732 B1). The multi-lobed, pure-silica pump-core of CP1100 ensures that pump energy is transferred efficiently into the central, ytterbium-doped laser core. Unlike competitors' double-clad fibers, that often employ a silicone rubber or low refractive index resin, CP1100 ha a doped silica outer cladding.

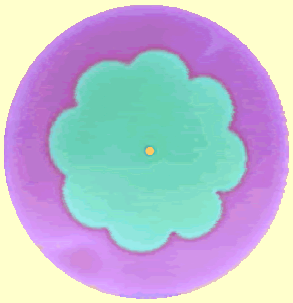
This unique construction dramatically improves and simplifies the handling characteristics of cladding-pump fibers. The 'hard' silica, circular cross section and standard 125 µm diameter enable the use of standard cleavers, fusion-splicers and ferrules – And can only increase fiber reliability.

Ytterbium Fiber Lasers – High Efficiency, Highly-Collimated YAG Replacement

With outputs in the region of 1100 nm and the ability to deliver high Q-switched pulse repetition-rates without degradation of peak-power, inherent in all fiber lasers, ytterbium is an obvious replacement for conventional Nd YAG devices in marking applications. However, with practical conversion efficiencies of more than 70% and the ability to collimate the output beam to a significantly greater degree that if it were at 1550 nm, ytterbium-doped fiber lasers also offer a compact, lightweight and energy-efficient solution for free-space applications that may not require eye-safety – for example, inter-satellite communications.

The standard 125 µm diameter of CP1100 delivers real benefit in terms of reliability and ease-of-handling, but does restrict output powers to a few watts. Please note that practical power limits are specific to individual applications and must be determine experimentally.

Unique, 125 µm, All-silica Construction

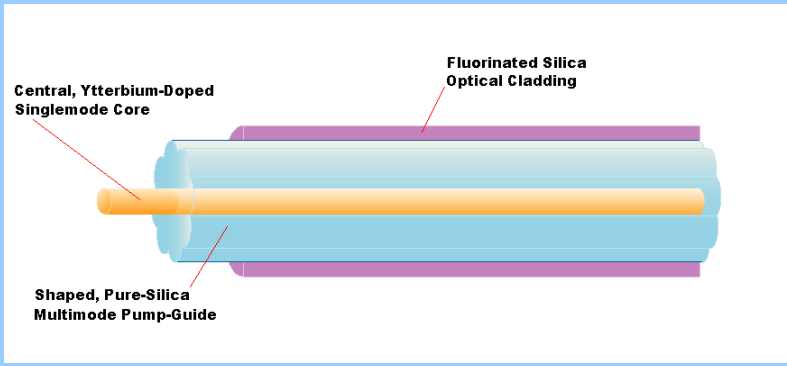


End face image of CP1100 (false colours)

- Fits standard ferrules
- High-quality cleaves achieved with standard cleavers
- Can be fusion-spliced using standard machines (Ericsson, Sumitomo, Fujikura, Vytran etc.)
- Inherent high mechanical reliability
- 1075 nm – 1100 nm output enables better collimation (cf 1550 nm)
- High (70%+) practical conversion efficiency reduces power consumption
- Suitable for output powers of a few watts

T: +44 (0) 23 8076 9893 F: +44 (0) 23 8076 9895 E: info@fibercore.com www.fibercore.com

Unique, 125 µm, All-silica Construction



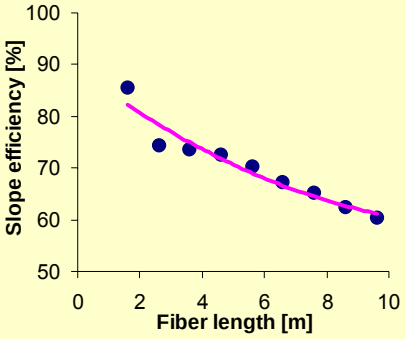
- Fits standard ferrules
- Cleaves and splices using Industry-standard equipment
- Inherent high mechanical reliability

Specifications

Laser Core	**Composition**	Aluminosilicate with ytterbium
	Design output wavelength (nm)	1075 - 1100
	Numerical Aperture	0.12 – 0.16
	MFD (µm) @ 1550 nm *nominal*	4.0 – 7.5
	Cut-off wavelength (nm) *nominal*	900
	Attenuation @1200 nm (dB/km)	≤ 40
Pump Guide	**Composition**	Pure silica with doped silica cladding
	Numerical Aperture	0.24 – 0.28
	Mean Core Diameter (µm)	85 – 105
	Outside Diameter (µm)	125 ± 1
General	**Proof Test Level**	1% (100 kpsi)
	Coating Type	Dual Layer Acrylate
	Coating Diameter	245 µm ± 5%

High Conversion Efficiency

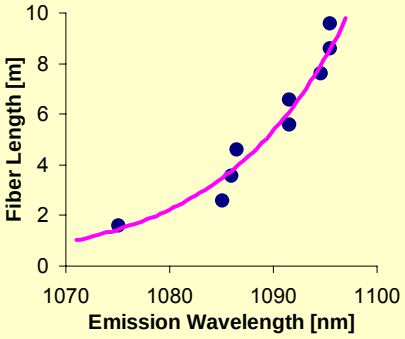
Slope efficiencies are equivalent to those of more conventional, 'core-pumped' fibers



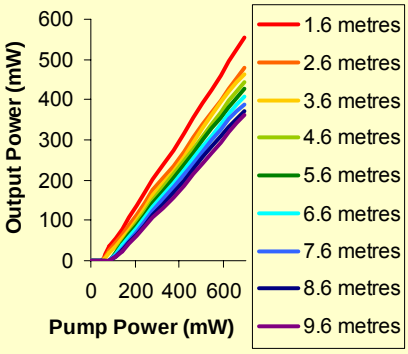
Slope Efficiency

Wavelength Tunable

Just like any three-level laser system, the central output wavelength of CP1100 is determined by the cavity length.



Emission wavlength variation with fiber length



ASE performance variation with fiber length, with a 1047nm core-pump configuration

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