

Medical OCT Fiber Optic Probes

Optical Coherence Tomography (OCT) is a non-invasive optical imaging procedure for tissue diagnosis. The choice of fiber and distal optics are critical for the quality and the resolution of the imaging solution.

Conventionally, two fibers are used to make the system, one of the fibers transmits and illuminates the target specimen, while the second fiber collects the reflected scattered light for reconstruction of the image by the detection system.

A newer, more sophisticated version uses a single, multi-clad fiber system where the transmission of the source light and the reflected light occurs in a single fiber. The distal optics geometry plays a role in deciding the focal point of the irradiated light and collection efficiency of the scattered light.

FEATURES & BENEFITS

- High signal-to-noise ratio
- Immune to EM radiation
- Excellent spatial resolution
- Volumetric and subsurface imaging

APPLICATIONS

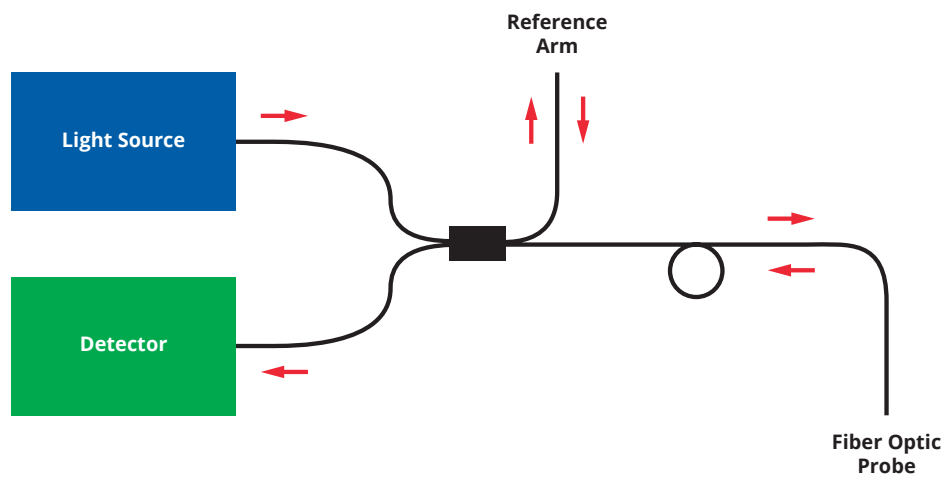
- Intravascular Imaging
- Ocular Imaging
- Dermal Imaging
- Pulmonary Imaging
- Gastroenterology Imaging
- Cardiovascular Imaging



BASIC OCT SYSTEM SCHEMATIC

An OCT imaging system using a light source coupled into an interferometry device with one of the light paths travelling to and from the specimen via the optical fiber probe.

OCT System

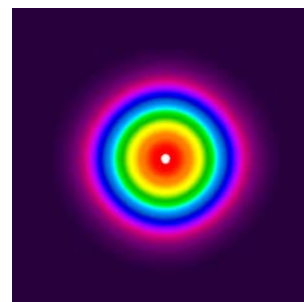
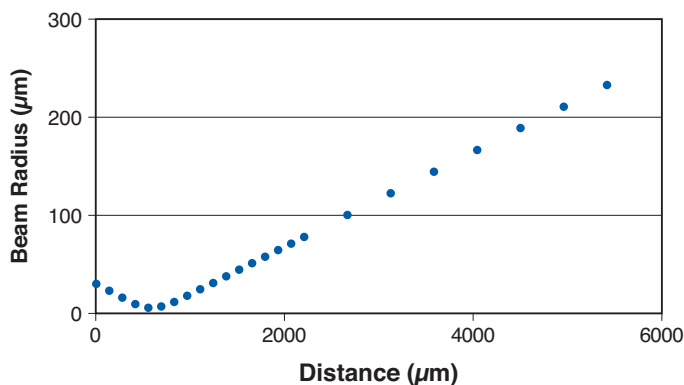


GENERAL BEAM CHARACTERISTICS

Coherent has the capabilities to measure the optical beam characteristics including working distance and beam waist. We have both scanning slit and camera based equipment to measure beam parameters.

Working Distance: Through the customized design of the distal tips, the working distance can be varied to suit the customer requirements.

Beam Waist: Similarly, the beam waist can also be designed to meet customer requirements.



TYPICAL FIBER ASSEMBLIES

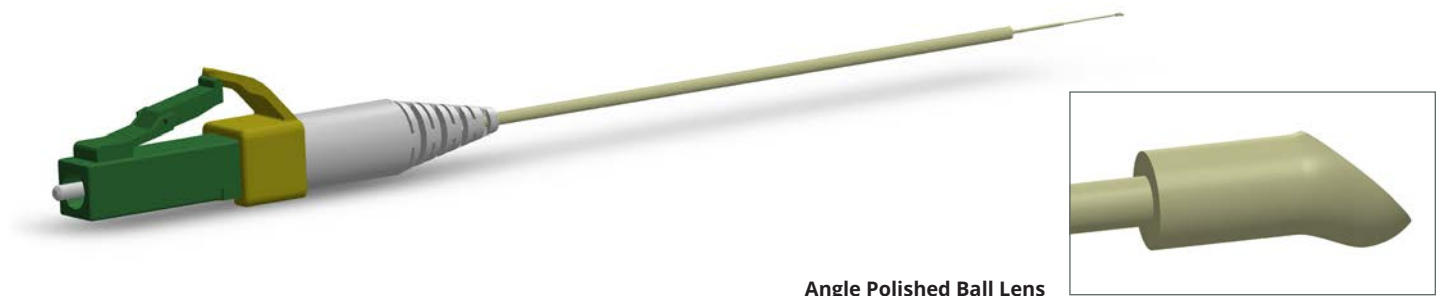
The fiber probes can be configured considering various options of connector, fiber types, and distal tip designs. The information below outlines some of the more common choices. In addition, Coherent has sophisticated testing capability to fully characterize even the most complex optical assemblies.

SPECIFICATIONS	
Wavelengths (nm)	720 to 1550
Internal Back Reflection (dB)	≤-60
Return Loss (dB)	-25 to -70
Insertion Loss (dB)	<0.5
Outer Diameter (μm)	125 to 1000
Spot Size (μm)	15 to 75
Working Distance (mm)	≤2

KEY CONSIDERATIONS OF OCT FIBER OPTIC PROBES ¹	
Operating Wavelength (nm)	720 to 1550
Connector	FC/APC FC/UPC LC/APC SC MU
Cable	250 acrylate jacket 900 micron Hytrel
Distal Tips	Angled ball lens Micro-prism Graded-index fiber lens (GRIN lens)

¹ Custom requests welcome.

Typical Fiber Probe Assembly with LC Connector



TYPICAL OCT FIBERS^{1,2,3}

Below are some of the specialty optical fibers specifically developed for OCT.

OPTICAL SPECIFICATIONS	1310-OCT	1310-OCT-80	1310-GDF-OCT	1310-GGF-OCT
Part Number	1398975	1398976	1398977	1398978
Operating Wavelength (nm)	1250 to 1600			
Core NA	0.12	0.12	0.13	0.13
Mode Field Diameter (µm) (at 1310 nm)	9.3 ± 0.5	9.3 ± 0.5	8.6 ± 0.5	8.6 ± 0.5
Cutoff (nm)	1150 to 1250			
Core Attenuation (dB/km) (at 1310 nm)	≤0.7	≤3.0	≤1.0	≤1.0
GEOMETRICAL & MECHANICAL SPECIFICATIONS				
Cladding Diameter (µm)	125 ±1	80 ±1	125 ±1	125 ±1
Core/Clad Offset (µm)	≤0.5	≤0.5	≤1.0	≤1.0
Coating Diameter (µm)	150 ±5	100 ±5	175 ±15	175 ±15
Coating Concentricity (µm)	≤1.5	≤1.5	≤5	≤5
Coating Material	Polyimide	Polyimide	Low Index Dual Acrylate	Dual Acrylate
Clad NA	NA	NA	0.46 (5%)	0.22 (50%)
Operating Temperature	-65 to 300°C (-85 to 572°F)	-65 to 300°C (-85 to 572°F)	-55 to 85°C (-67 to 185°F)	-55 to 85°C (-67 to 185°F)
Proof Test Level (kpsi)	200 to 220	200 to 220	100 to 160	100 to 160

1 Coherent offers customized fiber development.

2 Instrumentation grade fibers for each of the cited fibers are also available.

3 MM-S105/125-22A available as a compliment to single clad OCT fibers in catheters.



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Coherent follows a policy of continuous product improvement. Specifications are subject to change without notice. Coherent's scientific and industrial lasers are certified to comply with the Federal Regulations (21 CFR Subchapter J) as administered by the Center for Devices and Radiological Health on all systems ordered for shipment after August 2, 1976.

Coherent offers a limited warranty for all Collimating Fiber Assemblies. For full details of this warranty coverage, please refer to the Service section at www.coherent.com or contact your local Sales or Service Representative. MC-011-19-0M0519 Copyright ©2019 Coherent, Inc.

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