AKADEMIKA

Product Catalogue

FOL-PHYSICS
Physics of Fiber Optic Lab

FEATURES

- This laboratory is designed to study the physics of fiber optics.
- It deals with the study of various important characteristics of optical fiber cable like numerical aperture, V number, attenuation, coupling loss and mode field diameter

SPECIFICATIONS

Laser

- Source Type : He-Ne Laser
- Wavelength : 632.8nm
- Light : Red Visible
- O/P Power : 2 mW
- Complete system with power supply

Laser to fiber coupler

- Laser to fiber coupler with Lens adjustment facility to adjust beam into core of fiber
- Coupling Efficiency : >70% for SM fibers
  > 90% for MM fibers
- Operation Wavelength : 180 to 2000nm
- Power Handling Capacity : > 1watt

Laser power meter

- Separate Sensor Unit with Stand
- Separate Display Unit
- Power Measurement : 2µW ~ 20W
- Resolution : 1nW
- Power Density : 15KW/cm
- Sensor Diameter : 20mm
- Operation Wavelength : 400 ~ 1100 nm
- Calibrated to 633nm

Optical Patchcord ST-ST

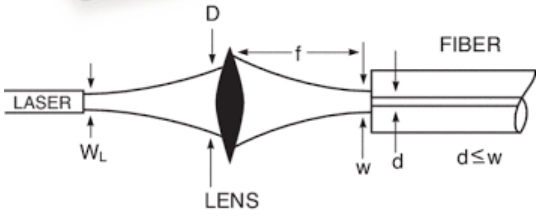
- Single Mode : 9/125 um 1mtr.
- Multi Mode : 62.5/ 125 um 1 mtr.
- Multi Mode Fiber Pigtail : 62.5/ 125um 3 mtr.
- Multi Mode : 100/140um 1mtr.

Spool

- 3 in 1 Multi Mode Spool(100m,500m,1000m)

MEASUREMENT OF COUPLING LOSS

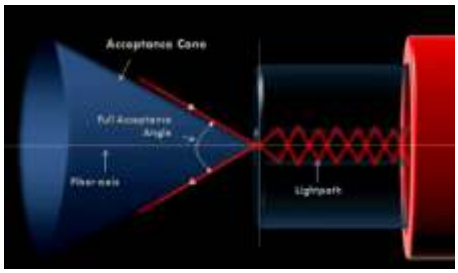
- In order to achieve maximum coupling efficiency, the fiber core diameter has to be bigger than the spot diameter
- Another factor which determines the coupling efficiency is the matching of fiber numerical aperture to numerical aperture ofthefocused rays.
- The size of the single mode fiber is very small, around 4-9 microns.



- For minimum coupling loss couple alignment shoul be proper and LASER beam characteristics should be matched properly

MEASUREMENT OF NUMERICAL APERTURE

- Numerical Aperture is range of acceptance angles rotated around axis, where light can be coupled into a waveguide such as the core of an optical fiber.



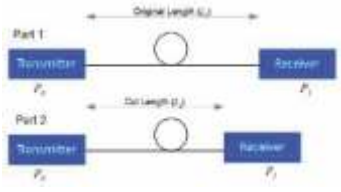
NUMERICAL APERTURE

- The blue cone is known as the cone of acceptance
- Light waves within the acceptance cone can be collected in a small area which can then be sent into the optical fiber
- Numerical aperture is measure of light gathering capacity of optical fiber Light outside the acceptance cone cannot be coupled to onto optical fiber
- It can be calculated quantitatively using formula

NA=nSinØ

MEASUREMENT OF ATTENUATION OF A OPTICAL FIBER BY CUTBACK METHOD:

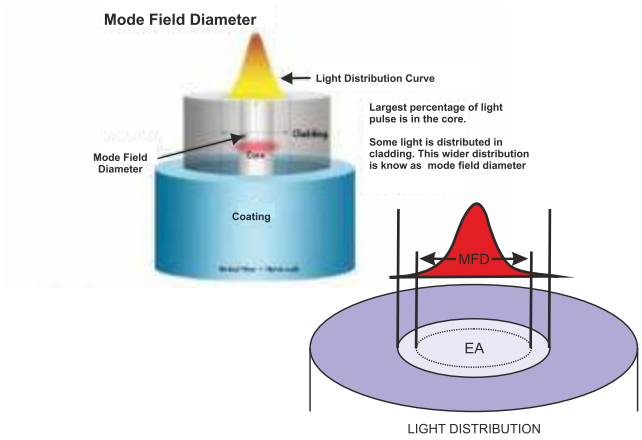
- The cutback method is used for measuring the total attenuation of an optical fibre.
- The cutback method begins by measuring the output power Py of the test fibre of known length 'L'. Without disturbing the input conditions, the test fibre is cut back to a shorter length



- The output power Px of the short test fiber is then measured and the fibre attenuation 'A' and the attenuation coefficient 'a'are calculated

MEASUREMENT OF MODE FIELD DIAMETER OF AN OPTICAL FIBER

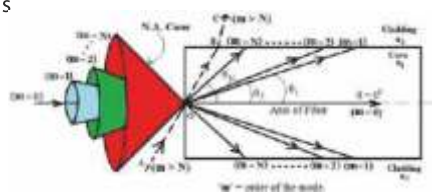
- The mode field diameter (MFD) represents a "measure of the transverse extent of the electromagnetic field intensity of a mode of light in a fiber cross section".
- In optical fiber, this typically is larger than the fiber core, since a portion of the light propagates through the cladding.
- MFD is determined using a Gaussian approximation of the intensity distribution with the MFD defined as the width of the curve at the 1/e2 power level.
- MFD is a function of wavelength, the core diameter, and the refractive-index.



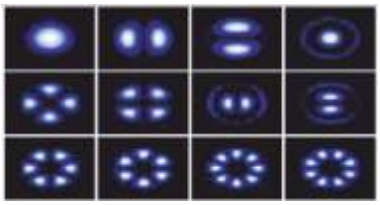
LIGHT DISTRIBUTION

MODE OBSERVATION

- Light can only be launched at certain discrete angles within the N.A. cone which can propagates through fiber core successfully
- Acceptance cone can not be assumed as a solid cone of rays, must be viewed as composed of discrete annular conical rings of rays.
- Discrete values of launching angles lead to formation modes



- In optical fiber, modes are different patterns of light intensity distribution around the core axis



NUMERICAL APERTURE

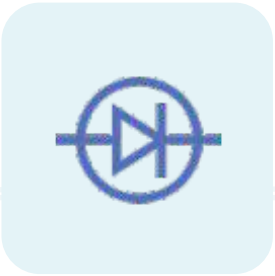
ACCESSORIES

• Optical Bread Board	: 01 No
• X-Y-Z Translation Stage	: 01 No
• Gimbal Mount for He-Ne Laser	: 01 No
• Rotary Stage	: 01 No
• Laser Fiber Coupler	: 01 No
• He-Ne Laser Source With Power Supply	: 01 No
• Laser Power Meter	: 01 No
• Laser to Fiber Coupler	: 01 No
• Coupler Holder	: 01 No
• Coupler Holder Base	: 01 No
• Rotary Stage Block	: 01 No
• Rotary Fiber Holder With Receptacle	: 01 No
• Photo Detector Holder	: 01 No
• Photo Detector Cap With Receptacle	: 01 No
• Photo Detector Cap With Knife-edge Slit	: 01 No
• Fiber Holder Stand	: 01 No
• Fiber Holder Stand Base	: 01 No
• Fiber Holder Stand Horizontal Plate	: 01 No
• Fiber Holder Stand Vertical Plate	: 01 No
• Photo Detector Holder Adjustable Stand	: 01 No
• Gimbal Mount Block	: 01 No
• Fiber Coupler Block	: 01 No
• Front Plate	: 01 No

Fiber Cable

• 9/125 micron 1Meter SMPatch Cord	: 01 No
• 62.5/125 micron MMPatch Cord	: 02 No
• 100/140 micron 1 meter MM Pigtail	: 01 No
• 3 in 1 Multi Mode Spool (100,500,1000)	: 01 No
• Allen Key Set	
• Allen Bolt	
• Acryllic Plate 4.5" X 4.5" X6 mm	: 01 No
• Power Cord	: 01 No

Our Products



Basic Electronics

Analog Communication

Digital Communication

RF/Antenna & Microwave

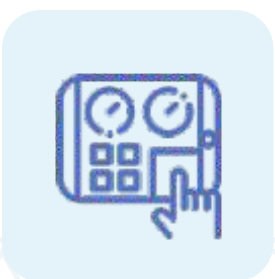
Fiber Optics

Radar

Wireless Communication

Network Laboratory

Processor



Controls & Instrumentation

Test & Measuring Instruments

Drone Technology Laboratory

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