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FUSED COUPLERS – FIBER OPTIC

Features

- Low loss and cost
- Broad bandwidth
- Good uniformity
- Small package
- High directivity
- Single mode, multi mode, polarization maintaining fiber versions are available
- Wide variety of wavelengths 400-2005 nm

Fused couplers are used to split optical signals between two fibers, or to combine optical signals from two fibers into one fiber. They are constructed by fusing and tapering two fibers together. This method provides a simple, rugged, and compact method of splitting and combining optical signals. Typical excess losses are as low as 0.2dB, while splitting ratios are accurate to within ±5 percent at the design wavelength. The devices are bi-directional, and offer low backreflection. The technique is best suited to singlemode and multimode couplers

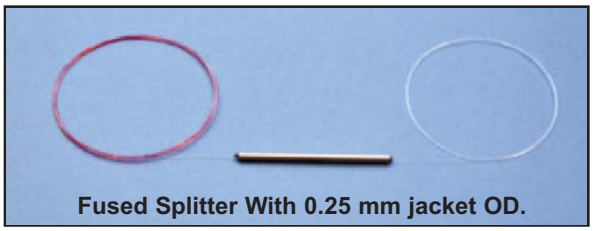
Fused couplers do suffer from some disadvantages. Multimode fused couplers are mode dependent. Certain modes within one fiber are transferred to the second fiber, while other modes are not. As a result, the splitting ratio will depend on what modes are excited within the fiber. The couplers are optimized for a uniform distribution of modes within the fiber known as an equilibrium mode field distribution,

This condition is met by using an incoherent source, such as an LED, or by using a mode scrambler, to mix up the modes traveling through the fiber. It is also achieved by sending the signal through a long length of fiber, before it enters the coupler.

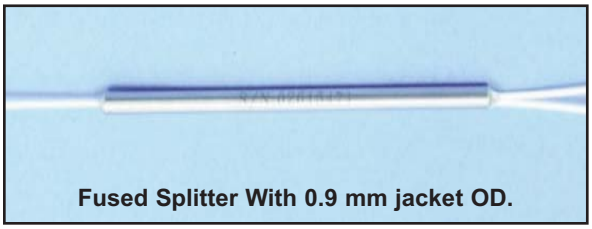
Singlemode fused couplers only transmit one mode, so they do not suffer from mode dependency. However, they are highly wavelength dependent. A difference in wavelength of only 10nm can cause a significant change in the splitting ratio. As a result it is important to specify the exact wavelength at which the fused coupler will be used.

Finally, fused couplers made from polarization maintaining fiber do not maintain polarization well at the fusion point, making them sensitive to temperature or vibration. As a result they are not well suited for polarization applications. If any of the above problems are of concern to you, then you should instead consider using an OZ Optics Fiber Optic Beam Splitter/Combiner, which uses hybrid micro-optics. Refer to the data sheet entitled *Fiber Optic Beam Splitters/Combiners.*

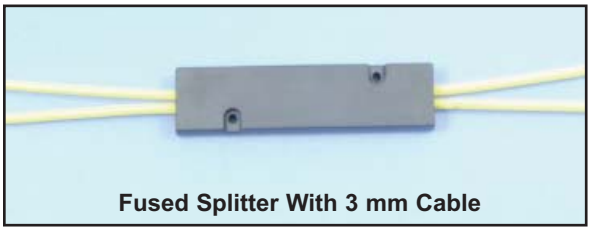
OZ Optics fused couplers are available in a range of wavelengths, fiber sizes, and splitting ratios. The fiber ends can be terminated with a variety of fiber connectors. Standard configurations are One-by-Two and Two-by-Two couplers. N by M fused couplers, such as one by three, or one-by four, etc., are also available on request.



Fused Splitter With 0.25 mm jacket OD.



Fused Splitter With 0.9 mm jacket OD.



Fused Splitter With 3 mm Cable

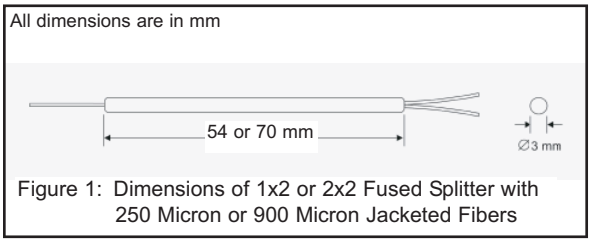


Figure 1: Dimensions of 1x2 or 2x2 Fused Splitter with 250 Micron or 900 Micron Jacketed Fibers

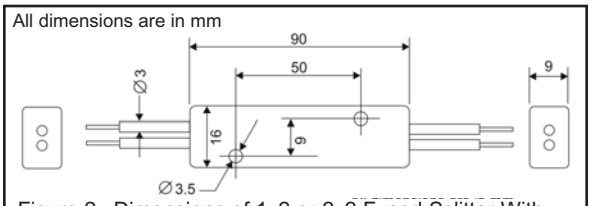


Figure 2: Dimensions of 1x2 or 2x2 Fused Splitter With 3mm Cabled Fibers

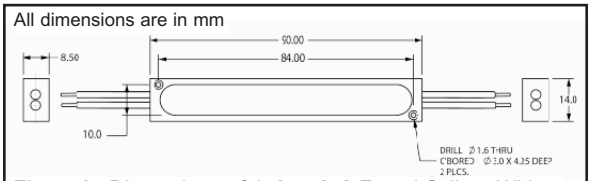


Figure 3: Dimensions of 1x2 or 2x2 Fused Splitter With 3mm Cabled Fibers (Version 2)

SPECIFICATIONS:

Standard Wavelengths: 405nm, 488nm, 514nm, 633nm, 830nm, 1300-1350nm,1490-1550nm and 2005nm for single-mode fused couplers. Other wavelengths are available on request. Multimode couplers are broadband

Fiber Sizes: Singlemode: 3.5/125 for 488nm and 514nm couplers, 4/125 for 633nm, 5/125 for 830nm, and 9/125 for 1300nm and 1550nm.
Multimode: 50/125, 62.5/125 and 100/140 size fibers.

Excess Loss: <0.3dB for 1300nm and 1550nm couplers. <0.5dB for 830nm couplers. <1.0dB for wavelengths between 480nm and 700nm.

Directivity: 50dB or better.

Splitting Ratio Accuracy: Within ±3% for 850nm, 1300nm, and 1550nm wavelengths. Within ±5% for wavelengths between 405nm and 850nm.

Temperature Range: -40°C to +85°C

Description	Part Number
One-by-Two Fused Splitter/Coupler	**FUSED-12-*W*-*a/b*-*S/R*-*XYZ*-*JD*-*L***
Two-by-Two Fused Splitter/Coupler	**FUSED-22-*W*-*a/b*-*S/R*-*TXYZ*-*JD*-*L***

W = Wavelength in nm (Standard 405, 488, 514, 633, 780, 850, 980, 1064, 1310, 1480, 1550 and 2005 nm)

a/b = Fiber core/cladding diameters
8/125 for 1480 & 1550 nm
7/125 for 1310 nm
6/125 for 980 & 1064 nm
5/125 for 780 & 830 nm
4/125 for 633 nm
3/125 for 405 nm

S/R = Split Ratio in % (50/50, 90/10, 95/5 and 99/1 are standard)

L = Fiber length in meters on all ports (standard is 1 meter)

JD = Fiber Jacket outside diameter in mm
0.25 for 0.25 mm OD coated fibers
1 for 0.9 mm OD loose tube jacket
3 mm for 3 mm OD loose tube kevlar reinforced PVC cable.

TXYZ = Input and Output Male Connectors (T,X are inputs,Y,Z are outputs)

X = No connector
3S = Super NTT-FC/PC
3U = Ultra NTT-FC/PC
3A = Angled NTT-FC/PC
SC = SC
SCA = Angled SC
LC = LC/PC
LCA = Angled LC
See table 6 of the OZ Standard Tables data sheet for other connectors.

Example: The customer requires a singlemode two-by-two 50/50 coupler for 633nm (fiber core size is 4/125 for 633nm singlemode fiber). All ends are to be 0.5 meters long, cabled, and terminated with FC style connectors, Super PC finish. OZ Optics' part number: **FUSED-22-633-4/125-50/50-3S3S3S3S-3-0.5.**

Note: OZ Optics reserves the right to substitute a two-by-two coupler for the equivalent one-by two splitter, depending on availability. This will not affect the couplers performance or pricing. The only difference will be an extra input fiber on the coupler.