



# OZ Optics

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## METALIZED FIBERS

### Features:

- Singlemode, multimode, or polarization maintaining fibers
- Easy to solder
- Cleaved enfaces available
- Unplated (masked) ends available
- Mid-span plating available
- Designed to meet Telcordia requirements
- Large volume manufacturing capacity
- Custom configurations available

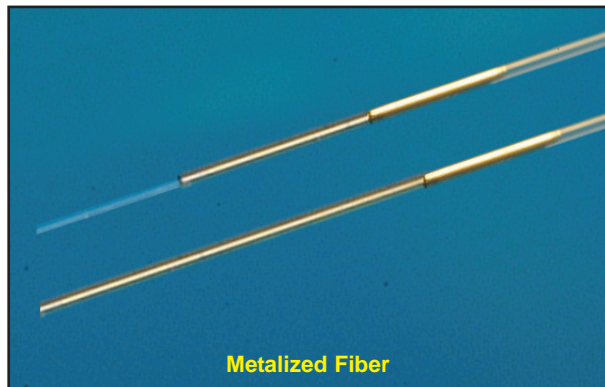
### Applications:

- Hermetic feed-throughs
- Integrated optics packaging
- Diode pigtailing

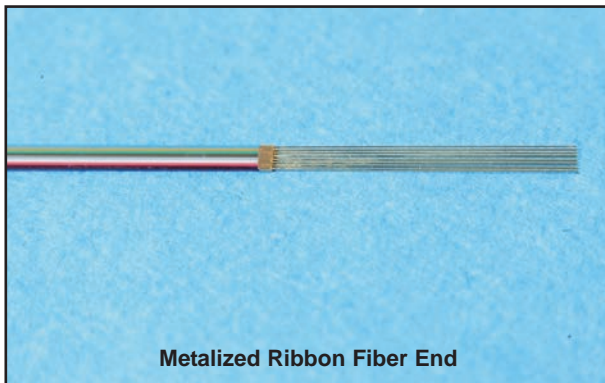
### Product Description:

OZ Optics metalized fibers are specifically designed for optoelectronic packaging. The fiber is first coated with a layer of nickel to provide superior adhesion and a stable soldering base. The fiber is then plated with an overcoat layer of gold to provide resistance to oxidization. The result is a strong, uniform coating capable of handling the rigors of soldering and hermetic sealing. OZ Optics metalized fibers are well suited for use in assemblies that must conform to Telcordia requirements. If required, OZ Optics metalized fibers can be manufactured with masked ends. This process provides a clean, non-metalized fiber end suitable for termination with ceramic ferrules, fusion splicing or direct connection to a device. This allows for an easy transformation of devices into hermetically sealed packages. Also available are custom mid-span metalization of optical fibers and metalized ribbon fibers. The mid-span configuration provides a solution for hermetically sealing in-fiber devices such as Fiber Bragg Gratings, optical isolators or optical filters, as well as allowing larger package devices that exceed the length restrictions of standard metalized fibers. Metalization of ribbon fibers allows for easy hermetic sealing of multiple fibers into hermetic packages that require many fibers or are being used with V-Groove assemblies.

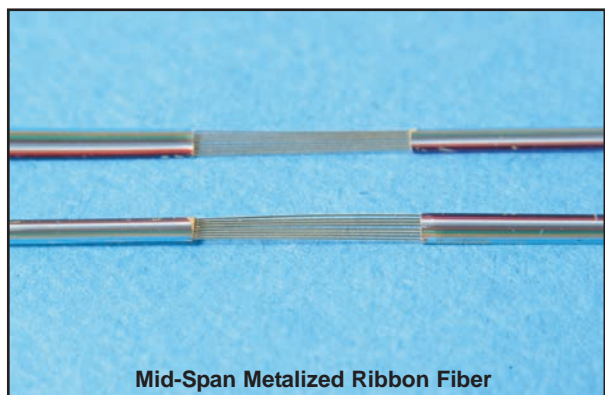
OZ Optics metalized fibers are available with Singlemode, Multimode or Polarization Maintaining (PM) fibers. PM fibers offer a means to control polarization of optical signals throughout the system thus controlling Polarization Dependent Losses (PDL) and Polarization Mode Dispersion (PMD). This control is crucial in developing high speed, 10 Gbs, 40 Gbs, and faster systems. In general, OZ Optics uses polarization maintaining fibers based on the PANDA fiber structure when building polarization maintaining components and patchcords. However OZ Optics can construct devices using other PM fiber structures. We do carry some alternative fiber types in stock, so please contact our sales department for availability. If necessary, we are willing to use customer supplied fibers to build devices.



Metalized Fiber



Metalized Ribbon Fiber End



Mid-Span Metalized Ribbon Fiber

## Ordering Information For Standard Parts:

Bar Code	Part Number	Description
3986	MESMJ-X-1300/1550-9/125-0.25-25-25-X-1.5	1.5 meter long, 0.25mm OD Jacketed 1300/1550nm 9/125 Corning SMF-28 fiber patchcord with metalized tip on one end, no connector on the other end. Strip length is 25mm, metalized length is 25mm, no ferrule or cleave on the end
5668	MESMJ-X-1300/1550-9/125-0.25-35.5-25-X-1.8	1.85 meter long, 0.25mm OD Jacketed 1300/1550nm 9/125 Corning SMF-28 fiber patchcord with metalized tip on one end, no connector on the other end. Strip length is 35.5mm, metalized length is 25mm, no ferrule or cleave on the end
3987	MEPMJ-X-1550-8/125-0.4-25-25-X-1.5	1.5 meter long, 0.40mm OD Jacketed 1550nm 8/125 Polarization Maintaining fiber patchcord with metalized tip on one end, no connector on the other end. Strip length is 25mm, metalized length is 25mm, no ferrule or cleave on the end
5667	MEPMJ-X-1550-8/125-0.4-35.5-25-X-1.8	1.85 meter long, 0.40mm OD Jacketed 1550nm 8/125 Polarization Maintaining fiber patchcord with metalized tip on one end, no connector on the other end. Strip length is 35.5mm, metalized length is 25mm, no ferrule or cleave on the end

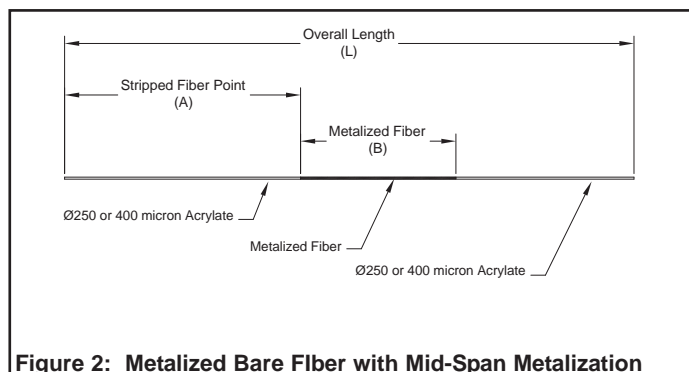
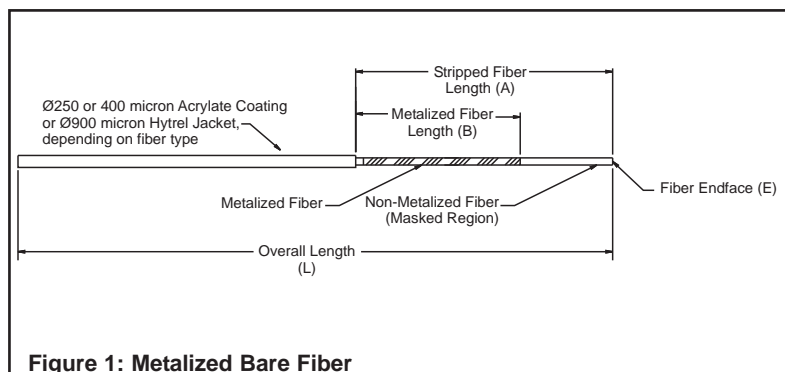
## Ordering Examples For Standard Parts:

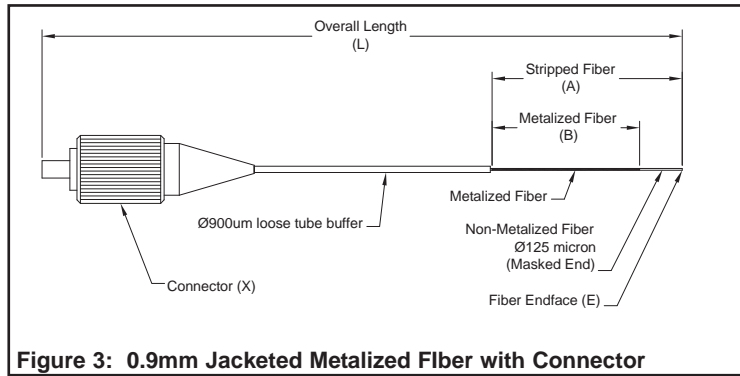
A customer needs to hermetically seal a 1.5 meter long length of Corning SMF-28 fiber into a package. To do so he will solder into place a metalized fiber. The metalized fiber length must exceed 20mm, but the actual length is not critical because it will be cut to length and polished. There is no need for a connector on the opposite end because it will be fusion spliced to another device.

Bar Code	Part Number	Description
3986	MESMJ-X-1300/1550-9/125-0.25-25-25-X-1.5	1.5 meter long, 0.25mm OD Jacketed 1300/1550nm 9/125 Corning SMF-28 fiber patchcord with metalized tip on one end, no connector on the other end. Strip length is 25mm, metalized length is 25mm, no ferrule or cleave on the end

## Standard Product Specifications:

Metalization Materials/Thickness	1.5 to 5.0 microns thick nickel base 0.15 to 0.20 microns thick gold overcoat. Other materials and thickness may be available on request
Maximum Plating Length	50mm
Plating Length Tolerance	±1mm
Stripped Length Tolerance	±1mm if cleaved. ± 5mm if not cleaved
Operating Temperature	-40°C to +85°C
Recommended Soldering Temperature	180°C to 260°C
PM Fiber Extinction Ratio	Standard >20dB, Premium ER >30dB
Recommended minimum bend radius for installed fiber	≥ 20mm
Raw fiber strength rating	100 kpsi. 200 kpsi available for special applications





**Figure 3: 0.9mm Jacketed Metalized Fiber with Connector**

### Ordering Information For Custom Parts:

OZ Optics welcomes the opportunity to provide custom designed products to meet your application needs. As with most manufacturers, customized products do take additional effort so please expect some differences in the pricing compared to our standard parts list. In particular, we will need additional time to prepare a comprehensive quotation, and lead times will be longer than normal. In most cases non-recurring engineering (NRE) charges, lot charges, and a 50 piece minimum order will be necessary. These points will be carefully explained in your quotation, so your decision will be as well informed as possible. We strongly recommend buying our standard products.

### Questionnaire For Custom Parts:

1. What type of fiber is required for your application?
2. Do you need the fiber to be protected with 0.9mm loose tubing?
3. What length of metalization is required?
4. Is the metalization needed at the end of the fiber or another location along the length?
5. If this is an end plating, do you require a bare length of fiber (masked region) at the end?
6. Do you need the end of the fiber to be cleaved?
7. What is the overall length of the fiber needed?
8. Do you need a connector on the opposite end?
9. What is the application that this fiber is being used for?

### MEFMJ-X-W-a/b-JD-A-B-E-L-(OPT)

<p><b>E</b> = Fiber Type  M = Multimode  S = Single Mode  P = Polarization Maintaining</p> <p><b>X</b> = Connector Code  3S = Super FC  3U = Ultra FC  3A = Angle FC  8 = ST  SC = Super SC  SCU = Ultra SC  SCA = Angle SC  MU = Super MU  LC = Super LC  LCA = Angle LC</p> <p><b>W</b> = Wavelength, in nanometers  1300/1550 for Corning SMF-28 singlemode fiber</p> <p><b>a/b</b> = Fiber core/cladding  9/125 for Corning SMF-28 Singlemode fiber  6/125 for 980nm PANDA style PM fiber  7/125 for 1300nm PANDA style PM fiber  8/125 for 1550nm PANDA style PM fiber</p>	<p>↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑</p>	<p><b>L</b> = Overall Length in Meters</p> <p><b>E</b> = Fiber Endface Finish  0 = 0° cleave (Flat)  8 = 8° cleave (Angled)  X = No cleave</p> <p><b>B</b> = Metalized fiber length in millimeters (for assemblies with full metalization, this number should match "A")</p> <p><b>A</b> = Stripped fiber length in millimeters</p> <p><b>JD</b> = Jacket Diameter  0.25 = 250 micron acrylate coating (standard bare fiber)  0.40 = 400 micron acrylate coating (PM bare fiber)  1 = 900µm Hytrel loose tube buffered fiber (standard bare fiber)</p> <p><b>OPT</b> = Options (add if required)  M = Mid-span plating  ER = 30 for &gt;30dB extinction ratio <sup>1</sup>  RN = Ribbon fiber, where N is the number of fibers in the ribbon (4 or 8 are standard)</p>
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**\* Note: 1 PANDA style 1300nm or 1550nm fiber only**

### Ordering Examples For Custom Parts

A customer needs to hermetically seal a 2 meter long length of PANDA style 1550nm PM fiber into a package. To do so he will solder into place a metalized fiber. The metalized fiber length needs to be 30mm long with only 20mm metalized, leaving 10mm of exposed bare fiber for attachment to his device, No fiber end finish is required. There is also a requirement for the fiber to be jacketed to 900 micron with an FC/APC connector.

Part Number	Description
MEPMJ-3A-1550-8/125-1-30-20-X-2	2 meter long, 0.9mm OD Jacketed 1550nm 8/125 Polarization Maintaining fiber patchcord with metalized tip on one end, Angle FC/PC connector on the other end. Strip length is 30mm, metalized length is 20mm, no ferrule or cleave on the end

## Frequently Asked Questions (FAQs):

**Q:** Is metalized fiber easy to cleave?

**A:** Metalized fiber is more difficult to cleave than bare fiber. Most cleaving methods rely on a scribe or scratch on the surface of the fiber which acts as a propagation point when the end of the fiber is pulled or deflected. With the presence of the metal coating, the crack propagation is restrained by the metal coating. This reduces the likelihood of achieving a clean cleave. The most common solution is to insert the metalized fibers into a ferrule and polish it to eliminate the potential of a less than perfect cleave. The other option is to leave a small region unmetalized, or masked, for cleaving purposes.

**Q:** Can metalized fiber be bent?

**A:** Due to the thin coating the metalized fiber is very flexible. The fibers are designed to withstand less than 17mm diameter bends without damage to the plating.

**Q:** Can custom metalization thicknesses be manufactured?

**A:** Yes, OZ Optics has the ability to vary the thickness of both the base metal and the overcoat metal as well as the ability to use custom metals. Please contact the factory if you need non-standard materials or thickness.

**Q:** Is the metalized fiber fragile?

**A:** The metalization is in fact more rugged than the bare fiber. The metalization acts as a protective coating which minimizes the chances of scratching and provides some additional bend protection compared to bare glass.

**Q:** Does the metalization go over the fiber acrylate coating?

**A:** Typically the metalization is applied as close as possible to the junction where the coating is stripped. It is allowed to extend over as much as 3mm of the jacketing, but there may also be as much as 2 mm of bare fiber. As an aid to prevent moisture penetration and provide some bend protection, a small bead of epoxy is in some cases applied over the metalization at the joint where the fiber coating ends.

## Application Notes:

### Soldering Recommendations

OZ Optics recommends that you use standard 60/40 tin/lead solder when attaching the metalized fibers to your device. This grade of solder melts at a temperature which can provide good adhesion without damaging the coating or the fiber.

### Proper Storage and Handling of Stripped or Metalized Fibers

Given that the protective acrylate coating is removed from the end of a fiber when it is metalized, certain precautions should be taken to ensure that the fiber will remain as strong as possible. This includes controlling the humidity, minimizing tensile stress, and minimizing handling of the bare glass.

**Humidity:** Humidity is not an issue unless the fiber is under some tensile stress. If there is stress, water from the air will find its way into the microscopic flaws in the glass and break the silica bonds, potentially leading to a fiber break years down the road. If there is no tensile stress, then this mechanism doesn't work. If the fiber will be placed under stress during subsequent processing steps and the fiber surface is either contaminated or has an effectively high moisture surface content from the air, then one can potentially cause a failure. It is good practice to store bare fiber (i.e. stripped or metalized fiber products) in a dry, controlled atmosphere or in nitrogen atmosphere.

**Handling:** With respect to mechanical reliability, once the protective coating has been removed, the bare glass is vulnerable to damage with any subsequent handling. Thus your production process should eliminate any handling of the bare glass on the stripped section. Also, one should design the product to minimize unnecessary contact with the bare glass.

**Fatigue resistance and maintaining fiber reliability:** In general do not subject the fiber to stress higher than 50% of the proof stress for longer than 1 second, or 1/3 of proof test for longer than 4hrs. (i.e. 100kpsi = 50kpsi for 1 second). Also for fiber patchcords do not bend the fiber too tightly. For 100kpsi fiber do not bend any tighter than a 13mm bend radius. For 200kpsi do not bend the fiber any tighter than a 6.5mm bend radius.

**Cleaning:** Use Isopropyl Alcohol (IPA) with a lint free open mesh cloth. Perform a single wipe only. Never use Acetone to clean.

### Cleaving

Cleaving the metalized fiber is usually not required because there are other processes typically completed during the final assembly that modify the fiber end. If the assembly process includes connectorization, length modifications prior to use (ie, trim to the exact length), or fiber polishing then a factory cleave is not needed. Unnecessarily requesting a cleaved end will add to the cost of the assembly without adding any benefit. If you intend to directly connect the fiber to a device without any further modification or you are going to fusion splice the assembly directly as supplied then specifying a cleaved end may be beneficial.

OZ Optics has the ability to metalize standard singlemode and multimode fibers supplied with a 900µm tight buffer jacket. Other fibers which are not stocked with the 900µm jacket, including customer supplied bare fibers, will be manufactured using loose tube jacketing if cabling is specified. Please contact the factory for custom applications or jacketing.

### Metalization of Ribbon fibers and Specialty Fibers

OZ Optics can metalize specialty fibers, including ribbon fibers. Either end-span or mid-span plating can be provided, with or without masking. Coating uniformity and strength are tightly controlled. Please contact the factory for additional information.

OZ Optics has the ability to metalize singlemode and multimode fibers supplied with a 0.9mm OD tight buffer jacket. Other fibers which are not stocked with a 0.9mm jacket, including customer supplied fibers, can be produced protected by a loose tube cabling if desired. Please contact the factory for custom applications or jacketing.