

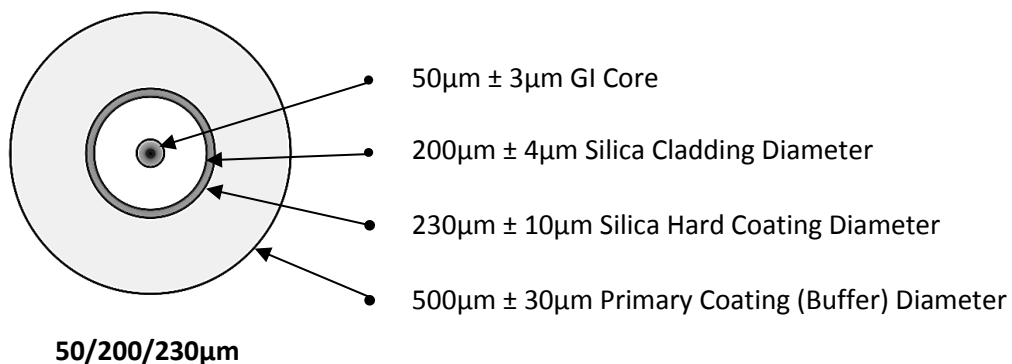
Polymer Coated Fiber Cable (PCF)

Panduit® has introduced a Polymer Coated Fiber (PCF) to their fiber cable offering available in 50µm and 62.5µm core diameters. Along with this cable having a stronger durability than standard fiber cable, it is quick to deploy and easy to terminate in the field. These two characteristics make this cable a preferred fiber solution when mechanical integrity and reliability is a necessity in the fiber deployment.

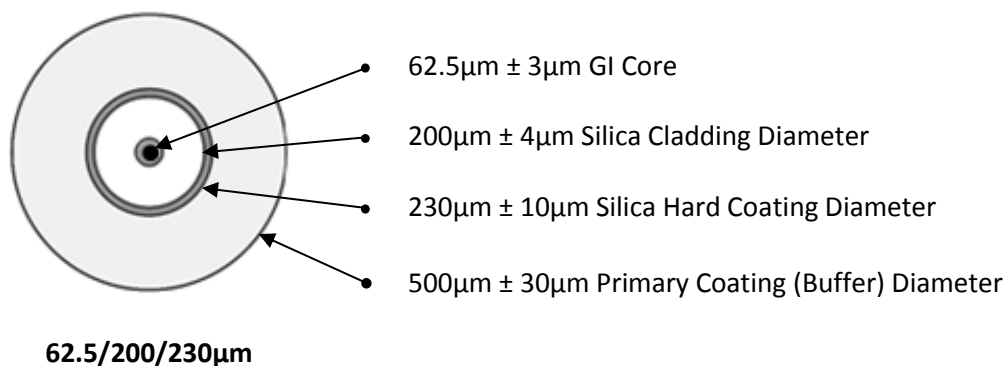
What are the general characteristics of PCF?

Panduit offers PCF cable that has a graded-index (GI) core composed of pure silica (50µm or 62.5µm), a silica cladding layer (200µm), a silica hard coating layer (230µm), and a HDPE (high density polyethylene) primary coating (500µm). The profiles of the two different offerings are shown below:

OM2 Multimode Graded Index (GI) Polymer Coated Fiber (PCF) 50/200/230 µm

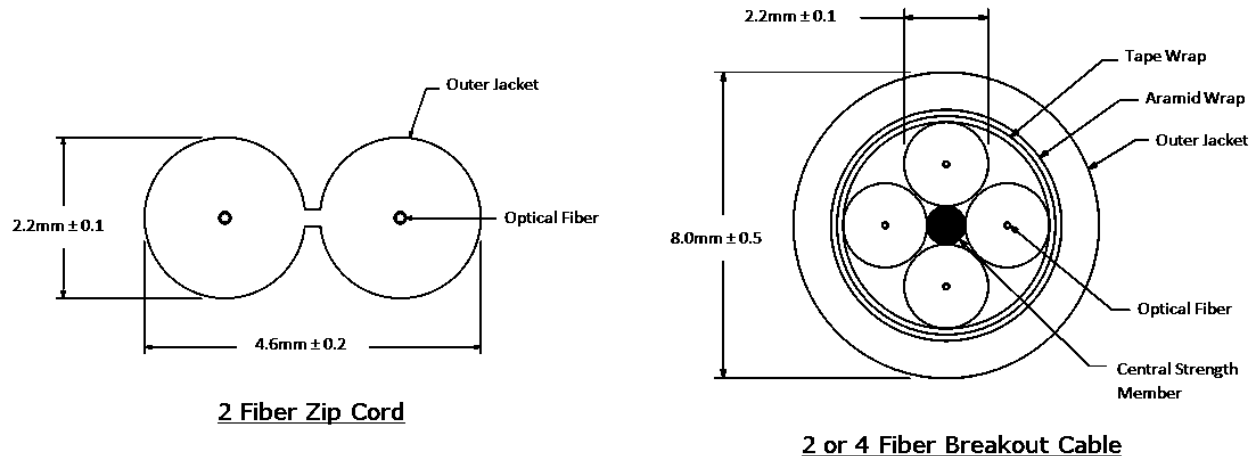


OM1 Multimode Graded Index (GI) Polymer Coated Fiber (PCF) 62.5/200/230 µm



What types of PCF are offered?

The 50 μ m and 62.5 μ m PCF are offered in three types of cable construction and two colors; 2-fiber zip cord (orange outer jacket) and 2-fiber or 4-fiber breakout cable (black outer jacket). All of these have a riser/low smoke zero halogen rated high density polyethylene (HDPE) outer jacket. While the zip cords are rated for use indoors, the breakout cables can be used indoors and outdoors, water blocked per EIA/TIA-455-828, FOTP-82. The breakout cables include a fiberglass central strength member and ripcord to access the fiber buffer tubes contained within the outer jacket.



Where can I use PCF?

PCF is primarily used in applications that demand high mechanical integrity and reliability such as in utility control rooms, factory automation environments and indoor industrial manufacturing deployments. All these cables meet the appropriate environmental requirements outlined in Telecordia GR-409-Core and/or ICEA-S-83-596.

The 2-fiber zip cord can be used internal to the control panel or zone enclosure where specific custom lengths are needed to help control cable management or where specific lengths of pre-made cords are not immediately available. If the zip cord is to be used external to the panel or enclosure an enclosed protection path (conduit or cable tray) is necessary to safeguard against damage to the cable. The zip cord has a short-term (installation) bend radius of 10mm and a long-term (installed) bend radius of 16mm with an operating temperature range from -65 to +125°C.

The 2-fiber and 4-fiber breakout cable can be used external to the control panel or zone enclosure and does not need to be installed in a conduit system or closed pathway. Due to the robustness of this cable, it can be installed on J hooks or run on cable ladder but to ensure cable integrity, best case cable installation practices should be followed. The breakout cable has a short-term (installation) bend radius of 10mm and a long-term (installed) bend radius of 16mm with an operating temperature range from -65 to +125°C.

How do I terminate the PCF?

PCF is terminated using a "cleave & leave" no polish solution. This allows for quick termination without a procedure that is dependent upon technician experience. The special cleaving tool produces a high-quality end face while utilizing a totally mechanical process that minimizes the potential for termination error.

After terminating the connector, the end face can be inspected utilizing a standard handheld fiber microscope but it cannot be cleaned utilizing standard fiber optic cleaning tools. It is best to use a piece of adhesive based tape and just dab the tip of the ferrule to remove any contaminants on the fiber.

What are the Optical Characteristics of the PCF?

The PCF cable has a higher loss characteristic than that of the standard multi-mode fiber cable, and is mostly utilized in point to point connections. This is due to the high insertion loss of a mated pair resulting from the non-polished “cleave and leave” termination. In general, a mated pair of PCF connectors averages from 1.5dB to 1.7dB.

The table below shows the difference in the bandwidth and attenuation values associated with the different core sized PCF cable at the 850nm and 1300nm wavelengths. PCF is reliable for transmission speed deployments of 10/100/1000 MB from 10’s to 100’s of meters dependent upon the transceiver being utilized in the fiber link.

Core Size (μm)	Bandwidth (MHz*km)		Attenuation (dB/km)	
	850nm	1300nm	850nm	1300nm
50	400	400	2.8	1.0
62.5	200	500	3.5	1.2

How do I test the PCF link?

Testing the PCF link is performed utilizing the standard testing procedures outlined in TIA-568-C (TIA-526-14A and TIA-526-7), test Method B (one jumper method). Although this connector and cabling solution has high loss, it still can be used in a horizontal cabling infrastructure with the insertion loss per mated pair specified at a maximum of 1.7dB. The PCF cabling and connector solution can be used in a 100BASE-FX application as horizontal cabling (two connector max) without having any effect on the signal being transmitted due to the high total link budget associated with the 100BASE-FX transmission solution. However, this PCF cabling and connector system was designed for point to point or switch to switch type applications and was not designed to be utilized in a horizontal cabling infrastructure.

When testing the PCF Link utilizing a Fluke DTX-1800 with MFM2 Modules, please follow the following procedure:

Setting up the Fluke DTX

1. On the Main unit, rotate the switch to Setup, and select Test Limit
 - a. Select F1 (more)
 - b. Scroll down and select Custom
 - c. Select F1 (create)

- d. Create a name for the test limit. (*PCF Connector Test*)
2. After creating a name, use right arrow key to move over to Tab 2
 - a. Scroll down to Maximum Connector Loss and hit “Enter”
 - b. Input the value 1.7dB (*This is the IL spec for the PCF connector*)
 - c. Hit the “Save” button
3. Hit the Exit Button and proceed to Setting Reference

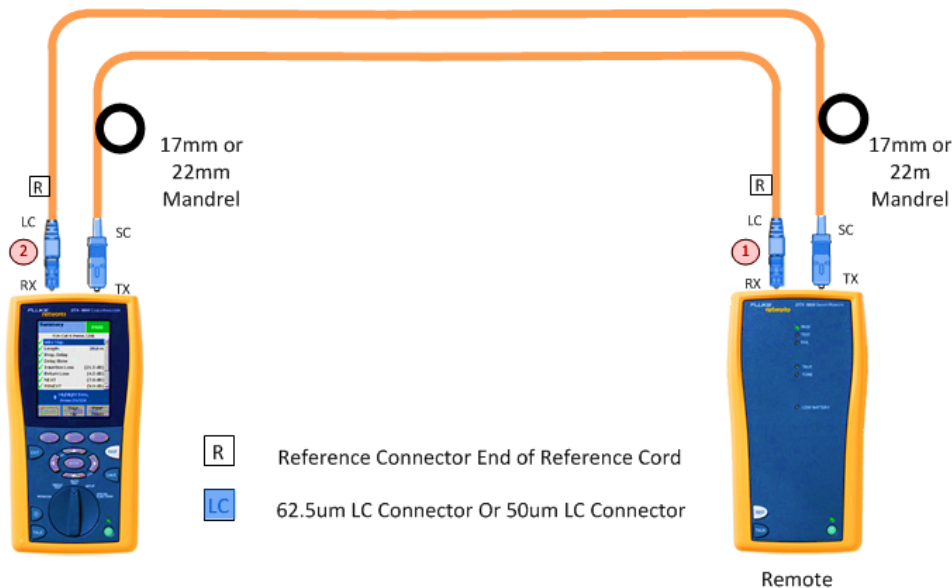
Setting Reference Using Method B (One Jumper)

On the Main unit, rotate the switch to SPECIAL FUNCTIONS, and select Set Reference.

Prepare the reference cables by applying a 17mm mandrel wrap for 62.5um cabling and a 22mm mandrel wrap for 50um cabling approx. 12” from the SC Standard Grade connector to both cords.

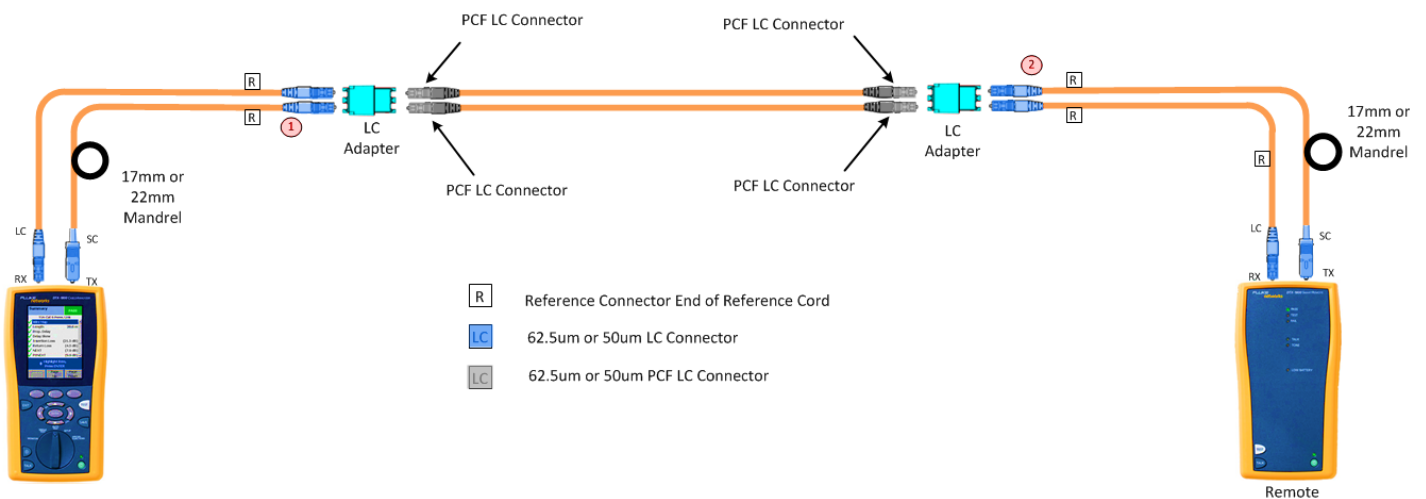
Inspect the connectors on the reference cords and clean if necessary.

1. Connect the Standard Grade SC connectors to the TX ports and the Reference Grade LC connectors (identified with reference grade label on the cord and labeled in the figure below as ① and ②) to the RX ports on the tester as per the figure below.
2. When connectivity between the Main and Remote is established, the DTX will emit an audible “chirp”.
3. Press the “test” key on the Main Unit and a reference measurement will be taken.
4. When the test is complete press “Save” to ensure the reference value is saved to memory.
 - a. 50um reference reading will be between -22.0dB and -24.0dB
 - b. 62.5um reference readings will be between -18.0dB and -20.0dB



Testing PCF Connectors

1. Remove the LC connectors from the RX ports on the Main and Remote units. DO NOT REMOVE THE SC CONNECTORS FROM THE TX PORT.
2. On the Main unit, rotate the switch to AUTO TEST.
3. Add a second Standard Grade LC to Reference Grade LC patch cord to both the Main and Remote Connections. The standard grade LC connector plugs into the RX port on the Main and Remote and the Reference Grade LC will connect into the LC adapter.



4. Connect the PCF fiber cable and connectors as shown in the figure above.
5. When connectivity between the Main and Remote is established, the DTX will emit an audible “chirp”.
6. Press the “test” key on the Main Unit and the DTX will test both of the cables. It will give a “Main to Remote” result and a “Remote to Main” result. The “Main to Remote” result will be the result for the connector attached to LC adapter closest to the Main and the “Remote to Main” result will be the result for the connector attached to the LC adapter closest to the Remote.
7. Results should be under 3.4dB. (Total of 1.7dB for each PCF connector)