



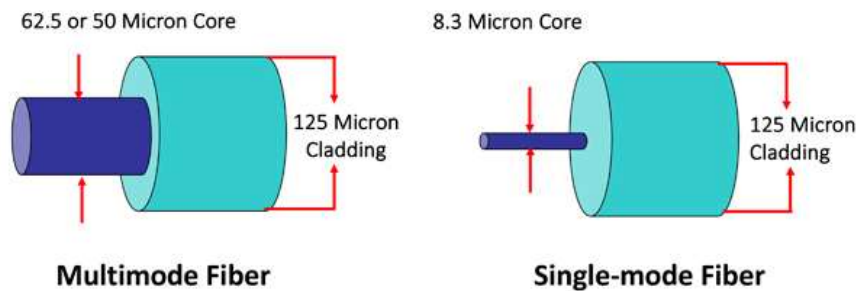
# Single-mode vs. Multimode

“How much distance will I be covering?”

“Is there a required bandwidth?”

“What’s my budget?”

These are just a few questions you’ll need to ask yourself when choosing between single-mode and multimode fiber. Single-mode fibers provide a single pathway for light to travel and are defined by their small core size of approximately 8.3 μm. Multimode fibers, on the other hand, have various paths, or modes, in which light can travel through optical fiber. These core sizes are larger, ranging from 50 μm to 62.5 μm.



When choosing between these two fiber types, you’ll need to take the following into consideration:

### Bandwidth

Single-mode fibers have a higher bandwidth capability than multimode fibers due to no modal dispersion effects, which means that they can transmit larger amounts of data over great distances. Their small core size prevents multiple modes of propagation, thus permitting higher volumes of data to be dispersed without interruption.

### Distance

Single-mode fibers are better suited for long-distance applications due to their high bandwidth capability. Since multimode fibers have a larger core size, the modal dispersion, or the overlapping of pulses, increases over larger distances; thus positioning this type of fiber to be the best choice for shorter-distance applications.

### Attenuation

Attenuation is defined as loss of light or signal. Multimode fibers tend to have higher attenuation than single-mode fibers since the intrinsic loss of the multimode fiber is higher due to the natural loss of the fiber in the operating wavelengths of 850 nm and 1300 nm.

### Cost

The cost of fiber is dependent on the volume that is run rather than any actual material cost. Since multimode fiber has shorter runs with more set up time, it tends to be the more expensive option unlike single-mode fibers, which have higher volumes and more continuous, efficient runs. However, single-mode fibers require more expensive active equipment, such as electronics and laser transmitters, to hit the small core target of 8.3 μm. Whereas multimode fibers utilize cheaper electronics, thus leading to lower overall system costs.

To learn more about fiber optic cable, check out [this presentation](#) from Patrick Dobbins, Director of Applications Engineering and Field Engineering for AFL.

### Recent Posts

#### Intrinsic and Extrinsic Attenuation in Fiber Optic Cables

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Attenuation, or the loss of light or signal, is nearly unavoidable when installing your fiber network. This blog will explore its two forms: intrinsic and extrinsic attenuation.

#### Product FAQs: Collapsible Ribbon

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As collapsible ribbon grows in popularity, AFL continues to receive inquiries concerning this new trend. To address some of the frequently asked questions, we reached out to our splicing experts to get the answers.

#### AFL’s SkyWrap® Cable Spans Greenland’s Terrain

11/5/2021 10:01:03 AM | with 0 comments

This blog showcases AFL’s SkyWrap® cable installation for a TELE-POST project in Greenland.

#### Optical Fiber is the Key to Future-Proof Networks

10/26/2021 4:06:15 PM | with 0 comments

AFL’s Seán Adam explains how optical fiber is key to ensuring “future-proof networks,” a crucial element in maintaining this growing rate of connectivity.

#### Product Spotlight: NodeFLEX® Bendable Cable Assembly

10/26/2021 11:45:52 AM | with 0 comments

AFL designed the NodeFLEX® Bendable Cable Assembly to help multi-system operators (MSOs) simplify the installation of aerial, underground and pedestal mount applications.

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