

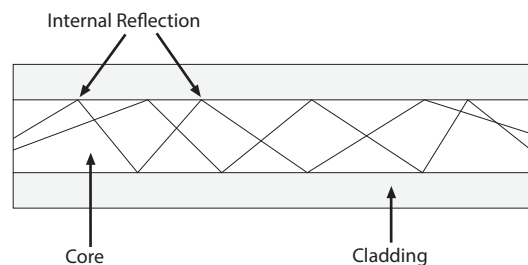


**DATANET**  
ASSETS

## Bend Insensitive Cables

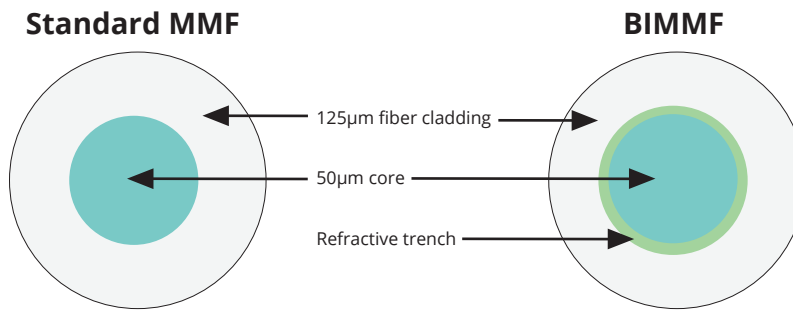
The first generation of optical cables, although widely adopted, saw occasional loss of performance due to bending degrades. In order to reduce these bending degrades a new type of optical cables was invented: Bend Insensitive Cables (BI Cables).

To transmit data, one or more light signals called modes (sometimes also referred to as paths or rays) are sent through the core of the fiber by hitting the boundaries of the core at steep angles and being reflected. This process is called total internal reflection. To keep the optical signal within the core, the refractive index of the core is greater than the index value of the cladding



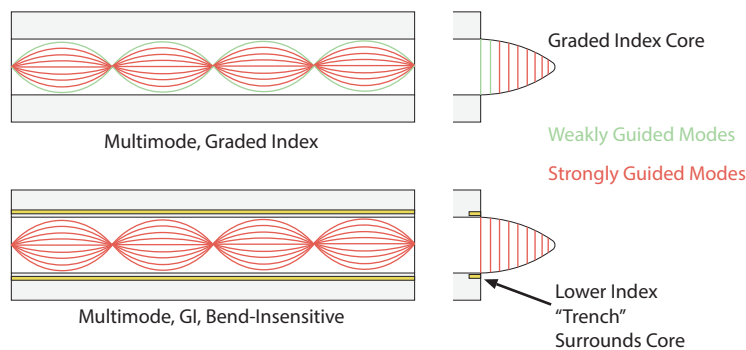
When a cable is bent, the cladding around the core tries to catch the light and guide it along. However, in some situations, such as improper installation or using a cable radius which is too small, the reflection of light in the standard fiber optical cable could no longer be guided by the cladding. This would result in the loss of data. To reduce this loss, many manufacturers are now adding an additional layer to the cable.

The added layer which can be found in Bend Insensitive cables (BI cables) is called the 'Refractive trench'. This layer is installed between the core and cladding of the cable.



The refractive trench is made of a glass material which has a lower refraction index than the core. This ensures that weakly guided modes are reflected to the core. This way no data is lost when bending the cable in a smaller radius.

The diagram below shows a standard optical cable vs a bend insensitive optical cable. For the standard cable the modes in green are in danger when a cable is bend. While in the bend-insensitive cable the modes that would otherwise be weak are now refracted causing the signal of all modes to remain strong.



Due to its increased bandwidth, cable lengths, and speed while having a lower weight and total cost of ownership, optical cables have become the preferred cable for numerous applications. Now that bend insensitive optical cables are available (which are less sensitive to data loss), the popularity of optical cables will continue to increase.

Besides being used for structured cabling environments (using separate transceivers and cables), bend insensitive cables are available as Active Optical Cables (AOC). An AOC is an assembly of a fiber optical cable with transceivers already attached at both sides of the cable.