

# Application Engineering Note - Multimode Fiber in Bending

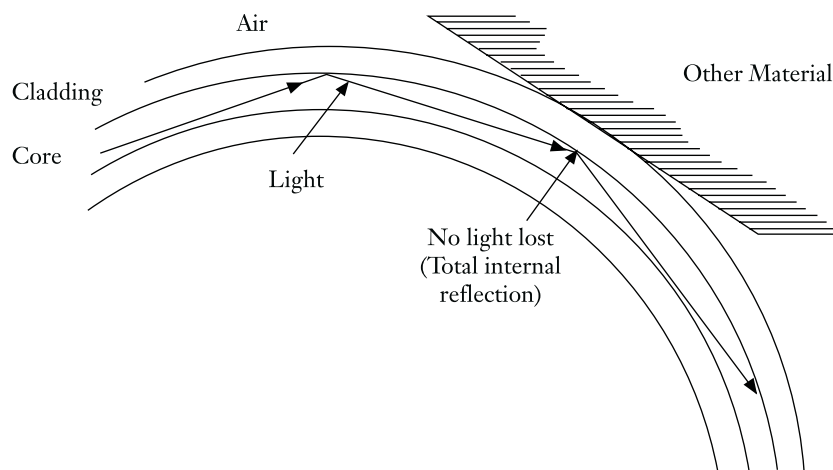
## Application Note

AN4255  
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Multimode fiber is very flexible and capable of relatively tight bending conditions (as illustrated in Figure 1).

### Multimode Fiber is Capable of Channeling Light Through Relatively Tight Bends

Figure 1



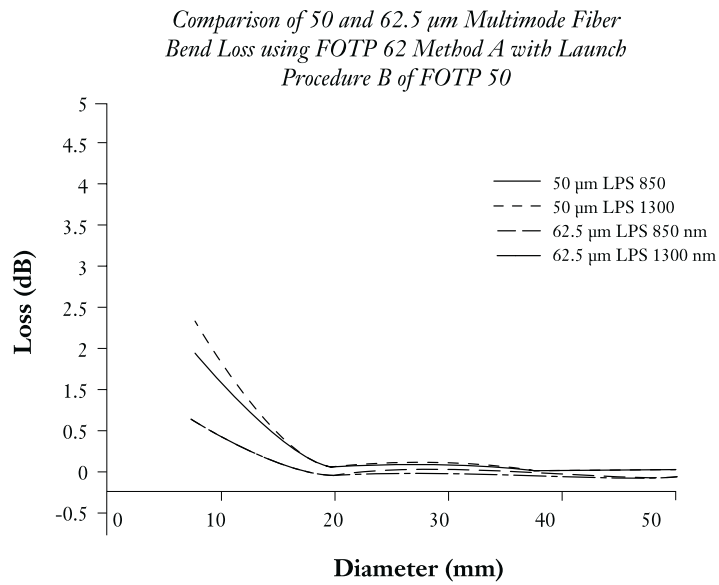
Since all premises fibers maintain the same glass cladding diameter of 125  $\mu\text{m}$ , they all have the same bending flexibility. Optical fiber bend diameters are limited by mechanical reliability considerations before optical performance is impacted. From a long-term mechanical standpoint, TIA 568 allows for a 30 mm bend radius (1.18 inches) for two and four fiber cables.<sup>1</sup>

From an optical standpoint, bending only induces significant levels of attenuation in multimode fiber at very small bend diameters (less than 20 mm or 1 inch). For example, a one-inch bend diameter (25.4 mm) will experience virtually the same attenuation loss for all multimode fibers, as shown in Figure 2.

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## Bending Performance

Figure 2



The actual text from TIA 568 is as follows:

*The bend radius for intrabuilding 2- and 4-fiber horizontal optical fiber cable shall not be less than 25 mm (1 in) under no-load conditions. When under a maximum tensile load of 222 N (50 lbf), the bend radius shall not be less than 50 mm (2 in).*

*The bend radius for intrabuilding optical fiber backbone cable shall not be less than that recommended by the manufacturer. If no recommendation is known, then the applied bend radius shall not be less than 10 times the cable outside diameter under no-load conditions and not less than 15 times the cable outside diameter when the cable is under tensile load.*

*The bend radius for interbuilding optical fiber backbone cable shall not be less than that recommended by the manufacturer. If no recommendation is provided or known, then the bend radius shall not be less than 10 times the cable outside diameter under no-load conditions and not less than 20 times the cable outside diameter when the cable is under a tensile load up to the rating of the cable, usually 2670 N (600 lbf).*

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