

1. Intrinsic Loss (connection loss):

For any type of splicing - midspan or pigtail connection losses are introduced at any splice stage from the fact that not all light from one fiber is transmitted to another. The main reason for this is mismatch and misalignment between two fibers.

2. Extrinsic loss:

It is caused by some imperfection in splicing that can be eliminated theoretically, other reasons for extrinsic loss include improperly prepared fiber ends and foreign particles on the surface of fiber end. It can be eliminated by a special process of cutting the fiber ends called cleaving.

3. Reflection Loss: Return loss is a problem for a connector used for single mode fiber, but not in multimode fiber.

Reflection loss is introduced in fiber when they are polished at ends to avoid insertion loss. Return loss can be reduced by polishing the ferrule end face at an angle of 8° with respect to the centerline of the hole. Reflection loss is also called return loss or back reflection or reflectance. It is measured in dB. It is negative.

FIBER COUPLERS:

An optical fiber coupler is a device that distributes light from a main fiber into one or more branch fibers. Couplers are required to divide or combine optical signals for application within optical fiber information distribution systems including data buses.

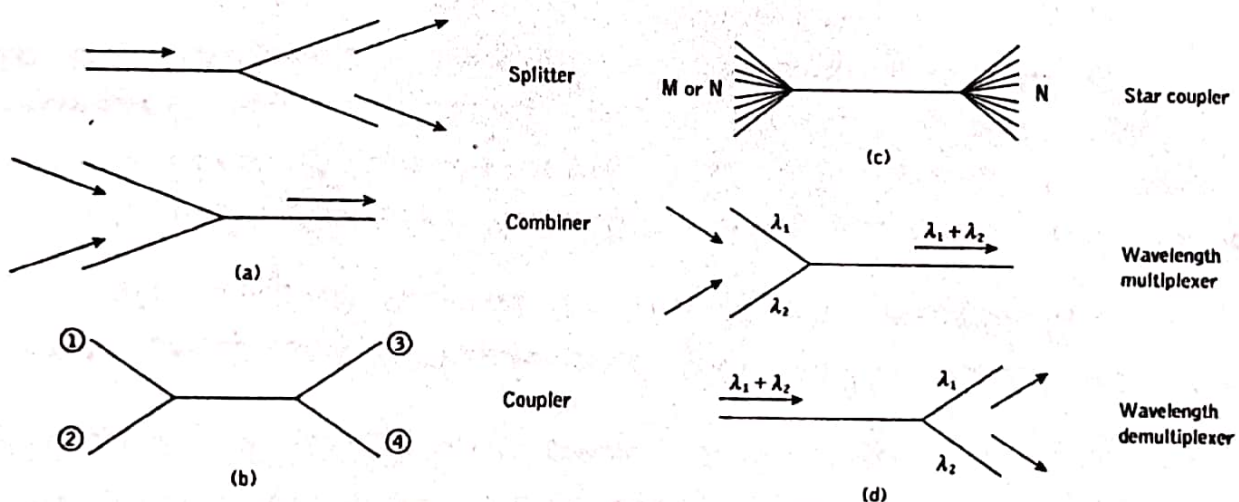
Optical fiber couplers are often passive devices in which the power transfer takes place either:

- Through the fiber core cross-section by butt jointing the fibers or by using some form of imaging optics between the fibers; or

b) through the fiber surface and normal to its axis by converting the guided core modes to both cladding and refracted modes which then enable the Power-sharing mechanism.

Multiport optical fiber couplers can be subdivided into the following main group.

1. Three and four port couplers, which are used for signal splitting, distribution and combining.
2. Star couplers, which are generally used for distributing a single input signal to multiple outputs.
3. Wavelength division multiplexing devices, which are specialized form of coupler designed to permit a number of different peak wavelength optical signals to be transmitted in parallel on a single fiber.



Optical fiber coupler types and functions: (a) three-port couplers; (b) four-port coupler; (c) star coupler; (d) wavelength division multiplexing and demultiplexing couplers