1.7 SPLICERS

For longer distance communication, we have to connect one fiber with other fiber and mean while the losses must be minimized. The process of connecting the two fibers for permanent requirement is called Splicing. Depend upon requirement splicing is classified into two type. They are,

1. Splices – For permanent connections.
2. Connectors – For temporary connections.

Types of splicing

There are two types of splices. They are (i). Mechanical splices (ii). Fusion splices.

Mechanical splices

a. Elastomeric splice

It is made by an elastomer material. It consists of a hole, so that we have to insert the two fibers from two ends for rigid hold. The elastomer is covered by a glass sleeve with ends in such a way that it aligns the fibers into the elastomeric splice. The gel has the same refractive index is used as an adhesive. Thus the fibers are connected.

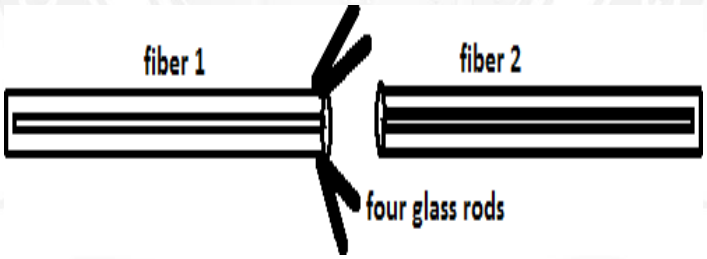

Figure 1.7.1 Elastometric Splice

[Source: "Optical Fibre Communications" by J.M.Senior, Page: 131]

b. Four Rod Splices:

The four glass rods are attached with one end of the fiber to hold another fiber firmly. Initially the rods curve slightly outward, so that the fiber can be easily inserted into it. By a suitable mechanical pressure the rods are made to be tightly clamping the two fibers. Here also gel is used for adhesion.

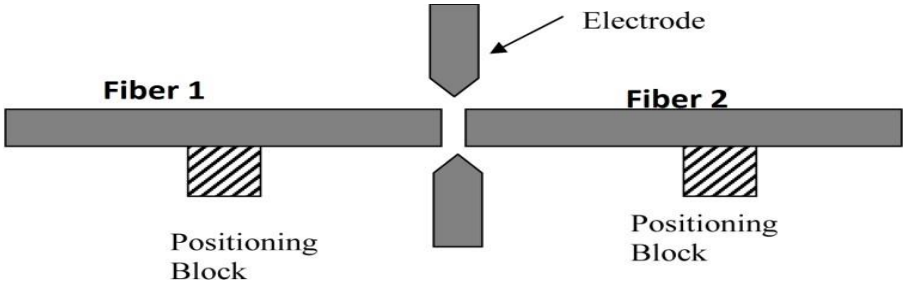

Figure 1.7.2 Four Rod Splice

[Source: "Optical Fibre Communications" by J.M.Senior, Page: 132]

c. **Fusion Splices:** Here two ends of the fiber is fused together with the help of a special equipment, using a high voltage electric arc. Hence, these splices are called fusion splices. Here the losses are minimized due to self-alignment system.

Connectors and fiber termination

(i) Butt-joint connectors

It is made up of a special type of material called ferrule, composing of metal/glass/plastic materials. The fiber is send into the drilled hole of the ferrules and is aligned properly with the help of the alignment sleeve. The distance between the fibers is minimized by adjusting the alignment sleeve and the guide ring, and is used to match the ends of the fibers. Once the matching was done, the light from one fiber can be easily coupled to the other fiber with minimum losses.

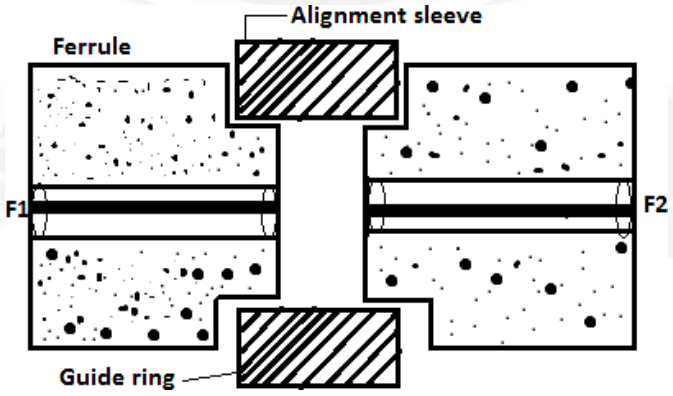

Figure 1.7.3 Butt Joint Connector

[Source: "Optical Fibre Communications" by J.M.Senior, Page: 133]

(ii) Expanded beam connectors:

It consists of a collimating lens at the end of transmitting fiber and focusing lens at entrance of the receiving fiber. Light coming out from the transmitting fiber is made to fall over the collimating lens. The collimating lens makes the beam parallel and is focused into the focusing lens. After passing through the focusing lens, the light is coupled into the receiving fiber without any loss. Thus the loss is minimized.

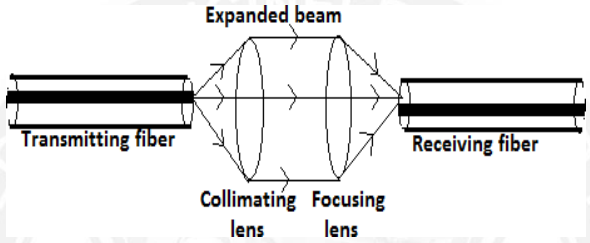

Figure 1.7.4 Expanded beam Connector

[Source: "Optical Fibre Communications" by J.M.Senior, Page: 135]