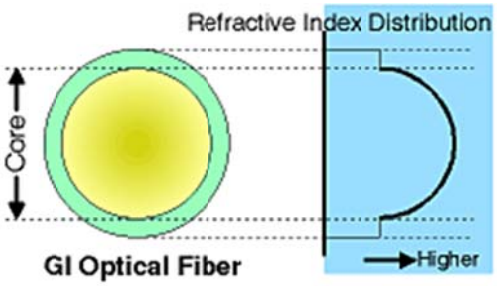
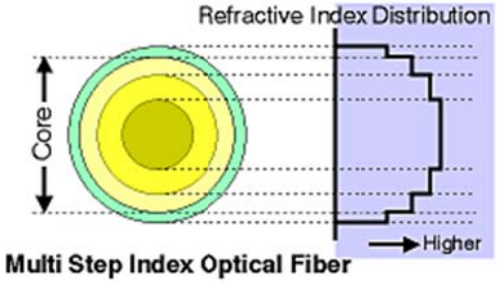
Optical Fiber Structures

The principles explained on the previous page apply to the step index (SI) structure. This is the method used for most POF, including those manufactured by Mitsubishi Rayon. On the other hand, the quartz fiber used for telephone lines uses the graded index (GI) structure for increased transmission volume. In GI-POF, the index of refraction progressively increases toward the center of the optical fiber. Therefore, it utilizes the principle of refraction, not reflection as in the previous example. This method is the same as what occurs when light refracts at the surface of water. GI fiber uses this principle to progressively change the track of the light to contain it within the fiber. This type of fiber is suitable for high-speed, high-volume transmission. The only GI-POF on the market today is the EskaGIGA manufactured by Mitsubishi Rayon.



GI Optical Fiber

Multi step structure fiber uses the both of the above principles for transmission. As its name indicates, the structure uses multiple step indexes (the *eS*f part of the SI). Although the basic principle is the same as that of SI-POF, because the index of refraction changes in multiple steps, the locus of the light is shifted toward the center at the same time. This structure was recognized as a simple solution to increasing bandwidth, and in 1999, Mitsubishi Rayon developed and successfully tested Eska-miu, the first multi step index fiber.



Multi Step Index Optical Fiber

Since POF is for consumers, there is a constant demand for this fiber to remain at reasonable prices. The mult-step index structure can be mass produced much easier than GI-POF. Also, since it can easily be applied to varying bandwidths by changing the number of steps, it has the added benefit of simple conversion to larger capacities in the future.

Mitsubishi Rayon proposes the Eska-miu, rather than the higher transmission capacity GI structure EskaGIGA, as the backbone for home networks, not only because the Eska-miu satisfies bandwidth requirements, but also because we feel that the superior productivity of the multi-step structure and cost performance are greater concerns for home networks.