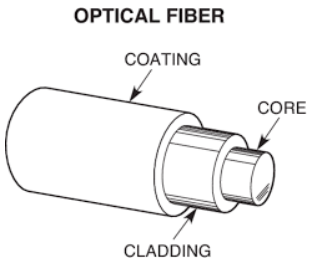
Principle and probagation of light in optical fibres

Optical fibres are the light guides used in optical communications as wave-guides. They are thin, cylindrical, transparent flexible dielectric fibres. They are able to guide visible and infrared light over long distances. The working structure of optical fibre consists of three layers. Core- the inner cylindrical layer which is made of glass or plastic.Cladding- whichenvelopsthe inner core. It is madeofthe same material of the core but of lesser refractive



index than core. The core and the cladding layers are enclosed in a polyurethane jacket called sheath which safeguards the working structure of fibre againstchemical reactions, mechanical abrasion and crushing etc

PropagationmechanisminOptical fibre:

In optical fibres light waves can be guided through it, hence are called light guides. The cladding in an optical fibre always has a lower refractive index (RI) than that of the core. The light signal whichenters into thecorecan strike the interfaceofthe coreand thecladding at angles greater than critical angle of incidence because of the ray geometry. The light signalundergoes multiple total internalreflections withinthefibrecore.Sinceeachreflectionisatotalinternalreflection, the signal sustains its strength and also confines itself completely within the core during propagation. Thus, the optical fibre functionsas a wave guide.