FIBER OPTIC CABLING

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You may know that fiber optic cabling is important to applications like the Internet, telephone systems and cable TV, but have you ever wondered about how it actually works, or why it's so perfect for transmitting data?

Fiber optic cabling is based on optical fibers, which are long, flexible, hair-width strands of ultra-pure glass. Optical fibers are formed when preform blanks – portions of specially manufactured glass – are heated to between 3000 and 4000 degrees and then drawn out at a rate of up to 66 feet per second. As optical fiber is pulled, it is constantly monitored by a laser micrometer, which ensures that its diameter is perfectly uniform from start to finish.

In order for optical fibers to transmit data over long distances, they need to be highly reflective. On their way to being spooled, newly-pulled glass fibers pass through coating cups and ultraviolet ovens, which respectively apply and then cure the thin plastic buffer coating that creates a mirror effect within the fiber.

The finished optical fiber is then extensively tested in a wide range of categories, including Tensile Strength, Refractive Index Profile, Fiber Geometry, Attenuation, Bandwidth, Chromatic Dispersion, Operating Temperature, Temperature Dependence of Attenuation, and Ability to Conduct Light Underwater. After testing has proven that the newly-manufactured optical fiber meets all standards, it is sold for use in fiber optic cabling.

Depending on what type of application it will be used for and how much data it will need to transmit, fiber optic cable can be built around a single strand of optical fiber, or larger groupings of it. To assemble a complete fiber optic cable, the strand or cluster of optical fiber is placed at the core, to be surrounded by a loose tube of PVC, which leaves the fiber room to bend when being routed around corners and through conduit. The loose PVC is then covered with a layer of shock-absorbing aramid yarn – usually made of Kevlar. To top it all off, the cable receives a final outer-jacket coating of PVC, which helps to seal out moisture.

In order for the finished cable to transmit data signals, it needs to be connected to the two other main components of a fiber-optic system. The first of these is the optical transmitter, a device which converts electrical and analog signals into either On-Off or Linear modulating light signals, then releases that data into the fiber optic cable. The cable then relays the data emitted by the optical transmitter to the optical receiver, which accepts the light signal and reformats the data into its original form.

Fiber optic cabling has advantages over standard copper coaxial cables, in that it can transmit larger quantities of data with far less loss, is able to maintain signals over long distances, carries little risk of corrosion, and is virtually free from interference.