

# DIT-MCO International

## Glossary of Fiber Terms

**Absorption** – Attenuation caused by the conversion of optical power to heat.

**Attenuation** – The power loss across a an optical fiber, it is expressed in “decibels” (dB) where “-10 dB” means a reduction in power by 10 times, -20 dB means another 10 times, or 100 times overall ( $10 \times 10 = 100$ ). Thus, “-30 dB” means another 10 times or 1000 times overall. Attenuation results from absorption and scattering.

**Cable assembly** – An installation-ready cable with connectors on both ends.

**Cable plant** – A fiber assembly that includes all the optical elements of cable, optical or mechanical connections, and permanent splices (mechanical or fused).

**Equilibrium Mode Distribution (EMD)** – This is a steady state modal distribution in multimode fiber. It is achieved some distance from the source (typically around 2 meters), where the relative power in the modes becomes stable with increasing distance. EMD is used to determine specifications for multimode fiber and components. If attenuation measurements are made without first establishing the equilibrium mode distribution condition, then the results obtained will be incorrect and unrepeatable with other equipment.

**Far-field region** – The region, far from the source of light (or radiating aperture) where the diffraction pattern is essentially the same as the pattern observed at an infinite distance.

**Ferrule** – Is a metal ring or cap placed around a pole or shaft for reinforcement to prevent splitting.

**Index of refraction** – The index of refraction is the mathematical ratio of the speed of light in free space to the speed of light in a given material. It is a function of wavelength. Lights of different wavelengths have different speeds in the optical fiber. In an optical fiber, cladding material has a lower index of refraction than the core material. The difference is what allows reflection to take place and propagate a signal down the fiber. The performance of a fiber optic cable depends on the relative indices of refraction of the core and cladding materials.

**Launch** – Sending – “launching” – a light signal from the source into the fiber.

**Loss** – See attenuation.

**Multimode** – Multimode fibers have a larger core (62.5 microns) than single-mode fibers and can transmit more than one electromagnetic wave. The light source is usually an LED (light-emitting diode).

**Near-field region** – The region near a source of light (or radiating aperture) where the diffraction pattern differs significantly from the pattern observed at distance.

**Pinch point** – A stress or pinch point that can result when pre-assembled fiber cables are pulled or bent beyond cable bend radius.

**Plastic optical fiber (POF)** – These fibers have large cores (about 1 mm) and use visible light.

These are the fibers used for illumination low speed, short data links.

**Propagation** – Traveling through space or a material. Energy waves such as light, sound, or radio waves, are propagated through a given medium.

**Scattering** – The change in direction of light after it strikes small particles. Scattering causes optical loss in optical fibers, and it is used to make loss measurements by an OTDR.

**Single-mode** – Single-mode fibers have a much smaller core, only about 9 microns. Such fibers are used for telephony and CATV with lasers providing the source of the light signal.

**Wavelength** – The scientific term for the color of light traveling in fiber, wavelength is expressed in nanometers (nm); 1 nm is one one-billionth of a meter. While plastic fiber uses a bright LED light, other fiber optic systems use light in the “infrared” region that is invisible to the human eye.