

General

Apart from applications in the field of telecommunications, fibre optic technology is of great importance in the industrial market sector. In telecommunications there are requirements for:

- High transmission capacity
- Low cable attenuation
- No crosstalk

These features are also required in the industrial sector along with the following major considerations:

- Zero susceptibility to electromagnetic interference
- Electrical insulation between transmitter and receiver
- Small cable diameter

Fibre optic communication works by pulses of light. When feeding them in at one end of the fibre optic cable, the pulses are passed to the other end by total internal reflection.

Total internal reflection occurs at the boundary layer between core and cladding by virtue of the different values of optical refractive index (n) between the two materials (n cladding less than n core).

There are three different types of optical fibres:

		Typical Dimensions Core/ Cladding Ø	Attenuation
Step index (SI) fibre HCS ^{® 1)} /POF ²⁾		200/230 µm	5 dB/km ... 8 dB/km 0.2 dB/km
Gradient index(GI) fibre		50 /125 µm	2.6 dB/km 3.2 dB/km
Single modem fibre		9/125 µm	< 0.3 dB/km

optical refractive index profile

The single modem fibre is mainly used in telecommunications because of its low attenuation and wide band-width.

The gradient index fibre and the step fibre with their large core diameters are chiefly used as communication cables in industrial applications due to their easy handling and relatively low costs. The link length ranges from several meters to several kilometers.

Mounting of connectors for gradient fibres is achieved by the use of adhesive.

For POF²⁾ or HCS^{® 1)} fibres, the crimping technique eases the connector attachment.

With the advanced HARTING quick assembly components, POF-cables can be mounted without the need of special tools. HARTING F.O. systems are designed for gradient index fibres with a core diameter of 50 and 62.5 µm as well as for 200 µm (HCS^{® 1)} and 1 mm (POF²⁾) step index fibres.

The typical operating wavelengths are 660 nm (POF²⁾, HCS^{® 1)}), 850 nm (GI, HCS^{® 1)}) and 1300 nm (GI).

¹⁾ HCS[®] (=Hard Clad Silica) is registered trade mark of SpecTran Corporation

²⁾ POF = Polymer Optical Fibre