Optical Glass Fibres
Multimode graded index type
Specifications

General
This document is a specification for the optical glass fibres which are used for communication purposes by ABB’s protection and control products.

Glass fibre
The glass fibres to be used must comply with the specifications of this document and the international standard ISO/IEC 11801.

The glass fibre must be of the multimode graded-index type. Multimode means that there are several paths for light rays to travel. Graded-index means that the refractive index varies with the distance from the fibre axis. This means that the light ray will refract in small steps and the pulse will keep its shape better than, for example, when step index fibres are used.

Fig. 1 The idea of graded index fibre

Polishing
There are several different forms and polishing methods for finishing the fibre tip. Polishing gives a clear window for the light to travel to and from the fibre. The function of the fibre tip form is to avoid reflections. Reflections cause problems when light is reflecting and travelling in the fibre among true data. A plane fibre tip is the most sensitive type regarding back reflection.

The tip of the glass fibre must be polished into a spherical shape, to avoid problems caused by back reflections.

Fig. 2 Round shape tip of the fibre.
Connector

The supported connector type for glass fibres is ST which is widely used in industrial and electrical protection and control applications.

![ST type connector](image)

Fig. 3  ST type connector.

Specifications

- **Type**: Multimode graded index OM1 (ISO/IEC 11801)
- **Diameter**: 62.5/125 µm core/gladding
- **Attenuation**: max 3.5dB/km at 850nm wavelength
- **Tip polishing shape**: rounded fibre tip, see fig. 2
- **Connector**: ST-type

Ordering fibres

The glass fibres, used with ABB substation automation products, must comply with the specifications of this document. The coat and protection of the fibre can be chosen according to the application requirements.

The star topology protocols, LON and IEC 60870-5-103, require duplex fibres, which means that two fibres are combined to a fibre pair for one connection. The loop topology protocols, SPA, require simplex fibres, which means that just one fibre is required to connect two devices.

You can order fibres of fixed lengths from well-known manufacturers or distributors. The design rules of different communication protocols for cable lengths and system constructions must always be followed.

Manufacturers

There are many reliable manufacturers around the world, who can deliver the specified fibres. We have successfully tested fibres from the following manufacturers:

- Draka NK Cables
- Brügg Kabel AG