

INTELLIGENT DATA & POWER SOLUTIONS

FIBRE SOLUTIONS

INS Sudlows have a wide range of experience in Optical Fibre Technology from both the Design and Installation aspects. This experience accrued over the last 20 years allows INS Sudlows to offer clients optimal solution with affordable optical technology.

There are two basic forms of fibre solution. The first is “Conventional” fibre sometimes referred to as “laid up” or “cabled fibre” and the second is “Blown Fibre”

1. CONVENTIONAL FIBRE

In this case one or more fibre cores are contained within an outer sheath, typically with glass yarn or kevlar to provide both tensile and crush resistance. The fibre cores can be primary coated (250 micron diameter.) or secondary coated (900 micron diameter.) often called tight buffered. Many cables for internal applications use 900 micron fibres since they are easier to terminate in the field. Most cables for external and long distance applications use primary coated fibres within a tube inside the cable. Such loose tube cables are slightly more complex to terminate, for example by using connectorised pigtailed that are fusion spliced to the fibre cores.

2. BLOWN FIBRE

A blown fibre solution comprises a series of empty plastic tubes which can be populated with a bundle of fibre cores. The 4 or 8 core bundle is blown down a tube using a compressor. Not only can the bundle be blown in but it can also be blown out of the tube and replaced with a bundle made up from a different type of fibre. This flexibility is widely used on campus sites.

The BT Blown Fibre System for example comprises 1,2,4,7,19 and 24 tube internal and external grade cables with 4, 8 and 12 core fibre bundles. Although single blowing distances are typically 600 metres, clever techniques enable overall blowing distances to extend up to several kilometers, if necessary.

Since the tubes can be interconnected using push on pneumatic couplings a system can comprise a main spine and a series of spurs. It is then possible to create a highly effective network of routes supporting multiple applications e.g. telephony, data and security.

TERMINATION

Either fibre system can be terminated using direct termination methods (e.g. glue and polish, hot melt, cold cure) and / or fusion spliced pigtailed. The most common form of connector is the SC/FC presented in a 19 inch rack mount patchpanel. Many older legacy systems use the bayonet style ST connector.

TESTING

Fibre systems are typically tested using a stabilised light source and power meter (insertion loss) and / or via OTDR (Optical Time Domain Reflectometer) that provides a unique characteristic trace of each fibre core (useful for future comparisons).

INTELLIGENT DATA & POWER SOLUTIONS

FIBRE TYPES AND ISO11801 ISSUE 2

There are two fundamental grades of optical fibre Multi-Mode and Single-Mode. In each case the outside diameter of the fibre is 125 microns, however a Multi-Mode fibre has a 50 or 62.5 micron core and the Single-Mode fibre, typically an 8 to 10 Micron core.

Single-Mode fibre has the lowest attenuation per unit length and also the highest bandwidth therefore historically it has been used for long distance and / or support of very high data rates.

The largest installed base of Multi-Mode fibre in Europe is 62.5/125 and it was long thought that it would be sufficient for the future. However, Gigabit Ethernet was developed and earlier grades of 62.5/125 micron fibre can only support up to 220 metres. The recent development of 10Gigabit Ethernet can reduce this distance to a mere 33 metres on 62.5/125. The use of 50/125 micron fibre results in a maximum distance of 550 metres for Gigabit Ethernet.

ISO 11801 ISSUE 2

The latest issue of the International Standard ISO11801 introduces a series of fibre performance specifications.

There are three classes of end-to-end or channel performance:

- OF-300 to support applications up to 300m (min)
- OF-500 to support applications up to 500m (min)
- OF-2000 to support applications up to 2000m (min)

The specification lists a series of physical and transmission characteristics e.g. attenuation at specific operating wavelengths. Four types of optical fibre are specified to support the three classes of channel performance.

There are three Multi-Mode fibre types (OM1, OM2, OM3) and one Single-Mode type (OS1). In reality they correspond well with older grades / types of fibre except OM3 which is a new high bandwidth 50/125 micron type.

WHAT DOES THIS MEAN IN PRACTICE?

In practice OM1 62.5/125 fibre will support Gigabit Ethernet – up to 275m for 1000BaseSX and up to 550m for 1000Base LX

(SX referring to short wavelength 850nm transmission and LX long wavelength 1300nm transmission).

OM2 50/125 micron fibre will support 550m for both 1000BaseSX and LX.

OM3 50/125 micron fibre will support 500m for 1000BaseSX and up to 5Km for 1000BaseLX. It also extends 10Gigabit Ethernet up to 300m

Single-Mode fibre (OS1) is becoming more widely used, although the electronics required to support Single-Mode are still two to three times more expensive compared to Multi-Mode. Generally where fibre cable lengths exceed 200-300m, Single-Mode is a viable option.

The deployment of OM3 fibre is uncertain at present although it will support legacy applications (and electronics) unlike Single-Mode.

INS Sudlows has the capability to Design, Install, Test and Certify Optical Fibre Systems.

Please contact us and one of our Design Engineers will be pleased to develop an 'Intelligent Solution' with you.