



The Fibreoptic Industry Association

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FIA TECHNICAL SUPPORT DOCUMENTS

by

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Two of the main aims of the FIA are to:

- promote and adopt standards to which professional participants within the fibre optic industry should be expected to adhere;
- provide a central source for information on wide ranging aspects of the fibre optic industry.

In support of these aims, the FIA has produced, and continues to develop, a range of Technical Support Documents that have an important role in explaining and interpreting existing standards-based requirements or making recommendations in areas in which national standards have not yet been produced or ratified.

In some cases, the FIA works to produce documents in collaboration with other industry bodies such as the Electrical Contractors Association within our joint activity, the Telecommunications Infrastructure Advisory Board.

Working in safety is a key focus of FIA Technical Support Documents. The **TSD-2000-5 series** of documents cover **optical power safety, handling of processing chemicals and disposal of optical fibre waste**. These are examples of documents that have been produced in response to the volume of enquiries to the FIA Secretariat. BS EN 60825-2 is the recognized safety standard for optical fibre communications systems and places demands on the users of such systems as well as the installers of the cabling that the systems operate over. The FIA TSD's provide clarification of these requirements and explain the methods by which conformance to the standards is demonstrated.

In some cases, technology can move faster than national standards and a good example has been test equipment. In 2002, **TSD-2000-4-2-1** was written to remind installers of the existing standards, outlining which test method to use to measure the **attenuation of specific configurations of installed cabling** using the older type of **LSPM equipment** - added to which the document defined alternative methods capable of measuring any cabling configuration with the more advanced kit that was then coming on to the market. In 2004, TSD-2000-4-2-1 began to be used by international groups during the revision of their test method standards. This, and other FIA work, led to the publication of ISO/IEC 14763-3:2006, BS EN 61280-4-1:2009 and the revision of IEC 61280-4-2 leading to an expected second edition of BS EN 61280-4-1 in 2012. Issue 4 of TSD-2001-4-2-1 and Issue 2 of **TSD-2000-4-2-2** define the FIA Position on the use of these standards for the testing of installed optical fibre cabling.

Both of the testing documents TSD-2000-4-2-1 (for LSPM) and TSD-2000-4-2-2 (for OTDR) provide guidance on the application of ISO/IEC 14763-3 and BS EN 61280-4-1 – both of which feature requirements or recommendations for the use of reference grade terminations on the test cords. **TSD-2000-4-2-3** results from work undertaken by FIA Project Team RGT on the specification, procurement and use of test cords - which is critical now that the pass/fail limits for many installed links have dropped to such low levels.

The early editions of TSD-2000-4-2-1 were an example of how work undertaken by the FIA, moving quickly, can influence the standards bodies. Another example is **TSD-2000-3-3** that defined the FIA standard approach to the **maintenance of polarity in installed cabling**. This document covers simplex, duplex and array connecting hardware and was written in response to enquiries from our

members. Since its publication in a number of British and international standards contain similar but not identical information. **TSD-2000-3-3** is being modified to provide an overview of the situation.

In rare circumstances, a single FIA member can highlight a topic of such importance that the production of a Technical Support Document is allocated to a project team which brings in resources from outside the FIA. This was certainly the case for **TSD-2000-4-1-1** that contains recommendations for the **specification of splice loss**. Although including multimode technology the document is targeted at those involved with medium- and long-haul singlemode installations.

The jointing of optical fibres using fusion splicing techniques is a long established approach to the provision of high performance, environmentally stable connections between optical fibres. Over the years, the capability of fusion splicing equipment has improved substantially as has the control over the tolerances of optical fibres at each side of the joint. This has led to a steady reduction in achievable splice loss. However, there is a point at which significant improvements in splice loss performance can no longer be made without direct influence over the optical fibres themselves and it is generally recognised that such a point was reached a number of years ago. The impact of specifying overly ambitious, or incorrectly defined splice loss requirements concerns both the client and the installer alike. The installer may be faced with a considerable degree of rework that can have dramatic commercial consequences. The client may be faced with considerable project delays - the resolution of which will add further costs to the project.

TSD2000-4-1-1 has had a useful by-product. It was discovered that the ITU specifies no less than nineteen different single mode optical fibre types - between which fusion splicing may, and in some cases will, result in modified performance as compared with splicing between singlemode optical fibres of the same type. The majority of FIA members were unaware of this range of product specifications and a simple FIA White Paper is now available covering the background to this subject.

The performance testing of splice joints requires the use of an optical time domain reflectometer. Such equipment can also be used to assess other components in an installation and can, under certain circumstances, produce measurements of installed cabling attenuation which are directly comparable with those of LSPM equipment. **TSD-2000-4-2-2** defines methods of **OTDR analysis of installed cabling** and components and is written as a sister publication to TSD2000-4-2-1.

The specification and guidance for the selection of cabling components is also covered by FIA Technical Support Documents. **TSD-2000-2-1** covers the **selection of optical fibre cables** for specific environment and applications. The document provides reference to existing recognized standards. However, there are types of components for which no useful standards exist and one area in which this is particularly relevant is that of cords.

Last but not least, we come to **TSD-2000-1-1**, the **FIA LAN Application Support Guide**. Following the withdrawal of BS 7718 in 2003, design guidance in national standards has disappeared. For local area network (LAN) telecommunications the data rates have increased dramatically and are still doing so. As part of that process we have moved from loss-limited, or attenuation-limited, applications such as Token Ring and FDDI to bandwidth-limited applications such as 1000BASE-SX/LX and 10 Gigabit Ethernet. This evolution has brought with it new design rules and enhanced performance options for multimode optical fibre cabling together with an increased emphasis on singlemode technology. The object of the FIA LAN Application Support Guide is to provide the reader with an understanding of both the "old" and "new" design issues.

All the FIA Technical Support Documents are free-of-charge to members, downloadable from the FIA web-site at www.FIA-online.co.uk. Members will need their password. The benefit of e-documents is that they can be updated quickly and at no cost to the FIA. Therefore, members are advised to ensure that they always have the latest versions at their disposal.