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NEW CABLED OPTICAL FIBRE CATEGORIES - PART I

by
**Mike Gilmore, Technical Director of the FIA
for Networking+ (March 2008)**

At their February meeting in Barcelona, ISO/IEC JTC1 SC25 WG3 proposed the establishment of two new optical fibre types or Categories - one multimode and one singlemode. In terms of standardisation, it is unlikely that changes to the list of "OM"s and "OS"s will take place before 2009. However, it is likely that marketing literature will contain the new designations quite soon and it may be useful to provide advance information for specifiers and installers alike.

The multimode variant, currently termed OM4, will provide twice the laser/VCSEL bandwidth of OM3 and is targeted to provide greater useable distance and/or lower system implementation costs for the next generation 40 Gb/s and 100 Gb/s Ethernet solutions that are currently in development. The FIA article in next months Networking+ will cover this in detail.

The new "OS", which currently has no designation, provides performance levels somewhere between those of OS1 and OS2 - and is explained below.

The discussions in Barcelona highlighted a number of issues regarding the meaning of the OM and OS terminology. One of most confused areas surrounding the development of new OF types or Categories related to their "meaning". Even though they call the OM/OS scheme "OF types", the international generic cabling standards make it clear that the designations OM1, OM2, OM3, OS1 and OS2 relate to cable transmission performance. The BS EN 50173 series makes it even clearer by describing the OM/OS scheme as "optical fibre cable Categories".

Published cable standards containing OM1, OM2, OM3 and OS1 products
Optical Fibre Cables : Indoor cables
IEC 60794-2-11:2005 (and BS EN 60794-2-11:2005) Detailed specification for simplex and duplex cables for use in premises cabling
IEC 60794-2-21:2006 (and BS EN 60794-2-21:2006) Detailed specification for multi-fibre optical distribution cables for use in premises cabling
IEC 60794-2-31:2006 (and BS EN 60794-2-31:2006) Detailed specification for optical fibre ribbon cables for use in premises cabling
Optical Fibre Cables : Outdoor cables
IEC 60794-3-12:2006 (and BS EN 60794-3-12:2006) Detailed specification for duct and directly buried optical telecommunication cables for use in premises cabling
IEC 60794-3-21:2006 (and BS EN 60794-3-21:2006) Detailed specification for optical self-supporting aerial telecommunication cables for use in premises cabling
New editions, currently under development, also containing OS2 products
Optical Fibre Cables : Outdoor cables
IEC 60794-3-12 Detailed specification for duct and directly buried optical telecommunication cables for use in premises cabling
IEC 60794-3-21 Detailed specification for optical self-supporting aerial telecommunication cables for use in premises cabling

Both the IEC and EN committees have strengthened this relationship in the production of their cable standards as shown in the inset. It can be seen that OS2 is included only in the new 60794-3 "outdoor" series standards. This is because OS2 was born in the industrial premises standard, ISO/IEC 24702, to support 5 km and 10 km channels - which are by definition "outdoor". More importantly, the low attenuation values of OS2 are only realistic in loose-tube cables in which the original optical fibre performance is almost unaltered by the cabling process (the same could be said of "blown fibre").

The new singlemode variant reflects the need for an improved "indoor" singlemode optical fibre cable that is compatible with the OS2 product. Why is this needed?

Firstly, OS1 defines a very old specification - the original performance values came from ISO/IEC 11801:1995 and required the use of an optical fibre compliant with ITU-T G.652a or G.652b (IEC 60793-2-50 Type B1.1). The designation OS1 was introduced in 2002 but the performance requirements did not change - but OS1 allowed the use of singlemode optical fibre types meeting G.652c or G.652d (IEC 60793-2-50 Type B1.3). Secondly, by comparison, OS2 introduced in

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2006, requires the optical fibre to be compliant with ITU-T G.652c or G.652d only.

ITU-T G652c/d optical fibres are "low water-peak", suitable for coarse wavelength division multiplexed operation, and specified for transmission at 1310, 1383 and 1550 nm. ITU-T G652a/b optical fibres are not specified at 1383 nm.

As a result, the performance of OS1 cables is not automatically compatible with OS2 cables - the jointing of an OS1 indoor cable to an OS2 outdoor cable would result in an unspecified performance of the whole channel at 1383 nm. Therefore a new specification is required for "indoor" cables that use ITU-T G.652c/d optical fibres. As indoor cables tend to be of a buffered, tight construction, the attenuation performance of OS2 is unlikely to be maintained - hence the new OS designation. It is repeating that the new designation not agreed - it may be that the new designation replaces OS1 and therefore becomes OS1:2009 for example.

Further information is available via the FIA web-site at www.fia-online.co.uk Enquiries can be e-mailed to jane@fiasec.demon.co.uk, or, alternatively, you can contact the FIA Secretariat in 01763 273039.

Biography

As the Technical and Standards Director of the UK Fibreoptic Industry Association, Mike is heavily involved in the development of training and competence standards for the fibre installation industry and sets down policy in this area. In addition he chairs the audit and arbitration committees for the FIA. His book "Fibre optic cabling; theory design and installation practice" published in 1991 remains a reference for both experts and entrants into this field.

Mike also initiated the establishment of the Telecommunications Infrastructure Advisory Board (TIA-B) along with the relevant directors of its other host organisations CMA and ECA-ITEC.

In the UK, Mike is Chairman of TCT7, the BSI Technical Committee responsible for the three panels on telecommunication cabling. He also chairs two of these panels (TCT7/-1 and TCT7/-3) and is Secretary of TCT7/-2. TCT7/-1 and TCT7/-2 act to assist development of European and international standards for the design and installation of telecommunications cabling respectively. TCT7/-2 also manages the implementation of these standards in the UK, where necessary producing supporting national standards.

Mike is involved in CENELEC TC215 - as Convenor of Working Group 1 and Secretary of Working Group 2. These committees are responsible for the development of an integrated series of standards for the design and installation of telecommunications cabling in a range of premises. In 2008 he led the ETSI STF362 on energy efficiency in broadband deployment resulting in the ETSI TS 105174 series documents, allowing Mike to assist in a new TC215 activity covering data centre facilities and infrastructures (monitored in the UK by BSI TCT7/-3).

At international level, Mike is Convenor of the Cabling Implementation Task Group (CITG) within ISO/IEC JTC1 SC25 WG3. This group is responsible for the strategic management of the international standards covering the specification, QA, installation, administration, operation, maintenance and repair of generic cabling. This work supports all the cabling design standards produced by ISO/IEC JTC1 SC25 WG3 including ISO/IEC 11801, ISO/IEC 15018, ISO/IEC 24764 and ISO/IEC 24702 for industrial premises produced by ISO/IEC JTC1 SC25 WG3 IPTG (also convened by Mike Gilmore).

Mike is a regular speaker at seminars and conferences in all five continents. He has provided the keynote address and opening presentation in many conferences in the UK, Germany and the Netherlands. His seminars, providing regular updates on the progression of cabling standards are particularly well attended and are operating in the UK and continental Europe.



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