



The Fibreoptic Industry Association

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## TESTING STANDARDS TO SERVE THE INDUSTRY (THE WORK OF **FIA** PROJECT TEAM RGT)

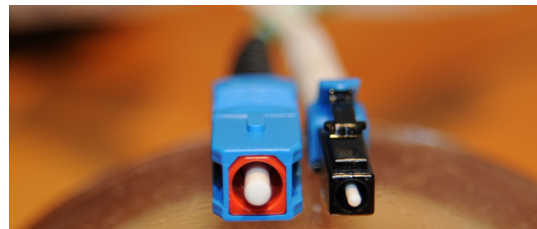
by

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**for Netcomms Europe (December 2010)**

This article describes the work of the Fibreoptic Industry Association to assist not only in the standardisation of test methods but also in ensuring those standards are usable by its members. This highlights the role of the FIA in not only contributing directly to the production of British, European and international standards but also in the subsequent, and sometimes vital, work in interpreting and explaining their use to its members and the wider industry. In this case, this support work has gone further by establishing procurement specifications to allow members to implement the standards at a reasonable cost - a key factor in their ultimate acceptance.

This work is set against the background of a growing use of optical fibre to support ever higher data rates. As the data rates have increased from 10 Mbps to 10 000 Mbps, the maximum channel lengths have dropped from kilometres metres to tens of metres for multimode optical fibre. Equally, the maximum allowed losses have dropped from 12,5 dB to approximately 2,0 dB. The need to measure the attenuation of ever shorter links and channels has forced all responsible organisations to take measurement much more seriously.



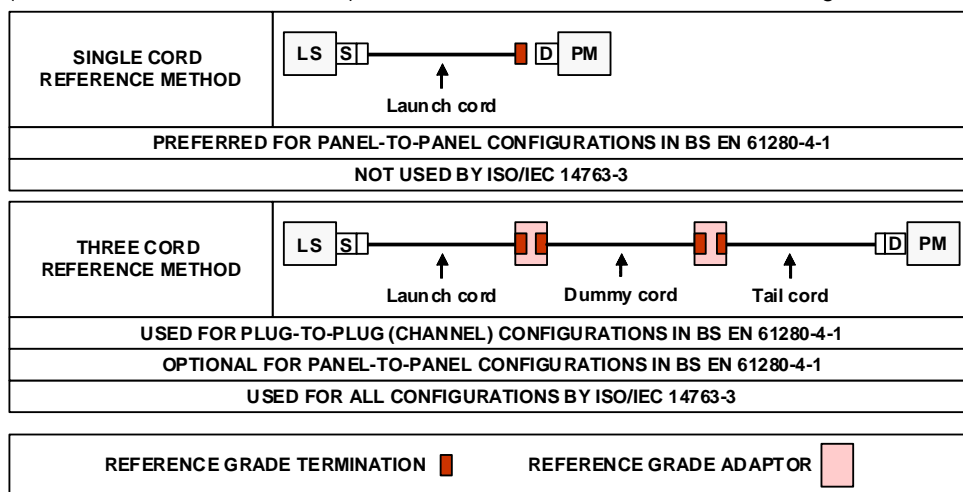
### History

As long ago as 2002, the FIA had identified that the test methods for installed optical fibre cabling were becoming outdated. The FIA attempted to address this by publishing two separate Technical Support Documents covering light source/power meter (LSPM) and OTDR testing. The problems highlighted in these documents were immediately recognised by international standards bodies - which began to develop new testing solutions - different to those proposed by the FIA, but equally generic, as ultimately specified in ISO/IEC 14763-3:2006.

During the development of ISO/IEC 14763-3, the FIA found that, for multimode optical fibre, test results were highly dependent on the launch condition at the interface to the cabling under test. For the FIA, this led to the funded development of practical mode controller cords, which could convert the output from a wide range of light sources into a common launch condition. For ISO/IEC, this meant having to decide what that launch condition should be - and how to define it.

ISO/IEC 14763-3:2006 contained a standardised launch condition (for multimode optical fibre cabling) and a requirement for "reference grade connectors" on all test cords. This represented a considerable sea-change in approach for optical fibre cabling installers but the complexity was not to end there.

ISO/IEC 14763-3 was written to support the testing of structured cabling systems in accordance with standards such as ISO/IEC 11801 and BS EN 50173 series standards. A more general IEC standard albeit restricted to multimode optical fibre. IEC 61280-4-1, already existed (published in 2004) and the work on ISO/IEC 14763-3 forced this IEC document to be revised. Having the opportunity to review ISO/IEC 14763-3, the IEC team decided that the launch conditions required further detailed work and when IEC 61280-4-1:2009 was published (in the UK as BS EN 61280-4-1) it contained a different metric for measuring launch conditions ("encircled flux").



However, the demand for accuracy was maintained in IEC 61280-4-1 by demanding that the test cords were fitted with reference grade terminations.

In 2009 ISO/IEC 14763-3 was amended to bring its specified launch conditions for multimode optical fibre cabling tests into line with IEC 61280-4-1.

## The FIA response to standardisation

The issue of launch conditions is being solved either by light source equipment suppliers or by the use of mode controller cords. The FIA web-site provides links to hose suppliers indicating the equipment for which those launch conditions are claimed and under what conditions they are achieved.

However, the matter of reference grade connectors/terminations (RGTs) is of major importance since their use also requires the application of reduced test limits. It is therefore critical to understand what RGTs are, how they are produced and how they should be used. FIA Project Team RGT was established in 2010 to do just that.

The work of FIA Project Team RGT has determined a way forward for the supply of test cords terminated with reference grade terminations - at a reasonable cost for installer. The specification and procurement of test cords will be defined in a Technical Support Document to be published later this year. The Technical Support Document for LSPM testing will also be revised to explain the relevance of the new testing standards and to provide a guide to use of the test cords - and provide further information regarding the issues surrounding the modification of test limits when RGT cords are used.

## Further concerns

This work undertaken by FIA Project Team RGT so far only addresses on circular ferrules on multimode optical fibre - no work has yet been done on circular ferrules for singlemode optical fibre or on either multimode or singlemode terminations using rectangular ferrules.

The work on circular ferrules for singlemode optical fibre is deferred awaiting further work by international standard bodies. However, the issue of RGTs for rectangular ferrules is of greater, more imminent, concern since array connectors containing 12 or 24 optical fibres of cabled optical fibre Categories OM3 or OM4 are beginning to be used in the implementation of 40 GbE and 100 GbE. When these array connectors begin to be used on patch panels, the industry will array connector RGTs to support testing.

The cause for concern is that because if RGTs are not present but are assumed, then the innocent, and standards-compliant, application of the RGT test limits is likely to produce many false "fails". Unless an appropriate mechanism for specification and procurement of array RGTs is developed it may be necessary to apply non-standard test methods - which seems to be a Pandora's box scenario.

This will be addressed by further FIA work but also needs to be considered by standards bodies in relation to possible amendments to address the clear and present risk of false fails caused by the false assumption of RGT presence.