



The Fibreoptic Industry Association

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CATS and MICE

by

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Most readers involved in telecommunications/IT cabling will be aware of the Category system of component performance. In Europe we have Cat. 5 (equivalent to 5e in the US), Cat. 6 and Cat. 7 balanced cables together with cabled optical fibre Categories OM1, OM2, OM3 and OS1. The BS EN 50173-x:2007 standards contain additional categories for specific types of premises - including plastic and plastic-clad optical fibres in industrial premises. However, the new standards will not be remembered for new CATS - in the long term it is more likely to be the MICE that catch the eye.

MICE is the system of classifying the environment in which the cabling has to function - "M" stands for "mechanical" characteristics, "I" covers "ingress", "C" addresses the "climatic/chemical" aspects while "E" represents the "electromagnetic" domain.

Each group (M, I, C and E) has three assessment levels e.g. M₁, M₂ and M₃ within which the environment becomes more "aggressive". So a M₁I₁C₁E₁ classification represents a relatively benign overall environment, such as an office, whereas the M₃I₃C₃E₃ classification harbours some pretty tricky conditions in which cabling is required to operate.

The MICE concept was founded in Europe during the development of EN 50173-3 but is now completely harmonised at international level in IEC 24702:2006 and in North America within ANSI/TIA/EIA-1005. MICE is also used in other standards and, in due course, cables and connecting hardware will be advertised with their MICE classifications.

All these aforementioned standards address cabling within industrial premises. However, in Europe the concept is applied to generic (structured) cabling for all types of premises and this widening of application is also finding favour in new international standards for generic cabling.

Two specific aspects of the MICE approach are worthy of close attention. The first is "C" - the climatic/chemical group of criteria. Within C, operating temperature is critical. Historically, the operating temperature of a cable was that of its immediate surroundings - i.e. the ambient temperature. Commonly available balanced cables (of all Categories) have a maximum operating temperature of 60° C - above which they, in effect, "fall apart". The boundary condition for environmental classification C₁ is therefore 60° C - C₂ and C₃ both having a maximum of 70° C. However, the advent of Power over Ethernet (PoE), and the future promise of PoEplus, creates a situation in which the cables become net producers of heat and the operating temperature has to take this into account. Therefore the ambient temperature as originally defined is no longer a basis for assessing the environmental classification.

The “E”lectromagnetic assessment is possibly the most powerful aspect of MICE where E_1 represents low level external electromagnetic interference with E_2 and E_3 becoming increasingly “nasty”. For optical fibre this has no impact whatsoever but balanced cabling demands improved electromagnetic immunity as we move from E_1 to E_2 to E_3 . This is now addressed in the new BS EN 50173 standards for structured cabling (and in the proposals for Category 6_A and 7_A cabling at international level) where cabling transmission performance is specified separately from electromagnetic immunity characteristics. The immunity of unscreened cabling is defined using TCL and ELTCTL while screened cabling uses coupling attenuation.

This separation of transmission and immunity characteristics also presents some opportunities for clear design rules in the field of “sheath sharing” where multiple applications are transported within the same cables.

Some may find it strange that an article produced by the Fibreoptic Industry Association focusses on PoE and balanced cabling - but the FIA believes that you need understand all transmission technologies to identify your own strengths and weaknesses. If you wish to access the resources provided by the FIA go to 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.