

To: 3P Customers and Business Partners

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Cabling Developments in 2009

On entry into the unpredictable 2009 it is more important than ever to stay on edge with technological developments. This goes for both producers, distributors and everyone else involved in the cabling business. Any shrinking markets can be compensated for, if you can increase market shares. An obvious way to do this is to be among the first to implement the new technological developments.

Fortunately technological developments are as fast as ever. The present 3P Newsletter is intended to give an overall impression of the copper cabling market developments without discussing the sometimes critical technical details.

General Technological Developments

The milestone 10 Gigabit Ethernet is presently established technology from an application point of view. IEEE has done its job and they are now looking at distant future applications like 40 and 100 Gigabit Ethernet, primarily for fiber optical cabling. Our traditional twisted pair cabling is **not** presently being considered for this high data rate cabling. However, the author cannot see any reason why a very well screened "Category 9" twisted pair S/FTP cabling could not do the job, mainly for shorter lengths of permanent links and channels (attenuation will be the critical parameter for such higher frequency, high immunity cabling specified to for instance 2,5 GHz).

However, even though IEEE has done the job there is still a tail of standards to be developed to make the 10 Gigabit ethernet technology of general practical use in installations. As usual TIA is first and has completed the standardisation of both channels, permanent links, cables, connecting hardware and cords. The standard was published last summer as document ANSI/TIA/EIA-568-B.2-10. ISO/IEC and CENELEC has completed the work on channels, and

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standards for permanent links, cables, connecting hardware and cords are at different stages of preparation.

The main technical challenge for the 10 Gigabit Ethernet cabling has been the critical significance of electromagnetic noise from the outside of the cabling. This concerns both neighbour permanent links and channels and external noise transmitters of any kind (radio transmitters, mobile phones, computers, etc.). It is the first time noise immunity reaches such high significance, as the internally generated noise in the channel has before been far more critical. Consequently we now see requirements to the external noise sensitive parameters alien crosstalk, coupling attenuation and balance as TCL and ELTCTL becoming a critical part of cabling requirements (as well as for components). All these types of measurements are a challenge to producers, but for installers, especially alien crosstalk requires skills and training to carry out and to understand (at least required for unscreened cabling).

The present developments also include a main focus on power feeding over twisted pair cabling and also energy efficient cabling. Especially the intended supply of 30 Watt power over the copper communication cabling becomes significant to the market. Future PC's could be powered through the patch cords, and low power equipment in the building could be power fed through the communication cabling (possibilities are numerous). Up to 30 Watt power supply does mean challenges with respect to heating of cable bundles in the installation and unplugging of RJ 45 connectors being under load. Technology is however mature and I believe that even higher power feeding might be possible in the future by optimised cable and connecting hardware designs.

New Cabling Environments

The present activities in standards committees include generic cabling of new environments like home, industry and data centres. Much work has been done and these new cabling environments offer new user benefits and market opportunities. Work is ongoing in both TIA, ISO/IEC and CENELEC. As an example the CENELEC standards for installations are organised in a well arranged family presently containing the following parts:

- EN 50173-1: General Requirements
- EN 50173-2: Office Cabling
- EN 50173-3: Industrial Cabling
- EN 50173-4: Home Cabling
- EN 50173-5: Data Center Cabling

This family is open for inclusion of any additional cabling environment.

Inclusion of new installation types for generic cabling has of course not been possible without new angles of specification work being necessary. The new environments are for instance placing strengthened requirements on humidity, water splashing, contamination, mechanical handling and exposures, chemicals and/or electromagnetic noise. Variability of temperature of cable runs was already taken care of by office cabling standards by the insertion loss high temperature requirements. Temperature is allowed to vary to cover installations from Sahara to Greenland (yes, they do have cabling in this breathtaking beautiful country).

MICE (**M**echanical, **I**ngress, **C**limatic and **E**lectromagnetic ratings) was developed to take care of other installation environments than office. Knowing the environment of an installation will make it possible to specify severity of environmental parameters for your installation by using the MICE classification system. However, the specific MICE ratings are difficult to identify and hence this reduces its user friendliness. A detailed MICE classification listing of typical installations would in my opinion be very helpful and consequently accelerate the implementation in the marketplace. Two examples are given below for illustration purposes (purely imaginary and with all reservations):

- $M_1I_1C_1E_2$ for office installation near radio communication center
- $M_2I_3C_1E_3$ for slaughterhouse

Using the MICE classification it would be easy to find the satisfactory performing components.

Special Connecting Hardware Challenges

The higher frequencies of Category 6A have caused major changes for connecting hardware. The good old measurement and design technology "pyramide testing", which was developed for Category 6, proved unsuitable in the higher frequency range. A new test method, "re-embedding", was developed and can be used to 500 MHz with better reproducibility and accuracy than the pyramide testing. This re-embedding test method poses significant technical challenges to the connecting hardware producers. However, after a dark time of despair and desperation it will make future measurements much faster and easier now that the technology is finally mastered. This will be essential for both development times and internal end product testing.

The exceptionally fine point about the new testing technology is that it can conveniently be applied also for Category 5e and Category 6 with just small changes in the data processing programme. 3P would therefore be surprised if this re-embedded test method will not replace the traditional test methods for both Category 5e and Category 6. The re-embedding test method will therefore also be of high interest to producers considering only "conventional" categories.

The end user does not need to know the complex details of the re-embedding test method. However, if the re-embedding test method is implemented for all categories of connecting hardware he should conclude which technology is applied for the producer's performance data. The two different test methods (for instance pyramide and re-embedding testing) usually give the same result, but small differences may exist causing failure by one method and passing of requirements by the other.

The painful difference in Cat. 6A connecting hardware performance between TIA and other coming international standards seems to be maintained and calls for awareness by the market whether Cat. 6A (TIA) or Cat. 6_A (ISO/IEC, IEC and CENELEC) connecting hardware performance is requested.

Maturing Cable and Cord Markets

The coming year will bring new cable and cord standards from both ISO/IEC, IEC and CENELEC, but requirements will hardly be very surprising to the market as the TIA



specifications have already been published (except for Cat. 7 and Cat. 7_A for which I still wonder why these ratings have not been taken onboard by TIA). I expect maturing of the market for the new cable types (Cat. 6A/6_A and Cat. 7_A) and increased focus on the EMC performance for all categories of cables and cords.

Fire performance of cables is a sleeping giant in Europe. 3P does not dare to predict developments in 2009, but is ready to support the market if and when new requirements unfold.

Yours sincerely,
3P Third Party Testing

A handwritten signature in blue ink that reads "Poul Villien". The signature is written in a cursive, flowing style.

Poul Villien