

To: 3P Customers and Business Partners

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3P Newsletter No. 6/2006

Progress of Cabling Standardisation - 1: General Developments

Efforts to develop requirements for the new generation of copper cabling has had high priority for the past few years as standardisation work has aimed to prepare the market for the new emerging 10 Gigabit Ethernet application. The work has intensified this September with meetings in both cabling, cable, connector, patch cord and field testing committees. The present 3P Newsletter will provide an **overview** of the general outcome of these meetings while coming 3P Newsletters will discuss the detailed results of the ISO/IEC cabling meeting and the most important developments for each component type.

The discussion below is general and is based on the 3P estimate of most significant technical market developments. Only copper cabling developments are treated here. Other than the below discussed issues may of course be critically important in the future or under specific circumstances, like the environmental classification of cabling (MICE) and fire safety ratings of cables in Europe (CPD). Such issues will also be included in the discussions in the future 3P Newsletters.

1. New applications demand challenging cabling requirements

New future applications are today being generated by IEEE and these applications dramatically increase the present and future requirements to copper cabling. The two most significant technical challenges are

- 10 Gigabit Ethernet
- High Power over Ethernet

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10 Gigabit Ethernet

The 10 Gigabit Ethernet application was agreed this summer by IEEE and the requirements have been published. Consequently **10 Gigabit Ethernet is today an existing technology** which will soon be general on the market. This does **not** mean, however, that cabling requirements for support to 10 Gigabit Ethernet have been published by either ISO/IEC, IEC, TIA/EIA or CENELEC. This work is going on at present with status as described later in this 3P Newsletter.

The 10 Gigabit Ethernet application has given birth to a new technical challenge, i.e. alien crosstalk, which is the main target of standardisation developments at present. Especially unscreened cabling has challenges in passing the 10 Gigabit Ethernet requirements for long permanent links and channels.

Cabling developments include generation of both (1) limits for existing Class E / Category 6 cabling and (2) requirements for a new 3rd generation Class E_A/Category 6A and Class F_A/Category 7A cabling, which are aimed to support new future applications **in addition to 10 Gigabit Ethernet**.

High Power over Ethernet

Power over ethernet is an existing technology for support of maximum 10 Watt power to the equipment. The new work is aimed to provide higher power in order to drive for instance portable PC's by using only the signal cables. Power level could for instance be 30 - 70 Watt depending on technical limitations of the connectors and cables.

The popular names of this technology are, as used in the standardisation world:

- PoE = Power over Ethernet (existing 10 Watt technology)
- PoEP = Power over Ethernet Plus (future higher power technology)

PoE and PoEP are intended to run over signal cables. In order not to have these cables treated as power cables (causing demanding "power cable" safety requirements) the voltage level must always be kept below approx. 50 Vdc. Power is supplied by using higher currents, which causes heating of cable bundles and arching of contacts by separation of the patch cords from the connectors. The very significant technical challenges for the coming PoEP applications are thus to create experience with the effects of high power and thereby to generate specifications for max. currents with respect to (1) separation of connectors under power load and (2) heating of cables in cable bundles.

2. Standardisation activities

In September most of the committees working with the future requirements have met. This concerns both cabling, cable, connecting hardware, patch cord and field testing committees. 3P works actively in these committees and has participated in the following meetings:

- A: ISO/IEC cabling meeting 18 - 21 September 2006 (ISO/IEC JTC 1, SC 25, WG 3). The subjects treated include cabling and component requirements for both copper and optical installations. The outcome of this meeting will be discussed separately in a future 3P Newsletter.
- B: IEC cable meeting 25 - 26 September 2006 (IEC SC 46C, WG7). The subjects treated include copper communication cable test methods (also alien crosstalk) and requirements of third generation cables.
- C: IEC connector meeting 19 September 2006 (IEC SC 48B). 3P participated during the discussions of test methods and experience with respect to separation of patch cords from connectors under power load.
- D: IEC field testing and patch cord meeting 14 - 15 September 2006 (IEC TC 46 WG 9). The subjects treated include field testing of cabling in support of 10 Gigabit Ethernet, new field tester for home cabling and third generation patch cords.
- E: CENELEC cable meeting 12 September 2006 (CENELEC SC 46XC). The subjects treated include European copper communication cable test methods (also alien crosstalk) and requirements of third generation cables. Also the new, coming fire safety ratings for cables were discussed (CPD).
- F: CENELEC communication cable material and fire safety meeting 13 September 2006 (CENELEC TC 46X, JTC 2). The subjects treated include material requirements, UV resistance of cables and, most important, progress of the CPD fire safety ratings for cables.

The above information is provided only to give a survey of the intense standardisation activities going on at present. Similar intense work is taking place in TIA/EIA committees and will result in many standards being published in the next few years to allow new technical progress of the communication cabling.

3. Status of 10 Gigabit Ethernet related standards

Very many new standards are presently being developed, most of which are critically important for the component or installation types they will cover. However, only selected specifications are listed below based on their relevance for 10 Gigabit Ethernet support. Other important new specifications will be presented in the coming 3P Newsletters.

The below listed "expected" publication times are only based on the personal estimate by the author.

The standard for **field testing** of cabling in support of 10 Gigabit Ethernet is:

- IEC 61935-1, edition 3.0
Present stage: Draft circulated to countries for comments.
Expected time of publication: Winter 2007/2008.
Comments: This standard includes specification for field testing of alien crosstalk of installations.

The most significant 10 Gigabit Ethernet related standards **for established cabling** requirements are:

- TIA/EIA TSB-155
Present stage: Edition 5.0 has been circulated and comments will be implemented in October.
Expected time of publication: Winter 2006/2007.
Comments: This standard is expected by the author to become the key document for approval of installations for running 10 Gigabit Ethernet because it will be the first one (and only one for a long period of time) containing permanent link requirements.
- ISO/IEC Technical Report TR 24750
Present stage: The draft specification has been circulated and approved.
Expected time of publication: Summer 2007.
Comments: This standard does not contain permanent link requirements.
- CENELEC Technical Report TR 50173-99-1
Present stage: Continued work is presently put on hold. The existing draft will hopefully be discussed and developed soon as permanent link requirements are needed for practical installation testing.
Expected time of publication: Late spring / summer 2008.

The most significant 10 Gigabit Ethernet related standards **for 3rd generation cabling** requirements are (mainly Class E_A/Category 6A and Class F_A/Category 7A):

- TIA/EIA-568-B.2-10
Present stage: Edition 5.0 has been circulated and comments will be implemented in October.
Expected time of publication: Winter 2007/2008.
Comments: This standard will contain both channel, permanent link, component and installation test requirements. Still significant technical challenges exist for components like connecting hardware and patch cords.
- ISO/IEC 2nd edition 11801, amendment 1.1
Present stage: The draft specification will be re-circulated to countries for approval.
Expected time of publication: Winter 2007/2008.
Comments: This standard does not contain permanent link or component requirements. Such requirements will be specified in a separate amendment 1.2 which will be discussed at the next ISO/IEC meeting in February.
- CENELEC 2nd edition EN 50173-x
Present stage: Continued work awaits maturing technical limits of TIA/EIA and ISO/IEC.
Expected time of publication: 2nd half of 2008.

The most significant 10 Gigabit Ethernet related standards for **3rd generation cable** requirements are (mainly Category 6A and Category 7A):

- TIA/EIA-568-B.2-10
Discussed under 3rd generation cabling.

- IEC 61156-5, 2nd edition (for horizontal cables) and IEC 61156-6, 2nd edition (for stranded cables).
Present stage: The drafts have been approved and will be circulated for final approval.
Expected time of publication: Summer 2007.

- CENELEC EN 50288-10-1 (horizontal cables).
Present stage: The draft has been discussed and will be circulated to countries for comments.
Expected time of publication: Summer 2008.

- IEC 60603-7-41 (for RJ 45 style unscreened connectors specified to 500 MHz) and IEC 60603-7-51 (for RJ 45 style screened connectors specified to 500 Mhz).
Present stage: The draft has been circulated to countries for comments.
Expected time of publication: Winter 2008/2009.

- IEC 61935-2 (for patch cords)
Present stage: A first draft will be circulated to countries for comments.
Expected time of publication: Winter 2008/2009.

The present overview will hopefully give an impression of the significant extent of work being done. The next 3P Newsletter will concentrate on the general outcome of the ISO/IEC meeting in September.

Yours sincerely,
3P Third Party Testing

A handwritten signature in blue ink, reading "Poul Villien".

Poul Villien