

# Power Over Ethernet Frequently asked questions

## General

<b>Q.</b>	<b>What is the status of the PoE standards?</b>
<b>A.</b>	The 4-Pair PoE standard (IEEE P802.3bt) is expected to be published in early 2018. This new standard will increase the power at the PSE (Power Source Equipment) to a minimum of 90W enabling a much broader range of devices to be remotely powered over balanced twisted pair cabling.
<b>Q.</b>	<b>Why has structured cabling become an important topic for PoE networks?</b>
<b>A.</b>	As power level increases, so does the current level. This will also increase the heat generation within a cable. As it is common practice to bundle cables from patch panels before they fan out to outlets, bundle size affects the ability for cables to dissipate heat, and the inner cables within the bundle will heat up. Channel transmission parameters such as insertion loss and DC resistance increase as a function of temperature, requiring considerations for adjusting achievable lengths. In addition, there is concern over operation of cable beyond its temperature rating.
<b>Q.</b>	<b>Will 4PPoE be able to run over installed cabling?</b>
<b>A.</b>	Yes, however the 802.3bt recommends a minimum of Class D/ Category 5e cabling as specified in ISO 11801-1 or ANSI/TIA-568-C.2 which include de-rating of insertion loss with temperature and associated reduction in channel lengths at higher temperatures
<b>Q.</b>	<b>How much power can be delivered over existing cabling?</b>
<b>A.</b>	Installed Category 5 or better cabling can support up to 60 watts ( 0.3 A nominal per conductor), when used in an ambient temperature of 50 C or lower. For higher current, users should consult with ISO TS 29125 or TIA TSB-184-A for the maximum bundle size for the particular Category to sustain the higher current per conductor. In the USA , NEC 2017 also has an ampacity table that provides maximum current per conductor for different bundle sizes.
<b>Q.</b>	<b>What about new installations? What is recommended?</b>
<b>A.</b>	The TIA TSB-184-A and ISO/IEC TS 29125 recommend the use of Category 6A cabling for 4PPoE, as it enables larger bundle sizes for given current and ambient temperature.
<b>Q.</b>	<b>How can I see if power can be delivered over cabling and to what level</b>
<b>A.</b>	Check the cable Category and the bundling configuration in which this cable is installed. With these two pieces of information, one can go to ISO TS 29125 and TIA TSB-184-A to find the maximum current that this cable can support.
<b>Q.</b>	<b>Are there any difference between UTP and shielded cabling?</b>
<b>A.</b>	While Category 7 and 7A cabling do support slightly larger bundle sizes for a given temperature rise, this is well beyond the recommended bundling limit set by the standards bodies. As such it is CommScope's recommendation that PoE performance should not be a factor when determining whether to use unshielded or shielded cabling as the performance is the same when considering practical bundle sizes.
<b>Q.</b>	<b>What are the grounding requirements for PoE?</b>
<b>A.</b>	There are no additional grounding requirements when running any of the Power over Ethernet or other remote powering applications on structured cabling. The same grounding requirements exist when running standard Ethernet applications.
<b>Q.</b>	<b>Are there requirements for the cabling components?</b>
<b>A.</b>	Yes, in addition to the structured cabling standards in TIA 568, ISO/IEC 11801 and CENELEC 50173, there are additional requirements for the connector contacts to ensure they do not corrode or fail when unplugged while under load. The applicable test standard is IEC 60512-99-001.
<b>Q.</b>	<b>Has CommScope qualified their connectors to IEC 60512-99-001?</b>
<b>A.</b>	Yes. In fact, the present standard calls for 600 mA to be applied to each contact in accordance to IEEE 802.3at PoEP requirement, which is relatively easy to pass. CommScope has carried out extensive testing on its connectors and connecting hardware using current level of 1960 mA per conductor, which is beyond the maximum level of 1920 mA per conductor specified in 802.3bt.

## PoE issues specific to USA

Q.	What is the NEC and why are they involved?
A.	The National Electrical Code (NEC), under its sub-committee NFPA 70 (National Fire Prevention Association) regulates the installation of electrical wiring and equipment in the United States. They had previously not been involved with low-voltage structured cabling networks prior to the formation of the 4-Pair PoE standardization efforts.
Q.	How is the NEC administered?
A.	Although the name implies that it is a national code in the United States, it is administered on a locally on a state by state basis or sometimes by smaller segments such as cities and municipalities. The status of NEC adoption by state through April 2017 can be found here: <a href="https://www.nema.org/Technical/FieldReps/Documents/NEC-Adoption-Map-PDF.pdf">https://www.nema.org/Technical/FieldReps/Documents/NEC-Adoption-Map-PDF.pdf</a>
Q.	What is LP cable?
A.	Limited Power or LP cable is a new designation set by the NEC for its 2017 edition of the code and is now a UL designation. It is an optional rating for cables that have been tested at various temperatures using different maximum currents per conductor. For example a LP (0.5A) cable is rated at 0.5A per conductor.
Q.	Some cabling vendors are promoting LP cables. What are the advantages of these, and are they needed?
A.	There is no advantage in using LP-rated cables and they are not required by the NEC. The only difference is that they have been tested by Underwriters Laboratories (UL) up to bundle sizes of 192 cables and the maximum current that was used will be shown on the jacket.
Q.	What are the NEC regulations saying and how will that affect installation?
A.	The latest edition of the NEC (2017 NEC) exempts communications circuits delivering less than 60 watts to communications equipment. At higher power levels, two options are specified for meeting the requirements:  <b>Option A:</b> Traditional CL3P, CL2P, CL3R, CL2R, CL3, or CL2 cables used to transmit power and data that comply with the requirements (e.g. 23 AWG 60°C rated cable can support up to 0.4 A per conductor in a 192 cable bundle). Article 840.160 additionally allows the substitution of communication cables for CL cables.  <b>Option B:</b> Cables as in Option A with a -LP appended to the listing (e.g. CL2P-LP) that have been tested at UL up to a bundle configuration of 192 cables and have the corresponding ampacity rating marked on the jacket (e.g. CL2P-LP(0.5A), 23 AWG).
Q.	The NEC guidelines and the TIA guidelines seem to differ. How do they differ and which one has priority?
A.	Table 725.144 is inconsistent with TIA TSB-184-A and based solely on a single test report without collaboration by affected standards bodies. The TIA TSB-184-A findings are a result of cooperative analysis of temperature rise versus current measurements from multiple cabling manufacturers, as well as modeling between standards organizations (IEEE/TIA/ISO/IEC) during the development of remote-powering guidelines. For example, <ul style="list-style-type: none"><li>• Table 725.144 limits cable bundle sizes to &lt;19 cables except for 22AWG (&lt;37 cables) with 0.5A per conductor</li><li>• TIA TSB-184-A allows for up to 74 cables in a bundle with 0.5A per conductor (1A per pair).</li></ul>
Q.	What is CommScope's position on the 2017 NEC around communications cabling?
A.	We believe that the 2017 NEC will add confusion and complexity to specifying generic telecommunications cabling. This, combined with the uncertainty of so-called "safety issues" and Code enforcement will adversely affect the adoption and cost of PoE deployment.  CommScope uses a holistic approach to manage PoE that includes not only ampacity control but implementation of the practical guidelines for reducing temperature rise in ISO/IEC TR 29125 and TIA TSB-184-A. These documents recommend a maximum bundle size of 24 cables that will dramatically improve thermal performance and negate the need for LP cables.

## PoE issues outside of USA

Q.	What are the relevant standards outside of US?
A.	The relevant international standard is ISO/IEC TS 29125 entitled Information technology – Telecommunications cabling requirements for remote powering of terminal equipment.
Q.	What do the electrical codes say about remote powering over communications cabling ? Are there similar restrictions like the NEC is imposing in the US?
A.	There are electrical codes being developed in IEC TC 64. However, unlike the NEC 2017 code, this draft document refers to ISO TS 29125 and ISO 14763-2 for installation guidelines so it is more closely aligned with the cabling industry standards.

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