

Power Over Ethernet

by Dick Johnson and Ed Lethert, PLT Services

What does the 2017 NEC have to do with PoE ++? That is a very good question...and an important one for technology workers.

In the past, when power was run over the same cable as data or voice communication, we simply ignored the power issue and classified it as a "communications" cable. The Electrical code states that "a Class 2 and class 3 circuit (including power) may be classified as communication circuit and carried by [listed] communications cable and classified as a communication circuit (800.133).

So why is that? If we go back to when this was first an issue, what kind of power did we carry on or apply to communications cable? We began with low level direct current and current-limited ring voltage for the land-line telephone. Moving forward, we use PoE for camera's, clocks, modems, Wireless access points, and more. PoE started at 15 watts and PoE Plus was limited to 40 watts of power; and that did not create any issues. The next progression in the technology was to go with more power and PoE Plus increased to 60 watts. PoE+ still was of little concern to NFPA and by extension UL as not much heat is created no issues have been reported or found in any testing that this author has found.

Now another change has upped the ante as we see the addition of PoE++ (see NEC 840.160). The power limitation is 100 watts over all 8 conductors. The new definition for this is "Communications over class 2 or Class 3 Power;" just the opposite of what we had before. The concern here is heat buildup when cables are bundled in large numbers. Berk-Tek and UL (and likely others) have performed testing and found that larger bundles of cable, when combed to a perfect looking neat package, have limited ability to dissipate heat, especially from the interior of the bundle. The obvious move was to take this out of article 840 of the code, Premise-Powered Broadband, and move it to Article 725, (NEC 725.144) where communications cables are used in lieu of class 2 and Class 3 cables. This change requires us to consider raceway fill ratios, heat properties in our cables, and bundling practices. Some cable marking will change, as cable used for these applications will have to be marked as "-LP" along with the ampacity listing for each conductor. That limits the power that may be applied from the source and stay within the listing of the cable and connectors. There is a lot to learn here and those involved in this work will have to be on their game. There is little doubt that inspectors will be paying closer attention to low voltage cabling.

I hope this helps the reader to better understand two things: 1) It is important to stay up to date with code changes, and 2) taking continuing education is not just to keep a chair warm.