NFPA70 and PoE

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Summary

- NFPA 70 Second Revision Document has passed the codemaking panels and correlating committee stages and is ready for the NFPA Technical Meeting
  - SR611 adds Art. 725.144 with ampacity tables for cabling
  - SR4564 adds Art. 840.160 with 60W exclusion and reference to tables in 725.144 for > 60W to communications equipment
- Pre-submitted motions to amend (called “NITMAM”s when submitted, then later Certified Amending Motions or “CAM”’s) may be taken at the NFPA meeting (6/16/16)
  - No motions or amendments are taken from the floor
  - Only members of NFPA since ~ December 18, 2015 may vote
- This presentation reviews the changes proposed & NITMAMs relevant to PoE and meeting details

NITMAMs/CAMs Posted

Motion Seq #	NITMAM Log #	Panel #	Section/Para	Person(s) Authorized to Make the Motion	Certified Amending Motion**	Motion Page #
70-39	79	3	725.144	Jeff Silveira, BICSI	Reject Second Revision No. 611, Including any Related Portions of First Revisions and First Correlating Revisions	74
70-40	84	3	725.179	Jeff Silveira, BICSI	Reject an Identifiable Part of Second Revision No. 615	77
[redacted]						
70-42	76	16	840.160	Joel Goergen, Cisco Systems, Inc.	Accept an identifiable part of Public Comment No. 1262	79
70-43	105 85	16	Part VI., 840.160	Jeff Silveira, BICSI; Tony Obrien, Cisco Systems	**Multiple Notices for a Single Motion:** Reject Second Revision No. 4564, including any related First Revision No. 4643	80

- NITMAMs 79, 84– reject 725.144 ampacity table in its entirety and related LP cabling text
- NITMAMs 85 (BICSI) and 105 reject 840.160 communications equipment text referring to 725.144 in its entirety
- NITMAM 76 amends 840.160 to correct defects

725.144 as Proposed (1 of 2)

NITMAM 79 (BICSI), rejects SR611 to add 725.144 including ampacity limits

725.144 Transmission of Power and Data.
The requirements of 725.144(A) and (B) shall apply to Class 2 and Class 3 circuits that transmit power and data to a powered device. The requirements of Parts I and III of Article 725 and 300.11 shall apply to Class 2 and Class 3 circuits that transmit power and data. The conductors that carry power for the data circuits shall be copper. The current in the power circuit shall not exceed the current limitation of the connectors.
Informational No. 1: One example of the use of cables that transmit power and data is the connection of closed-circuit TV cameras (CCTV).
Informational Note No. 2: The 8P8C connector is in widespread use with powered communications systems. These connectors are typically rated at 1.3 amperes maximum.
Table 725.144 Ampacities of Each Conductor in Amperes in 4-Pair Class 2 or Class 3 Data Cables Based on Copper Conductors at an Ambient Temperature of 30°C (86° F) with all All Conductors in All Cables Carrying Current, 60°C (140°F), 75°C (167°F), and 90°C (194°F) Rated Cables

AWG	Number of 4-Pair Cables in a Bundle																				
	1			2–7			8–19			20–37			38–61			62–91			92–192		
	Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating			Temperature Rating		
	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C	60°C	75°C	90°C
26	1	1	1	1	1	1	0.7	0.8	1	0.5	0.6	0.7	0.4	0.5	0.6	0.4	0.5	0.6	NA	NA	NA
24	2	2	2	1	1.4	1.6	0.8	1	1.1	0.6	0.7	0.9	0.5	0.6	0.7	0.4	0.5	0.6	0.3	0.4	0.5
23	2.5	2.5	2.5	1.2	1.5	1.7	0.8	1.1	1.2	0.6	0.8	0.9	0.5	0.7	0.8	0.5	0.7	0.8	0.4	0.5	0.6
22	3	3	3	1.4	1.8	2.1	1	1.2	1.4	0.7	0.9	1.1	0.6	0.8	0.9	0.6	0.8	0.9	0.5	0.6	0.7

Note 1: For bundle sizes over 192 cables, or for conductor sizes smaller than 26 AWG, ampacities shall be permitted to be determined by qualified personnel under engineering supervision.
Note 2: Where only half of the conductors in each cable are carrying current, the values in the table shall be permitted to be increased by a factor of 1.4.
Informational Note: The conductor sizes in data cables in wide-spread use are typically 22–26 AWG.
(A) Use of Class 2 or Class 3 Cables to Transmit Power and Data.
(1) Where Types CL3P, CL2P, CL3R, CL2R, CL3, or CL2 transmit power and data, the following shall apply, as applicable:
The ampacity ratings in Table 725.144 shall apply at an ambient temperature of 30°C (86°F).
(2) For ambient temperatures above 30°C (86°F), the correction factors of 310.15(B)(2) shall apply.
Informational Note: One example of the use of Class 2 cables is a network of closed- circuit TV cameras using 24 AWG, 60°C rated, Type CL2R, Category 5e local area network (LAN) cables.
(B) Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.

725.144 as Proposed (2 of 2)

Types CL3P-LP, CL2P-LP, CL3R-LP, CL2R-LP, CL3-LP, or CL2-LP shall be permitted to supply power to equipment at a current level up to the marked ampere limit located immediately following the suffix LP and shall be permitted to transmit data to the equipment. The Class 2-LP and Class 3-LP cables shall comply with the following, as applicable:

Informational Note 1: The "(xxA)" following the suffix -LP indicates the ampacity of each conductor in a cable.

Informational Note 2: An example of a limited power (LP) cable is a cable marked Type CL2-LP(0.5A), 23 AWG. A Type CL2-LP(0.5), 23 AWG could be used in any location where a Type CL2 could be used; however, the LP cable would be suitable for carrying up to 0.5 A per conductor, regardless of the number of cables in a bundle. If used in a 7-cable bundle, the same cable could carry up to 1.2 amperes per conductor.

(1) Cables with the suffix "-LP" shall be permitted to be installed in bundles, raceways, cable trays, communications raceways, and cable routing assemblies.

(2) Cables with the suffix "-LP" and a marked ampere level shall follow the substitution hierarchy of Table 725.154 and Figure 725.154(A) for the cable type without the suffix "LP" and without the marked ampere level.

(3) System design shall be permitted by qualified persons under engineering supervision.

Additionally, NITMAM 84 (BICSI), rejects change to add LP cabling listing and marking, which is related to 725.144

725.179 Listing and Marking of Class 2, Class 3, and Type PLTC Cables….

(I) Limited Power (LP) Cables.

Limited power (LP) cables shall be listed as suitable for carrying power and data circuits up to a specified current limit for each conductor without exceeding the temperature rating of the cable where the cable is installed in cable bundles in free air or installed within a raceway, cable tray, or cable routing assembly. The cables shall be marked with the suffix "-LP" with the ampere limit located immediately following the suffix LP, where the current limit is in amperes per conductor.

Informational Note: The ampere limit located immediately following the suffix LP is the ampacity of each conductor in a cable. For example, 1 ampere Class 2 limited-power cables would be marked CL2-LP (1.0A), CL2R-LP (1.0A), or CL2-LP (1.0A).

840.160 as Proposed

NITMAMs 85 (BICSI) and 105 (Tony O'Brien), reject SR 4564 to add 840.160

Part VI. Premises Powering of Communications Equipment over Communications Cables
840.160 Powering Circuits.
Communications cables, in addition to carrying the communications circuit, shall also be permitted to carry circuits for powering communications equipment. Where the power supplied over a communications cable to communications equipment is greater than 60 watts, communication cables and the power circuit shall comply with 725.144 where communications cables are used in place of Class 2 and Class 3 cables.

NITMAM 76 (Joel Goergen), accepts parts of comment 1262 to amend 840.160

Recommended Text if Motion Passes:

840.160 Powering Circuits.
Communications cables, in addition to carrying the communications circuit, shall also be permitted to carry circuits for powering communications equipment. Where the power supplied over a communications cable to communications equipment is greater than ~~60 watts~~ 0.5A per conductor or greater than 100 watts, communication cables and the power circuit shall comply with 725.144 where communications cables are used in place of Class 2 and Class 3 cables.

Cables and Equipment Marking Supplying Premises Power and Communications. Powering circuits supplying more than 0.5A per conductor or greater than 100 watts per cable must be clearly labeled on the equipment face plate in maximum watts per port.

NITMAM 76

Panel 16 NFPA 70, *National Electrical Code* **A2016**
Motion Seq # 70-42: Joel Goergen, Cisco Systems, Inc.

Motion Seq#	**Certified Amending Motion:** Accept an Identifiable Part of Public Comment No. 1262
70-42	**Recommended Text if Motion Passes:** 840.160 Powering Circuits. Communications cables, in addition to carrying the communications circuit, shall also be permitted to carry circuits for powering communications equipment. Where the power supplied over a communications cable to communications equipment is greater than ~~60 watts~~ 0.5A per conductor or greater than 100 watts, communication cables and the power circuit shall comply with 725.144 where communications cables are used in place of Class 2 and Class 3 cables. Cables and Equipment Marking Supplying Premises Power and Communications. Powering circuits supplying more than 0.5A per conductor or greater than 100 watts per cable must be clearly labeled on the equipment face plate in maximum watts per port.
	Recommended Text if Motion Fails: 840.160 Powering Circuits. Communications cables, in addition to carrying the communications circuit, shall also be permitted to carry circuits for powering communications equipment. Where the power supplied over a communications cable to communications equipment is greater than 60 watts, communication cables and the power circuit shall comply with 725.144 where communications cables are used in place of Class 2 and Class 3 cables.

Amends 840.160 to correct for missing amperage limit and be consistent:

Change from: ≤ 60W w/ no clear current limit

To: ≤ 0.5A/conductor and ≤ 100W

Details of NFPA Meeting

- Where: Las Vegas, NV
  - Mandalay Bay Convention Center
- When: June 13-16, 2016
  - Tuesday June 14: Electrical Section meeting
  - Thursday June 16: Technical Meeting
- To register or for more information see:
  - http://www.nfpa.org/training/conferences/conference

Straw Poll #2 (Pick One)

- I would support NITMAMs: 31
  - NITMAMs to delete changes
    - 79 (Ampacity table 725.144)
    - 84 (LP Cabling text)
    - 85/105 (Communications Equipment)
  - NITMAM to amend change to communications equipment (76)
- I would oppose all of the above and support the proposed changes (pick no others): 1
- I abstain (pick no others): 3

Straw Poll #3 (vote for one)

- If the proposed second revisions stay as they are, I would consider removing Class 7 and Class 8 from IEEE P802.3bt

- Y: 5
- N: 14
- Don’t know: 14