# Public Input No. 1021-NFPA 70-2017 [ Definition: Class 3 Circuit. ]

**Class 3 Circuit.**

The portion of the wiring system between the load side of a Class 3 power source and the connected equipment. Due to its power limitations, a Class 3 circuit considers safety from a fire initiation standpoint. Since higher levels of voltage and current than for Class 2 are permitted, additional safeguards are specified to provide protection from an electric shock hazard that could be encountered.

Insert the following new definition and Informational Note.

**Nominal Current.** The designated current per conductor as specified by equipment design.

Informational Note. One example of nominal current is 4-pair Power over Ethernet (PoE) applications based on IEEE Std. 802.3--2015, *IEEE Standard for Ethernet* , that supplies current over 2 or 4 twisted pairs. The nominal current for 60 watt PoE power sourcing equipment is 0.3 amperes per conductor, where the current in one conductor can be 0.36 amperes and another conductor can be 0.24 amperes.

## Statement of Problem and Substantiation for Public Input

The new definition, “Nominal Current” is necessary to account for deviations in conductor current due to circuit imbalances and is used in proposed revisions to Sections 725.121(C), 725.144(A) and (B), 725.170 and the exception to Section 840.160. These deviations are found in commonly deployed systems. The new definition is necessary to avoid adverse impact on these systems. Panel 16’s existing text for 840.160 attempted to provide an exception for systems at 0.3 amperes or less, for which there are no demonstrated safety concerns. However, the text in 840.160 inadvertently used only the power and not current to provide an exception, an issue corrected in a companion input. The use of maximum current in 725.144 and the lack of any current level below which there is an exception is inconsistent with the treatment of existing low-power devices in 840.160. The concept of nominal current to account for imbalance and the exception for less than or equal to 0.3 amperes nominal current is applied to 725.144 as well. The Informational Note further clarifies the term “Nominal Current” by providing an example of a common powering arrangement and identifies permissible current imbalances per industry-accepted standards.

support

The NEC Correlating Committee, at the direction of the NFPA Standards Council, formed the Power over Ethernet Task Group (PoE Task Group) to address issues regarding the provision of power over Ethernet and communications conductors. Members of the PoE Task Group, including members of NEC Panel 3, NEC Panel 16, and the NEC Correlating Committee, are as follows: E. Gallo – Chair, M. A. Cardona, W. J. McCoy, R. Kusuma, R. Emplit, R. Foster, S. Kaufman, M. Shariff, A. Tassone, J. Kacperski, R. Ivans, T. Pope, T. C. Coleman, J. Brunssen, J. Goergen, G. A. Zimmerman, L. Ayer, P. Vanderlaan, C. Bullock, C. Jones, and M. Ode. The PoE Task Group prepared this TIA. In accordance with the Standards Council’s instructions, the task group was broad based and specifically included representation of those with knowledge and experience in telecommunications and Ethernet communications.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 1019-NFPA 70-2017 [Definition: Network Terminal.] | |
| Public Input No. 1020-NFPA 70-2017 [Section No. 840.160] | |
| Public Input No. 1022-NFPA 70-2017 [Section No. 725.121(C)] | |
| Public Input No. 1023-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |
| Public Input No. 1024-NFPA 70-2017 [Section No. 725.144(A)] | |
| Public Input No. 1025-NFPA 70-2017 [Section No. 725.144(B)] | |
| Public Input No. 1026-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |
| Public Input No. 1028-NFPA 70-2017 [Section No. 725.170] | |

## Submitter Information Verification

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## Public Input No. 3992-NFPA 70-2017 [ Section No. 725.121(A) ]

**(A)** Power Source.

The power source for a Class 2 or a Class 3 circuit shall be as specified in 725.121(A)(1), (A)(2), (A)(3), (A)(4), or (A)(5):

Informational Note No. 1: Informational Note Figure 725.121, No. 1 illustrates the relationships between Class 2 or Class 3 power sources, their supply, and the Class 2 or Class 3 circuits.

Informational Note No. 2: Table 11(A) and Table 11(B) in Chapter 9 provide the requirements for listed Class 2 and Class 3 power sources.

The direct-current limits in Table 11(B) in chapter 9 apply to continuous DC as well as DC that is delivered in pulses, bursts, packets, or other intermittent method. If non-continuous, the effective maximum values of current and power that power source can deliver shall be used to determine conformance with Table 11(B) in chapter 9.

(1) A listed Class 2 or Class 3 transformer

(2) A listed Class 2 or Class 3 power supply

(3) Other listed equipment marked to identify the Class 2 or Class 3 power source

*Exception No. 1 to (3): Thermocouples shall not require listing as a Class 2 power source.*

*Exception No. 2 to (3): Limited power circuits of listed equipment where these circuits have energy levels rated at or below the limits established in Chapter 9, Table 11(A) and Table 11(B).*

Informational Note: Examples of other listed equipment are as follows:

(1) A circuit card listed for use as a Class 2 or Class 3 power source where used as part of a listed assembly

(2) A current-limiting impedance, listed for the purpose, or part of a listed product, used in conjunction with a non–power-limited transformer or a stored energy source, for example, storage battery, to limit the output current

(3) A thermocouple

(4) Limited voltage/current or limited impedance secondary communications circuits of listed industrial control equipment

(4) Listed audio/video information technology (computer), communications, and industrial equipment limited-power circuits.

Informational Note: One way to determine applicable requirements for listing of information technology (computer) equipment is to refer to UL 60950-1-2011, *Standard for Safety of Information Technology Equipment* . Another way to determine applicable requirements for listing of audio/video, information and communication technology equipment is to refer to UL 62368-1-2014, *Safety of audio/video, information and communication technology equipment* . Typically such circuits are used to interconnect data circuits for the purpose of exchanging information data. One way to determine applicable requirements for listing of industrial equipment is to refer to UL 61010-2-201, *Safety requirements for electrical equipment for measurement, control, and laboratory use –Part 2-201: Particular requirements for control equipment* , and/or UL 61800-5-1, *Adjustable speed electrical power drive systems –Part 5-1: Safety requirements –Electrical, thermal and energy.*

(5) A dry cell battery shall be considered an inherently limited Class 2 power source, provided the voltage is 30 volts or less and the capacity is equal to or less than that available from series connected No. 6 carbon zinc cells.

### Statement of Problem and Substantiation for Public Input

This proposal clarifies that the values in Table 11(B) in section 9 apply to these types of circuits even if the direct-current is not continuous.

This is an important clarification as some newer technologies claim that bursts, pulses or groupings (packets) of DC energy are not applicable to the values in Table 11(B).

The "effective" power or current can then become well beyond the intended limits if the duty cycle is high. It has been reported that as much as 1200 effective watts and 3-4 effective amps are being delivered over LAN cables or other Class 2. Class 3, and Communications cables to power building lighting and appliances, which is well beyond the 100 watt limit, and the current 1.3 amp safety standard limits normally applied to telecommunications, ITE, PoE, and other communications circuits.

mentions PoE but is aimed at Voltserver type installs

This proposal simply clarifies that the limits for these circuits apply to continuous DC as well as the effective DC that can be delivered in bursts or pulses.

A similar proposal is being submitted for 840.170 (G)

## Submitter Information Verification

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## Public Input No. 1022-NFPA 70-2017 [ Section No. 725.121(C) ]

this was a TIA.

**(C)** Marking.

The power sources for limited power circuits in 725.121(A)(3) and limited power circuits for listed audio/video, information ~~technology (equipment)~~ , and communications technology equipment, and listed industrial equipment in 725.121(A)(4) shall have a label indicating the maximum voltage and maximum current or maximum voltage and nomnal current output for each connection point. Where multiple connection points have the same rating, a single label shall be permitted to be used. The effective date shall be January 1, 2018.

*Exeption: Marking shall not be required for power souces providing 0.3 amperes nominal current or less per conductor.*

## Statement of Problem and Substantiation for Public Input

There are several proposed revisions to Article 725 to accommodate circuits that transmit power and data to a powered device. The proposed revisions to Section 725.121(C) include identification of communications equipment as an appropriate component of remote powering technology, identification of the necessary labeling (marking) to help ensure that proper current limits are observed and, with the term “nominal current”, alerting the NEC user that current may vary (within acceptable limits) because of circuit imbalances. The proposed exception excepts circuits operating at 0.3 amperes or less from the labeling (marking) requirement in keeping with the conclusions of the UL Fact Finding Report on Power over Local Area Network Type Cables (4-Pair Data/Communications Cables) dated September 25, 2015 ( http://www.plasticsindustry.org/sites/plastics.dev/files/SPI%20Fact%20Finding%20Report%20%28Issued%202015-09-25%29%2BErrata%201%C2%A9UL%26SPI.pdf ). The existing text of 725.121(c) requires additional labeling of all power sources by January 2018, even though nearly half a billion ports of these power sources have shipped over the past 15 years without any demonstrated record of loss, and they provide less than 0.3 amperes nominal current per conductor – a level that the aligns with the results of the UL Fact Finding Report on Power over Local Area Network Type Cables (4-Pair Data / Communications Cables), dated September 25, 2015, and the proposed code agrees is safe. Updating the large variety, breadth and number of these types of power sources represents an undue burden on industry. Changing the labeling to align with the ‘nominal current’ specification of the other changes removes this burden.

The text as written would require a label per connection point. However, the changes applied to 725.121(C) in the 2017 NEC code cycle were intended to apply to high-density multi-port power sources, such as Power over Ethernet switches. These have many connection points of the same rating in a small front panel space, making a label per connection point impractical. The proposed change inserts text (which was omitted in the 2017 NEC) to specifically permit a single label in the case where multiple connection points have the same voltage and current outputs.

Additionally, the proposed revision makes an editorial revision to align with the title of the relevant UL document, (UL 62368-1-2014, Safety of audio/video, information and communication technology equipment).

support

The NEC Correlating Committee, at the direction of the NFPA Standards Council, formed the Power over Ethernet Task Group (PoE Task Group) to address issues regarding the provision of power over Ethernet and communications conductors. Members of the PoE Task Group, including members of NEC Panel 3, NEC Panel 16, and the NEC Correlating Committee, are as follows: E. Gallo – Chair, M. A. Cardona, W. J. McCoy, R. Kusuma, R. Emplit, R. Foster, S. Kaufman, M. Shariff, A. Tassone, G. Kacperski, R. Ivans, T. Pope, T. C. Coleman, J. Brunssen, J. Goergen, G. A. Zimmerman, L. Ayer, P. Vanderlaan,, C. Bullock,, C. Jones,and M. Ode,. The PoE Task Group prepared this Public Input. In accordance with the Standards Council’s instructions, the task group was broad based and specifically included representation of those with knowledge and experience in telecommunications and Ethernet communications.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 1019-NFPA 70-2017 [Definition: Network Terminal.] | |
| Public Input No. 1020-NFPA 70-2017 [Section No. 840.160] | |
| Public Input No. 1021-NFPA 70-2017 [Definition: Class 3 Circuit.] | |

Public Input No. 1023-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]]

Public Input No. 1024-NFPA 70-2017 [Section No. 725.144(A)]

Public Input No. 1025-NFPA 70-2017 [Section No. 725.144(B)]

Public Input No. 1026-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]]

Public Input No. 1028-NFPA 70-2017 [Section No. 725.170]

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# Public Input No. 3659-NFPA 70-2017 [ Section No. 725.121(C) ]

would support the change if it said nominal current.

**(C)** Marking.

The power sources for limited power circuits in 725.121(A)(3) and limited power circuits for listed audio/video information technology (equipment) and listed industrial equipment in 725.121(A)(4) shall have a label indicating the maximum voltage and current output per conductor for each connection point. The effective date shall be January 1, 2018.

## Statement of Problem and Substantiation for Public Input

The only way current output is useful to the AHJ is to have it expressed in a value per conductor. Table 725.144 is where this is most important and simply knowing a total current per interface (1 to 8 conductors) for instance in a PoE interface is not going to help the AHJ or the installer. They need the current per conductor.

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# Public Input No. 3664-NFPA 70-2017 [ Section No. 725.121(C) ]

wrong, this section is about the power source and only the power source. the change is unnecessary but the commenter is correct that the labelling is only on the equipment

**(C)** Marking.

The power sources for limited power circuits in 725.121(A)(3) and limited power circuits for listed audio/video information technology (equipment) and listed industrial equipment in 725.121(A)(4) shall have a label indicating the maximum voltage and nominal current output for each power source connection point on the equipment . The effective date shall be January 1, 2018.

## Statement of Problem and Substantiation for Public Input

Substantiation:
1.) Clarify that the current is the nominal current
2.) The marking requirement in 725.121 (C) that is supposed to go into effect Jan 1, 2018 has been causing a lot of consternation in the industry regarding what it means and where markings are required. As written it seems that EVERY appearance in the network of the power source output would have to be marked with voltage and current. In a typical PoE or communications network there are multiple jacks / jack panels, splices, inline protectors, etc. The output side of each of these is considered an output. As written you may need to have every appearance of these in a building or installation marked with current and output which is nearly impossible or totally unfeasible. Apparently this was not the intent so this clarification is to just ensure the voltage and current are on the output of the source equipment, which is believed to be the intent.
3.) The implementation date should also be removed as it will be past when the 2020 code is released. But when I tried to delete it, this editor corrupted the section, so I did not show the deletion.

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## Public Input No. 71-NFPA 70-2017 [ Section No. 725.139(D)(1) ]

**(1)** ~~Classified as~~ In Communications ~~Circuits~~ Cables .

Class 2 and Class 3 circuit conductors shall be permitted in the same listed communications cable with communications circuits~~, in which case the Class 2 and Class 3 circuits shall be classified as communications circuits and shall be installed in accordance with the requirements of Article 800~~ . ~~The cables shall be listed as communications cables.~~

## Statement of Problem and Substantiation for Public Input

new requirement that cable be listed? force LP?
Recommend REJECT.

Requirements in the 2017 NEC
Section 725.139(D) in the 2017 NEC states:
(D) Class 2 and Class 3 Circuits with Communications Circuits.

(1) Classified as Communications Circuits. Class 2 and Class 3 circuit conductors shall be permitted in the same cable with communications circuits, in which case the Class 2 and Class 3 circuits shall be classified as communications circuits and shall be installed in accordance with the requirements of Article 800. The cables shall be listed as communications cables.

(2) Composite Cables. Cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall be permitted to be classified as communications cables. The fire resistance rating of the composite cable shall be determined by the performance of the composite cable.

Section 800.133(A)(1)(b) in the 2017 NEC correlates with 725.139(D). It states:

(b) Class 2 and Class 3 Circuits. Class 1 circuits shall not be run in the same cable with communications circuits. Class 2 and Class 3 circuit conductors shall be permitted in the same cable with communications circuits, in which case the Class 2 and Class 3 circuits shall be classified as communications circuits and shall meet the requirements of this article. The cables shall be listed as communications cables.

Exception: Cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall not be required to be classified as communications cable. The fire-resistance rating of the composite cable shall be determined by the performance of the composite cable.

Section 840.160 in the 2017 NEC states:

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.

The introductory paragraph of section 725.144 in the 2017 NEC states:

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.

Inconsistencies in the 2017 NEC requirements

The 2017 NEC has some inconsistencies that need to be addressed. Article 725 and Article 800 permit Class 2 circuit conductors to be run in the same cable with communications circuit conductors provided that the Class 2 circuits are classified as communications circuits. Article 840 permits listed communications cables to carry communications circuits and powering circuits for communications equipment. If the power level is over 60 watts, Article 840 requires the power circuit to comply with 725.144 and also requires that a listed communications cable be used in place of a Class 2 or Class 3 cables.

There is a conflict between Article 840 which requires the powering circuit to comply with Article 725, to remain for example, a Class 2 circuit (if over 60 watts) and Articles 725 and 800 which require reclassification of the Class 2 circuit to a communications circuit.

Another issue that needs to be addressed is that while Articles 725 and 800 require reclassification of the Class 2 Class 3 circuits to communications circuits, there is no mention of the equipment. Once the Class2 or Class 3 circuit is reclassified to a communications circuit is it required to use listed communications equipment instead of Class 2 or Class 3equipment. That's obviously absurd, since the Class 2 or Class 3 equipment is already installed.

The solution to this conundrum is to revise Articles 725 and 800 to require the use of communications cables when Class 2 or Class 3 cables are run in the same cable with communications circuits instead of requiring reclassification of the circuit, as shown below:

Article 725

725.139(D) Class 2 and Class 3 Circuits with Communications Circuits.

(1) In Communications Cables. Class 2 and Class 3 circuit conductors shall be permitted in the same cable with communications circuits in a listed communications cable.

(2) Composite Cables. Cables constructed of individually listed Class 2, Class 3, and communications cables under a common jacket shall be permitted to be classified as communications cables. The fire resistance rating of the composite cable shall be determined by the performance of the composite cable.

Article 800

800.133(A)(1)(b) Class 2 and Class 3 Circuits. Class 1 circuits shall not be run in the same cable with communications circuits. Class 2 and Class 3 circuit conductors shall be permitted in the same listed communications cable with communications circuits.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 72-NFPA 70-2017 [Section No. 800.133(A)(1)] | Correlating section in Article 800 |

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## Public Input No. 1012-NFPA 70-2017 [ Section No. 725.144 [Excluding any Sub-Sections] ]

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 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 | | |
| | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperatu 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 | 7 |
| 26 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.7 | 0.8 | 1.0 | 0.5 | 0.6 | 0.7 | 0.4 | 0.5 | 0.6 | 0.4 | 0.5 | 0 |
| 24 | 2.0 | 2.0 | 2.0 | 1.0 | 1.4 | 1.6 | 0.8 | 1.0 | 1.1 | 0.6 | 0.7 | 0.9 | 0.5 | 0.6 | 0.7 | 0.4 | 0.5 | 0 |
| 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 |
| 22 | 3.0 | 3.0 | 3.0 | 1.4 | 1.8 | 2.1 | 1.0 | 1.2 | 1.4 | 0.7 | 0.9 | 1.1 | 0.6 | 0.8 | 0.9 | 0.6 | 0.8 | 0 |

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.

### Statement of Problem and Substantiation for Public Input

All the ampacities in the table are expressed to one tenth of an ampere except for the ampacities of 1,2 and 3 amperes. An ampacity of 1 ampere could be interpreted to be 1.4 amperes. The ampacities 1, 2 and 3 need to be revised to 1.0, 2.0 and 3.0 to avoid incorrectly interpreting these numbers.

would accept and introduce a rule of rounding for this table. (+/-.5)
OR
would agree if we extend all the numbers and extend the precision (take the precision out to the second decimal place i.e. 10s of mA and truncate, use the numbers from the SPI FFR).

### Submitter Information Verification

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**Affilliation:** PLASTICS Industry Association (formerly SPI)
**Street Address:**
**City:**
**State:**
**Zip:**
**Submittal Date:** Sat Jun 10 13:15:29 EDT 2017

**Copyright Assignment**

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## Public Input No. 1023-NFPA 70-2017 [ Section No. 725.144 [Excluding any Sub-Sections] ]

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.~~ IEC 60603-7 specifies these connectors to have a current carrying capacity per contact of 1.0 amperes maximum at 60 C (149 F). See IEC 60603-7, *Connectors for electronic equipment - Part 7: Detail specification for 8-way, unshielded, free and fixed connectors* , for more information on current carrying capacity at higher and lower temperatures.

Informational Note No. 3: The requirements of Table 725.144 were derived for carrying power and data over 4-pair copper balanced twisted-pair cabling. This type of cabling is described in ANSI/TIA 568-C,2-2009, *Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling and Components Standard.*

Informational Note No. 4: See TIA-TSB-184-A, *Gudelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling* , for information on installation and management of balanced twisted-pair cabling supporting power delivery.

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 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 |
| | 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 |
| 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 |
| 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 |
| 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 |
| 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 |

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.

### Statement of Problem and Substantiation for Public Input

Informational Note No. 2 was included in NEC 2017 to inform the NEC user of the maximum current rating of commonly used connectors. The proposed change updates the current rating and provides temperature limitations, as well as reference standards, associated with the 8P8C connector widely used in telecommunications and data applications. Informational Note No. 3 and No. 4 are added to identify the specificity of Table 725.144 and to provide the appropriate reference standards that address the cables covered in the Table. Table 725.144 is based on evaluation of the specific 4-pair cabling described in ANSI/TIA-568C.2-2009, and not just any cabling with 4 pairs. The new informational notes

3 and 4 provide the reader with references describing the type of cabling referred to by Table 725.144 as well as practices for installation and management of balanced twisted-pair cabling supporting power delivery.

support

The NEC Correlating Committee, at the direction of the NFPA Standards Council, formed the Power over Ethernet Task Group (PoE Task Group) to address issues regarding the provision of power over Ethernet and communications conductors. Members of the PoE Task Group, including members of NEC Panel 3, NEC Panel 16, and the NEC Correlating Committee, are as follows: E. Gallo – Chair, M. A. Cardona, W. J. McCoy, R. Kusuma, R. Emplit, R. Foster, S. Kaufman, M. Shariff, A. Tassone, G. Kacperski, R. Ivans, T. Pope, T. C. Coleman, J. Brunssen, J. Goergen, G. A. Zimmerman, L. Ayer, P. Vanderlaan,, C. Bullock,, C. Jones,and M. Ode,. The PoE Task Group prepared this Public Input. In accordance with the Standards Council's instructions, the task group was broad based and specifically included representation of those with knowledge and experience in telecommunications and Ethernet communications.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 1019-NFPA 70-2017 [Definition: Network Terminal.] | |
| Public Input No. 1020-NFPA 70-2017 [Section No. 840.160] | |
| Public Input No. 1021-NFPA 70-2017 [Definition: Class 3 Circuit.] | |
| Public Input No. 1022-NFPA 70-2017 [Section No. 725.121(C)] | |
| Public Input No. 1024-NFPA 70-2017 [Section No. 725.144(A)] | |
| Public Input No. 1025-NFPA 70-2017 [Section No. 725.144(B)] | |
| Public Input No. 1026-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |
| Public Input No. 1028-NFPA 70-2017 [Section No. 725.170] | |

## Submitter Information Verification

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## Public Input No. 1026-NFPA 70-2017 [ Section No. 725.144 [Excluding any Sub-Sections] ]

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~~ Class 3 Balanced Twisted-Pair Cables Based on Copper Conductors at an Ambient Temperature of 30°C (86°F) with 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 | | |
| 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 | | | | | |
| 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 | | | | | |
| 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 | | | | | |
| 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 | | | | | |

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.~~ No. 1: Elevated cable temperatures can reduce a cable's data transmission performance. For information on practices for 4-pair balanced twisted-pair cabling see TIA-TSB-184-A and sections 6.4.7, 6.6.3 and Annex G of ANSI/TIA-568-C.2, which provide guidance on adjustments for operating temperatures between 20 C and 60 C.

Informational Note No.2: The per-contact current rating of conductors can limit the maximum allowable current below the ampacty shown in Table 725.144.

## Statement of Problem and Substantiation for Public Input

Title is changed to replace NEC undefined term “data cables” with language consistent with relevant industry standards (e.g., ANSI/TIA-568-C.2-2009) and consistent with language in other proposed inputs for this section.
The existing Informational Note is deleted as this information is inconsistent with current standardized practices. Additionally, the user of the code is advised that the elevated temperatures envisioned by Table 725.144 can adversely impact the data transmission performance of cables. The proposed new Informational Notes identify this potentially adverse condition, direct the NEC user to the appropriate industry standards for additional information, and alert the NEC user to the possible current limits that might need to be considered because of connector current rating limitations.

Title is changed to replace NEC undefined term “data cables” with language consistent with relevant industry standards (e.g., ANSI/TIA-568-C.2-2009) and consistent with language in other proposed inputs for this section.

The existing Informational Note is deleted as this information is inconsistent with current standardized practices.

Additionally, the user of the code is advised that the elevated temperatures envisioned by Table 725.144 can adversely impact the data transmission performance of cables. The proposed new Informational Notes identify this potentially adverse condition, direct the NEC user to the appropriate industry standards for additional information, and alert the NEC user to the possible current limits that might need to be considered because of connector current rating limitations.

support

The NEC Correlating Committee, at the direction of the NFPA Standards Council, formed the Power over Ethernet Task Group (PoE Task Group) to address issues regarding the provision of power over Ethernet and communications conductors. Members of the PoE Task Group, including members of NEC Panel 3, NEC Panel 16, and the NEC Correlating Committee, are as follows: E. Gallo – Chair, M. A. Cardona, W. J. McCoy, R. Kusuma, R. Emplit, R. Foster, S. Kaufman, M. Shariff, A. Tassone, G. Kacperski, R. Ivans, T. Pope, T. C. Coleman, J. Brunssen, J. Goergen, G. A. Zimmerman, L. Ayer, P. Vanderlaan,, C. Bullock,, C. Jones,and M. Ode,. The PoE Task Group prepared this Public Input. In accordance with the Standards Council's instructions, the task group was broad based and specifically included representation of those with knowledge and experience in telecommunications and Ethernet communications.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 1019-NFPA 70-2017 [Definition: Network Terminal.] | |
| Public Input No. 1020-NFPA 70-2017 [Section No. 840.160] | |
| Public Input No. 1021-NFPA 70-2017 [Definition: Class 3 Circuit.] | |
| Public Input No. 1022-NFPA 70-2017 [Section No. 725.121(C)] | |
| Public Input No. 1023-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |
| Public Input No. 1024-NFPA 70-2017 [Section No. 725.144(A)] | |
| Public Input No. 1025-NFPA 70-2017 [Section No. 725.144(B)] | |
| Public Input No. 1028-NFPA 70-2017 [Section No. 725.170] | |

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## Public Input No. 1864-NFPA 70-2017 [ Section No. 725.144 [Excluding any Sub-Sections] ]

this is OBE by 1026, if 1026 is accepted. otherwise, we support.

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.

Informational Note 3: See ANSI/TIA-568.0-D-2015, *Generic Telecommunications Cabling for Customer Premises* and ANSI/TIA-568-C.2-2009, *Balanced Twisted-Pair Telecommunications Cabling and Components Standard* for industry practices on cabling used to transmit power and data .

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 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 | | |
| | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperatu 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 | 7 |
| 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. |
| 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. |
| 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. |
| 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. |

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.

### Statement of Problem and Substantiation for Public Input

Need to clarify that article 725.144 on remote control, signaling and power limited circuits are for data networking purposes and are described in detail in the corresponding ANSI/TIA generic, and copper cabling standards. Otherwise people are not fully informed about the types of cabling that article 725.144 is addressing.

### Submitter Information Verification

support

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## Public Input No. 1920-NFPA 70-2017 [ Section No. 725.144 [Excluding any Sub-Sections] ]

compliance, conductor misspelled in note. needs nominal added. 0.3A can invalidate AT. would be OBE by a PoE committee PI 1024.

The requirements of 725.144(A) ~~and~~ or 725.144 (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.

Exception: Compliace shall not be required for installations where the cable conductors are 24 AWG or larger and the current does not exceed 0.3 amperes in any cnductor.

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 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 | |
| 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 | | | | |
| 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 | | | | |
| 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 | | | | |
| 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 | | | | |

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.

### Statement of Problem and Substantiation for Public Input

The intent of 725.144 is to permit the use of the ampacity table 725.144 which provides current limitations based on conductor AWG, cable temperature ratings and bundle sizes or, as an alternative, to permit the use of an LP rated cable. The current wording suggests that following the ampacity table and the use of LP cable are both required.

24 AWG cables were tested in a wide variety of installation scenarios providing confidence that 0.3 amperes or less per conductor would not overheat cables. This is reflected in 840.160 where compliance with 725.144 is not required for systems operating at 60 watts or less. (The assumption was that 60 watts at a common system operating voltage of 50 volts results in a current limit of 0.3 amperes per conductor.) There is no reason not to have this exemption in 725.144 as well. However, there is no data supporting this exemption for cables containing conductors smaller than 24 AWG. Although the fact-finding report contained some data 26 AWG cables, the data was limited to smaller bundle sizes as included in Table 725.144 and did not explore other installation scenarios or smaller AWG sizes (like 28 AWG) that would allow one to exempt these smaller cables from the requirements. A companion proposal to add the minimum 24 AWG requirement to 840.160 has been submitted.

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## Public Input No. 2878-NFPA 70-2017 [ Section No. 725.144 [Excluding any Sub-Sections] ]

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.

Informational Note No. 3: See ANSI/NEMA C137.3-2017, American National Standard for Lighting Systems- Minimum Requirements for Installation of Energy Efficient Power over Ethernet (PoE) Lighting Systems, for information on installation of cables for PoE lighting systems.

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 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 | | |
| | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperature Rating | | | Temperatu 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 | 7 |
| 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. |
| 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. |
| 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. |
| 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. |

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.

### Statement of Problem and Substantiation for Public Input

PoE lighting is a very important application covered by 725.144. The referenced standard provides useful information for the installers of PoE lighting systems.

need to get copy of C137.3 and review.

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## Public Input No. 465-NFPA 70-2017 [ Section No. 725.144 [Excluding any Sub-Sections] ]

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 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 | | |
| 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 | | | | | |
| 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 | | | | | |
| 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 | | | | | |
| 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 | | | | | |

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.

### Statement of Problem and Substantiation for Public Input

The deleted text has no value, as it is already required. disagree

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# Public Input No. 1024-NFPA 70-2017 [ Section No. 725.144(A) ]

**(A)** Use of Class 2 or Class 3 Cables to Transmit Power and Data.

Where Types CL3P, CL2P, CL3R, CL2R, CL3, or CL2 transmit power and data, ~~the following shall apply, as applicable:The~~ the ampacity ratings in Table 725.144 shall apply to the nominal current at an ambient temperature of 30°C (86°F). ~~For ambient temperatures above 30°C (86°F), the correction factors of 310.15(B)(2) shall apply.~~

*Exception: Compliance withTable 725.144 shall not be requied for installations where the nominal current does not exceed 0.3 amperes in any conductor.*

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~~

5e balanced twisted-pair cabling .

## Statement of Problem and Substantiation for Public Input

NEC usability is enhanced by identifying applications where Table 725.144 need not be consulted. Systems where 24 AWG or larger conductors are used and the nominal current of the power supply is 0.3 amperes or less on all conductors are excepted from the requirements of Table 725.144. Existing subsections (1) and (2) are combined and revised to indicate that, because of system imbalances, it is the nominal current that is of interest. The new text provides a clear exception to widely deployed systems, supplying power at current levels that the UL Fact Finding Report on Power over Local Area Network Type Cables (4-Pair Data / Communications Cables), dated September 25, 2015 ( http://www.plasticsindustry.org/sites/plastics.dev/files/SPI%20Fact%20Finding%20Report%20%28Issued%202015-09-25%29%2BErrata%201%C2%A9UL%26SPI.pdf ), found no cause for concern. The existing text is inconsistent with 840.160, which provides an exception below 60 watts (0.3 amperes nominal current). By omitting such an exception in 725.144, the existing text creates a circumstance where it has an adverse impact on the installation of conventional power-over-Ethernet equipment running over existing wiring, which the change seeks to remedy. Industry has shipped over half a billion ports of standards-compliant product over the past 15 years. These products have been supplying nominal current up to 0.3 A/conductor without any demonstrated record of loss. Additionally, the UL Fact Finding Report on Power over Local Area Network Type Cables (4-Pair Data / Communications Cables), dated September 25, 2015, finds no concern with these current levels. Under the text of 725.144, as written, these systems and wiring may require consideration of the bundling by the user before installation, whereas today they are user-installable on existing data wiring. This change prevents the unjustified disruption of this ~100 million port per year market, yet retains the intended safety concerns for higher current devices.
Additionally, the informational note is changed to refer to delete the reference to “local area network (LAN) cables”, because it is undefined in the NEC, and to replace it with “balanced twisted-pair cabling” which aligns with the relevant cabling standard (ANSI/TIA-568-C.2-2009).

support

The NEC Correlating Committee, at the direction of the NFPA Standards Council, formed the Power over Ethernet Task Group (PoE Task Group) to address issues regarding the provision of power over Ethernet and communications conductors. Members of the PoE Task Group, including members of NEC Panel 3, NEC Panel 16, and the NEC Correlating Committee, are as follows: E. Gallo – Chair, M. A. Cardona, W. J. McCoy, R. Kusuma, R. Emplit, R. Foster, S. Kaufman, M. Shariff, A. Tassone, G. Kacperski, R. Ivans, T. Pope, T. C. Coleman, J. Brunssen, J. Goergen, G. A. Zimmerman, L. Ayer, P. Vanderlaan,, C. Bullock,, C. Jones,and M. Ode,. The PoE Task Group prepared this Public Input. In accordance with the Standards Council’s instructions, the task group was broad based and specifically included representation of those with knowledge and experience in telecommunications and Ethernet communications.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 1019-NFPA 70-2017 [Definition: Network Terminal.] | |

Public Input No. 1020-NFPA 70-2017 [Section No. 840.160]

Public Input No. 1021-NFPA 70-2017 [Definition: Class 3 Circuit.]

Public Input No. 1022-NFPA 70-2017 [Section No. 725.121(C)]

Public Input No. 1023-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]]

Public Input No. 1025-NFPA 70-2017 [Section No. 725.144(B)]

Public Input No. 1026-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]]

Public Input No. 1028-NFPA 70-2017 [Section No. 725.170]

## Submitter Information Verification

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**Submittal Date:** Tue Jun 13 14:29:25 EDT 2017

# Public Input No. 1921-NFPA 70-2017 [ Section No. 725.144(A) ]

**(A)** Use of Class 2 or Class 3 Cables to Transmit Power and Data.

Where Types CL3P, CL2P, CL3R, CL2R, CL3, or CL2 transmit power and data, the following shall apply, as applicable:

(1) 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 Table 310.15(B)(2)(a) 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.

## Statement of Problem and Substantiation for Public Input

310.15(B)(2) references two tables; one for a 30°C ambient and one for a 40°C ambient. Since Table 725.144 is based on an ambient temperature of 30°C, it would be clearer to point directly to the appropriate correction factor table in 310.15.

support

## Submitter Information Verification

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**Submittal Date:** Tue Aug 08 14:53:07 EDT 2017

# Public Input No. 4272-NFPA 70-2017 [ Section No. 725.144(A) ]

**(A)** Use of Class 2 or Class 3 Cables to Transmit Power and Data.

Where Types CL3P, CL2P, CL3R, CL2R, CL3, or CL2 transmit power and data, the following shall apply, as applicable:

(1) 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.

*Exception (1): Compliance with Table 725.144 shall not be required for installations where the nominal current does not exceed 0.3 amperes in any conductor.*

*Exception (2): Compliance with Table 725.144 shall not be required where the nominal current does not exceed 0.5 amperes in any conductor and either the conductors are 22AWG (or larger), or fewer than 37 cables are present in any bundle.*

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.

## Statement of Problem and Substantiation for Public Input

Simplification of the application of article 725.144 will greatly streamline inspection and installation. The vast majority of power and data systems in the marketplace are based on IEEE Std 802.3 power over Ethernet. In the newest version of the standard (currently being completed) there are two different "Types" of power source - one with a maximum nominal current of 0.3 A per conductor, and one with a maximum nominal current of just less than 0.5 A per conductor. TIA 1299 to NEC 2017 provided by the PoE Task Group provided a definition of nominal current to allow for minor imbalances and provided an exception for 0.3 A/conductor systems, consistent with the UL fact finding report on 24 AWG cabling. This proposed change provides similar relief for 0.5 A/conductor systems, also consistent with the UL report and Table 725.144. Together, these two exceptions will make inspection and installation of the vast majority of systems simpler and more efficient.

support

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**Submittal Date:** Thu Sep 07 18:23:44 EDT 2017

# Public Input No. 1025-NFPA 70-2017 [ Section No. 725.144(B) ]

**(B)** Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.

Types CL3P-LP, CL2P-LP, CL3R-LP, CL2R-LP, CL3-LP, or CL2-LP shall be permitted to supply power to equipment at a nominal current level up to the ~~marked ampere~~ marked current limit located immediately following the suffix LP and shall be permitted to transmit data to the equipment. Installation LP cables in bundles of 192 or fewer cables shall be permitted to use the ampacities in Table 725.144. For ambient temperatures above 30 C (86 F), the correction factors of 310.15(B)(2) shall apply. 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~~ An example of lmited power (LP) cable is ~~a cable marked Type~~ acable 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.~~ 23 AWG.

(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~~

(1) current limit 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~~

(1) current limt .

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

## Additional Proposed Changes

| File Name | Description | Approved |
|---|---|---|
| addtl_infor_for_PI_1025.docx | Additional clarifying info for PI 1025 | ✓ |

## Statement of Problem and Substantiation for Public Input

725.144(B) inadvertently omitted that the temperature correction factors of 310.15(B)(2) applies to the ampacity of LP cabling. The change inserts that text in the first paragraph of 725.144(B) as mandatory text.
Additionally, Informational Note No. 2 contains text that might be construed as a requirement and is deleted, and the requirement is moved to the main body paragraph of 725.144(B). The first sentence of what was Informational Note No. 2 is relocated as the remaining Informational Note. The remaining text from Informational Note No. 2 is revised to include that LP cables can be used above their marked LP rating in accordance with the appropriate ampacities of Table 725.144, and these statements are relocated to the main text of 725.144(B) as mandatory text in conformance to the NEC Style Manual. The word "current" is revised to "nominal current" to reflect variation in current because of system imbalances; the term "ampere limit" is editorially revised to "current limit", the more appropriate terminology. Item (2) is editorially revised to replace the term "ampere level" with the technically correct term "current limit".

support

The NEC Correlating Committee, at the direction of the NFPA Standards Council, formed the Power over Ethernet Task Group (PoE Task Group) to address issues regarding the provision of power over Ethernet and communications conductors. Members of the PoE Task Group, including members of NEC Panel 3, NEC Panel 16, and the NEC Correlating Committee, are as follows: E. Gallo – Chair, M. A. Cardona, W. J. McCoy, R. Kusuma, R. Emplit, R. Foster, S. Kaufman, M. Shariff, A. Tassone, G. Kacperski, R. Ivans, T. Pope, T. C. Coleman, J. Brunssen, J. Goergen, G. A. Zimmerman, L. Ayer, P. Vanderlaan,, C. Bullock,, C. Jones,and M. Ode,. The PoE Task Group prepared this Public Input. In accordance with the Standards Council's instructions, the task group was broad based and specifically included representation of those with knowledge and experience in telecommunications and Ethernet communications.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 1019-NFPA 70-2017 [Definition: Network Terminal.] | |
| Public Input No. 1020-NFPA 70-2017 [Section No. 840.160] | |
| Public Input No. 1021-NFPA 70-2017 [Definition: Class 3 Circuit.] | |
| Public Input No. 1022-NFPA 70-2017 [Section No. 725.121(C)] | |
| Public Input No. 1023-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |
| Public Input No. 1024-NFPA 70-2017 [Section No. 725.144(A)] | |
| Public Input No. 1026-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |
| Public Input No. 1028-NFPA 70-2017 [Section No. 725.170] | |

## Submitter Information Verification

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**Submittal Date:** Tue Jun 13 14:47:37 EDT 2017

TeraView did not accept the proposed changes as intended. The following is the correct text in legislative format for items (1), (2) and (3).

(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~~ current limit 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 current limit ~~ampere level~~.
(3) System design shall be permitted by qualified persons under engineering supervision.

# Public Input No. 1922-NFPA 70-2017 [ Section No. 725.144(B) ]

**(B)** Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.

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. For ambient temperatures above 30C (86F), the correction factors of Table 310.15(B)(2)(a) shall apply. 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 wihout limitations on the number of cables in a bundle . Cables with the suffix "-LP" shall also be permitted to be installed using the ampacity and bundle sizes specified in Table 725.144 even if the ampacity exceeds the LP rating of the cable.

(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.

## Statement of Problem and Substantiation for Public Input

It was always the intent that the reference to 310.15(B)(2) should apply to LP cables and UL has stated this in response to numerous inquiries on this subject. It is necessary that for ambient temperatures over the anticipated temperature, correction factors be applied. For example, If I install a 60°C cable in a 60°C ambient there is no room left for any cable heating due to current. 310.15(B)(2) indicates that the ampacity of the cable at this temperature would be zero. Although the existing reference in 725.144(A) points to 310.15(B)(2), this paragraph references two tables; one for a 30°C ambient and one for a 40°C ambient. Since the evaluation of LP cable is based on an ambient temperature of 30°C, it would be clearer to point directly to the appropriate correction factor table in 310.15.
The last part of informational note 2 referred to text in the original proposed wording of 725.144 that was deleted during the adoption process. It therefore does not make any sense in the current context. We propose to delete the latter part of the informational note 2 and to add the pertinent information in 725.144 (B)(1). The new text clarifies that a cable with an LP rating can still be installed using the table 725.144 ampacities based on the AWG, temperature rating of the cable and bundle size even if the LP rating is exceeded.

support

## Submitter Information Verification

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# Public Input No. 417-NFPA 70-2017 [ Section No. 725.144(B) ]

**(B)** Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.

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~~ their marked ~~ampere limit located immediately following the suffix LP~~ current limit and shall be permitted to transmit data to the equipment. ~~The~~ These cables shall also be permitted to supply power to equipment at a current level above their marked current limit in accordance with the bundle size and ampacity limitations of Table 725.144. 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.

~~Cables with the suffix "-LP" and a marked ampere level~~

(1) Class 2 and Class 3 LP cables, listed and marked in accordance with 725.179(I) and communications LP cables listed and marked in accordance with 800.179H), 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.~~

(1) current level. Communications LP cables shall be permitted to substitute for Class 2 and Class 3 LP cables in accordance with the substitution hierarchy in Table 725.154 provided that the current limit of the communications LP cable is equal to or greater than the current limit of the Class 2 or Class 3 LP cable.

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

## Statement of Problem and Substantiation for Public Input

LAN (Local Area Network) cables, one example being Category 6A, are almost universally listed as communications cables, Types CMP, CMR, CMG and CM. Because communications cables are permitted to substitute for Class 2 and Class 3 cables, there is little, or no, need for Class 2 and Class 3 LAN cables.

The 2017 NEC established listing requirements for Class 2 and Class3 LP cables in 725.179(J) and applications for these cables in 725.144(B). Notwithstanding the fact that the 2017 NEC has no provisions for listing communications LP cables, the vast majority of LP cables on the market are listed as communications Types CMP-LP, CMR-LP, CMG-LP and CM-LP, and are used as substitutes for Class 2 and Class 3 LP cables. See http://iq.ul.com/wire/ to see the all the listings of LP cables by UL LLC.

It's time for the NEC to catch up with practice in the field and list communications LP cables and to explicitly permit them to substitute for Class 2 and Class 3 LP cables. We have submitted a companion Public Input for 800.179 to establish the listing of communications LP cables in the NEC.

The recommended text also clarifies that the "LP" listing is an additional feature and that the "LP" cables retains all the uses and applications of the base cable. For example, a CL2P-LP cable can be used anywhere a CL2P cable can be used. If the recommended text that clarifies that "LP" cables can be used anywhere a non-LP cable can be used, is accepted then Informational Note No. 2 is superfluous; it can be deleted. This clarification and the accompanying deletion of Informational Note No. 2 complies with section 3.1.3 of the NEC Style manual which states, ": If an Informational Note is needed to explain the text of the Code, consideration should be given to rewriting the text of the

code to make the rule clear."

The recommended text also deletes Informational Note No. 1 because it is superfluous; it repeats information in Table 725.144 and 725.179(I).

Several editorial changes are recommended to improve clarity.

If this PI is "accepted" section 725.144(B) will read as follows:

725.144(B) Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data. 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 their marked current limit and shall be permitted to transmit data to the equipment. These cables shall also be permitted to supply power to equipment at a current level above their marked current limit in accordance with the bundle size and ampacity limitations of Table 725.144. Class 2-LP and Class 3-LP cables shall comply with the following, as applicable:

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

(2) Class 2 and Class 3 LP cables, listed and marked in accordance with 725.179(I) and communications LP cables listed and marked in accordance with 800.179H) 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 current limit. Communications LP cables shall be permitted to substitute for Class 2 and Class 3 LP cables in accordance with the substitution hierarchy in Table 725.154 provided that the current limit of the communications LP cable is equal to or greater than the current limit of the Class 2 or Class 3 LP cable.

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

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 415-NFPA 70-2017 [New Section after 800.179(G)] | listing requirements for communications LP cables |

## Submitter Information Verification

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# Public Input No. 697-NFPA 70-2017 [ Section No. 725.144(B) ]

**(B)** Use of Class 2-LP or Class 3-LP Cables to Transmit Power and Data.

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.

## Statement of Problem and Substantiation for Public Input

The second sentence in the informational note is a complete contradiction of everything else in this section. According to the language of this rule, an LP rated cable uses its marked ampacity regardless of bundling. The first sentence in the note reiterates this, but is then contradicted by the next sentence.
I recommend deleting the sentence altogether, although relocating the concept it describes to somewhere in subsection (A) would work as well.

support, though this should be handled by other PIs.

## Submitter Information Verification

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# Public Input No. 1028-NFPA 70-2017 [ Section No. 725.170 ]

**725.170** Listing and Marking of Equipment for Power and Data Transmission.

The listed power source for circuits intended to provide power and data over Class 2 cables to remote equipment shall be as specified in 725.121(A)(1), (A)(2), (A)(3), or (A)(4). The current on individual conductors of the powering circuit shall be permitted to deviate from the nominal current up to + 20 percent due to circuit imbalance provided this increased current is offset by a reduction of current in the other conductors. In accordance with 725.121(B), the power sources shall not have the output connections paralleled or otherwise interconnected, unless listed for such interconnection. Powered devices connected to a circuit supplying data and power shall be listed. Marking of equipment output connections shall be in accordance with 725.121(C).

## Statement of Problem and Substantiation for Public Input

Circuit imbalance may cause the current on individual conductors to deviate from the nominal current up to +20%. The proposed revision alerts the reader that such elevated current may be observed in individual conductors, but is only permitted if offset by a reduction in current in other conductors. Additionally, the proposed revision limits the amount of imbalance that may be allowed as “nominal current”.

support

The NEC Correlating Committee, at the direction of the NFPA Standards Council, formed the Power over Ethernet Task Group (PoE Task Group) to address issues regarding the provision of power over Ethernet and communications conductors. Members of the PoE Task Group, including members of NEC Panel 3, NEC Panel 16, and the NEC Correlating Committee, are as follows: E. Gallo – Chair, M. A. Cardona, W. J. McCoy, R. Kusuma, R. Emplit, R. Foster, S. Kaufman, M. Shariff, A. Tassone, G. Kacperski, R. Ivans, T. Pope, T. C. Coleman, J. Brunssen, J. Goergen, G. A. Zimmerman, L. Ayer, P. Vanderlaan,, C. Bullock,, C. Jones,and M. Ode,. The PoE Task Group prepared this Public Input. In accordance with the Standards Council’s instructions, the task group was broad based and specifically included representation of those with knowledge and experience in telecommunications and Ethernet communications.

## Related Public Inputs for This Document

| Related Input | Relationship |
|---|---|
| Public Input No. 1019-NFPA 70-2017 [Definition: Network Terminal.] | |
| Public Input No. 1020-NFPA 70-2017 [Section No. 840.160] | |
| Public Input No. 1021-NFPA 70-2017 [Definition: Class 3 Circuit.] | |
| Public Input No. 1022-NFPA 70-2017 [Section No. 725.121(C)] | |
| Public Input No. 1023-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |
| Public Input No. 1024-NFPA 70-2017 [Section No. 725.144(A)] | |
| Public Input No. 1025-NFPA 70-2017 [Section No. 725.144(B)] | |
| Public Input No. 1026-NFPA 70-2017 [Section No. 725.144 [Excluding any Sub-Sections]] | |

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# Public Input No. 414-NFPA 70-2017 [ Section No. 725.179(I) ]

**(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~~ LP(XXA)" where XXA designates 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~~ . An example of the marking on a Class 2 cable with an LP rating is CL2-LP ( ~~1~~ 0 . ~~0A), CL2R-LP (1.0A), or CL2-LP (1.0A)~~ 6A) ( 75°C) 23AWG 4 pair, which indicates that it is a 4-pair plenum cable with 23 AWG conductors, a temperature rating of 75°C and a current limit of 0.6 ampere per ampere .

## Statement of Problem and Substantiation for Public Input

This PI is editorial. The text of 725.179 (I) in the 2017 NEC refers to both "current limit" and "ampere limit". This PI recommends consistent terminology and recommends that the term "current limit" be used and the term "ampere limit" be deleted. It also expands the informational note to include temperature rating on the cables since LAN cables on the market today are generally rated for at least 75°C. Several editorial changes are recommended to improve clarity.

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