



Public Input No. 1837-NFPA 70-2014 [New Section after 725.154(C)]

TITLE OF NEW CONTENT

(D) Transmission of Power and Data. Where Class 2 cables, or permitted substitutes, are used for transmission of power and data, the following shall apply, as applicable.

- (1) Where cables are used for transmitting data and power, the cable shall be listed and marked with the suffix “-LP”.
- (2) Where installed in HVAC systems, the temperature rating of the conductors and cables shall be greater than the maximum permitted for that portion of the HVAC system.
- (3) Where cables extend beyond one building and are installed on rooftops, the requirements of 310.15(B)(3)(a)(5)(c) and Table 310.15(B)(3)(c) shall apply in addition to the requirements of 725.141.
- (4) Cables with the “LP” suffix installed without “maintained spacing” shall not exceed the temperature rating of the cables and terminations, using the ampacity of the conductors in Table 725.154(B). For ambient temperatures other than 30°C, adjustments shall be applied as shown in Table 310.15(B)(2)(a).
- (5) For cables without the “LP” suffix used to supply power and data and where installed without maintained spacing for a continuous length longer than 600mm (24in.), or when more than 3 current carrying conductors are installed in a raceway, the ampacity of these conductors shall be per Table 725.154(B). The use of existing wiring shall be permitted only if the current supplied by the power source is sufficiently low to ensure that the temperature limitations of the conductors are not exceeded.

Table 725.154(B)

Ampacity Based on Copper Conductors at Ambient Temperature of 30°C (86°F), Conductor Temperature 60° C (140°F)

Conductor Size (AWG)	Ampacity	Without Maintained Spacing - Ampacity
26	1.1	0.4
24	1.8	0.6
23	2.9	1.0
22	4.4	1.5

Informational Note: Table 725.154(B) shows the current permitted in each conductor of a multi-pair cable.

Statement of Problem and Substantiation for Public Input

This new section provides requirements for cables that are used for transmission of data and power. Current flow in the bundled or bunched cables may cause an increased temperature in the conductor or cable that may have a degrading effect on the insulation. There are a number of systems on the market where the cables may or may not be bundled. An example a system that uses bundled or bunched cables is Power over Ethernet. The number and types of cables permitted to be installed with no degradation of the insulation is dependent on the ambient temperature, conductor size, amount of cable spacing and ventilation, and the current flowing in the bundle of cables. Also, the industry standards, the equipment, and the cables have changed to permit transmission of more power and faster data speeds. This variability makes it difficult to clearly identify what is a safe installation. Bundling and bunching of cables for transmission of data and power results in heating. No conductor (or cable) should be used in such a manner that its operating temperature exceeds its rated maximum temperature. Article 725 does not specify a temperature rating for cables in Section 725.179. Where cables are installed without “maintained-spacing,” cables rated for temperatures above 60°C (140°F) may be required. How much higher is dependent on many factors including ambient temperature, spacing and ventilation among cables and bundles, wire gauge and power (watts) being dissipated in the cables between the power source and load. Article 310 provides an extensive (and complicated) method of de-rating conductors. Hopefully, there will be more detailed information available for future editions of Article 725.

Class 2 conductors and cables may be installed in various portions of the HVAC system. It is important to use wiring materials rated greater than the maximum temperature of that portion of the HVAC system. The maximum temperatures for the various portions of a HVAC system are detailed in NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems.

The specific reference to conductors and cables installed on rooftops seems reasonable, due to the recent addition of this requirement in Article 310.

Related Public Inputs for This Document

<u>Related Input</u>	<u>Relationship</u>
Public Input No. 1838-NFPA 70-2014 [New Part after IV.]	New listing requirements for equipment
Public Input No. 1839-NFPA 70-2014 [Section No. 840.1]	Expands the scope of Article 840 to correlate with the title
Public Input No. 2365-NFPA 70-2014 [Section No. 725.179 [Excluding any Sub-Sections]]	LP cable listing requirements
Public Input No. 2366-NFPA 70-2014 [New Section after 725.179(K)]	LP cable listing requirements
Public Input No. 2269-NFPA 70-2014 [Section No. 840.170]	New listing requirements for cable and equipment
Public Input No. 1861-NFPA 70-2014 [New Section after 840.154]	Powering comm equipment over comm cables
Public Input No. 1836-NFPA 70-2014 [Section No. 725.154 [Excluding any Sub-Sections]]	
Public Input No. 1838-NFPA 70-2014 [New Part after IV.]	
Public Input No. 1839-NFPA 70-2014 [Section No. 840.1]	
Public Input No. 1861-NFPA 70-2014 [New Section after 840.154]	
Public Input No. 2269-NFPA 70-2014 [Section No. 840.170]	
Public Input No. 2365-NFPA 70-2014 [Section No. 725.179 [Excluding any Sub-Sections]]	
Public Input No. 2366-NFPA 70-2014 [New Section after 725.179(K)]	

Submitter Information Verification

Submitter Full Name: Terry Peters
Organization: SPI
Affiliation: SPI
Street Address:
City:
State:
Zip:
Submission Date: Sat Oct 11 07:13:37 EDT 2014

Committee Statement

Resolution: This public input does not meet the requirements of 4.3.4.1(d) of the Regulations Governing the Development of NFPA Standards. Technical substantiation was not provided in the Public Input for a new limited power cable as submitted in 725.154(D) and 725.179(L). This cable is allegedly being used for transmission of data and power using Table 11(A) and (B) in Chapter 9 for power, current, and voltage limitation with a new suffix of "LP" added to the cable. In Item No. 1 of this Public Input, the text requires the cable to be listed but failed to provide any of the listing requirements. Information on the new cable must be provided with all of the technical background data for the new cable. The

cable designation must be provided, as well as the voltage, frequency, typical connectors for the cable, connection points in the system, enclosure requirements, marking requirements, if a conductor or a cable, sunlight resistant, wet location, dry location, evaluated for outdoor locations, plenum rated, limited combustibility, copper-clad, aluminum, solid, stranded, as well other technical data of the cable must be provided. In Item No. 2 of this PI, the text states "where installed in HVAC systems, the temperature rating of the conductors and cables shall be greater than the maximum permitted for that portion of the HVAC system." Further explanation of this concept is necessary since the text does not mention if the cables and conductors will be located inside of the listed HVAC equipment, external to the equipment, within the fabricated ducts and other spaces for environmental air (plenums), in outdoor locations, indoors, or both, humidity and other similar applications, as well as the maximum and minimum temperatures to which the cables and conductors will be exposed. In Item No. 3, the text states that where "cables extend beyond one building and are installed on rooftops the requirements of 310.15(B)(3)(a)(5)(c) and Table 310.15(B)(3)(c) shall apply." The first section in that reference appears to apply only to the adjustment factor of 60% for AC or MC Cable where these cables are stacked or bundled and would not apply to LP cable. The reference to application of 725.141 would only address cables or conductors subject to contact with electric light or power conductors over 300 volts to ground. This reference should be explained in detail for application and installation details. In Item No. 4, "maintained spacing" is not explained and "not maintaining spacing" is not defined or explained for LP cables. Where these LP cables are not spaced properly (a spacing determination is not provided in the text), the temperature rating of the cables and the rating terminations cannot be exceeded without providing the technical documentation on the minimum and maximum rating of the cable or the terminations. Table 725.154(B) has been provided without any technical documentation of the origin of the Table, the conductor sizes, the ampacity provided, the value of the ampacity without maintaining spacing, what the spacing would be for the conductors or cables, as well as other pertinent data. This Table appears to apply to both LP cables and non LP cables based on Item No. 4 and Item No. 5. In Item No. 5, the last sentence in this statement is the "use of existing wiring shall be permitted only if the current supplied by the power source is sufficiently low to ensure that the temperature limitations of the conductors are not exceeded." There isn't any explanation of what is meant by existing wiring, what it supplies, where the power source originates, what power supply level of current is sufficiently low enough to ensure the conductors will not overheat. Panel 3 has not received any technical data on an LP (limited power) cable, on Power over Ethernet, or any explanation of the pertinent issues involved with the Ethernet system. In addition, Panel 3 would entertain any other pertinent information that could be provided on this cable and Ethernet application.