CMP 3 PIs (a subset)

Chad Jones

Tech Lead, Cisco

Principal, CMP3

Chair, IEEE P802.3bt

NEC PoE TG PIs

- PIs 1021, 1022, 1023, 1024, 1025, 1026, and 1028
- These seven PIs are output from the NEC PoE TG. I would recommend that SCC18 take a position in support of First Revision (FR) for six of these PIs and resolve for the seventh (1024).

NEC PoE TG

PI	Section	Changes
1021	725.2	Adds nominal current to the definitions, with informational note.
1022	725.121	Mark: adds nominal current as a marking option and states that a single label can be used where multiple connection points have the same rating.
1023	725.144	Provides external reference for specifications of: 8P8C connectors, balanced twisted-pair cabling, and TIA-TSB-184-A (power delivery on balanced twisted-pair cabling).
1024	725.144(A)	Adds nominal, adds 0.3A exception, cleans up informational note. Needs to be resolve. Don't delete: "For ambient temperatures above 30°C (86°F), the correction factors of 310.15(B)(2) shall apply."
1025	725.144(B)	Adds nominal. Allows LP to be used with Table 725.144 and points to 310.15 for temp adjustment. Fixes informational note 2 and moves requirement out.
1026	Table 725.144	Fixes title of Table 725.144. Deleted old informational note below it. Adds two new ones to inform that balanced twisted-pair cabling is specified only to 60C and that the contacts may further limit beyond Table 725.144. typo in IN2
1028	725.170	Adds nominal to the listing requirements. Defines the 20% unbalance tolerance.

PI 3659, 725.121(C)

- Adds ‘per conductor’ to 725.121(C): shall have a label indicating the maximum voltage and current output per conductor for each connection point.
- Recommend FR as this can help prevent confusion

PI 3664, 725.121(C)

- Adds text in red: 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
- Recommend resolve. 725.121 is 'Power Sources for Class 2 and Class 3 Circuits', therefore don't need power source. 'on the equipment' requires clarification of what equipment. PI 1022 handles addition of nominal.

Correlate with poe tg PI that makes it clear that it's not every point.

PI 71, 725.139(D)(1)

- Reduces (D)(1) to:

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

- From:

  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.

- CMP 3 proposal:

  Communications Cables. Conductors of one or more Class 2 or Class 3 circuits shall be permitted in the same cable with conductors of communications circuits provided the cable is a listed communications cable. The communications cable shall be installed in accordance with the requirements of Article 800.

Can’t refer to entire article. Can we refer to just a part?
Bill says 800.110.

PI 1864, 725.144

- Adds: “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.” to 725.144
- This is covered by PI 1023, but recommend FR.

Covered by 1023, didn’t pick up 568.0

PI 1920, 725.144

- Changes “The requirements of 725.144(A) and (B) shall apply” to “The requirements of 725.144(A) or 725.144(B) shall apply” and adds “Exception: Compliance 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 conductor.” [fixed typos]
- Change from ‘and’ to ‘or’: and implies you need to use Table 725.144 AND LP cable. Or clarifies that you use LP or use the table.
- PI 1024: “*Exception: Compliance with Table 725.144 shall not be required for installations where the nominal current does not exceed 0.3 amperes in any conductor.*”
- Suggest: *Exception: Compliance with Table 725.144 shall not be required for installations where* the cable conductors are 24 AWG or larger and *the nominal current does not exceed 0.3 amperes in any conductor.*

PI 1012, 725.144

- Argues that the entries in Table 725.144 that are only one digit can be interpreted to a higher number. The example is 1 could be interpreted as 1.4 Amperes.
- This one is complex. I've done a lot of analysis on the table and have an accompanying document to walk through.
- Bottom line, I recommend taking table out to two decimal places across the board and getting the second decimal place from the UL FFR.

Note about rounding to make it clear that 1.4<>1.

Stopped here.

PI 1921, 725.144(A)

- Changes “the correction factors of 310.15(B)(2)” to “the correction factors of Table 310.15(B)(2)(a)”
- Recommend resolve. Change to “the correction factors of Table 310.15(B)(2)(a) or Equation 310.15(B)(2)”

PI 4272, 725.144(A)

- Looks to add simple compliance statements for IEEE 802.3bt compliant Type 3 and Type 4 systems to aid inspection.
- Adds:

  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.
- Exception 1 is added by PI 1024. Exception 2 is the addition for Type 4 and is derived from Table 725.144 (just like Exception 1). Recommend FR
- Correlate with PI 1920 and add the cable conductors are 24 AWG or larger and to Exception 1

Need to correlate with 1025

PI 417, 725.144(B)

- End goal: list communications LP cables and to explicitly permit them to substitute for Class 2 and Class 3 LP cables.
- 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.

- Recommend FR

Correlating 417 and 1025

Gold – missing from 417
Blue – 1025 text
Red – 417 text

Section 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 current limit located immediately following the suffix LP and shall be permitted to transmit data to the equipment. Installation of LP cables in bundles of 192 or fewer cables shall be permitted to use the ampacities in Table 725.144. 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. 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: An example of a limited power (LP) cable is a cable marked Type CL2-LP(0.5A), 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 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. 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.

1025 text without markup

Section 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 current limit located immediately following the suffix LP and shall be permitted to transmit data to the equipment. Installation of 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: An example of a limited power (LP) cable is a cable marked Type CL2- LP(0.5A), 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 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.
3. System design shall be permitted by qualified persons under engineering supervision.

1025 plus 417

Section 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 current limit located immediately following the suffix LP 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. 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: An example of a limited power (LP) cable is a cable marked Type CL2- LP(0.5A), 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. 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 800.179(H), 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.

PI 697, 725.144(B)

- Deletes the sentence: ‘If used in a 7-cable bundle, the same cable could carry up to 1.2 amperes per conductor.’ from informational note 2.
- Should be already handled by PI 1025 or PI 417, but this should be FR.

PI 1922, 725.144(B)

- Makes same change to Table 310.15(B)(2)(a) as 1921. Change to “the correction factors of Table 310.15(B)(2)(a) or Equation 310.15(B)(2)”
- Deletes confusing text in Informational Note 2. PI 1025 also does this.
- Adds this text to (B)(1): “without 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.” second sentence is covered by PI 1025.
- PI boils down to adding this text to (B)(1): “without limitations on the number of cables in a bundle.” and addition of Eq310.15b2
- Recommend resolve with text of last bullet.

PI 414, 725.179(I)

- Looking to clarify the text around LP marking. In general it is good but there are typos and a problem with the example.

  "An example of the marking on a Class 2 cable with an LP rating is CL2-LP (0.6A) (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~~ conductor."

- "and a current limit of 0.6 ampere per conductor." should be something more like "an LP certification valid up to 0.6 amperes per conductor" – looking for opinions on proper wording.

PI 414, 725.179(I)

- Current text:

  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).

- Proposed text:

  Limited Power (LP) Cables. Limited power (LP) cables shall be listed as suitable for carrying power and data 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(XXA)” where XXA designates the current limit in amperes per conductor.

  Informational Note: An example of the marking on a Class 2 cable with an LP rating is CL2- LP (0.6A) (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 CONDUCTOR.